

HAWK

User Guide



PH3 Fumigation Gas Monitoring Transmitter

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Information (ⓘ) Indicates helpful or clarifying information that supports correct installation or operation. This symbol does **not** relate to a hazard.

Caution (⚠ CAUTION) Indicates a hazard that **may** cause minor or moderate injury or equipment damage if the instructions are not followed.

Warning (⚠ WARNING) Indicates a hazard that **could** cause serious injury or significant equipment damage if the instructions are not followed.

Danger (⚡ DANGER) Indicates a hazard that **will** cause serious injury or death if the instructions are not followed.

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Introduction

The **HAWK Sensor** is an autonomous phosphine-monitoring device designed for use in both bunker and silo fumigation applications. It combines an integrated sample-draw system with advanced connectivity features to provide reliable, remote measurement of phosphine concentrations throughout the fumigation cycle.

Equipped with an **LTE communication module**, the HAWK Sensor automatically uploads measurement data to a secure cloud service, enabling operators to view real-time and historical readings through a remote dashboard. This capability supports continuous oversight of fumigation conditions without requiring on-site access.

The sensor is engineered to operate **directly under a fumigation tarp** in bunker applications or to **draw air samples through connected tubing** in silo installations. This flexibility allows the HAWK to be deployed across a wide range of storage environments while maintaining accurate sampling performance.

For configuration and local operation, the HAWK includes **Bluetooth connectivity** and is fully supported by the HAWK Config mobile application. The app provides tools for device setup, spot measurements, data logging, and on-device data visualisation, giving operators a complete interface for both commissioning and field diagnostics.

Phosphine Measurement Range

The HAWK Sensor is designed to measure phosphine gas with a resolution of 1 ppm over a range of 0–2000 ppm, with overload capability up to 4000 ppm.

Battery Life and Fumigation Duration

The **HAWK Sensor** is designed for autonomous phosphine monitoring in both bunker and silo fumigation. Whether placed under a tarp or drawing air samples through connected tubing, the sensor operates for **at least 31 days**, taking a measurement **every 8 hours**.

 For charging, use only the supplied charger. Using an unapproved charger may damage the charging circuit and batteries.

Data Upload and Local Backup

The **HAWK Sensor** automatically uploads all measurement data to a secure cloud service, where it can be viewed remotely through the HAWK dashboard. In addition to cloud reporting, the sensor maintains a **local internal data log** as a backup to ensure data integrity during fumigation. This local log can be **downloaded and shared** directly from the sensor using the HAWK Config mobile app.

The cloud platform also supports integration with approved third-party applications; however, users must consult **Control Equipment** or an **approved reseller** to confirm compatibility and enable access to these services.

Stabilising the Sensor

To accurately measure fumigant concentration, the HAWK Sensor requires time to stabilise its sensing elements and electronics. Use the following table to determine the required stabilisation time before starting fumigation.

HAWK Sensor mode	Stabilisation time
Standby	Less than a minute
Switched off for a week	At least 30 minutes
Switched off for more than a week	2 hours

Standby Mode

Standby Mode allows the HAWK Sensor to remain ready for connection and configuration while conserving battery power. It also helps maintain sensor biasing, allowing the unit to reach operational readiness significantly faster than from a fully switched-off state.

Using Standby Mode is recommended where possible, as it avoids unnecessary power cycling and will help improve the reliability and longevity of the electronics.

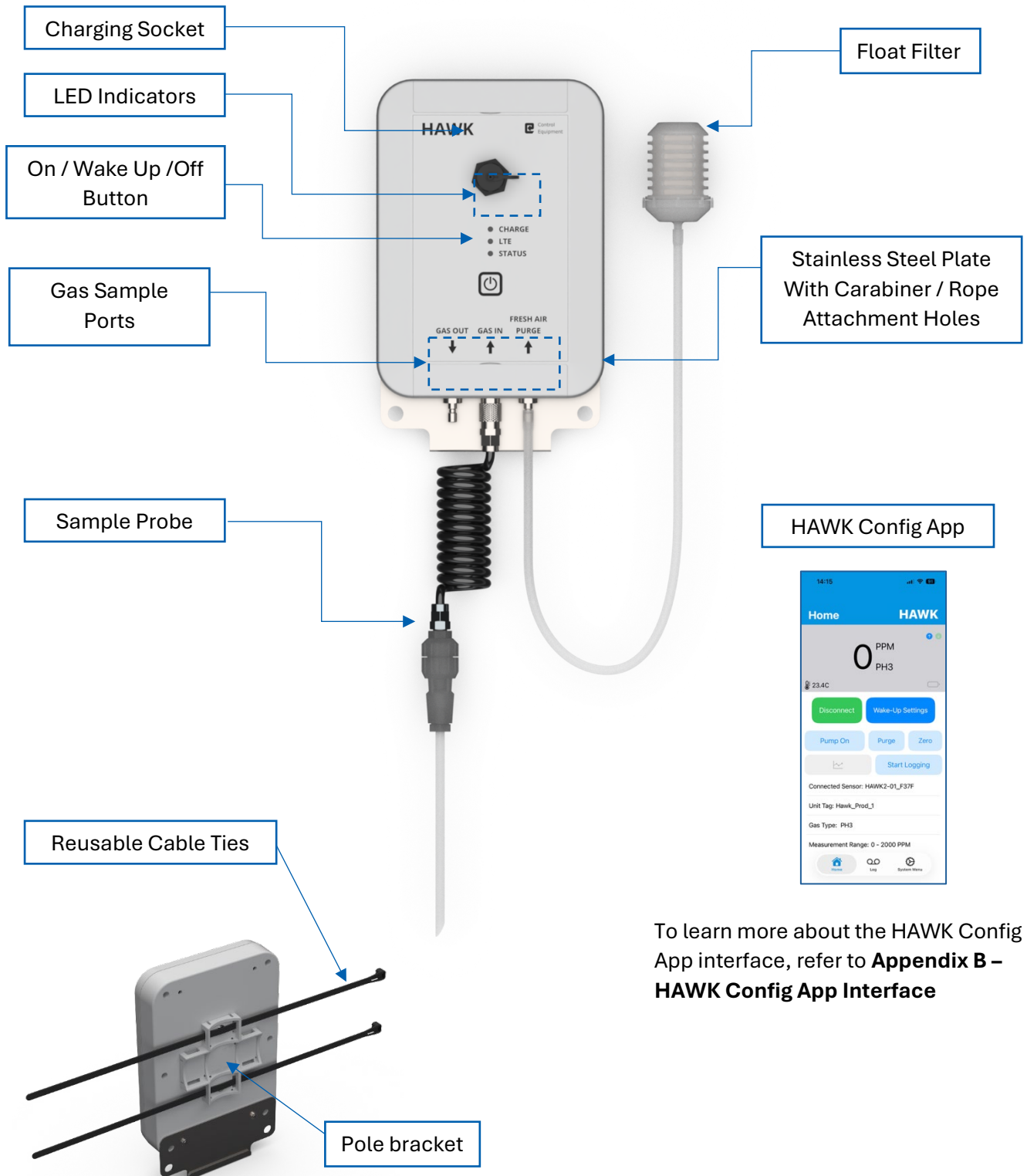
The HAWK Sensor can remain in Standby Mode for approximately 6 months. While in Standby Mode, the status LED flashes red every 15 seconds.

Refer to **Configuring Standby Mode** section

Site Installation

For detailed instructions on how to install the HAWK Sensor on site, refer to the **Silo Installation Guide** and **Bunker Installation Guide**. These are separate documents supplied with the HAWK Sensor documentation.

HAWK Sensor Overview



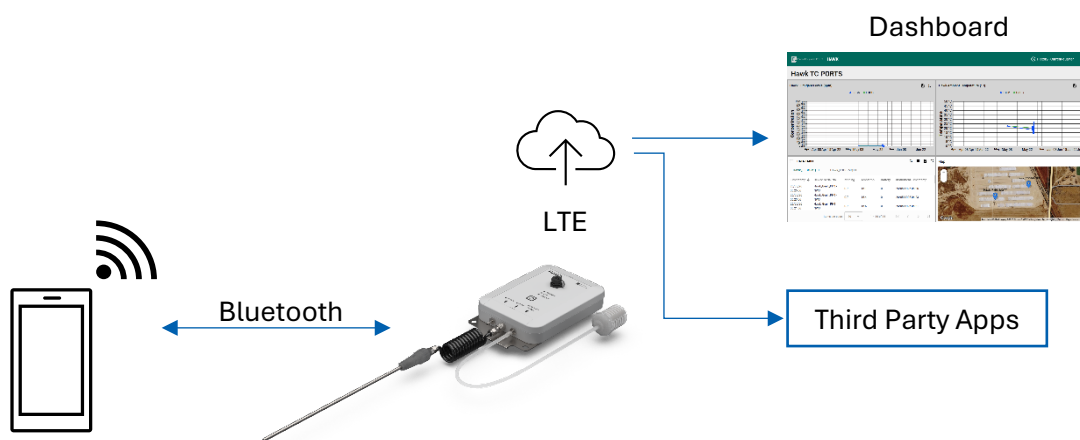
To learn more about the HAWK Config App interface, refer to **Appendix B – HAWK Config App Interface**

System Connectivity Overview

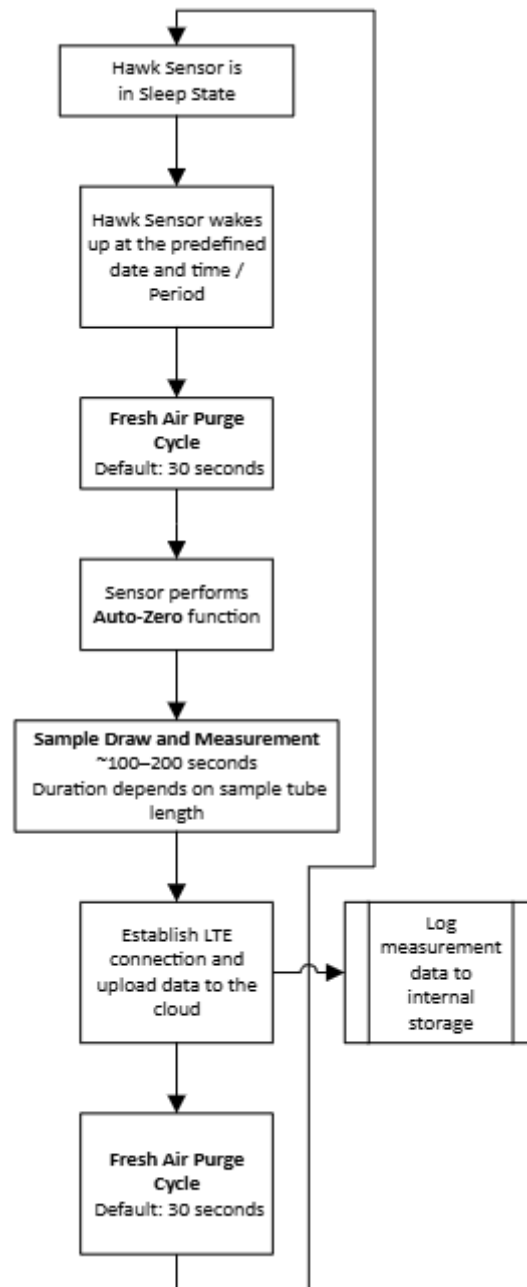
The HAWK Sensor communicates through **Bluetooth** and **LTE** to support configuration, data transfer, and remote monitoring.

Bluetooth provides a direct local link between the sensor and the HAWK Config mobile app for setup, spot measurements, and data retrieval.

For **autonomous operation**, the sensor uses its integrated **LTE** module to upload measurement data to the cloud service, where it becomes available on the online dashboard for real-time visualization and analysis. The cloud platform also supports integration with approved third-party applications; however, users must consult **Control Equipment** or an **approved reseller** to confirm compatibility and enable access to these services.



HAWK Sensor Measurement Cycle Overview



Autonomous Monitoring vs Spot Measurement

The HAWK Sensor can operate in two measurement modes:

Autonomous Monitoring

In Autonomous Monitoring mode, the operator configures a wake-up schedule. This schedule includes the first wake-up date and time, as well as the repeating wake-up period.

At each scheduled wake-up, the HAWK Sensor performs the standard measurement cycle and uploads the measurement data to the cloud.

Spot Measurement

In Spot Measurement mode, the operator connects to the HAWK Sensor using the HAWK Config App and manually activates the sample draw pump.

The HAWK Sensor transmits the measurement results back to the mobile device. The app also allows the operator to log spot measurement results and export them using the mobile device's standard file-sharing options.

Spot Measurement can be performed **at any time**, even while the sensor is running in Autonomous Monitoring. Bluetooth communication remains available, allowing the operator to connect to the sensor without interrupting its scheduled monitoring cycle.

