# perma STAR VARIO LONG RANGE
Pocket Guide
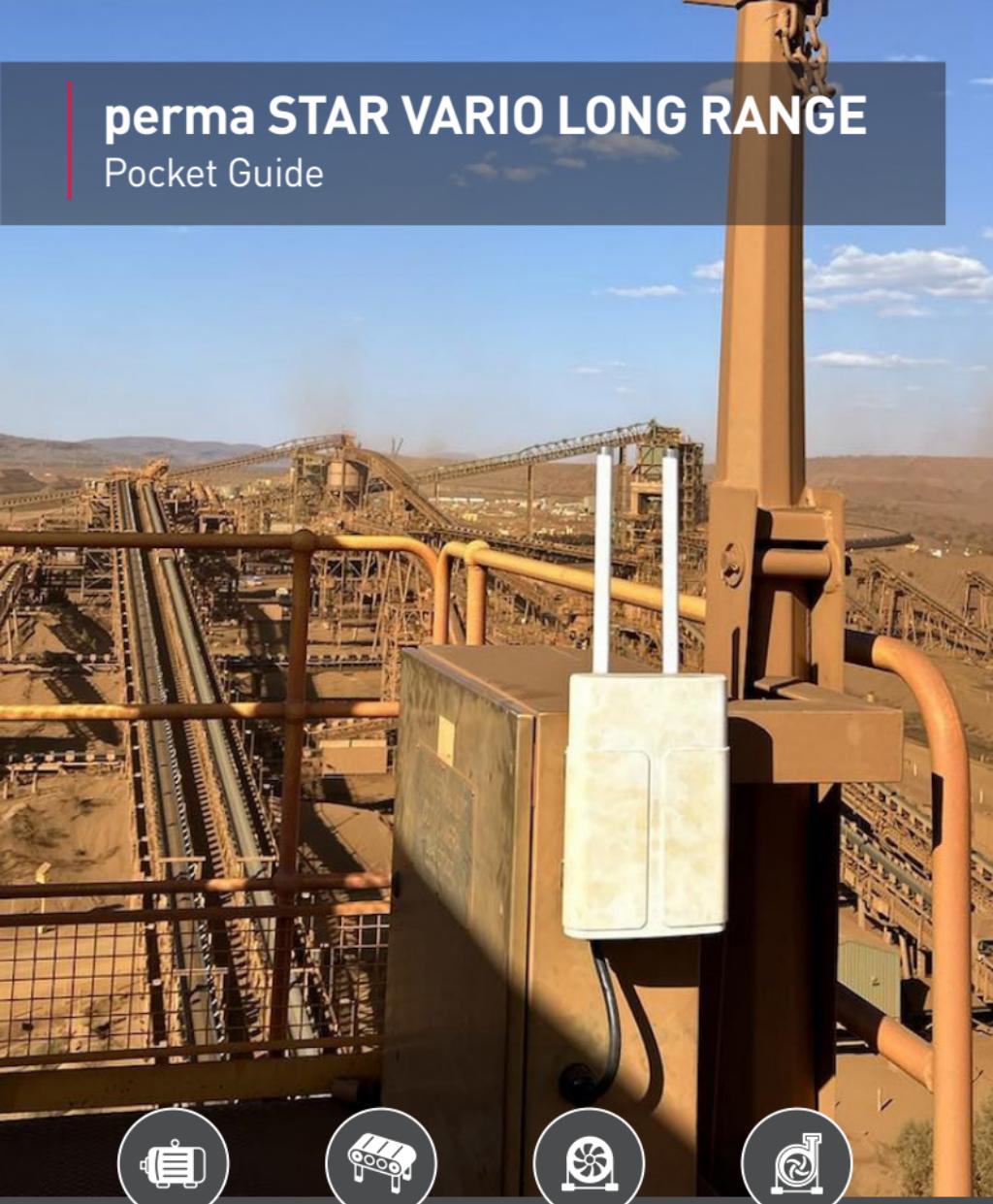
The Expert in Lubrication Solutions

perma

# General Information
Other Drive Types

The operation of the perma STAR VARIO LONG RANGE lubrication system via the SET button, lubrication rates and general handling instructions are identical to other perma STAR VARIO products. For detailed instructions on manual operation of the perma STAR VARIO LONG RANGE lubrication system, refer to the perma STAR VARIO pocket guide.

General Information
System Design & Architecture

The perma STAR VARIO LONG RANGE system consists of four components, as described below

1 **perma STAR VARIO LONG RANGE lubrication systems** - Smart automatic single-point lubricators with built-in LoRa® connectivity.

2 **Gateway LONG RANGE** - LoRaWAN® gateways that relay messages between the perma STAR VARIO LONG RANGE lubricators and the perma LoRa Network Server (LNS).

3 **perma LoRa Network Server (LNS) & perma CONNECT database** - The perma LNS receives, decrypts, and processes the messages, which are then addressed, stored and managed in the perma CONNECT database.

