

LIQUIMECH[®]

FMS Hardware



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1. Introduction

Welcome to the Liquimech Fuel Management System User Manual. This guide provides detailed instructions for operating, troubleshooting, and maintaining your system's hardware components. From understanding system components to mastering setup and calibration, each section offers clear instructions and illustrative figures for easy comprehension. Learn how to interpret indicator lights, troubleshoot common errors, and prioritise safety and reliability through regular maintenance and adherence to safety precautions.

2. Overview

Liquimech Fuel Management System is designed to effectively manage fuel in challenging environments, ensuring accurate monitoring, efficient usage, and reduced waste. Easy to use with swipe cards, tags, and secure authentication, it simplifies tracking and enhances security. Installation is simple and seamlessly integrates with the Liquimech Connect Desktop Application, providing administrative controls and detailed usage logs. Features like instant reporting, remote access, and automatic tank gauging help maintain accurate fuel inventories for informed decision-making.

3. Power-On Procedure

Before proceeding, ensure all system components are correctly installed and connected as per the setup instructions provided in Section 5.

1. Pre-Checks:

- 1.1 Ensure all connections between the Main Control Unit (MCU) and battery/AC power outlet are securely fastened and properly checked.
- 1.2 Verify that the provided Telstra SIM card is activated and correctly inserted into the designated slot on the MCU (refer to Section 5).

2. Power-On:

- 2.1 Switch on the isolators to supply power to the system.
- 2.2 Wait for the device to initialise. This process may take up to 2 minutes, depending on network strength and system configuration.
- 2.3 Monitor the System Busy indicator light. Wait until it goes off before proceeding further.

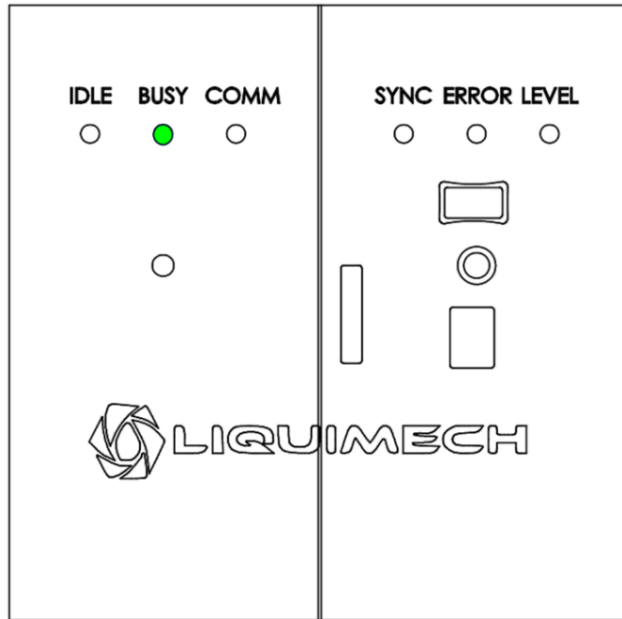


Figure 1: System Initialising Indication light.

3 System Ready:

Once the System IDLE indicator light is ON, the device is ready for operation.

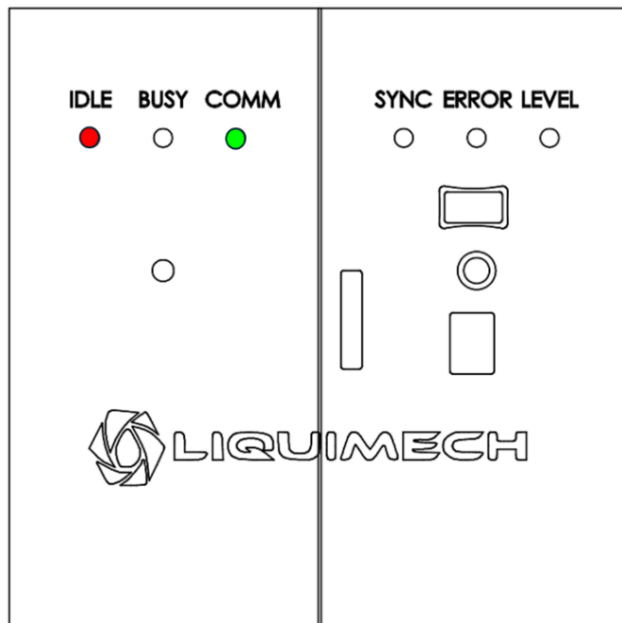


Figure 2: System ready indication light.

Congratulations! You have successfully completed the power-on procedure.