	Autonomous Monitoring	Spot Measurement
Measurement	Scheduled measurements based on a predefined wake-up schedule. The typical repeat period is 8–24 hours.	Manual measurement using the HAWK Config App. Spot Measurement is available when the sensor is connected to the app, including while the sensor is configured for Autonomous Monitoring.
Data transmission	Measurement data is uploaded to the cloud using the LTE connection.	Measurement data is transmitted to the mobile device using Bluetooth while the HAWK Config App is connected.
Data visualisation and data export	Advanced data visualisation is available through the dashboard interface, including XY plots, data tables, and GPS map location. Historical data can be viewed by date and time. Data can be exported from the dashboard in CSV, XLS, or XLSX format.	Measurement data can be viewed in the app using an XY plot. Spot Measurement results can be logged and exported as a CSV file using the mobile device's standard sharing options

LED Indicators Overview

The purpose of the LED indicator is to inform the operator of the HAWK Sensor's current operating state.

LED Name	Colour / Pattern	Meaning	Notes
STATUS	Flashing Red every 15 seconds	In Sleep Mode / Standby Mode The HAWK Sensor is in Sleep Mode / Standby Mode. The sensor will wake up according to the configured wake-up settings.	Bluetooth remains active, and the sensor can be connected to using the HAWK Config App. This state is activated by pressing the power button.
	White -> Flashing Green -> Blue -> Cyan -> OFF	On from Off state Boot-up sequence when the HAWK Sensor is turned on from the Off state.	Activated by pressing the power button.
	Blue -> Flashing Blue -> OFF	Wake up from Sleep Mode / Standby Mode - by Button Wake-up sequence when the HAWK Sensor is woken from Sleep Mode using the power button.	The HAWK Sensor must be in Sleep Mode / Standby Mode. Activated by pressing the power button.
	Flashing Blue -> OFF	Wake up from Sleep Mode – by App The HAWK Config App has connected to the HAWK Sensor.	The HAWK Sensor must be in Sleep Mode/ Standby Mode. The connection is initiated from the HAWK Config App.
	Blue -> Cyan -> OFF	Entering Sleep Mode The HAWK Sensor is entering Sleep Mode. This can occur after pressing the power button or after disconnecting the HAWK Config App.	The HAWK Sensor must be awake. The awake state may have been initiated by pressing the power button or by connecting with the HAWK Config App.
	Blue -> Red-> OFF	Switching Off The HAWK Sensor has been switched off using the power button.	The HAWK Sensor must be awake. The awake state must have been initiated by pressing the power button.

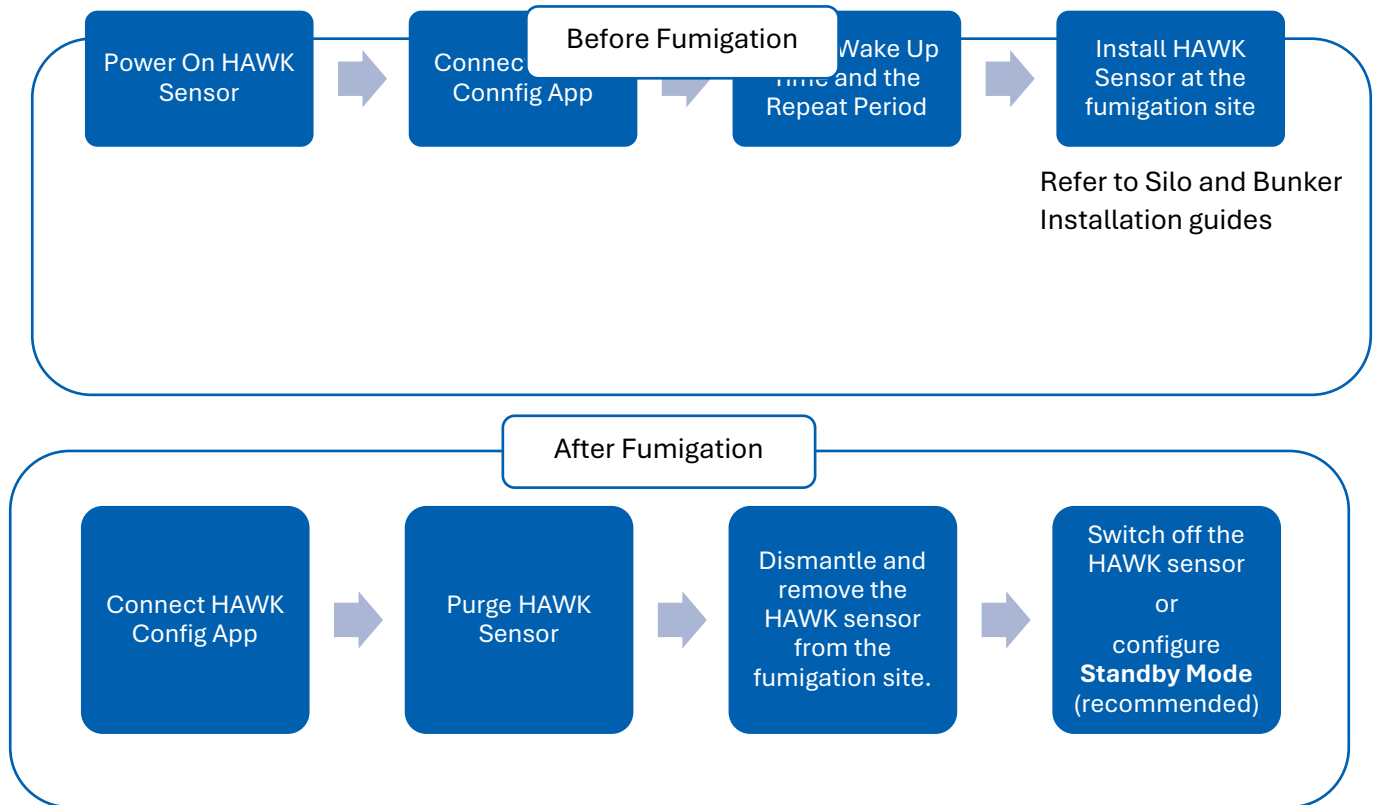
LTE	Red	The LTE module is powered and attempting to establish communication.	
	Green	LTE communication has been established.	
	Cyan	Cloud connection has been established.	

CHARGE	Red	The HAWK Sensor is charging	Requires the charging cable to be connected. When the HAWK Sensor is fully charged, the LED indicator turns off
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Autonomous Monitoring Set Up Process Overview

The following section provides a high-level overview of what is required to set up HAWK Sensor for fumigation for Autonomous Monitoring.

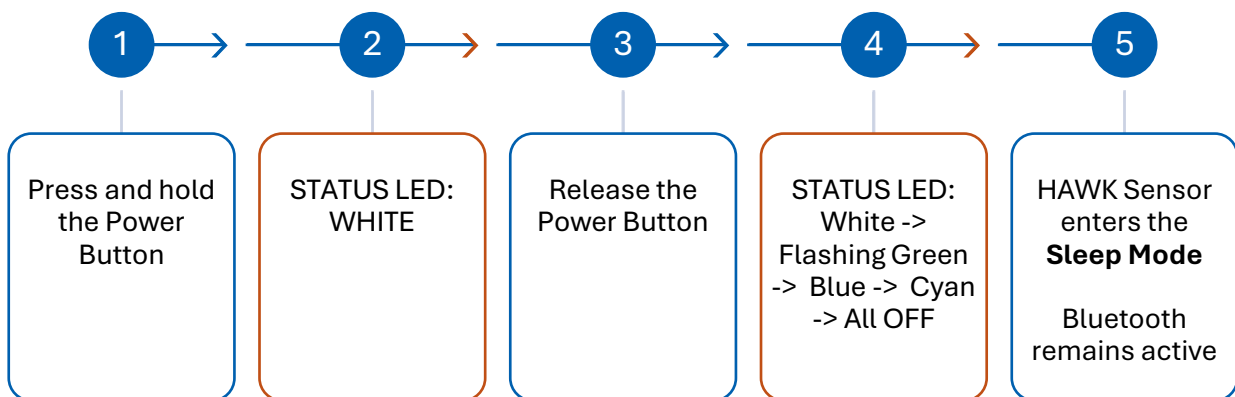
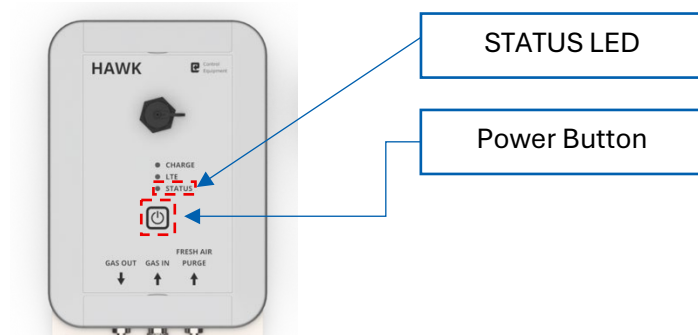
Prerequisite: Read the Silo and Bunker Installation guides



Powering Up HAWK Sensor

This section describes how to switch on the HAWK Sensor from a fully switched-off state. After power-up, the HAWK Sensor enters **Sleep Mode**.

Note: When the HAWK Sensor is switched off, the status LED does not flash red every 15 seconds.

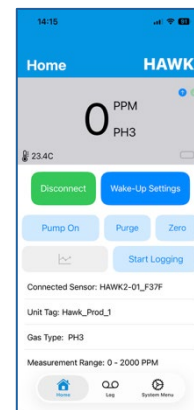
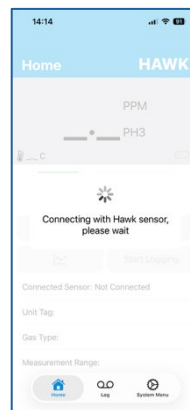
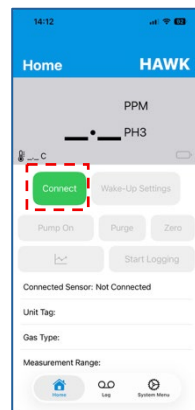
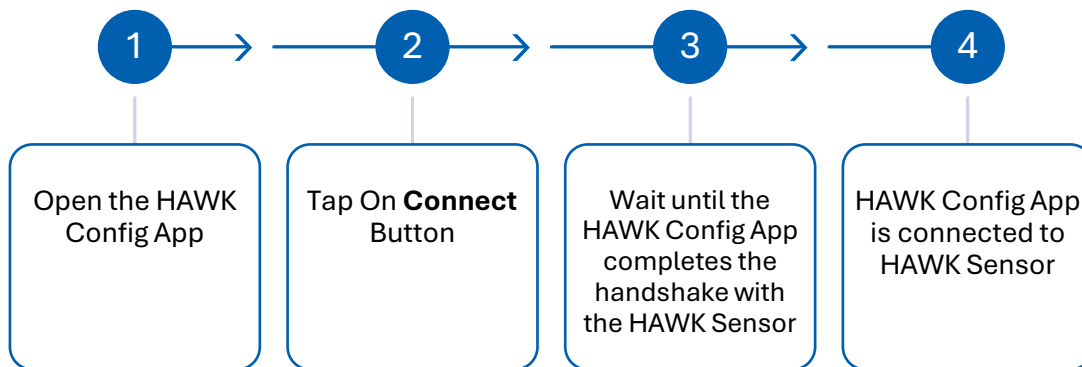


Connecting the HAWK Config App

This section describes the steps necessary to connect HAWK Config app when only single HAWK Sensor is nearby.

Prerequisite: The HAWK Sensor is in **Sleep Mode / Standby Mode.**, and the status LED indicator is flashing every 15 seconds.

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**

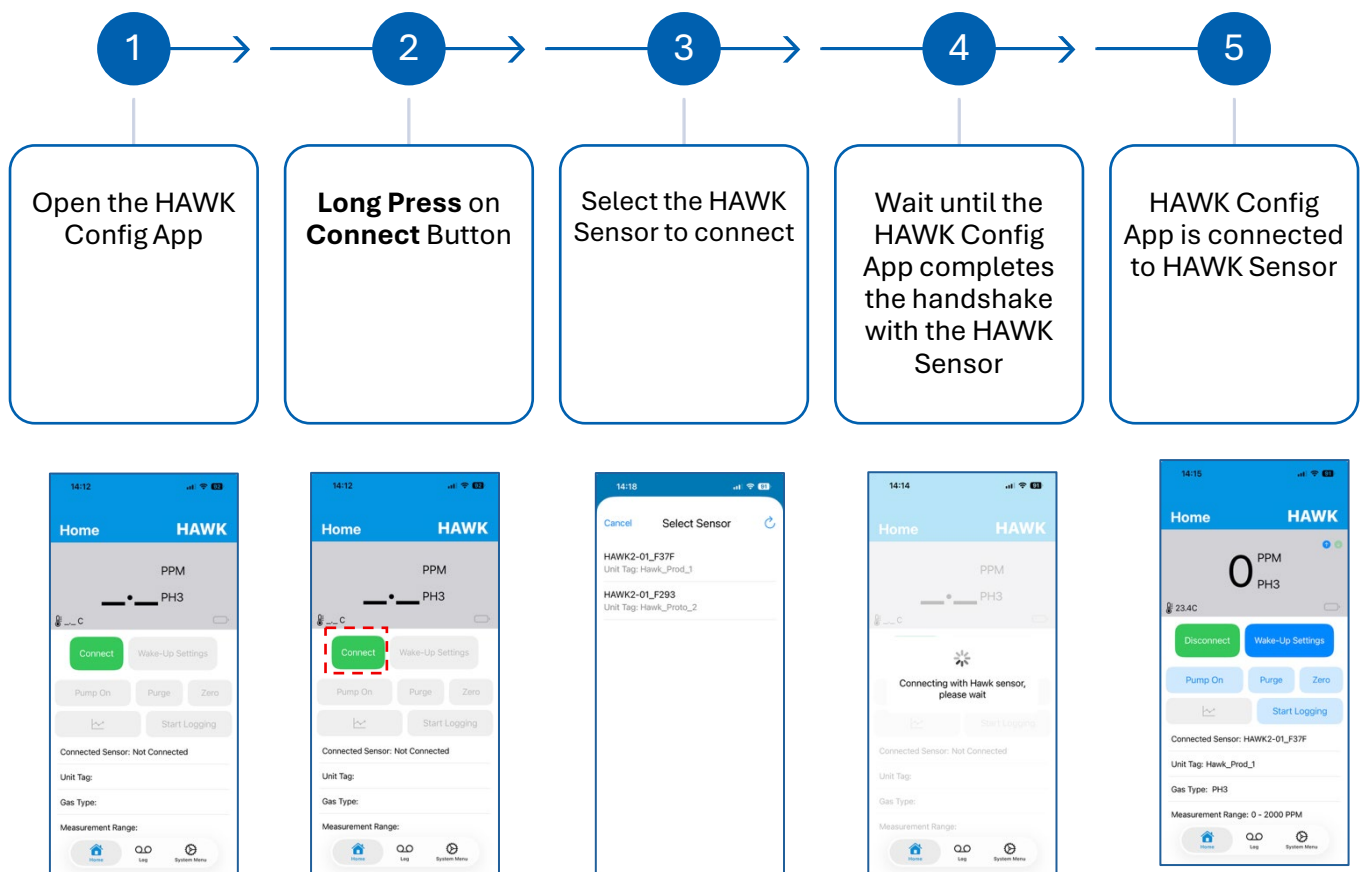


Connecting HAWK Config App to a Specific HAWK Sensor When Multiple Sensors Are Nearby