4 **perma CONNECT App** - User interface / dashboard for remote monitoring and control of the perma STAR VARIO LONG RANGE lubrication systems. Free to use and available via smart device app or desktop web browser.
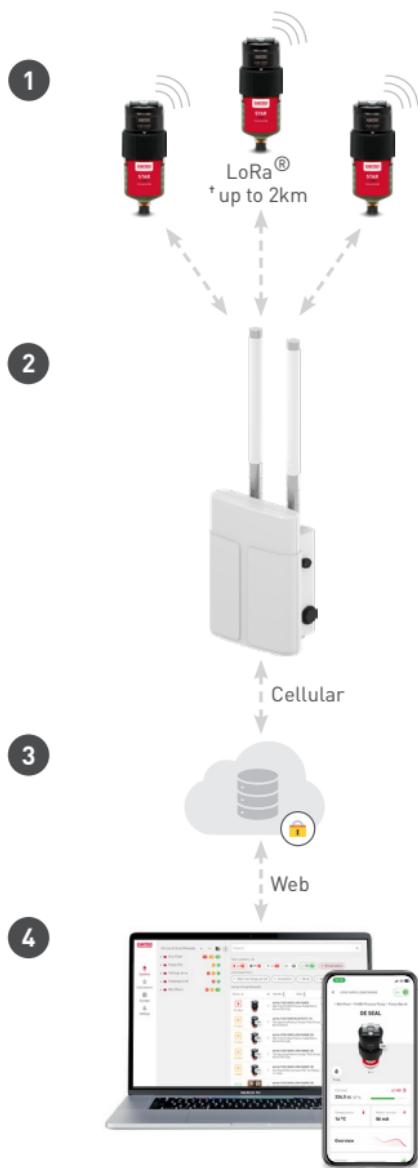
1

LoRa®
† up to 2km

2

Cellular

3

Web

4

Gateway LONG RANGE
Set-up & Installation

The Gateway LONG RANGE is a plug-and-play system that is pre-configured by perma. There is no need to attempt to connect to, configure, or modify the gateway in any way. **Do not press the physical "reset" button on the gateway as this will result in a complete factory reset.**

For the gateway to become operational, all that is required is for the user to:

> Physically mount/install the gateway in a location with a strong cellular coverage.

> Provide the correct power supply to the gateway.

Follow the below steps to successfully activate the Gateway LONG RANGE:

1. Packing List:

Before you begin the gateway installation, check the package contents to verify you have received all the below items.


1 x Gateway LONG RANGE	1 x PoE Injector	1 x Mounting Bracket	Mounting Equipment	1 x Ethernet Cable
1 x Antenna Coaxial Cable	1 x RJ45 Cable Gland	1 x Short Mounting Kit Board	2 x External Antennas	1 x M12 DC Power Cable
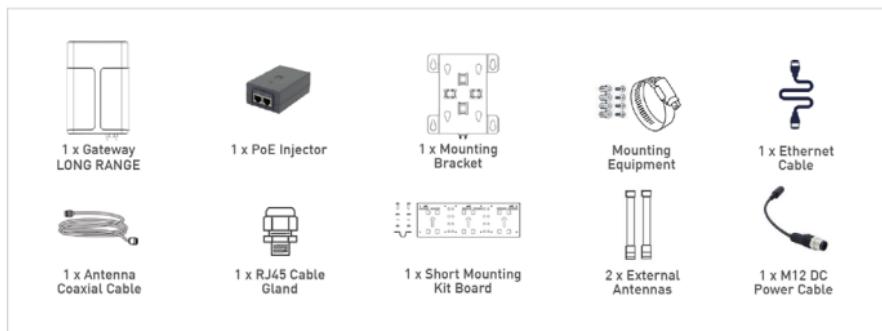
2. Power Supply Method:

Decide on power supply method. The Gateway LONG RANGE has two power supply options:

12V DC via provided M12 Connector

M12 Plug Pin Diagram

12 V DC via M 12 Plug
(max 4.8W power consumption)

Pin	Colour	Description
1	Black	GND
2	White	Reserved
3	Yellow	Reserved
4	Red	+12 V

802.3af Standard PoE via provided PoE injector

Note - Ethernet cable between gateway & PoE injector to be connected to the "Data & Power"port on the PoE injector. Do not connect Ethernet cable to the "Data" port.

GPO
240 V Single Phase

Ethernet Cable
(Power & Data)
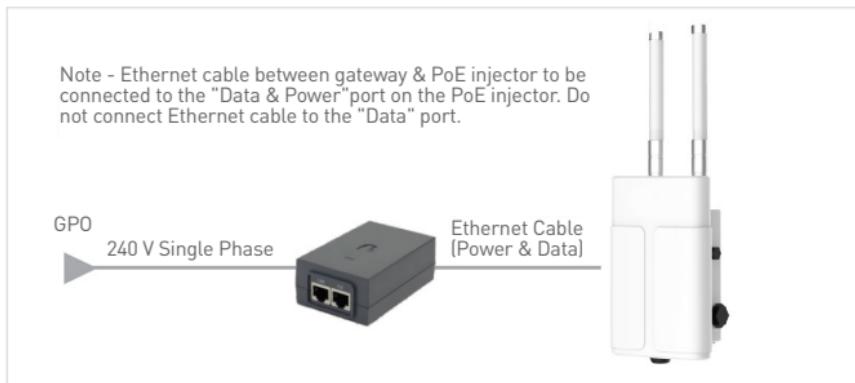
3. Identify suitable mounting locations based on the following criteria:

    a) Maximise cellular signal strength (Telstra).

    b) Minimise obstructions between the gateway and where the lubricators will be installed.

    c) Minimise distance from available power supply.

    d) The gateway is IP67 rated and does not require protection from the elements. However, if powered via the PoE injector, this component requires mounting within a weather-proof enclosure.

4. Determine mounting method:

The Gateway LONG RANGE can be mounted in the following ways:

Wall/Surface mount

Pole/Rail mount

5. Prepare ancillary/miscellaneous items:

The following items may be required to complete a best practice installation.