4. System Components

Let's familiarise ourselves with the key components of the Liquimech Fuel Management System:

Main Control Unit (MCU)	Central processing unit responsible for system operation and control.
Swipe Card Readers and Swipe Cards	Communication module facilitating interaction with external devices such as Swipe Cards.
Data Logger	Storage device used for logging data and system configuration.
SIM Card	Subscriber Identity Module enabling communication with Liquimech Server.
Tank Level Sensor	Sensor used for monitoring the fuel level in the tank.
Indicator Lights	Visual indicators for system status including System Idle, Busy, Communication status, Syncing, Error, and Tank-level.
Buzzer	Audible alarm for alerting users to system events such as access granted/denied and tank levels.

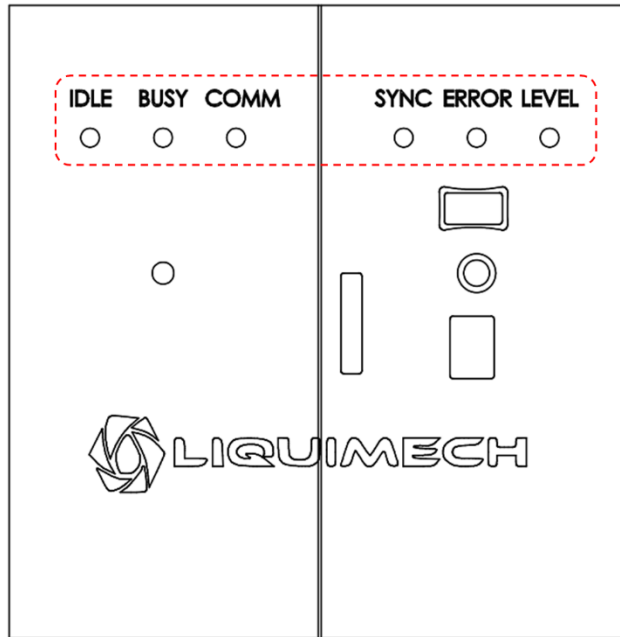


Figure 3: Indicators lights used on Liquimech Fuel Management System.

Liquimech Connect Application: Mobile

Easily calibrate tank levels using our intuitive mobile app Liquimech Connect. Initiate calibration from your smartphone for precise adjustments of thresholds, ensuring accurate fuel monitoring.

Liquimech Connect Management Suite

Take control of our desktop app. Manage users, access permissions, and view system logs conveniently from your computer. Gain centralized oversight and maintain system integrity with ease.

5. Setup

Proper setup is crucial for ensuring the smooth functioning of the Liquimech Fuel Management System.

Follow these steps to set up your system:

1. Component Connection:

Ensure all components are securely connected to the Main Control Unit (MCU).

2. SIM Card Activation and Insertion:

Before insertion, ensure the Telstra SIM card is activated. Failure to activate the SIM card beforehand may lead to communication issues with the server.

- ▽ Locate MCU Connection: Identify the wire connected to the PCB on the 3V3 pin.
- ▽ Carefully Remove Wire: Disconnect the wire ensuring a safe disconnection to prevent electrical interference.
- ▽ Prepare SIM Card: Retrieve the activated Telstra SIM card.
- ▽ Align SIM Card: Orient the SIM card correctly, aligning it with the designated slots on the MCU to avoid any damage during insertion.
- ▽ Insert SIM Card: Gently slide the SIM card into the designated slots on the PCB until it fits securely.
- ▽ Secure Locking: Ensure the SIM card is firmly and securely locked in place, following the guidelines provided in the accompanying picture.
- ▽ Reconnect Wire: Once the SIM card is securely inserted, reconnect the previously removed wire to its original position on the 3V3 pin of the PCB.
- ▽ Verify Connection: Confirm that the connection between the wire and the PCB is stable and secure.