This section applies when **more than one HAWK Sensor** is nearby in **Sleep Mode / Standby Mode**. and the status LED indicator is flashing every 15 seconds. The operator needs to select which HAWK Sensor to connect to.

Prerequisite: More than one HAWK Sensor is nearby and in Sleep Mode / Standby Mode.

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



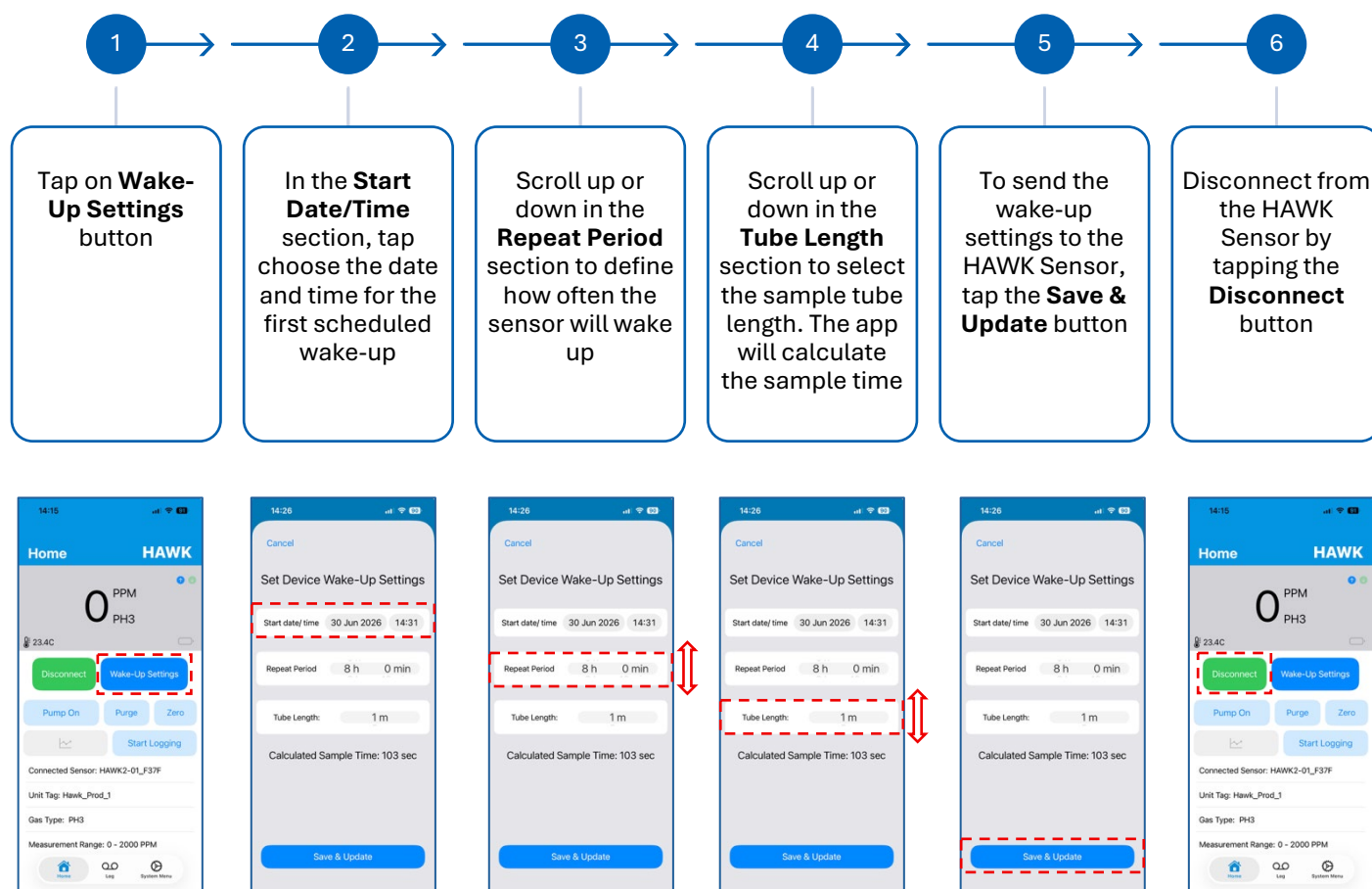
Setting Up Wake - Up Cycle

This section applies when the HAWK Config App is already connected to the HAWK Sensor.

The procedure explains how to configure the HAWK Sensor for Autonomous Monitoring by setting up a wake-up cycle. The wake-up cycle allows the sensor to wake up automatically and perform measurements at predefined intervals.

Prerequisite: The app already connected to the HAWK Sensor

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



Configuring Standby Mode

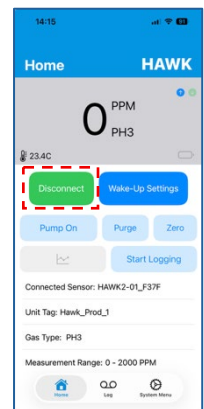
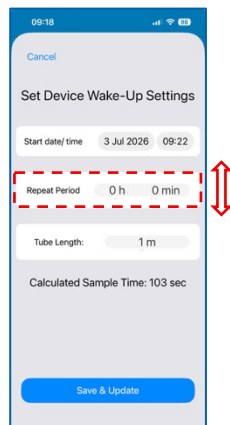
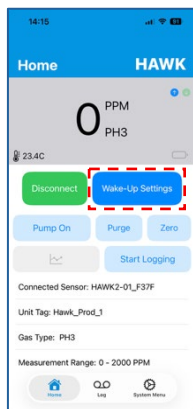
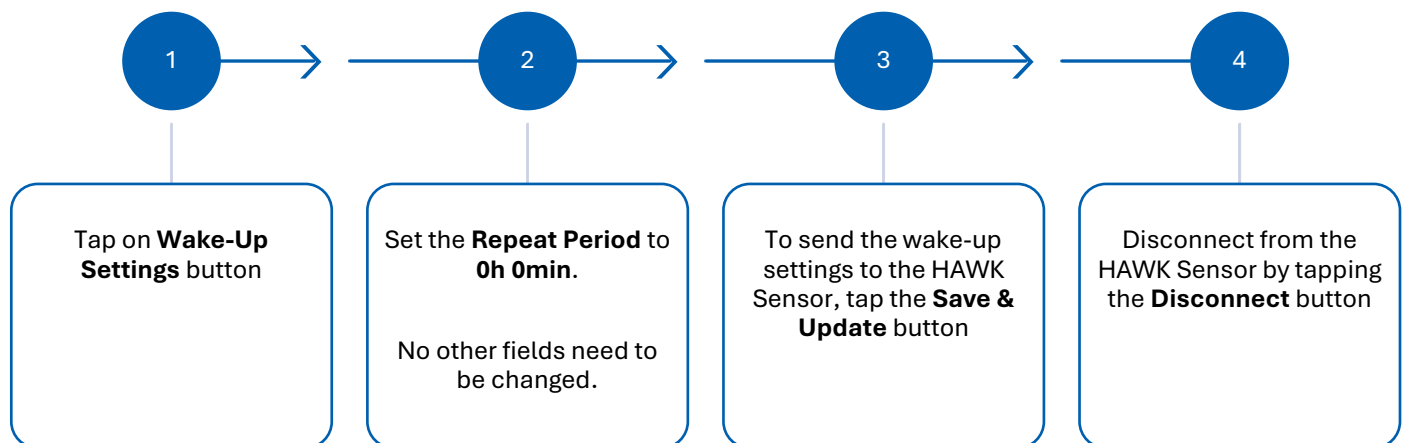
This section describes the necessary step to put the HAWK Sensor in Standby mode.

Standby mode is similar to Sleep mode, with the difference that the HAWK Sensor never wakes up to perform a measurement cycle.

While in Standby Mode, the status LED flashes red every 15 seconds.

Prerequisite: The app is already connected to the HAWK Sensor

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



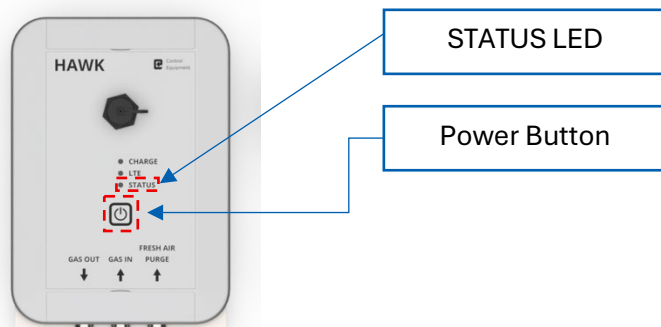
Switching Off the HAWK Sensor

This section describes the steps required to switch off the HAWK Sensor and fully shut down the electronics.

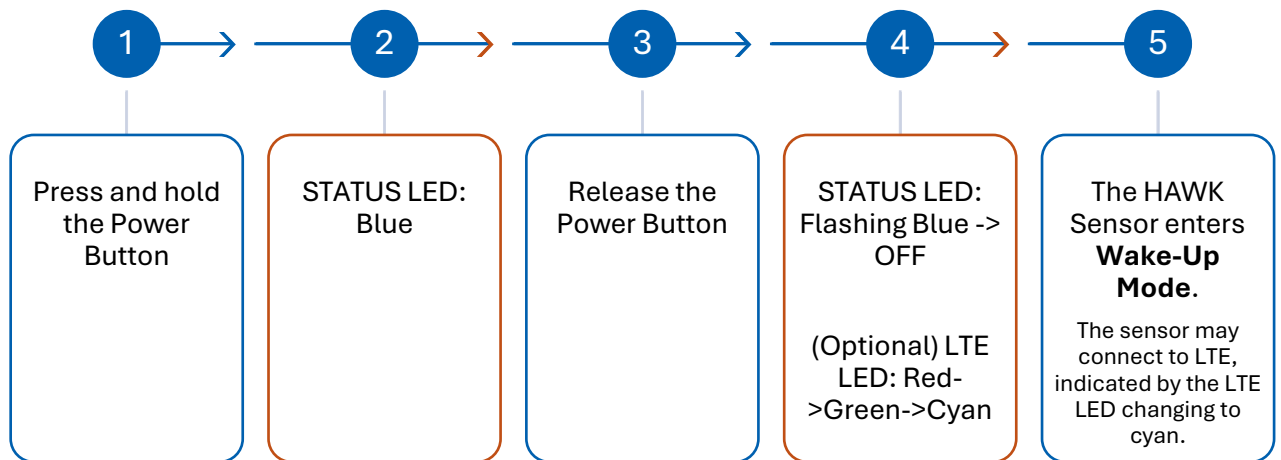
Prerequisite: The HAWK Sensor is in Sleep mode / Standby mode, and the status LED indicator is flashing every 15 seconds.