> a) Electrical conduit.
>
> b) Electrical enclosure to mount PoE injector (if applicable).

6. Assemble, install and check gateway:

> ✅ Install both external LoRa antennas.
>
> ✅ Mount gateway utilising provided mounting attachments.
>
> ✅ Provide power supply to gateway.
>
> ✅ After a few minutes, check the LED's on the underside of the gateway to ensure all 3 are green.

Success! Your gateway is now operational. It is now time to create your perma CONNECT company and start onboarding your STAR VARIO LONG RANGE lubrication systems.

perma CONNECT
Registration & Set-up

The perma CONNECT dashboard is utilised to monitor and control your perma STAR VARIO LONG RANGE lubrication systems. The perma CONNECT dashboard is free to download and use on desktop or smart devices.

It is recommended to:

> Utilise the smart device app to onboard your perma STAR VARIO LONG RANGE lubrication systems into perma CONNECT.

> Utilise the desktop version to build your company structure, monitor and control your perma STAR VARIO LONG RANGE lubrication systems.

The following sections outline the steps required to register a new account and start setting up your company structure.

1. Download and install the app on your smart device:

The smart device app is available to download from the App Store or Google Play.

App Store

Google Play

2. Joining a company:

If someone within your organisation has already created a company within the perma CONNECT app, they will need to invite you to this company.

Once invited, you will receive an email.

> Follow the link in the email to register your account.

> When registering, ensure you use the same **email address** and input the same **company name** that was specified in the email invitation.
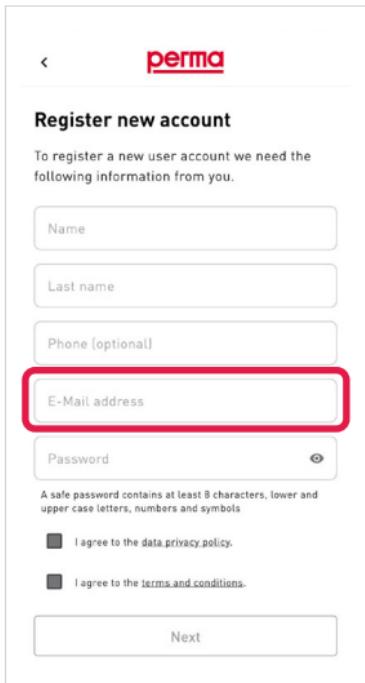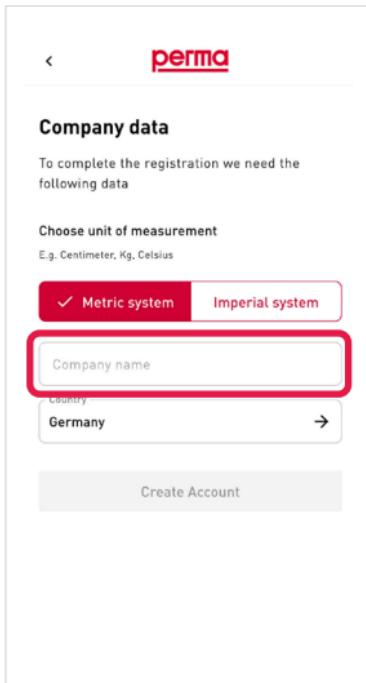
3. Creating a company:

If you are the first person in your organisation to register an account, open the perma CONNECT app or webpage and follow the prompts to register a new account.

A new company will be created from the company name that you input during the registration process.

This company can now be used to house the lubrication systems you wish to monitor/control within perma CONNECT.

perma CONNECT
User Management

The CONNECT User Management page is used to invite new Users, remove existing Users, or change User roles within the company.

There is no limit on the number of users you can invite to your company and User roles can help manage user access levels.

The User which creates the company profile will automatically be assigned as an Owner. Only Owners can access User Management.

To access User Management:

> Navigate to the **Systems** tab.

> Click the "**...**" symbol next to the company name.

> Select **User Management** from the drop-down menu.
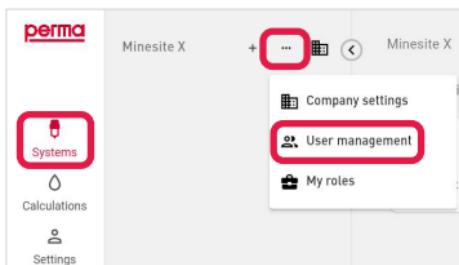
There are 4 levels of access that can be assigned in the User Management page. These are detailed below:

Owner	User	Changer	Guest
Full access. Can manage users and edit company structure.	Can create lubrication points and assign lubrication systems to these points.	Designed for lubrication techs. Can adjust system settings.	Read-only access. Can view systems and edit notes.
✅ Read data ✅ Exchange LC's ✅ Operate lubrication systems ✅ Edit lubrication systems & lubrication points ✅ Apply updates ✅ Edit company structure ✅ Create & assign tasks ✅ User rights management ✅ Invite users	✅ Read data ✅ Exchange LC's ✅ Operate lubrication systems ✅ Edit lubrication systems & lubrication points ✅ Apply updates	✅ Read data ✅ Exchange LC's ✅ Operate lubrication systems	✅ Read data

Alternatively, Users can be added under a specific sub-folder within a company to limit their access to this section only. To invite users to specific sub-folders within a company:

> Navigate to the **Systems** tab.