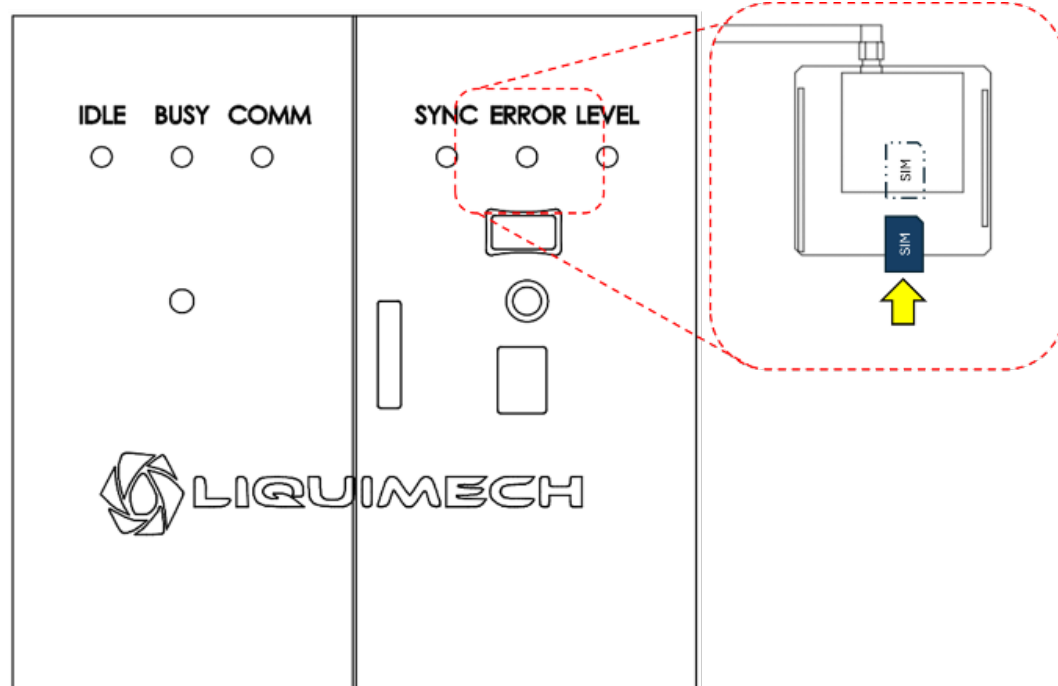


Figure 4: Port to Insert SIM card on the module.

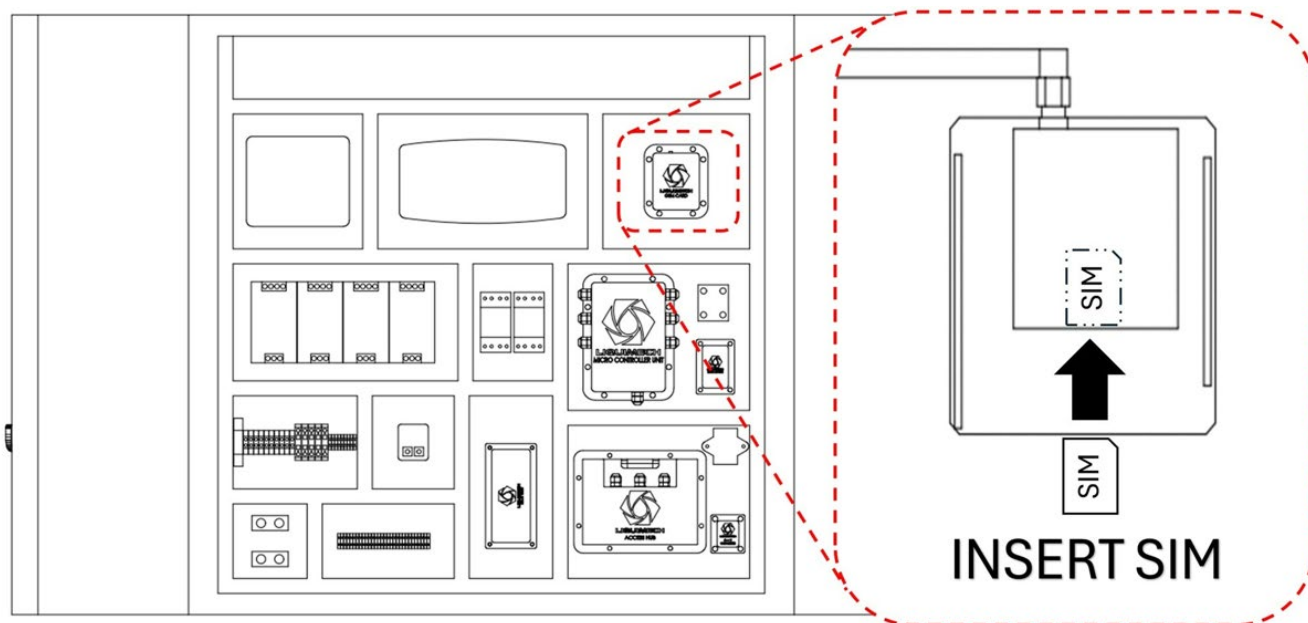


Figure 5: Front View of FMS control Module (Open Cabinet)

3. Power On and Initialisation:

Turn On the isolators and wait for the device to initialise. Initialisation may take up to 2 minutes, depending on the strength of the network. Wait until the System Busy indicator light goes off.