The procedure includes two sections:

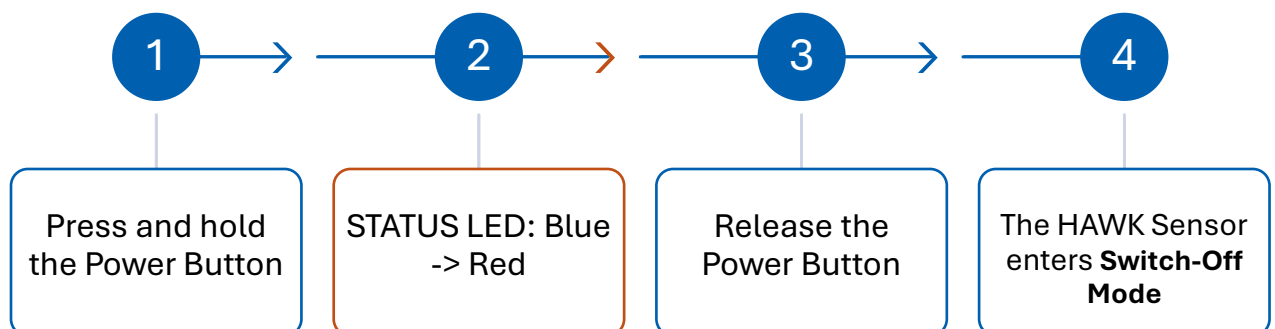
1. Waking Up the HAWK Sensor
2. Switching Off the HAWK Sensor



1. Waking Up the HAWK



2. Switching Off the HAWK



Internal Log Management - Retrieving and sharing internal memory log

This section applies when the HAWK Config App is already connected to the HAWK Sensor.

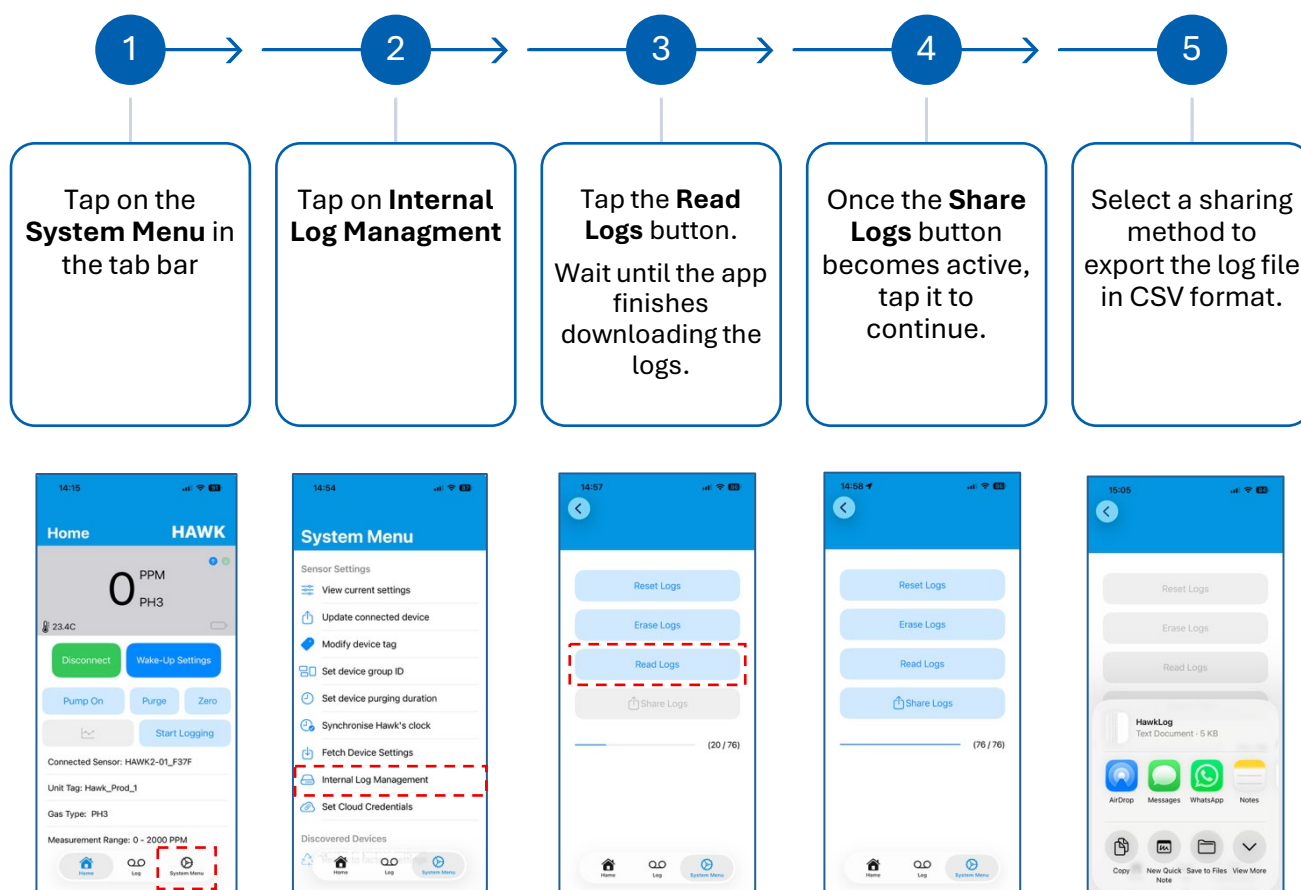
When the HAWK Sensor is operating in Autonomous Monitoring mode, it performs measurements at predefined intervals. In addition to uploading the measurement data to the cloud, the HAWK Sensor also stores a copy of the measurement data in its internal memory log.

The internal memory log is separate from the Spot Measurement log. The Spot Measurement log is created only when measurements are manually logged in the HAWK Config App during Spot Measurement.

This section explains how to manage, retrieve and share measurement data stored in the HAWK Sensor's internal memory log.

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**

Prerequisite: The app already connected to the HAWK Sensor



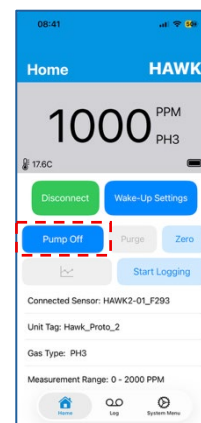
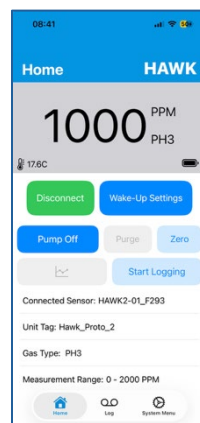
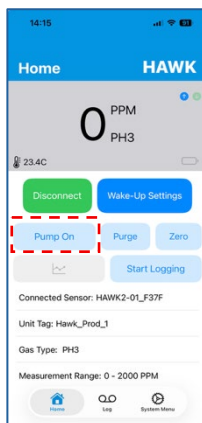
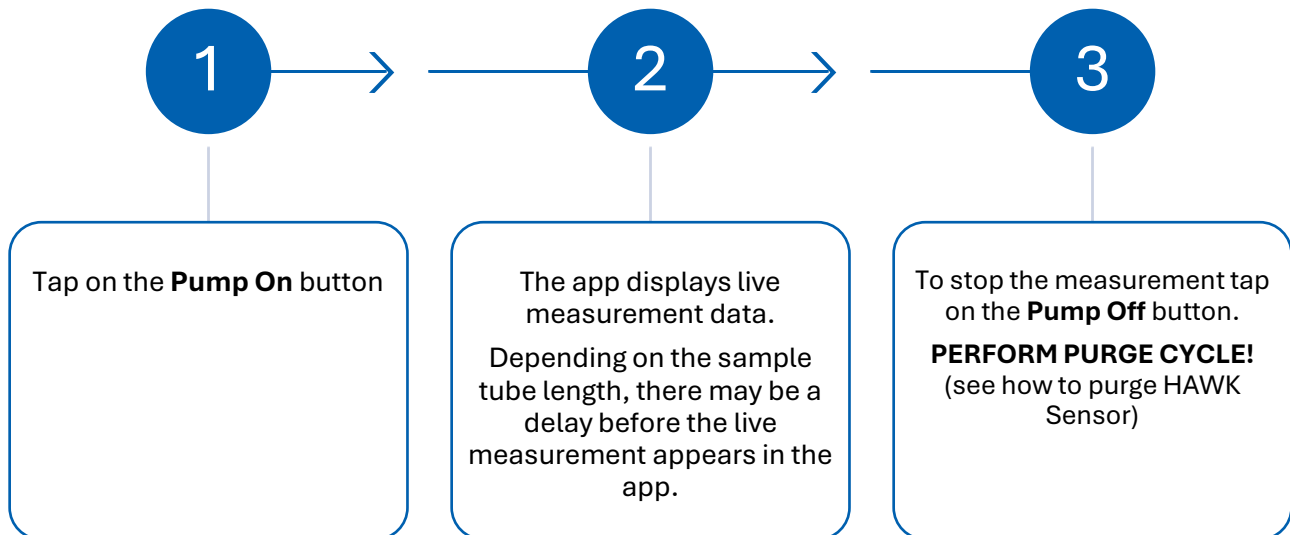
Taking Spot Measurement with HAWK Sensor

This section applies when the HAWK Config App is already connected to the HAWK Sensor.

The procedure explains how manually activate sensors sample draw pump and take a spot measurement.

Prerequisite: The app is already connected to the HAWK Sensor

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



WARNING — PURGE AFTER USE

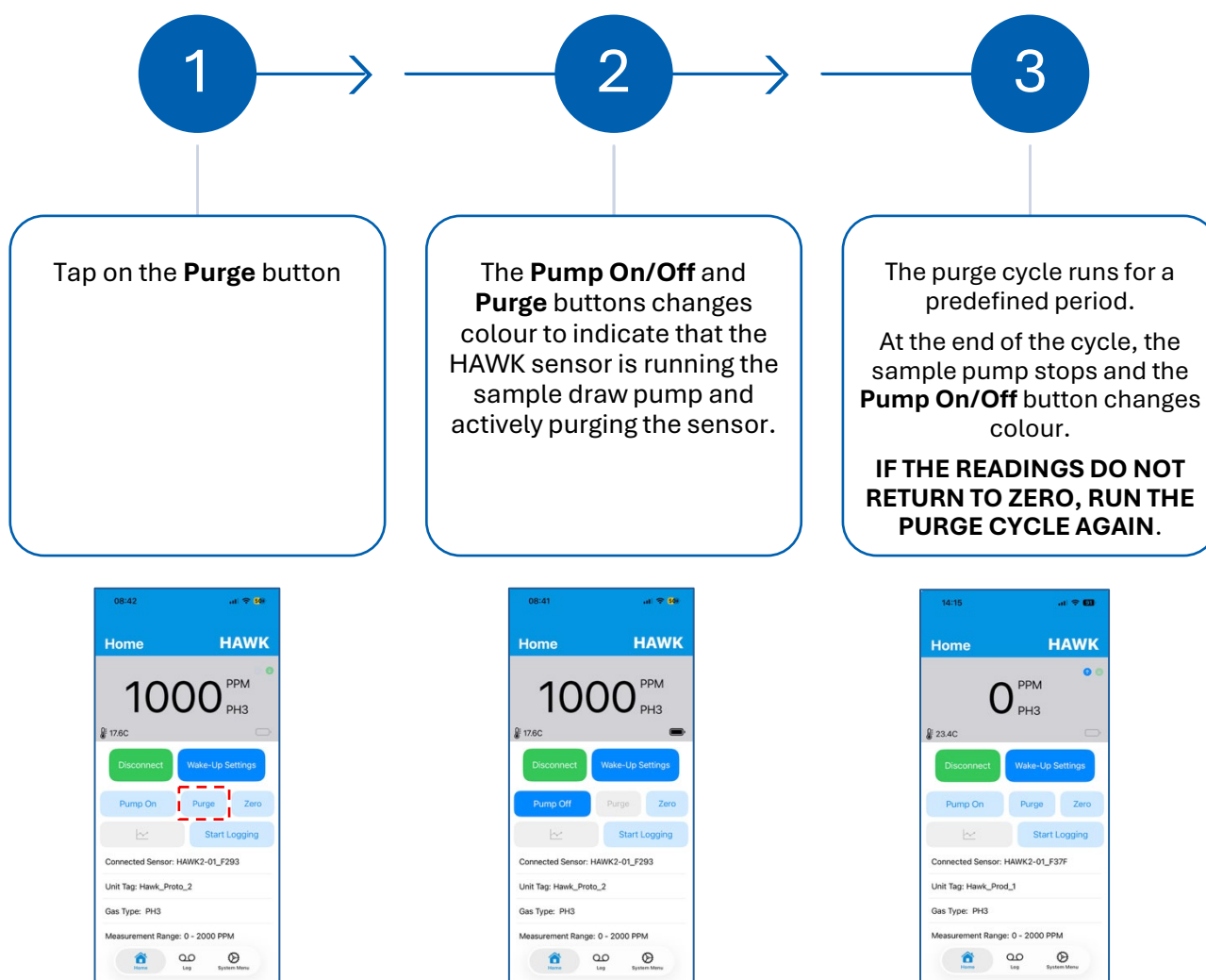
Do not leave phosphine inside the HAWK Sensor. Always purge the instrument after use. Refer to the purging section for instructions.

Purging the HAWK Sensor after Spot Measurement

This section describes the procedure for purging the HAWK Sensor with fresh air after completing a spot measurement.

Prerequisite: The app already connected to the HAWK Sensor

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



WARNING

Do not leave phosphine inside the HAWK Sensor. Always purge the instrument after use.