> Click the "**...**" symbol next to the desired sub-folder

> Select **User Management** from the drop-down.
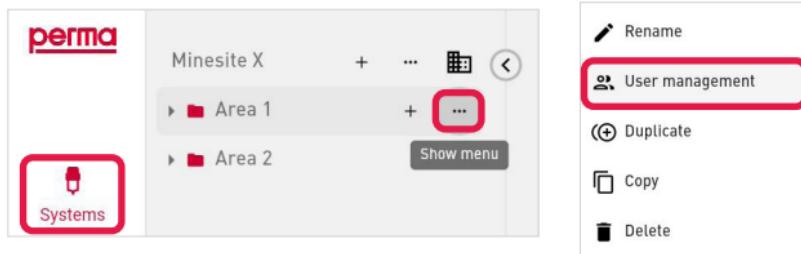
perma CONNECT
Building Your Company

Your company structure is fully customisable and should be built to suit your companies specific needs (e.g. utilising existing asset naming conventions).

It can consist of any combination of **Location**, **Application** or **Other** (sub-folder) units in which **Lubrication Points** are located at the lowest level.

Lubrication Systems, such as perma STAR VARIO LONG RANGE, can then be assigned to these Lubrication Points.

The easiest way to build your company structure is via the desktop web application version of perma CONNECT as outlined below:

> Access the web application - https://perma-connect.com/#/login

> The "**+**" symbol creates a new sub-folder/lubrication point.

> Click on the drop-down menu to select what to build.

> Name the new sub-folder/lubrication point.
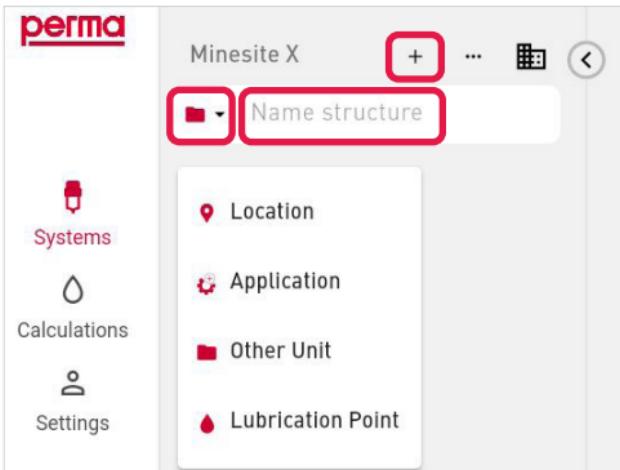
Clicking on the "**+**" symbol adjacent to a sub-folder will allow you to create units/lubrication points underneath this sub-folder. The example below shows another sub-folder being created underneath the "Area 1" sub-folder.

The "**...**" symbol adjacent to any sub-folder/lubrication point allows you to do the following actions:

> **Rename** the item.

> Enter the **User Management** page (sub-folders only).

> **Duplicate** generates an identical item in the same location.

> **Copy** allows the user to paste an identical item into any location.

> **Delete** the item.
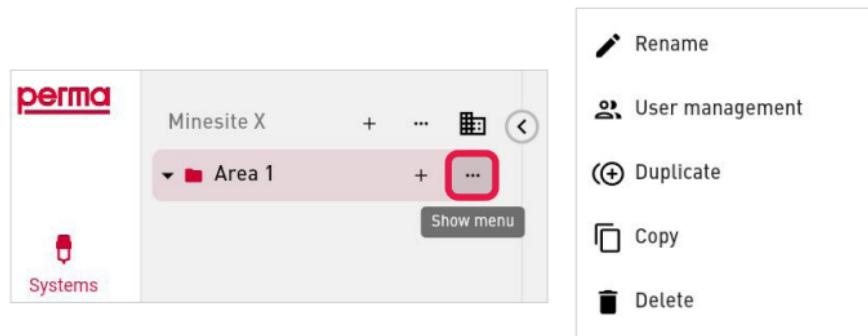
TIP - Play around with creating and moving around folders & lubrication points. Your company structure can always be modified later on if required.

perma CONNECT
Notifications

Automatic email notifications for your user profile can be set-up in Settings > Notifications:
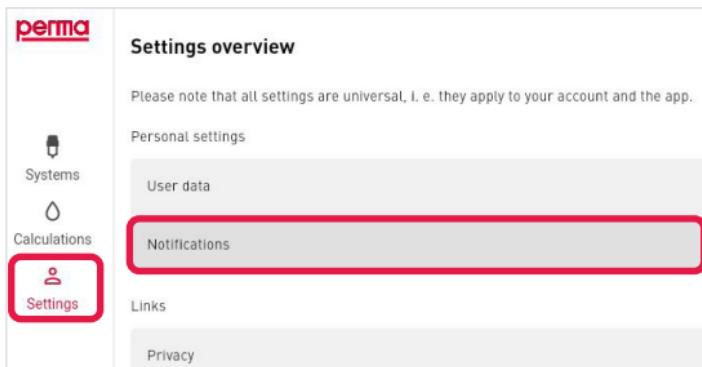
Notifications are not mandatory and can be turned ON or OFF at any time.

Two types of notification types are available, as described below:

1. Status updates - an email notification of all lubrication systems that have underlined transitioned into a state requiring action since the last status update notification.