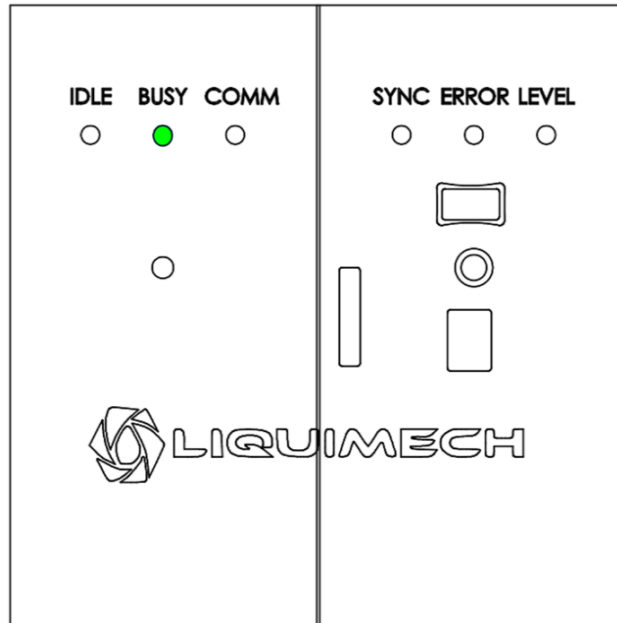


Figure 6: System initialising.

4. System Ready Status:

Once the System IDLE indicator is ON, the device is ready to use.

*Congratulations! You've successfully completed the initialisation process.
Your device is now ready to use.*

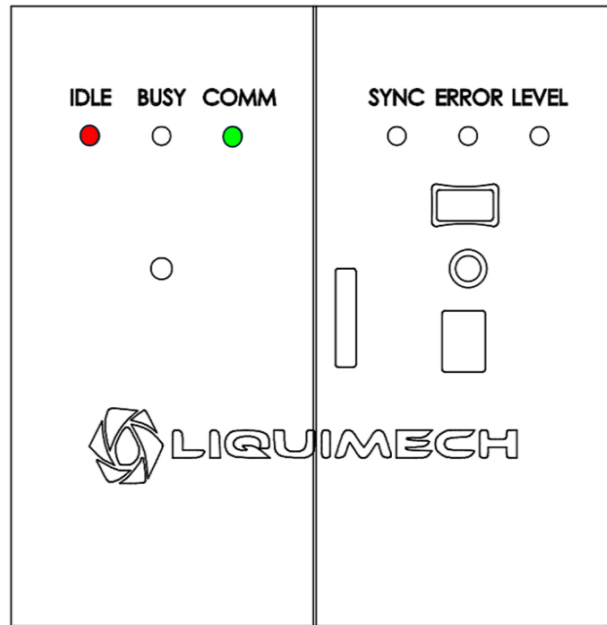


Figure 7: System ready indicator.

Note: The Comm indicator light will be ON if connected to the network. However, regardless of the Comm indicator Light status, the system is ready to use either in ONLINE mode if the Comm indicator light is ON or OFFLINE mode if the Comm indicator light is OFF.

Calibration Process:

1. Fill the tank to the desired level to calibrate the maximum level as the high-level threshold.
2. Connect to the FMS device using the Liquimech Connect mobile app. For detailed instructions, refer to the Connect Desktop and Mobile App User Manual.
3. Once the connection is established, press on "Calibrate Tank" within the app. This will assign the new high-level threshold value.
4. If the calibration process is not completed, the system will use the last recorded value for the high-level threshold.
5. Failure to calibrate the sensor will affect the accuracy of the level monitoring.

6. Operation

Understanding the various indicators and their meanings is crucial for effective system operation:

1. System IDLE/Ready:

Indicates that the system is idle and ready for operation.