Logging Spot Measurement Data – Initiating log from the Home Screen

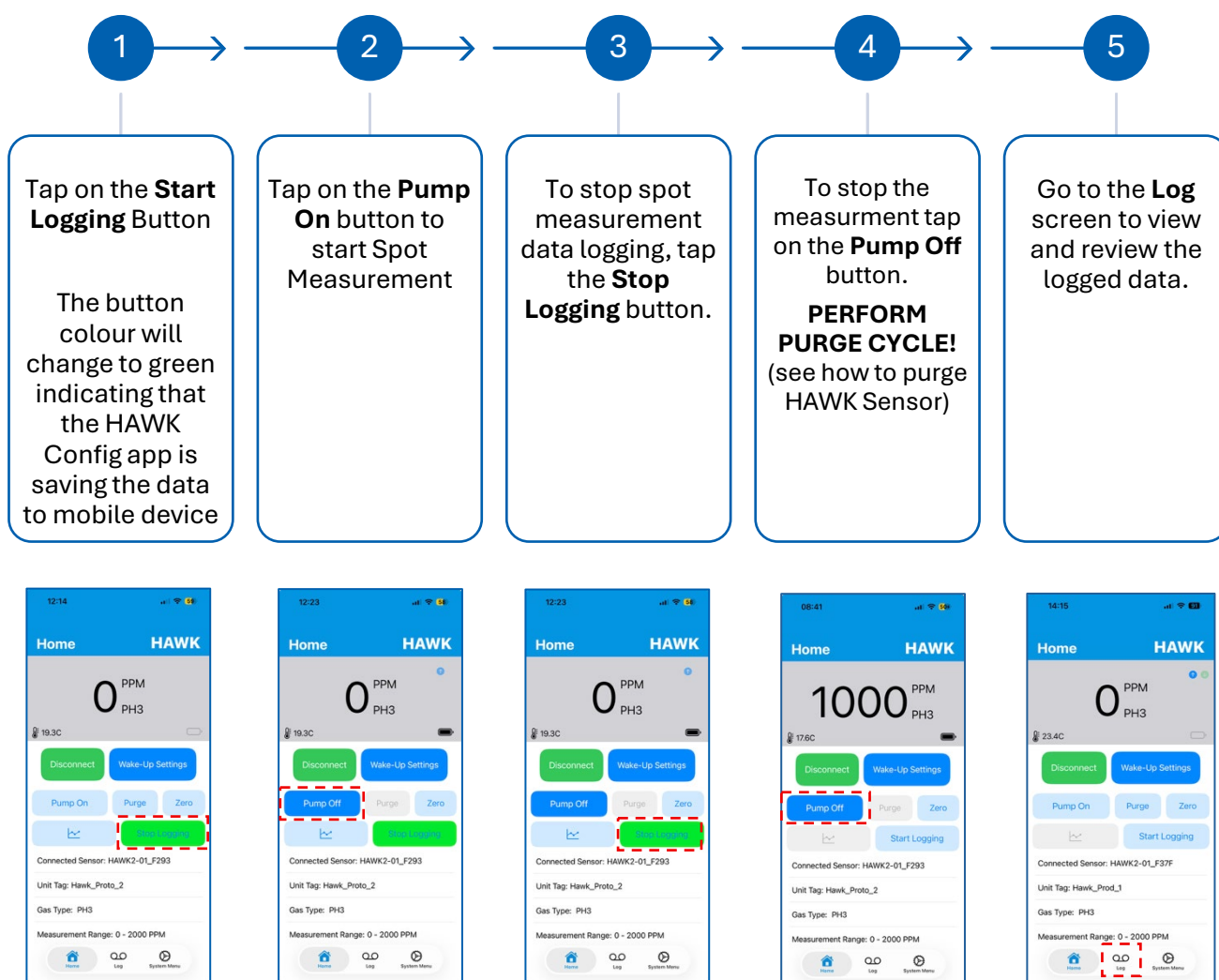
This section describes the steps required to save spot measurement data to the mobile device while initiating the logging from the app home screen.

When initiating the logging from the Home Screen, the app gives a default name to the log file in the following format: **“New_Log_day/month/year_hour:minutes:seconds”**

The log data is accessible in the **Log Screen**. The log name and details can be edited in the **Log Screen**. See section on editing log details.

Prerequisite: The app is already connected to the HAWK Sensor

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



WARNING

Do not leave phosphine inside the HAWK Sensor. Always purge the instrument after use.

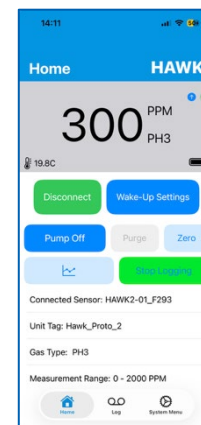
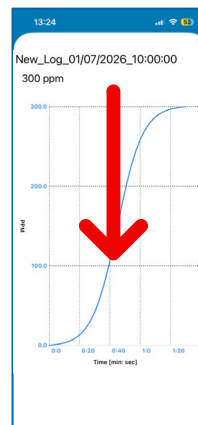
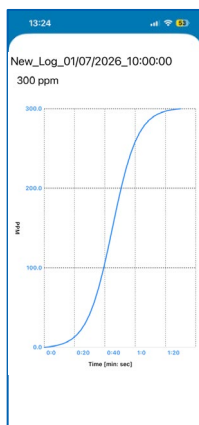
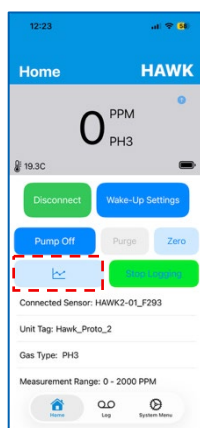
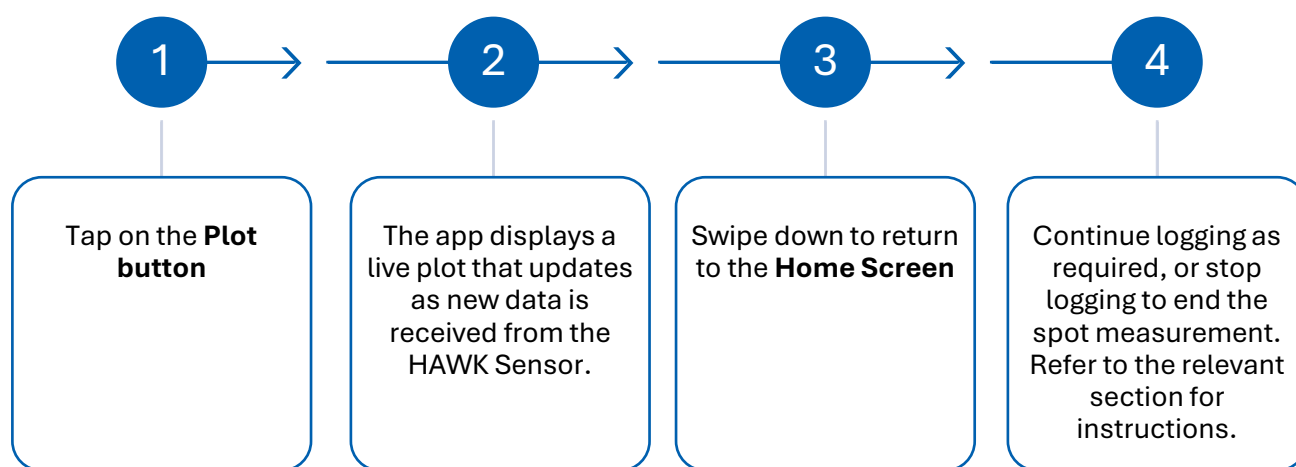
Displaying a Live Plot During Spot Measurement Logging

This section describes the steps required to display a live plot of the logged spot measurement data while logging is active.

Prerequisite:

1. The app is already connected to the HAWK Sensor.
2. The pump is running and taking a spot measurement.
3. The app is logging spot measurement data.

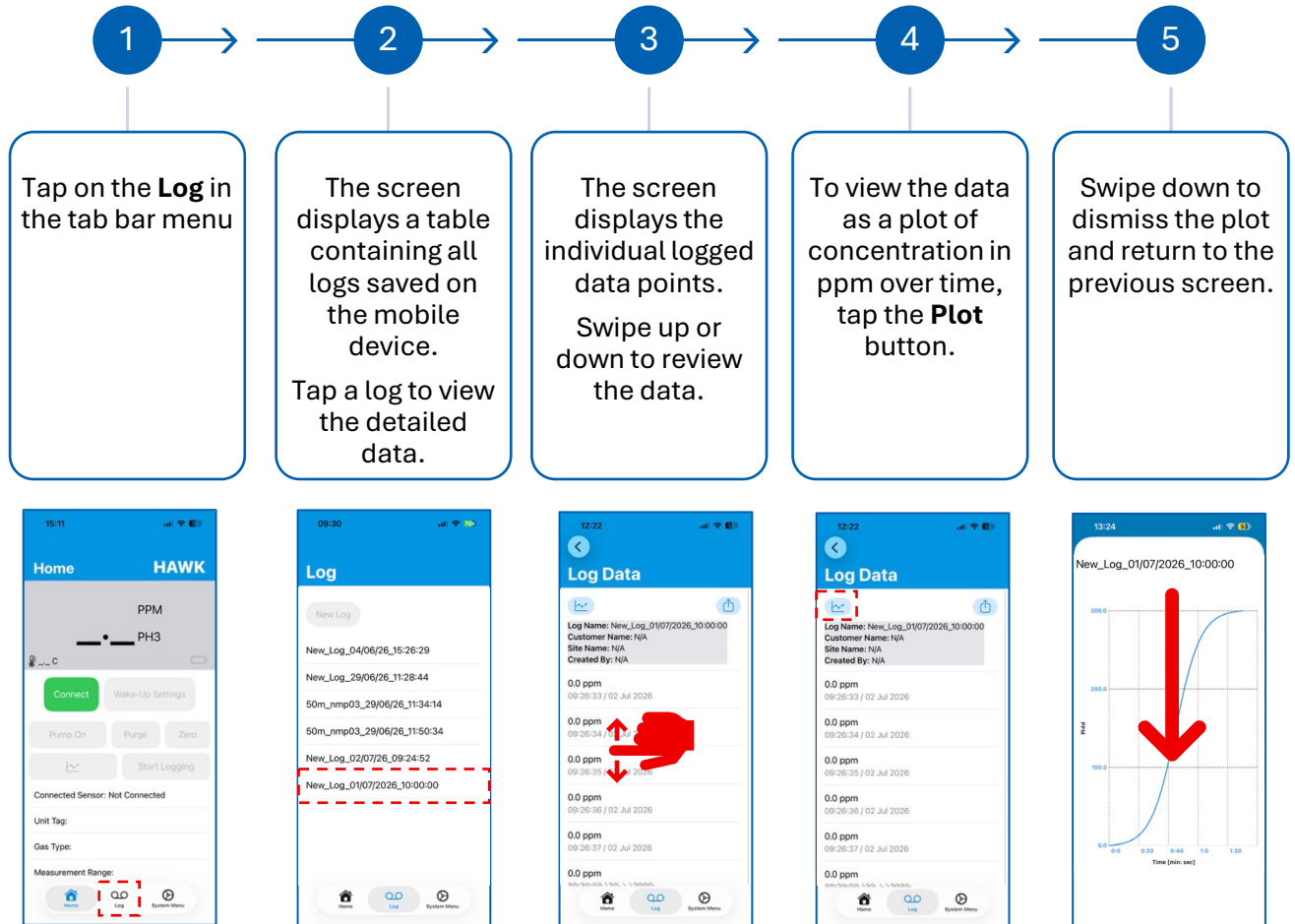
For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



Log Screen – Viewing Previously Logged Data

Measurement data recorded during spot measurement can be accessed from the **Log** screen. The logged data is available even when the app is **not connected** to the HAWK Sensor.

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**

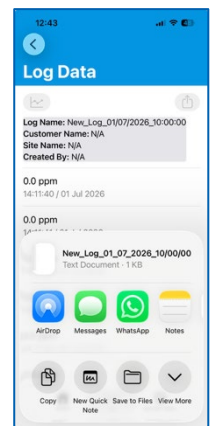
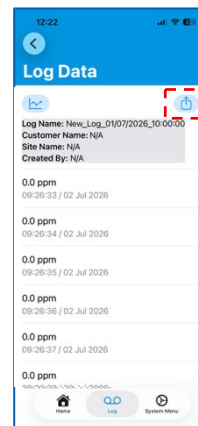
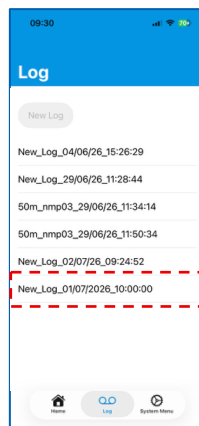
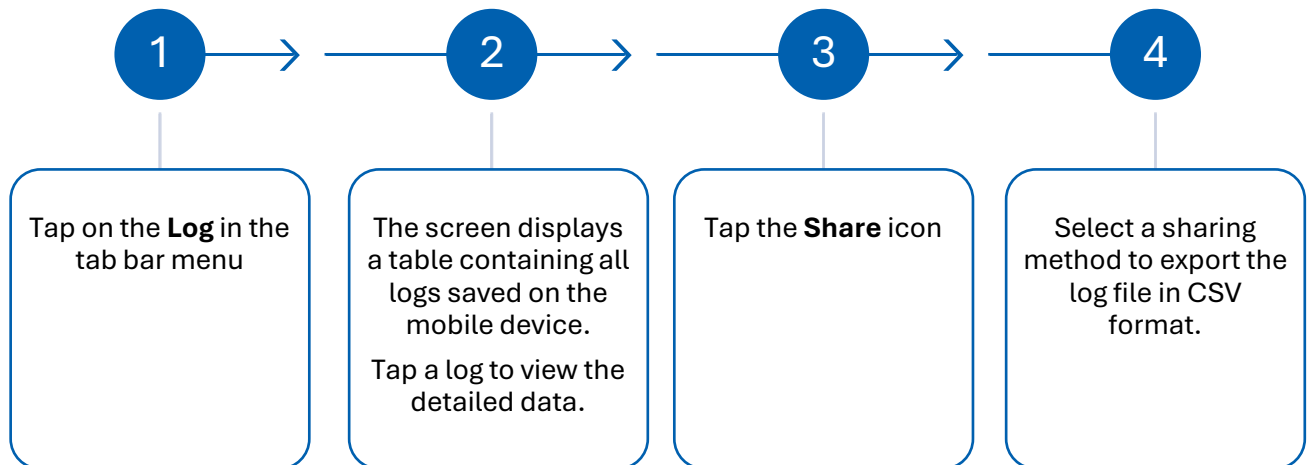


Log Screen – Sharing Logged Spot Measurement Data

Measurement data recorded during spot measurement can be accessed from the **Log** screen. The logged data is available even when the app is **not connected** to the HAWK Sensor.