2. Summaries - a complete email summary of the state of all lubrication systems.

perma CONNECT
Company Settings

The company settings page is accessible by Owners only. It can be accessed by clicking "**...**" symbol adjacent to your company name in the Systems tab as shown below:
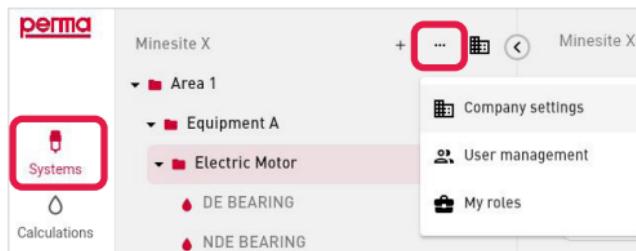
The following items can be edited under the company settings page:

1. Advanced warning time:

By setting an "Advanced warning time", systems that are coming up to an exchange will be flagged under the virtual status "Exchange Due Soon".

Example - Advanced warning time is set to 7 days. All lubrication systems that are within 7 days of requiring an exchange will be flagged with the virtual status "Exchange Due Soon".

2. Company details:

Company name and address details can be updated if necessary.

perma **CONNECT**
Onboarding Your perma STAR VARIO LONG
RANGE Lubrication Systems

NOTE - onboarding perma STAR VARIO LONG RANGE lubrication systems
is best completed on a smart device (mobile phone or tablet) via the perma
CONNECT app. This will allow you to utilise the QR code scanning function.

You can add perma STAR VARIO LONG RANGE lubrication system to any
lubrication point by following the steps outlined below:

1

Locations & structure

Minesite X

▾ Area 1

   ▾ Equipment A

      ▾ Electric Motor

         🌢 DE BEARING   **+** ···

         🌢 NDE BEARING

Show 0 results

Clear filter

2

Set-Up Assistant

In the next steps we will explain how to set up your
lubrication system.

LONG RANGE Lubrication Systems

perma
STAR VARIO LONG RANGE   >

Bluetooth Lubrication Systems

perma
STAR VARIO BLUETOOTH   >

perma
STAR VARIO BLUETOOTH EX   >

perma
ULTRA   >

Single-Point Lubrication Systems

perma
STAR VARIO   >

perma
STAR VARIO EX   >

3

**Assemble lubrication system**

Now put the parts together as shown in this
image.

Okay

☐ Don't show again

4

At this point, make sure you follow the procedures outlined in the
Appendix section (Page 22) to assemble and set the physical drive unit
prior to continuing in perma CONNECT.

5
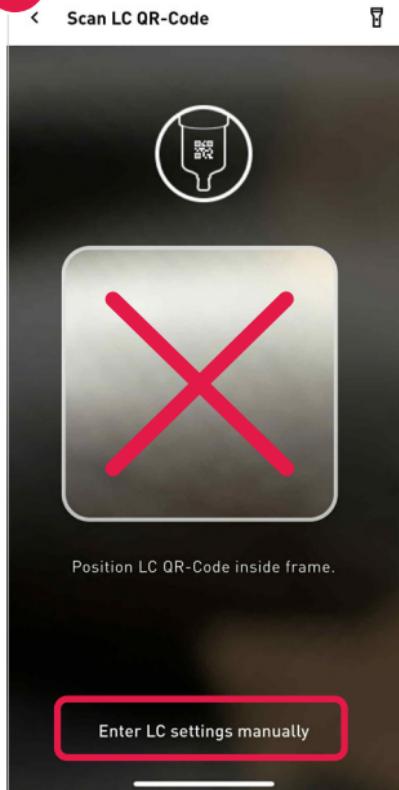
Do not scan at this stage of the process.

Instead select "Enter LC settings manually".

6
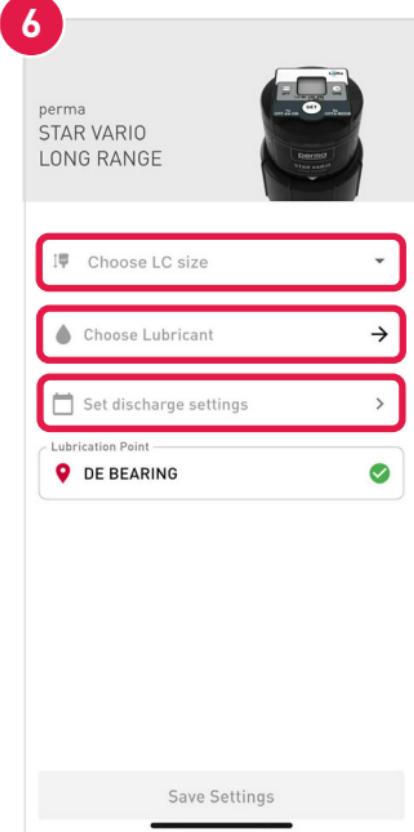
Input LC size, Lubricant, and Discharge settings.