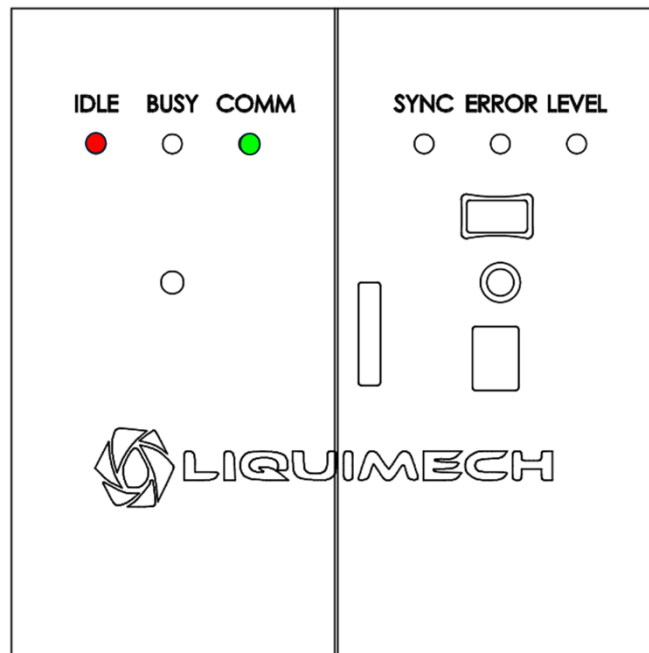


Figure 8: System at IDLE mode.

2. System Busy / Access granted and Denied:

- Solid ON with access granted buzzer indicates that access has been granted or a process is underway.
- Solid ON indicates the system is Locked.
- Blinking twice with a denial buzzer denotes access denial.

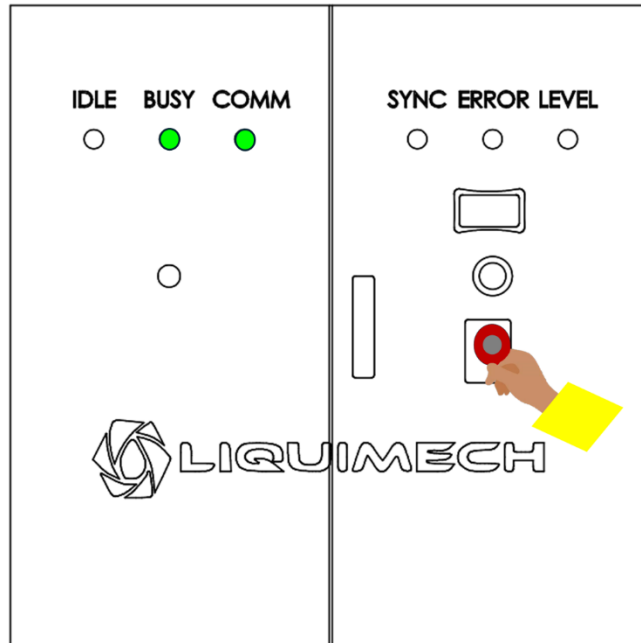


Figure 9: System at BUSY mode.

3. Comm Light:

Solid ON indicates successful communication with the network, while OFF suggests a communication failure with the server or no reception. Regardless of comm light, the system should run either on Online mode or Offline mode.

4. Sync on process:

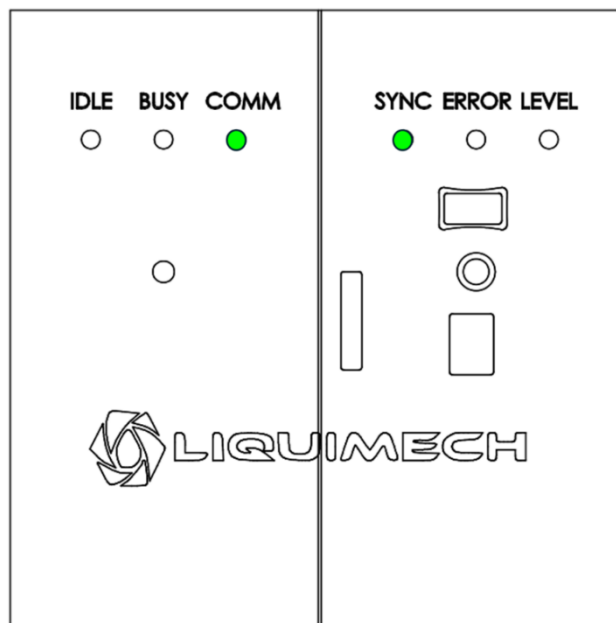


Figure 10: System at SYNC mode.

- ❑ The Sync Pilot Light is ON during synchronisation processes with the Server / Desktop App.
- ❑ The system is not ready to use for dispensing. Should wait until the Sync light goes off and System IDLE is ON.

5. Error State:

Solid ON indicates various error conditions such as comms failure with a data logger, Swipe card module, and level sensors.