Data logged and saved to the mobile device during a spot measurement can be shared as a comma-delimited CSV file.

For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**

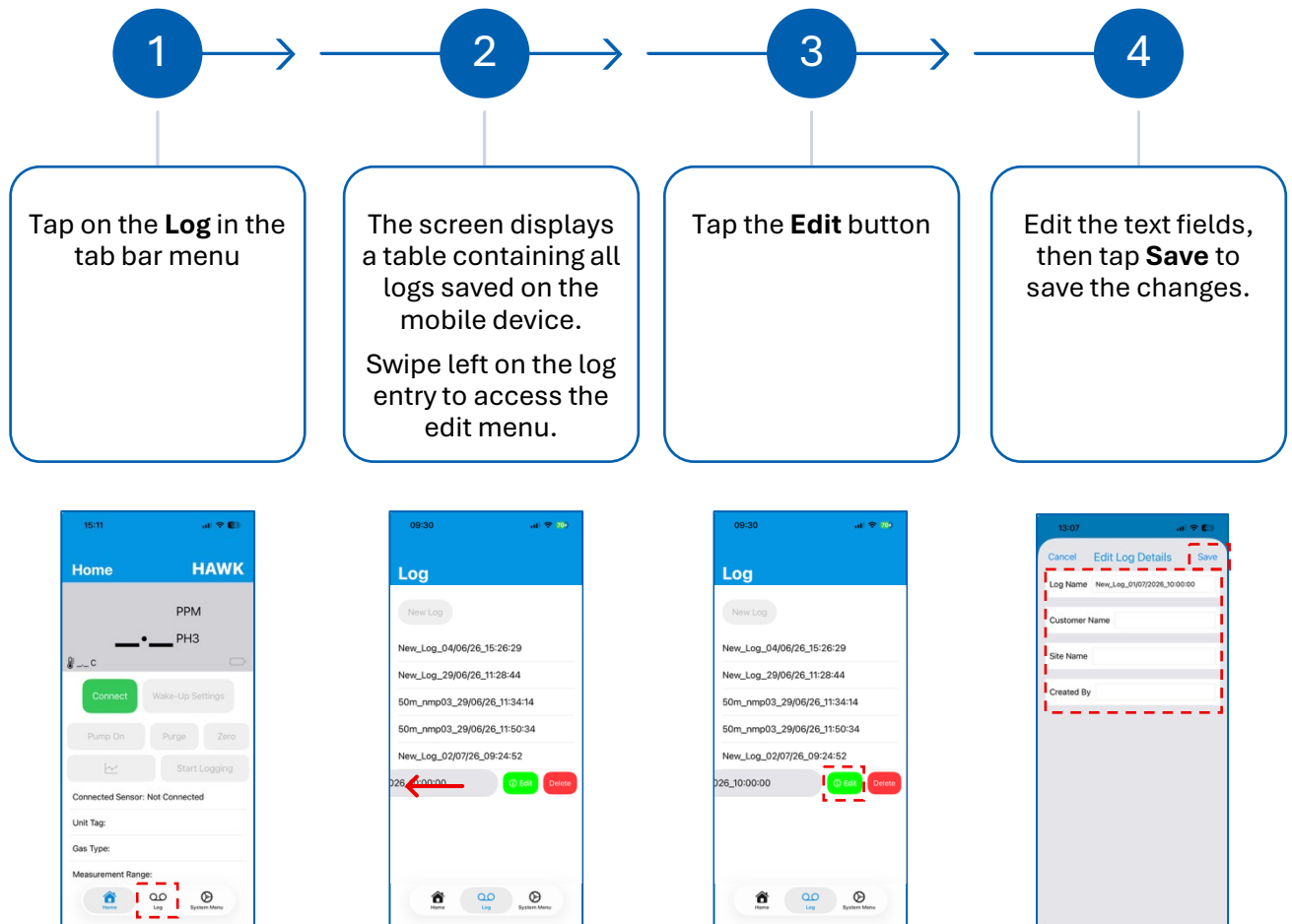


Log Screen – Editing Log Details

Measurement data recorded during spot measurement can be accessed from the **Log** screen. The logged data is available even when the app is **not connected** to the HAWK Sensor.

The operator can edit optional log details, including **Log Name**, **Customer Name**, **Site Name**, and **Created By**.

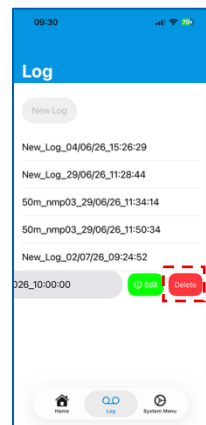
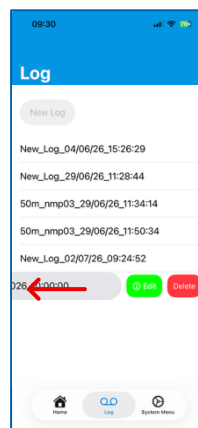
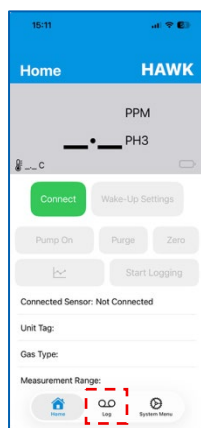
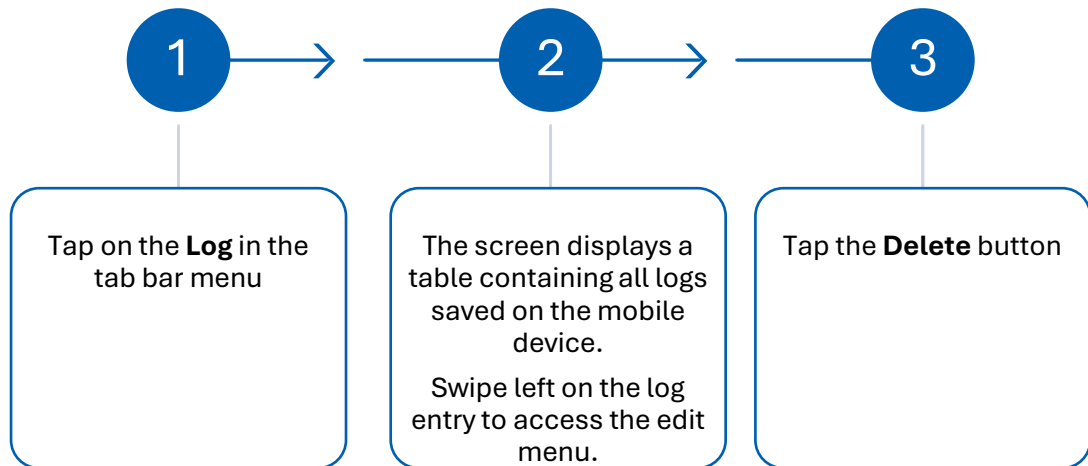
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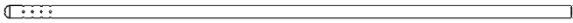
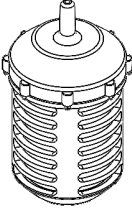
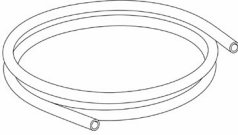
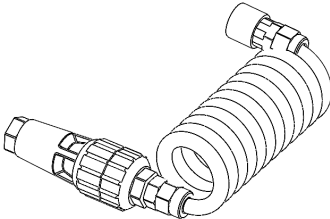
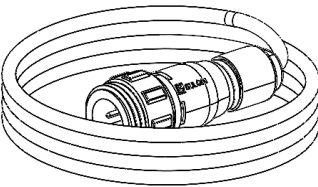
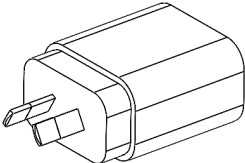
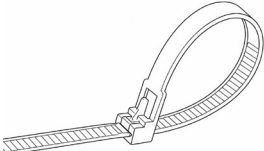
Log Screen – Deleting Log Data Entry

Measurement data recorded during spot measurement can be accessed from the **Log** screen. The logged data is available even when the app is **not connected** to the HAWK Sensor.

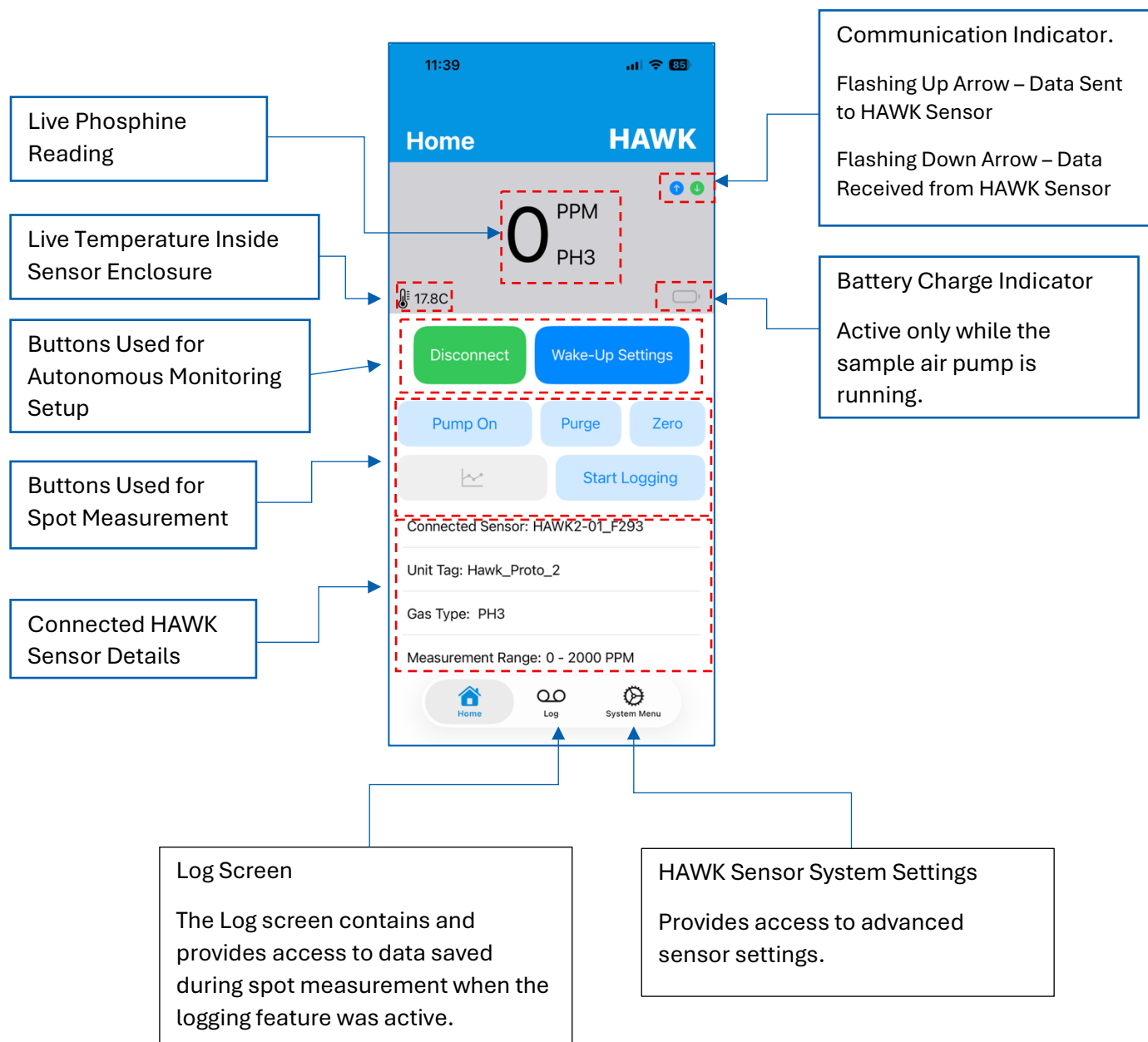
For guidance on how to read and follow the procedure diagrams used in this manual, refer to **Appendix C – How to Read Procedure Diagrams**