7

perma
STAR VARIO
LONG RANGE

LC Size
STAR LC250

Lubricant
MOBIL POLYREX EM →

Discharge settings
48 weeks ✓

Lubrication Point
DE BEARING ✓

Save Settings

8

‹ STAR VARIO LONG RANGE OFF

Minesite X › Area 1 › Equipment A › Electric Motor

DE BEARING

250

IoT setup required (since today) ›

Fill level   LC 250
250 cc 100 %

Next exchange   -

📄 Information   ⌄

🕑 History   ›

📄 Note   ›
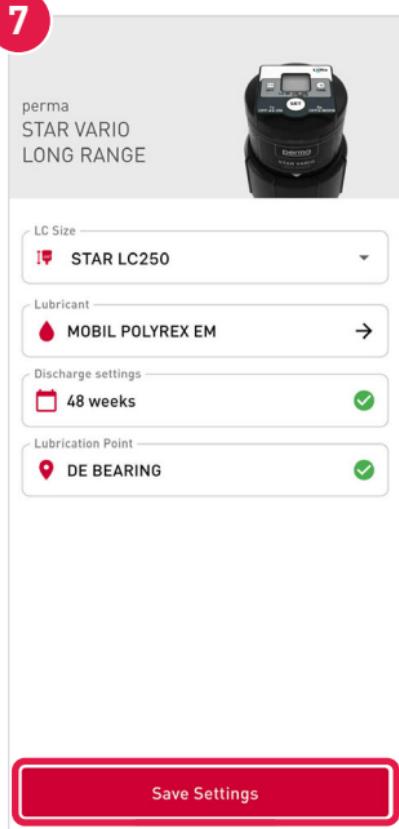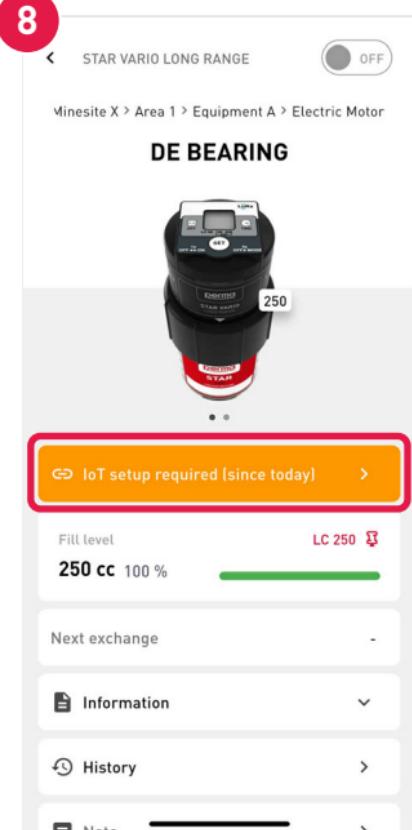
Select "Save Settings".

Select "IoT setup required".

9

Scan LONG RANGE QR-Code

Position LoRa QR-Code inside frame.

Enter lora system information manually

10

STAR VARIO LONG RANGE — OFF

Minesite X

DE Bearing

Purge

▶ Not started yet (since today) >

Gateway connection lost (since 2 d... >

⏳ Synchronisation pending (since to... >

Fill level — LC 250
250 cc 100 %

✓ Successfully assigned to LONG RANGE System. ✕
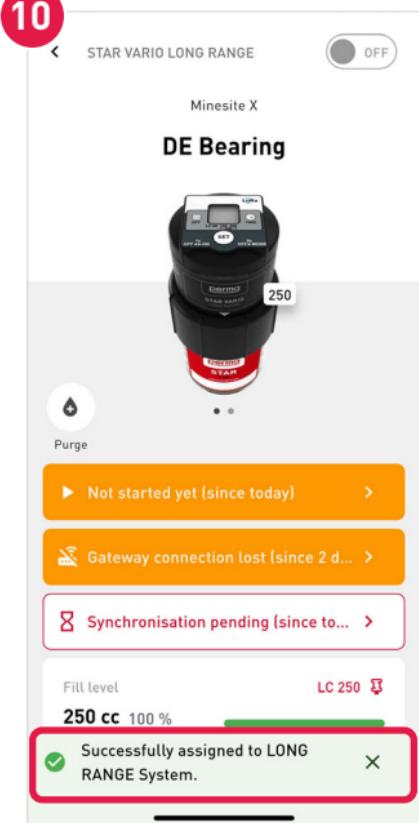
Scan your physical LoRa drive units QR code.

Your physical perma STAR VARIO LONG RANGE unit is now successfully assigned to this lubrication point.

11

If you are ready to commence lubrication, the lubricator can now be turned on using the physical SET button. Alternatively, if you want to commence the lubrication cycle at a later date, you can turn the lubricator ON via the perma CONNECT app at any time.

perma **CONNECT**
Monitoring Your Gateway LONG RANGE

Once your gateway is operational, and you have lubrication systems communicating with it, the Gateway LONG RANGE will be automatically populated into the gateway tab within perma CONNECT.

On the desktop version of perma CONNECT, the gateway tab can be accessed by utilising the toggle at the top right of the **Systems** page as depicted below:

Once your gateway appears in the list, you can press the **Claim Gateway** button to assign this gateway to your company. Once claimed, the gateway will no longer be visible in any other companies gateway tab.

From the gateway tab you can monitor the status of your gateways. You can also provide a name and specify certain details for each gateway that is communicating with you lubrication systems.