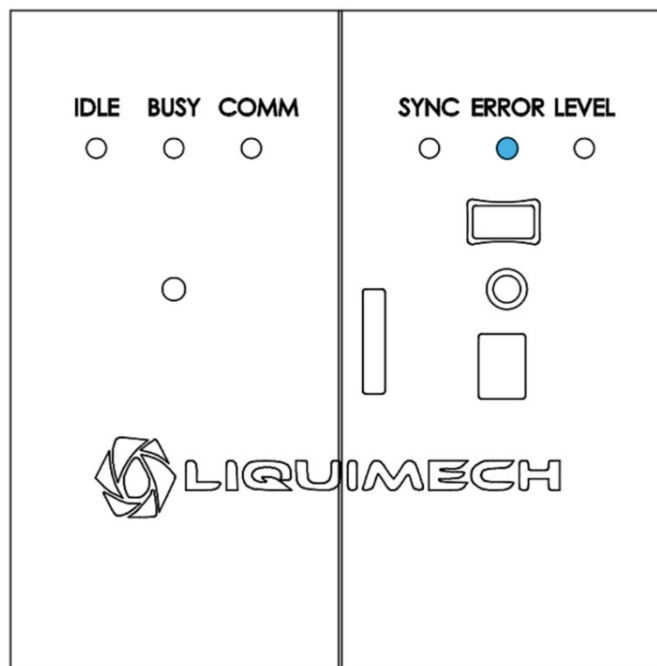


Figure 11: System at ERROR mode.

6. Level Lights:

When the 'Solid ON' Level indicator light is illuminated, it indicates that the tank level surpasses the predefined threshold. Upon initially exceeding this threshold, the high-level alarm will activate for a duration of 10 seconds. Subsequently, even if the tank remains at a high level, the high-level indicator light will remain illuminated, yet the alarm will not sound. To re-enable the high-level alarm after it has been triggered once, the tank level must decrease by approximately 15% from the high-level threshold value. Even if the high-level indicator is ON, the system should still be able to use.

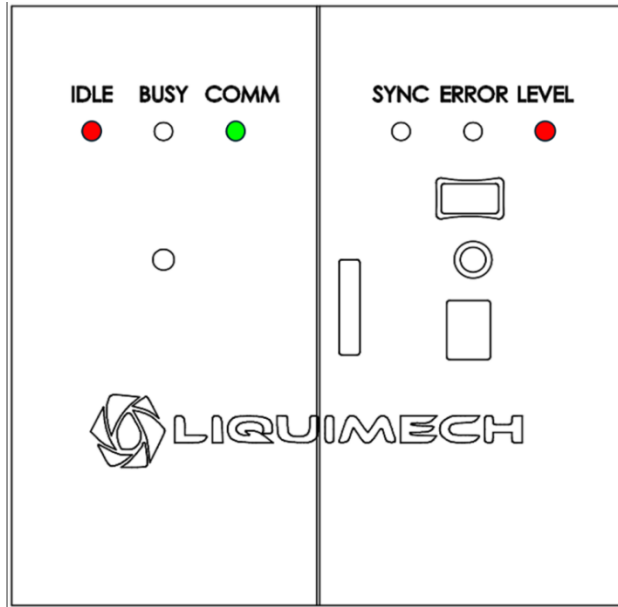


Figure 12: System at High Level.

When the 'Level Light' is accompanied by both the 'Sync' and 'Error' lights, it indicates that the tank is at a critically low level. The system will remain inactive until the tank is filled to approximately 15% above the critical low-level threshold.

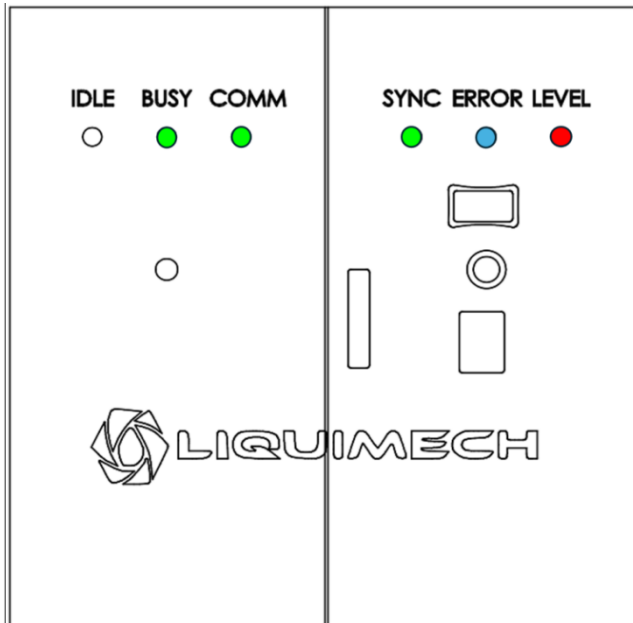


Figure 13: System at Critical LOW Level.