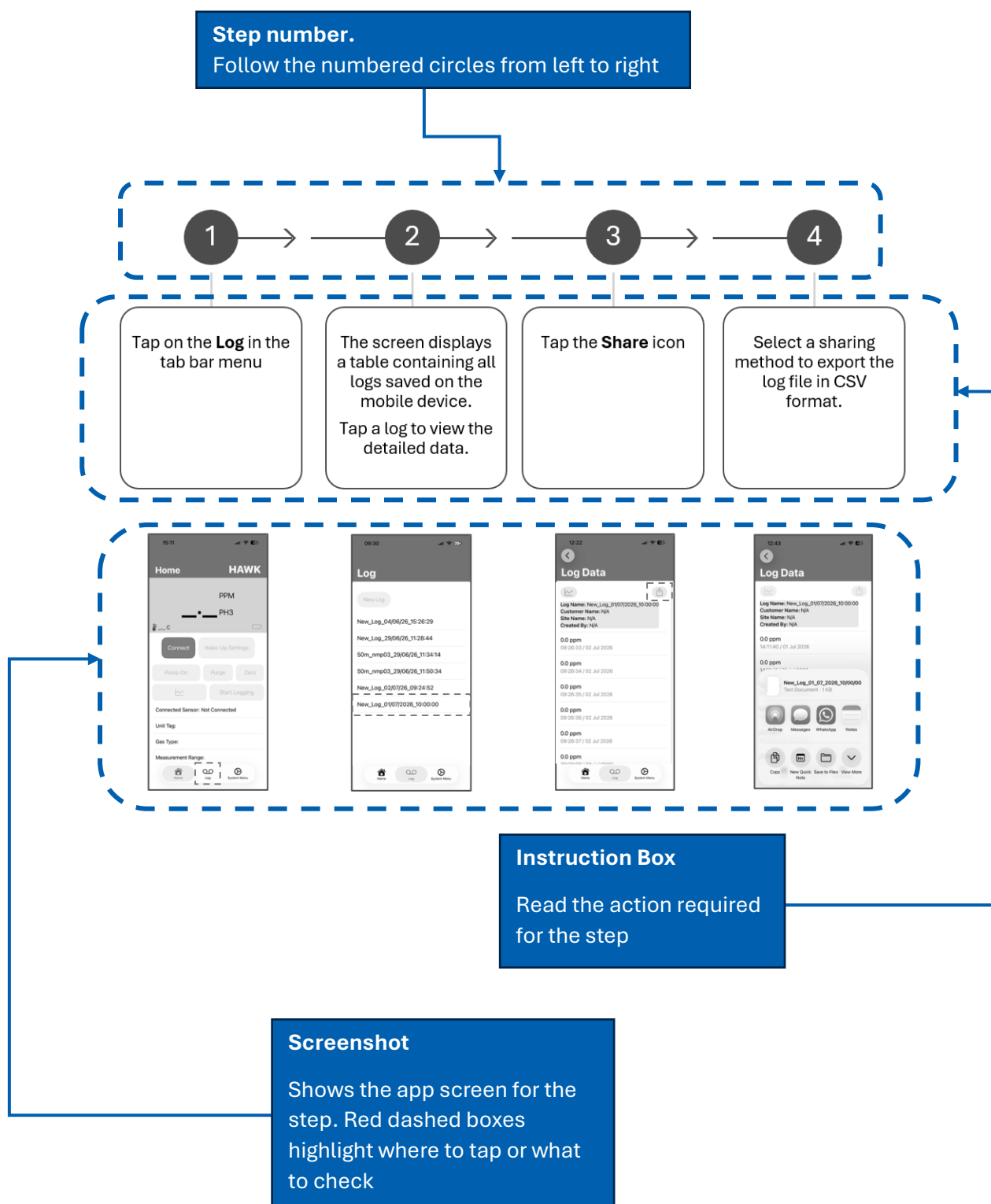
Appendix A – Accessories Supplied with the HAWK Sensor

Description	Image	Quantity
Stainless Steel Probe Tube		1
Plastic Probe Tube		1
Float Filter		1
Flexible tubing, 1 m		1
Probe holder with integrated air filter		1
Charging cable		1
Charging Adapter		1
Reusable Cable Tie		2

Appendix B – HAWK Config App Interface



Appendix C – How to Read Procedure Diagrams



Appendix D – HAWK Sensor -Bunker Installation Guide



i General Application Note

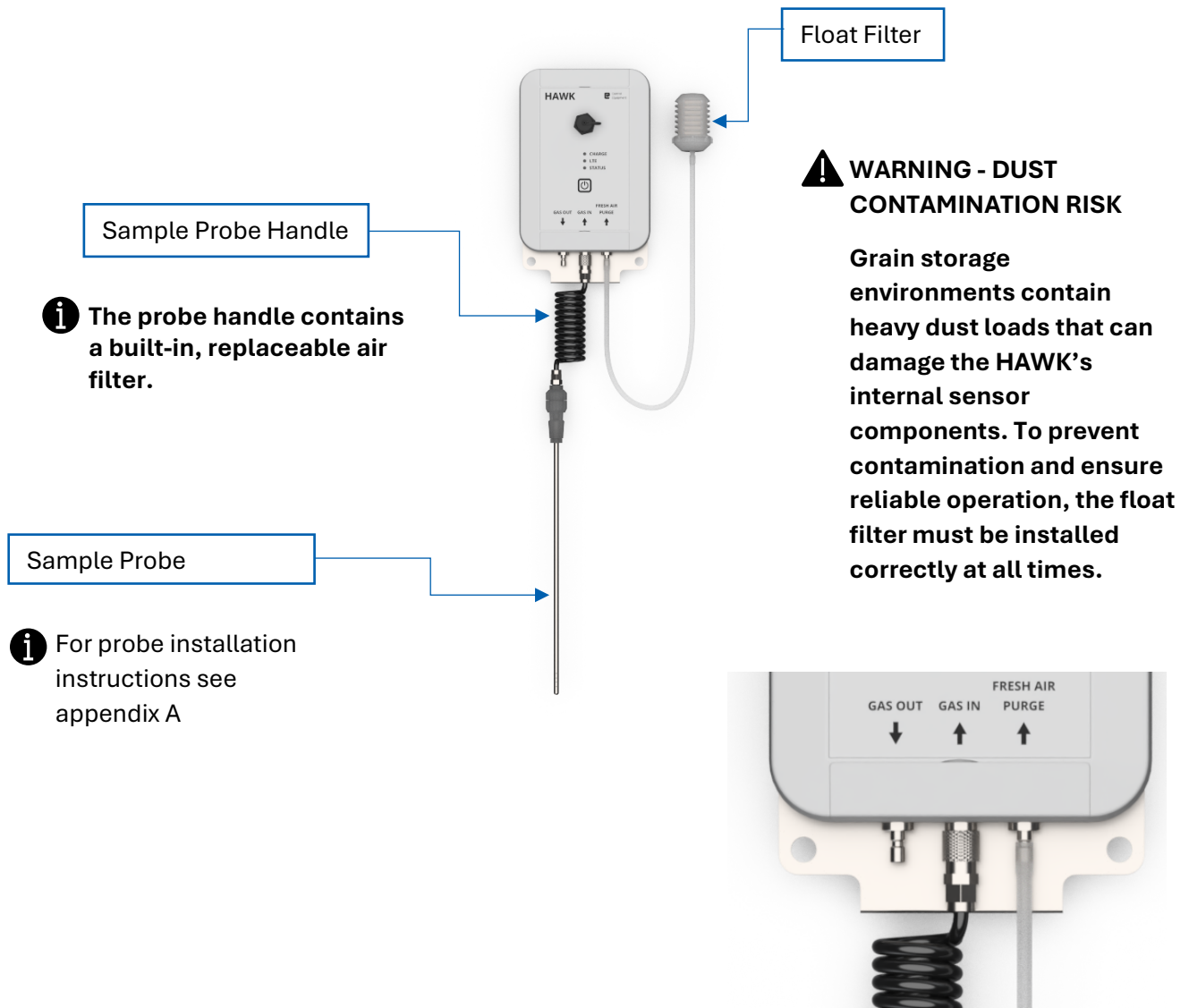
The HAWK phosphine sensor is designed to operate autonomously during fumigation, taking measurements up to three times per day and functioning for at least 31 days on a full charge.

Fully charge the HAWK sensor



i When the HAWK's battery reaches a full charge, the Charge LED indicator will turn off.

Fit the sample probe and the float filter

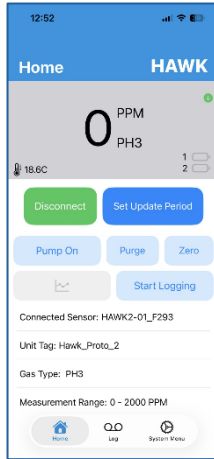


Attach a rope or carabiner (not supplied) to the HAWK's bracket

It is recommended to attach a rope or carabiner (not supplied) to the HAWK's bracket to secure the unit while it is positioned beneath the tarp during fumigation. The rope should remain above the tarp.



Use the HAWK Config App to set up the wake-up period

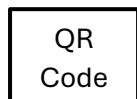


CAUTION - VALIDATE LTE CONNECTIVITY

To validate proper LTE connectivity and confirm that the HAWK is operating correctly, perform the first wake-up while the unit is positioned near the installation point

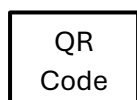
 Once the HAWK establishes a successful connection to the cloud service, the LTE indicator will change from green to cyan.

Scan the QR code with your iPhone camera to view a video demonstrating wake-up period.



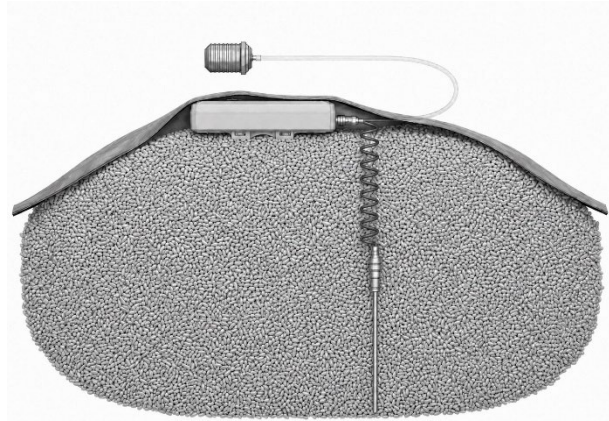
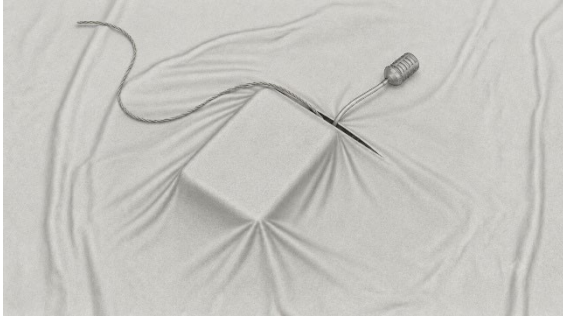
Download the App

Scan the QR code below with your iPhone camera to download the **HAWK Config App** from the Apple App Store.



Install the HAWK Sensor under fumigation tarp

Cut an opening in the fumigation tarp large enough to install the HAWK. Slide the HAWK under the tarp and position it parallel to the grain pile surface. Insert the probe into the grain. Ensure that both the float filter and the rope remain outside the tarp.



Recommended HAWK installation for bunker fumigation



WARNING — FLOAT FILTER POSITION

It is critical that the float filter is installed outside the fumigation tarp. Incorrect placement will obstruct the sensor's ability to purge and zero correctly, leading to inaccurate readings and potential exposure to phosphine gas.



The HAWK sensor purges and auto-zeros using fresh air before and after each measurement cycle, and proper exposure to ambient air is essential for maintaining accuracy and long-term sensor performance.

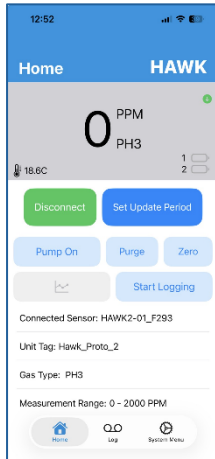


WARNING - DUST CONTAMINATION RISK

Grain storage environments contain heavy dust loads that can damage the HAWK's internal sensor components. To prevent contamination and ensure reliable operation, the float filter must be installed correctly at all times.

Purge the HAWK Sensor After Fumigation

Connect to the HAWK sensor using the HAWK App. Use the purge function in the app to flush the sensor until the displayed phosphine reading returns to zero.



WARNING — RESIDUAL PHOSPHINE

Residual phosphine inside the HAWK sensor can be hazardous if released into the work area. The operator must purge the sensor after fumigation and ensure the surrounding area remains safe during the purge in accordance with site or company safety policies.

Appendix E – HAWK Sensor -Silo Installation Guide



i General Application Note

The HAWK phosphine sensor is designed to operate autonomously during fumigation, taking measurements up to three times per day and functioning for at least 31 days on a full charge.