On the smart device application version of perma CONNECT, the gateway tab can be accessed directly from the **Systems** page as depicted below:
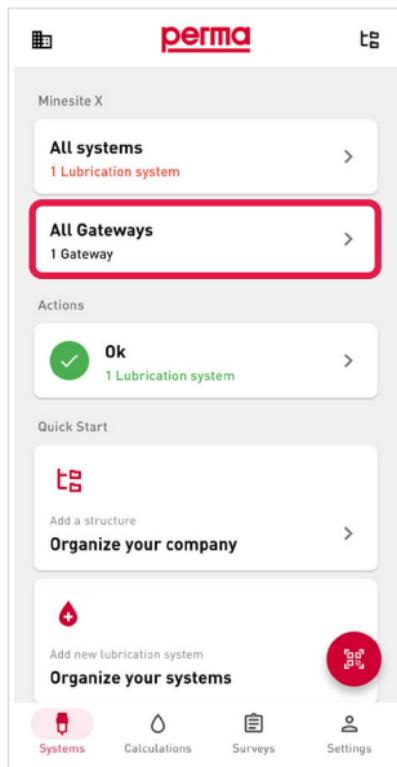
Appendix
Drive Set-up

The operation of the perma STAR VARIO LONG RANGE lubrication system via the SET button, lubrication rates and general handling instructions are identical to other perma STAR VARIO products. For detailed instructions on manual operation of the perma STAR VARIO LONG RANGE lubrication system, refer to the perma STAR VARIO pocket guide.

Battery Insertion
And Initial Assembly

The perma STAR VARIO LONG RANGE is set and controlled via a simple to navigate menu using a single SET button. The menu is intuitive and requires minimal manipulation after the initial setting.

Features which support simple operation and error minimisation include:

Initial set screen
A new lubricator displays $\boxed{00}$. This forces users to SET the time and Lubricant Cartridge (LC) size before the lubricator can be turned on.

Automatic restart
When the LC and battery set is changed the lubricator automatically restarts. There is no requirement to use the SET button when servicing lubricators.

1

Insert battery set into the underside of the DRIVE. It will click into place.

The DRIVE will perform a self-test, during which the LED system will change from red to green to orange and the drive motor will run continuously.

1 → 2 → CLICK! = OK 3 →
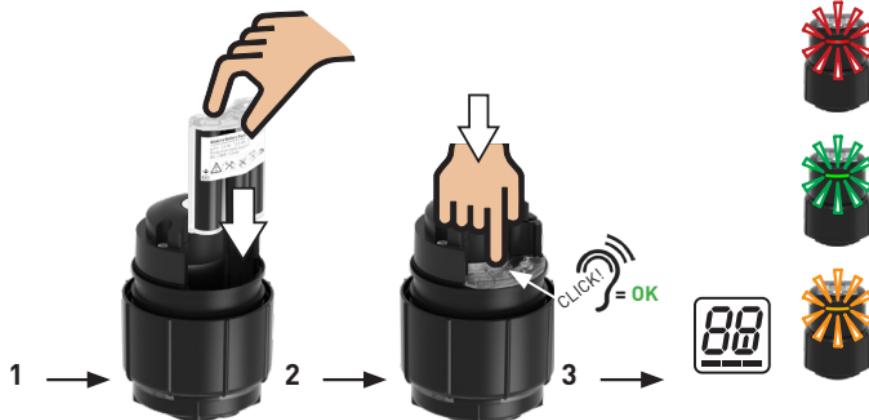
2

Place the DRIVE on top of the LC so that the socket of the DRIVE engages correctly with the hexagonal head of the LC spindle.

Secure it by rotating the collar until it comes to its stop point.

When correctly assembled the white triangle markings around the DRIVE will be visible as shown.

OK
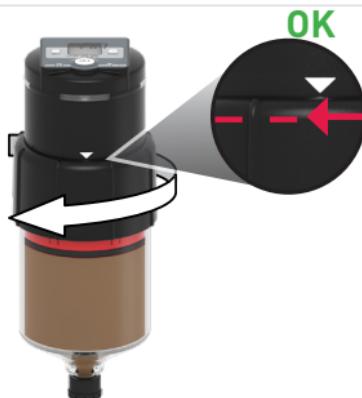
Setting
For The First Time

The LC SIZE, TIME interval type (months or weeks) and TIME setting must be assigned for each new DRIVE before first use.

1

Insert a new battery set. The lubricator will perform a self-test and display $\boxed{00}$.

$\boxed{00}$ = **New DRIVE which has not been set**

2

The lines at the bottom of the display indicate the SIZE options of 60, 120, 250 and 500cm^3. Press the SET button for 5 seconds and the lines will begin to flash. Release and press the SET button to scroll through the SIZE options. Stop at the required size.
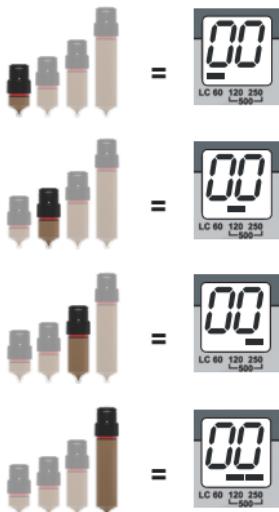
3

After assigning LC SIZE, wait for 'm' (months) to be displayed. Press the SET button to toggle between 'm' (months) and 'w' (weeks). Stop at the required TIME interval type.

4

Press and release the SET button to scroll through the TIME options. Stop at the required setting.
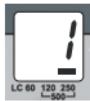
5

Wait for the screen to go to the OFF status ⊡ .

Press the SET button for 1 second to turn the lubricator ON.

The setting will be displayed and after 8 seconds the lubricator will perform an initialisation run cycle.
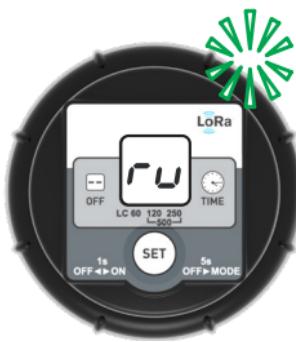
At the end of the run cycle the display will return to the allocated setting.

Example - 120cm^3 set to 3 months.