7. Offline Services

Accessing Device and Transferring Logs in Offline Mode

To utilise the offline functionality of the Liquimech app for accessing device data and transferring logs in the absence of server communication, follow these steps:

Step 1: Open the Liquimech App

Launch the Liquimech app on your device and navigate to the "Offline Functions" section.

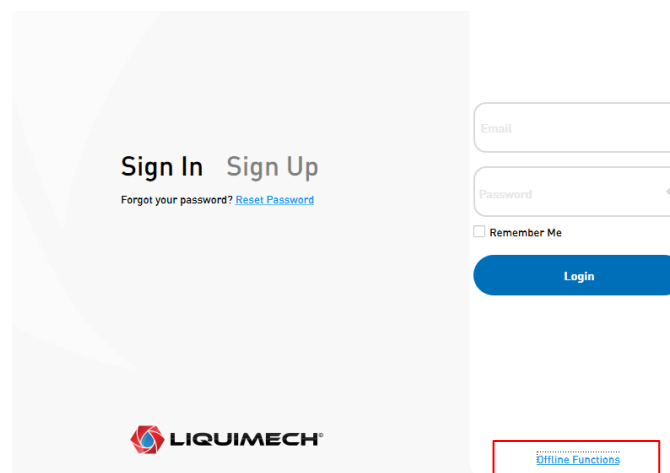


Figure 14: Liquimech App Login Screen

Step 2: Select Operation

Choose the desired operation from the options displayed within the offline function's menu.

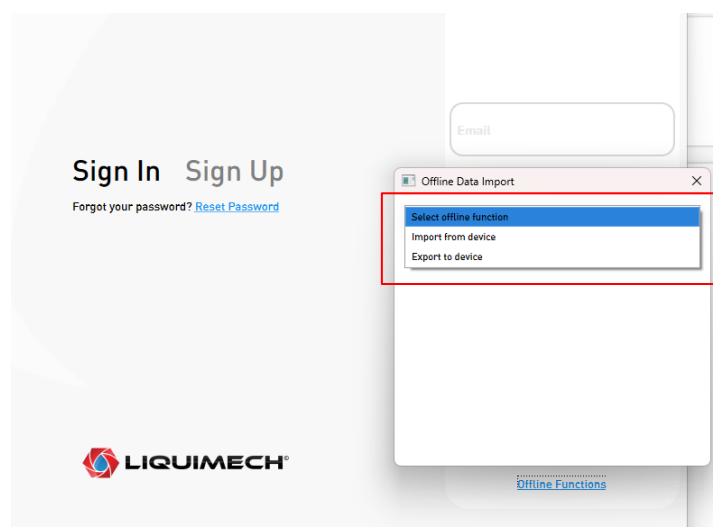


Figure 15: Liquimech App operation selection menu.

Step 3: Select Medium for Transfer

You'll be prompted to select the medium through which the data transfer will occur.

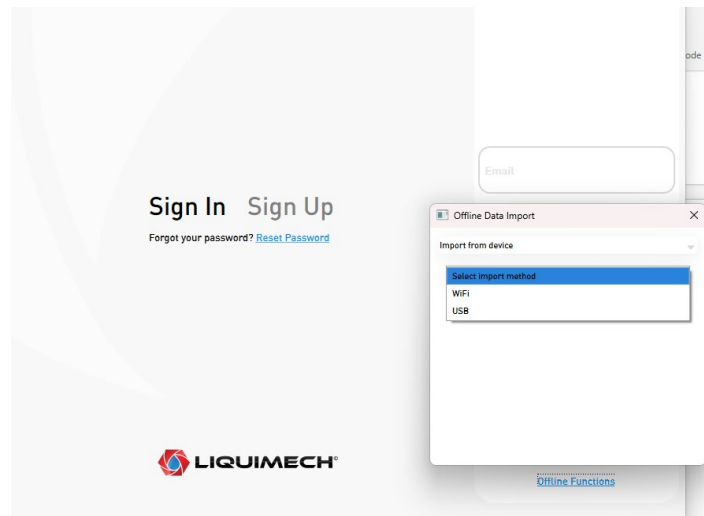


Figure 16: Liquimech App medium selection menu for transfer of data

Step 4: Enter Device Key and Import

Input the device key (follow the software manual for steps to generate the key) when prompted, then proceed to select the "Import" option to initiate the data transfer process.