Fully charge the HAWK sensor



i When the HAWK's battery reaches a full charge, the Charge LED indicator will turn off.

Fit the sample probe and the float filter

Sample Probe Handle

i The probe handle contains a built-in, replaceable air filter.

Sample Probe

i For probe installation instructions see appendix A

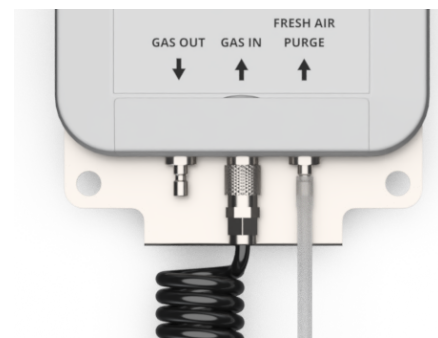
Float Filter

! WARNING - DUST CONTAMINATION RISK

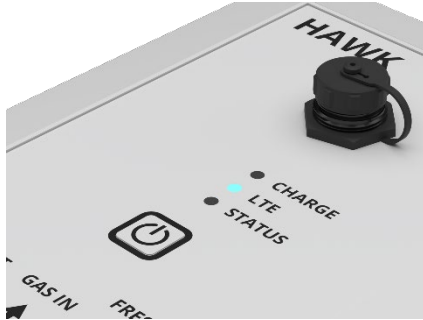
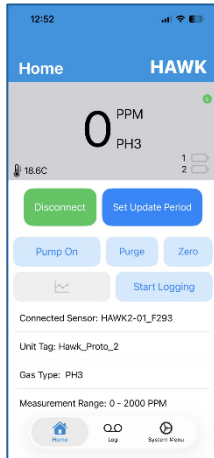
Grain storage environments contain heavy dust loads that can damage the HAWK's internal sensor components. To prevent contamination and ensure reliable operation, the float filter must be installed correctly at all times.

! WARNING - USE PLASTIC PROBE

The stainless-steel probe has openings only on its peripheral surface. Connecting the sample tube directly to this probe will block these openings and prevent proper gas flow.



Use the HAWK Config App to set up the wake-up period

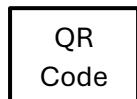


⚠ CAUTION - VALIDATE LTE CONNECTIVITY

To validate proper LTE connectivity and confirm that the HAWK is operating correctly, perform the first wake-up while the unit is positioned near the installation point

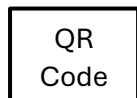
i Once the HAWK establishes a successful connection to the cloud service, the LTE indicator will change from green to cyan.

Scan the QR code with your iPhone camera to view a video demonstrating how to configure the wake-up period.



Download the App

Scan the QR code below with your iPhone camera to download the **HAWK Config App** from the Apple App Store.



Fix the HAWK to the silo structure using the pole bracket at the back of the sensor and reusable cable ties.

i Adjust the orientation of the cable ties to suit the specific geometry of the structure.

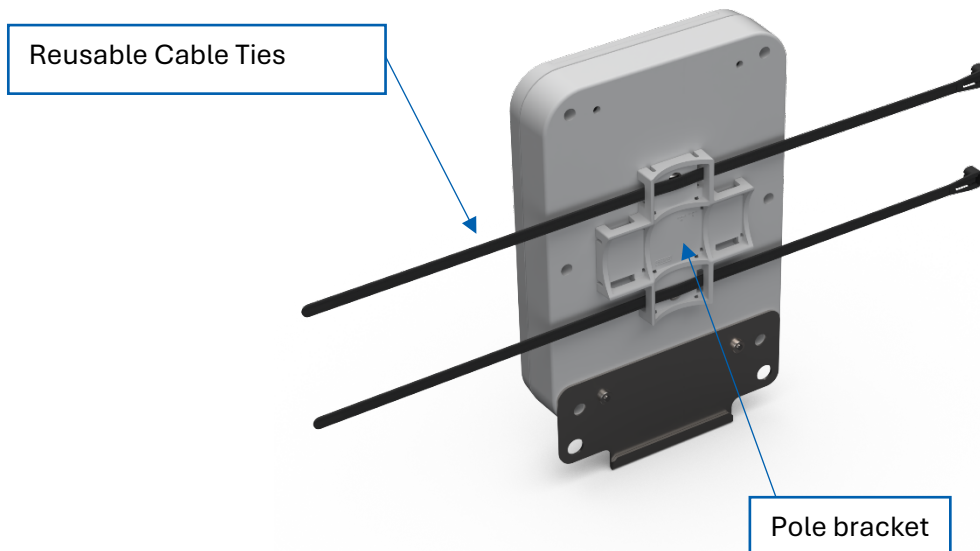


CAUTION

Confirm that the HAWK is securely fastened and properly fixed to the silo.



Illustration HAWK sensor Silo Installation (not to scale)



Connect the sampling tubes between the silo and HAWK sensor

Gas Sample Tube
Tube ID = 4mm
Recommended Material:
Polyethylene
Length: Up to 20 meters

⚠ WARNING – USE CORRECT TUBING

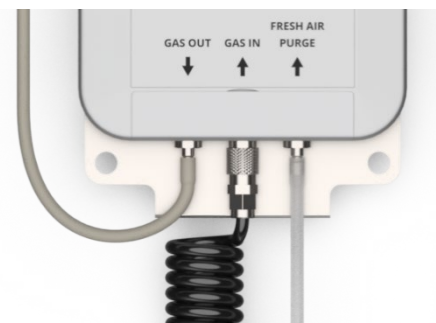
It is important to use for sample line tubing with an internal diameter of 4 mm, as the HAWK App relies on this size to calculate the correct sample time for the specified tube length

i If required, use a short section of flexible tubing as an intermediate coupler between the plastic probe and the sample tube. This compensates for misalignment or rigidity and ensures a continuous, leak-free connection.

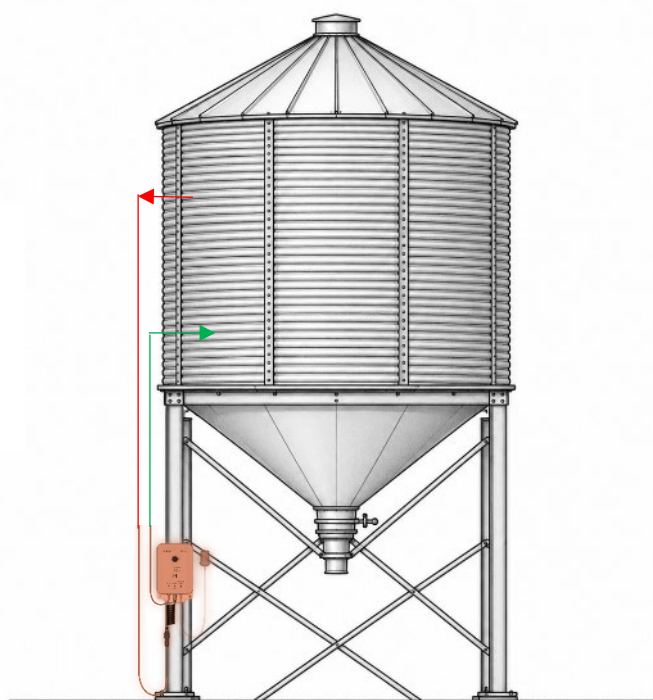
Exhaust line
Back to the silo

⚠ DANGER – SAFE OPERATION

To ensure safe operation, the phosphine gas drawn into the sensor must be returned to the silo through the exhaust line. Failure to do so will result in hazardous gas being released into the work area, creating a severe risk of poisoning.

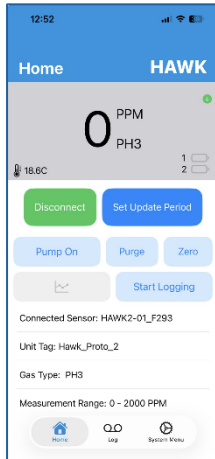


i The installation and maintenance of the sampling ports on the silo are the responsibility of the operator.



Purge the HAWK Sensor After Fumigation

Connect to the HAWK sensor using the HAWK App. Use the purge function in the app to flush the sensor until the displayed phosphine reading returns to zero.



WARNING — RESIDUAL PHOSPHINE

Residual phosphine inside the HAWK sensor can be hazardous if released into the work area. The operator must purge the sensor after fumigation and ensure the surrounding area remains safe during the purge in accordance with site or company safety policies.

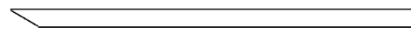
Appendix F – Probe Installation Instructions

1. Probe Types Supplied with the HAWK Sensor

- a. Stainless-Steel Probe - Intended for bunker fumigation applications.

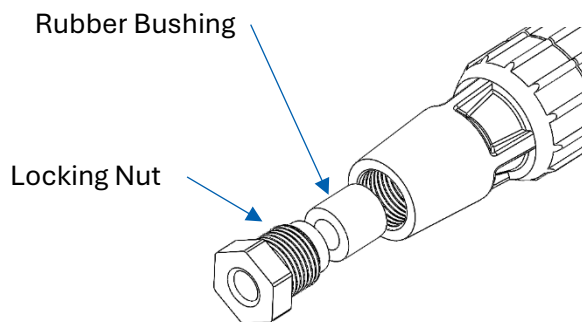


- b. Plastic probe - Intended for silo fumigation applications

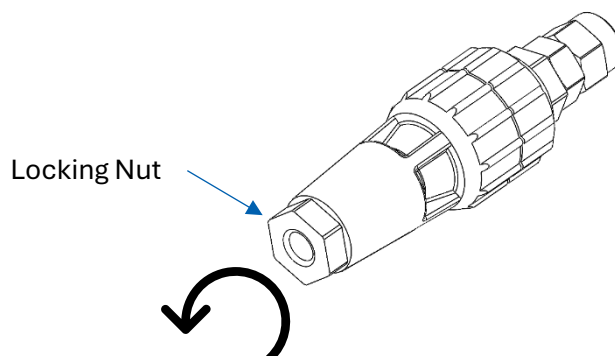


2. Locking Nut and Rubber Bushing

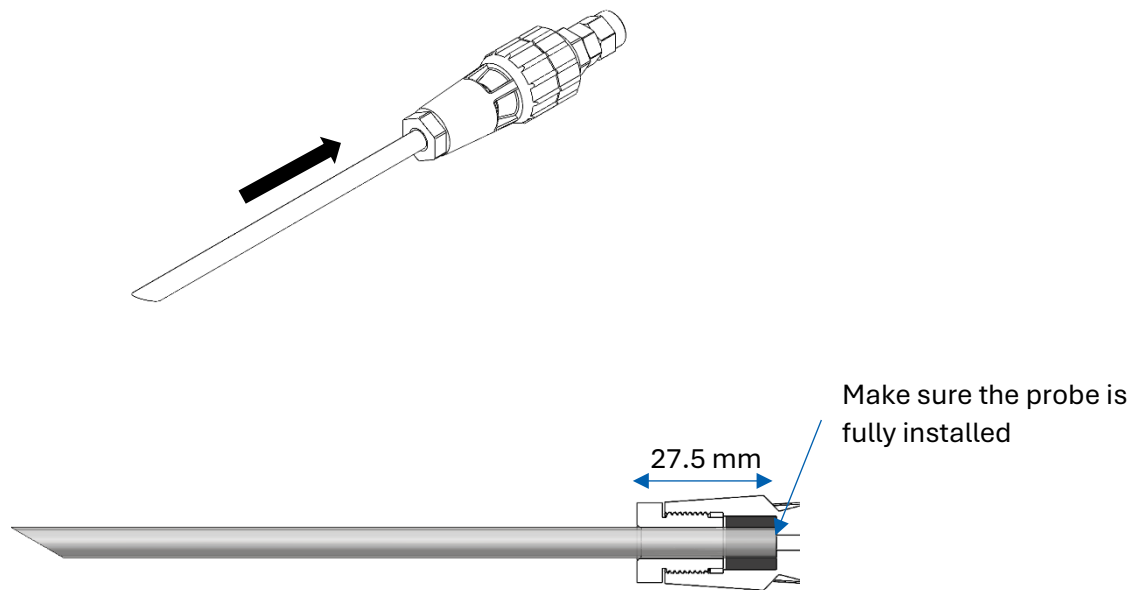
The rubber bushing is compressed by the locking nut, creating a gas-tight seal between the probe components.



3. Loosen the locking nut

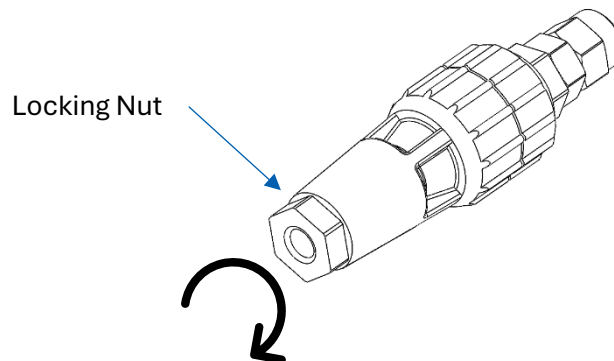


4. Push either the stainless-steel or plastic probe fully into the probe handle.



5. Hand-tighten the nut

If required, the nut may be tightened further using an open-end wrench. Apply no more than a few additional degrees of rotation to avoid over-compression of the bushing.





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