Dispensing Rates
Weekly Settings

| Time setting, weeks	Daily dispensing rate, cm³ per day			
	60cm³	120cm³	250cm³	500cm³
1	8.57	17.14	35.71	71.43
2	4.29	8.57	17.86	35.71
3	2.86	5.71	11.90	23.81
4	2.14	4.29	8.93	17.86
5	1.71	3.43	7.14	14.29
6	1.43	2.86	5.95	11.90
7	1.22	2.45	5.10	10.20
8	1.07	2.14	4.46	8.93
9	0.95	1.90	3.97	7.94
10	0.86	1.71	3.57	7.14
11	0.78	1.56	3.25	6.49
12	0.71	1.43	2.98	5.95
13	0.66	1.32	2.75	5.49
14	0.61	1.22	2.55	5.10
15	0.57	1.14	2.38	4.76
16	0.54	1.07	2.23	4.46
17	0.50	1.01	2.10	4.20
18	0.48	0.95	1.98	3.97
19	0.45	0.90	1.88	3.76
20	0.43	0.86	1.79	3.57

This dispensing rate data applies to the perma STAR VARIO product range. Details on the dwell time between lubricant delivery cycles are available upon request.

Time setting, weeks	Daily dispensing rate, cm³ per day			
	60cm³	120cm³	250cm³	500cm³
21	0.41	0.82	1.70	3.40
22	0.39	0.78	1.62	3.25
23	0.37	0.75	1.55	3.11
24	0.36	0.71	1.49	2.98
25	0.34	0.69	1.43	2.86
26	0.33	0.66	1.37	2.75
28	0.31	0.61	1.28	-
30	0.29	0.57	1.19	-
32	0.27	0.54	1.12	-
34	0.25	0.50	1.05	-
36	0.24	0.48	0.99	-
38	0.23	0.45	0.94	-
40	0.21	0.43	0.89	-
42	0.20	0.41	0.85	-
44	0.19	0.39	0.81	-
46	0.19	0.37	0.78	-
48	0.18	0.36	0.74	-
50	0.17	0.34	0.71	-
52	0.16	0.33	0.69	-

Dispensing Rates
Monthly Settings

This dispensing rate data applies to the perma STAR VARIO product range. Details on the dwell time between lubricant delivery cycles are available upon request.

| Time setting, months	Daily dispensing rate, cm³ per day			
	60cm³	120cm³	250cm³	500cm³
1	2.0	4.0	8.3	16.45
2	1.0	2.0	4.2	8.22
3	0.67	1.3	2.8	5.48
4	0.50	1.0	2.1	4.11
5	0.40	0.80	1.7	3.29
6	0.33	0.67	1.4	2.74
7	0.29	0.57	1.2	-
8	0.25	0.50	1.0	-
9	0.22	0.44	0.93	-
10	0.20	0.40	0.83	-
11	0.18	0.36	0.76	-
12	0.17	0.33	0.69	-

perma CONNECT
Other Features

Identifying your perma STAR VARIO LONG RANGE lubrication system:

There may be some circumstances where you may not know where a physical perma STAR VARIO LONG RANGE lubrication system is assigned within your company, and therefore not know which specific lubrication point it should be installed on.

In order to identify where this physical unit is assigned in perma CONNECT, follow the steps outlined below (to be completed on your smart device):
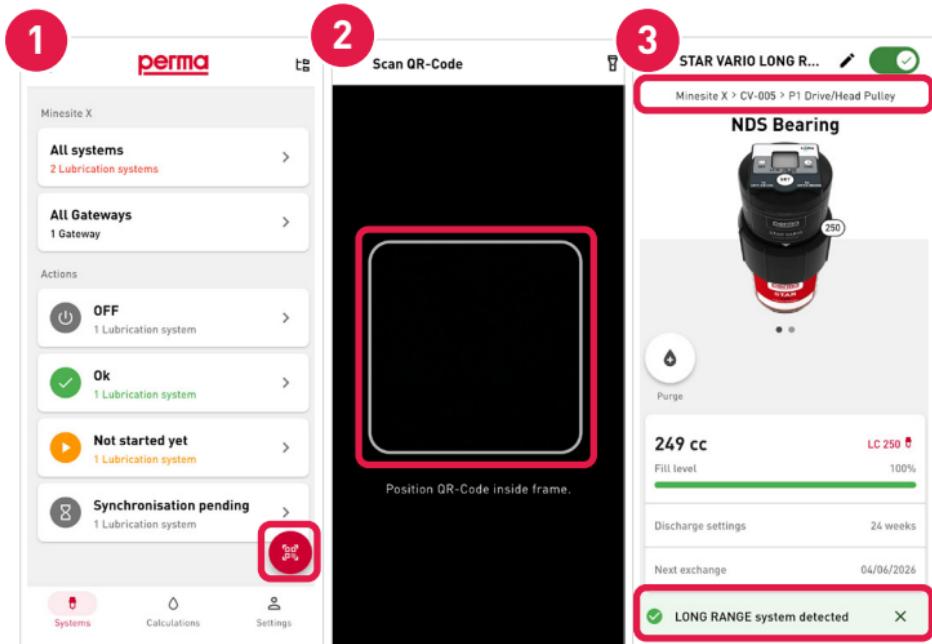
Click the circular red scan button at the bottom right of the home page.

Scan the physical drive units QR code.

If the drive unit is assigned in your company, you will be redirected to this lubrication systems page.

**Scan for more
information**