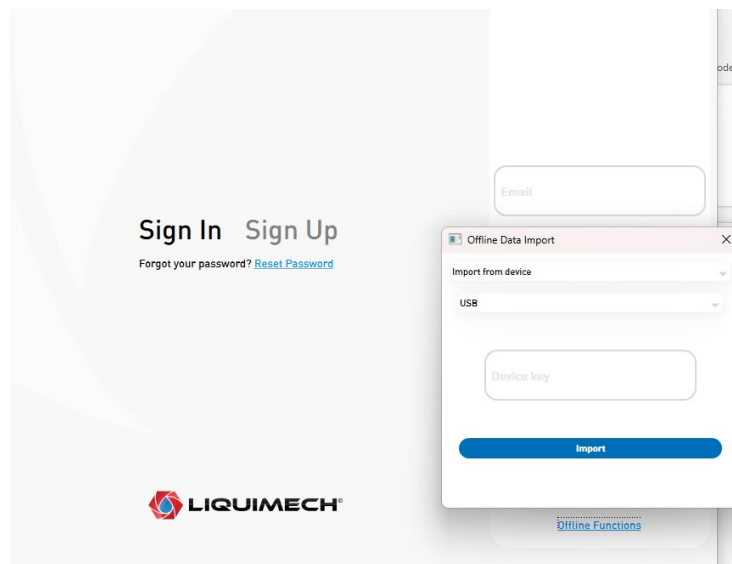






























Figure 17: Liquimech App Device key insertion section

Liquimech Fuel Management System Indicator Light Sequencing Guide

Pilot Light Indication	Description	Use device
System Ready 		
- On 	System is on IDLE State.	
-Off 	System not ready	
System Busy Light 		
- Solid On 	Access Granted with access granted tone.	
	Device is Locked	
-Blinking two time 	Access denied with access denied tone	
Comm Light 		
- Solid On 	Connected to the network.	
- Off 	No comm with network/Failed to send message	
Sync on process 		
- On 	Syncing in Progress.	
Error State 		
- Solid On 	No connection with Swipe Card Reader	
	No comm with Data logger	
	Log failed to save on Data logger	
Level Lights 		
-Solid On 	Fuel level above high threshold	
- (level light, error light, sync ON)	Fuel level below the low-level threshold	

8. Troubleshooting

In the event of system errors or malfunctions, follow these troubleshooting steps:

<p>Error 1: (Error Pilot Light ON)</p>	<p>Proper power supply should be ensured, and inspection for physical damage or loose connections should be conducted. If this error persists, contacting the supplier is recommended.</p>
<p>Error 2: (Error Pilot Light ON)</p>	<p>Assistance should be sought from the supplier to address the problem with the data logger as indicated by this error.</p>
<p>Error 3: (Comm Pilot OFF)</p>	<p>Verify SIM balance, activation status, card insertion, network coverage, and verify APN settings if needed.</p>
<p>Error 4: (Level, Error, and Sync Pilot Light On the same time)</p>	<p>Monitor tank levels attentively and alert the server when the tank level reaches a critical LOW to prevent pump depletion. Ensure the tank is refilled to at least 20% above the low-level threshold.</p> <p><i>Note:</i> The comm light may be ON or OFF based on network status. If connected, four pilot lights will be illuminated; otherwise, three lights will be On.</p>
<p>Error 5: (Level Light On with alarm for 10 sec, and Light stays ON)</p>	<p>Maintain vigilant monitoring of tank levels and activate the high-level alarm for 10 seconds, simultaneously notifying the server. This action will trigger a flag to activate the buzzer. If the level does not decrease by 20%, the buzzer will not activate again, even if the tank level remains above the high-level threshold. The level must drop within this range to reset the flag.</p>
<p>Error 6: (Out of Sync error)</p>	<p>Assistance should be sought from the supplier to address the out-of-sync issue as indicated by the error.</p>

9. Maintenance

Regular maintenance helps ensure the longevity and reliability of your system:

- Regularly check the battery's condition and ensure the connection of battery terminals.
- Keep SIM card slots clean and free from debris to prevent connectivity issues.
- Change the battery of the float alarm every 6 months.

10. Safety Precautions

To ensure safe and proper operation of the Liquimech Fuel Management System, adhere to the following safety precautions:

- Avoid opening or modifying system components unless authorized and qualified to do so.
- Handle SIM cards with care to prevent damage.
- Protect the system from moisture and extreme temperatures to prevent damage.

11. Contact Information

For further assistance or inquiries regarding the Liquimech Fuel Management System, please contact our customer support team at [1300 954 202].

12. Disclaimer

The Liquimech Fuel Management System is intended for industrial use only. Use the system in accordance with the provided instructions to ensure safe and effective operation.

Liquimech shall not be held liable for any damages or injuries resulting from misuse or unauthorized modifications to the system.



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