



enLink[®] OdourSense

USER GUIDE

LoRaWAN Washroom odour monitor



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enLink OdourSense User Guide

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enLink OdourSense

LoRaWAN Washroom odour monitor

Synetica's enLink OdourSense is a specialist washroom monitoring solution designed to accurately detect and quantify odour levels in real time. Built on Synetica's proven monitoring technology, this advanced unit incorporates a highly sensitive odour sensor capable of detecting the key gases responsible for unpleasant washroom environments.

Designed and manufactured in the UK, enLink OdourSense delivers actionable data on washroom conditions, enabling facilities teams to improve hygiene standards, optimise cleaning schedules and enhance user experience.

Traditional air quality monitoring in washrooms often relies on ammonia detection, which does not correlate well with perceived odour. The most noticeable and objectionable washroom odours are caused by compounds detectable at extremely low concentrations, including methyl mercaptan, dimethyl sulfide, hydrogen sulfide and trimethylamine. enLink OdourSense directly targets these compounds, providing a true representation of human-perceived odour, not just air composition.



enLink OdourSense:

- Advanced odour detection targeting key washroom gases
- Detects compounds at extremely low concentrations (ppb levels)
- Battery or externally powered (12–24V DC)
- Built in sensors for:
 - Temperature (°C)
 - Humidity (%RH)
 - Volatile Organic Compounds (VOC's)
 - Barometric Pressure (Pa)
 - Odorous gases
 - Light level (lux)*
 - Motion (PIR)*
- Optional sensors for enhanced environmental monitoring
- Discreet, modern design suitable for any washroom environment
- Subscription-free data access and simple integration
- Easy configuration via USB/downlink
- LoRaWAN™ wireless, up to 16km range

Features

- Multiple sensor options*
- Frequency range 863-870MHz*
- Frequency range 902-928MHz*
- Up to +18dBm Tx power
- Dimensions 80 x 120 x 25mm
- UKCA, CE, FCC, RoHS compliant
- Made in the UK
- Works with WELL licensed

**Option / model dependent*

1. Introduction

enLink OdourSense accurately measures multiple environmental parameters including room temperature, humidity, VOC's, barometric pressure, odorous gases, light level* and motion*.

Readings are transmitted to the cloud using long range LoRa® wireless, where the data can be displayed and analysed.

Designed for integration within modern smart buildings, enLink OdourSense connects seamlessly to existing infrastructure via LoRaWAN® for long-range, low-power operation. The system is fully compatible with BMS and IoT platforms via BACnet IP and MQTT, enabling predictive, demand-led cleaning and airflow strategies that optimise operational efficiency and resource allocation. The unit can be either externally or battery powered for maximum flexibility.

A built in USB port allows all parameters including air quality data, wireless signal strength and wireless network configuration to be viewed and set using simple menus via any USB enabled host such as a PC or Mac.

**Option / model dependent*

#Dependent on factors such as transmission interval

2. Configuration

LoRa devices can be configured using OTAA (Over-the-Air-Activation) or ABP (Activation-by-Personalisation).

OTAA is the most secure way to connect a device to the LoRa network. In OTAA, the device performs a Join-procedure with the network, during which a dynamic DevAddr (device address) is assigned and security keys are negotiated with the device.

ABP allows you to set the DevAddr as well as the security keys in the module. This is simpler than OTAA as there is no Join procedure, however, it is less secure than OTAA.

This guide will illustrate using OTAA as it is the most secure and flexible method.

The OTAA configuration requires the following parameters to be correctly set:

- DevEUI: End-device Identifier. It is unique for every device and is set at device manufacture.
- AppEUI / JoinEUI*: Application Identifier. Used to identify the end application.
- AppKey: Application Key. Used to create the session keys.

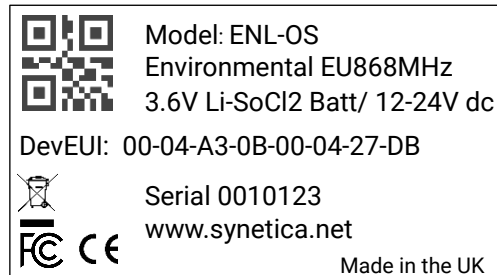
**Note: In LoRaWAN 1.1, AppEUI was renamed to JoinEUI.*

For many applications Syntetica can supply enLink OdourSense units with the AppEUI and AppKey pre-configured, so providing the LoRa gateway has the matching values, the join process will happen automatically once the OdourSense unit is in wireless range and switched on.

The DevEUI is always set at device manufacture and is unique. The device AppEUI and AppKey can easily be set via the USB connection if required and the process is detailed later in this document.

3. Join enLink Devices to the LoRa Network

enLink devices in wireless range and with the correct AppEUI and AppKey settings will automatically join the LoRa network when they are first powered up.



enLink OdourSense Unit Label

The unique **DevEUI** is printed on all enLink devices and is also present in the QR code. The **DevEUI** can be used to identify the device once joined to the network.

4. Powering the Unit

To power the device ON, slide the power switch to the EXT position and insert the 4 x AA sized Lithium 3.6V batteries taking great care to insert them the correct way around. Locate the plus (+) and minus (-) signs on the battery and use the plus (+) and minus (-) guides on AA battery holders to insert the batteries in the proper direction. All four batteries face in the same direction.

Be sure to insert the minus (-) end first and remove the plus (+) end first when replacing the batteries.



Lithium batteries have very high energy capacity and a great degree of care should be exercised to ensure that all batteries are new, from the same manufacturer, installed the correct way around and are not damaged in any way. Refer to section 12 (Battery Installation / Replacement) for more details.

Check that the batteries are correctly inserted and then slide the power switch to BATT.

Alternatively, the unit can be externally powered from a PSU with 12V to 24V DC (rated 200mA or greater). See section 11 for more information on externally powering the unit. Apply correct power to the unit, carefully observing the polarity and slide the power switch to EXT.

Note that the unit can only be battery powered or externally powered. When the switch is in the BATT position, any external power source is automatically disconnected. When in the EXT position, the batteries are automatically disconnected.

To power the device ON, remove the rear cover of the enLink OdourSense by inserting a small screwdriver blade into the slots on the bottom of the unit as shown below.



Cover Removal

Locate the power switch and using small screwdriver gently slide the power switch towards the BATT position marked on the unit as shown, or apply external power (12V-24V DC) to the unit and slide the power switch to EXT.



EXT
↕
BATT
Power Switch

Switch to the BATT Position

Once powered ON, the enLink device will send a Join request message to the gateway. The Status LED will blink RED as shown below whilst the Join process is taking place. Depending on factors such as signal strength, RF interference etc. the Join process may take several seconds to complete.



Blinking Red LED – Attempting Join

When the device has successfully joined the network the Mode LED will blink GREEN for several seconds to show that the Join has been completed. The LED's will then switch off to conserve the batteries.

5. Setting / Changing the enLink LoRa Keys

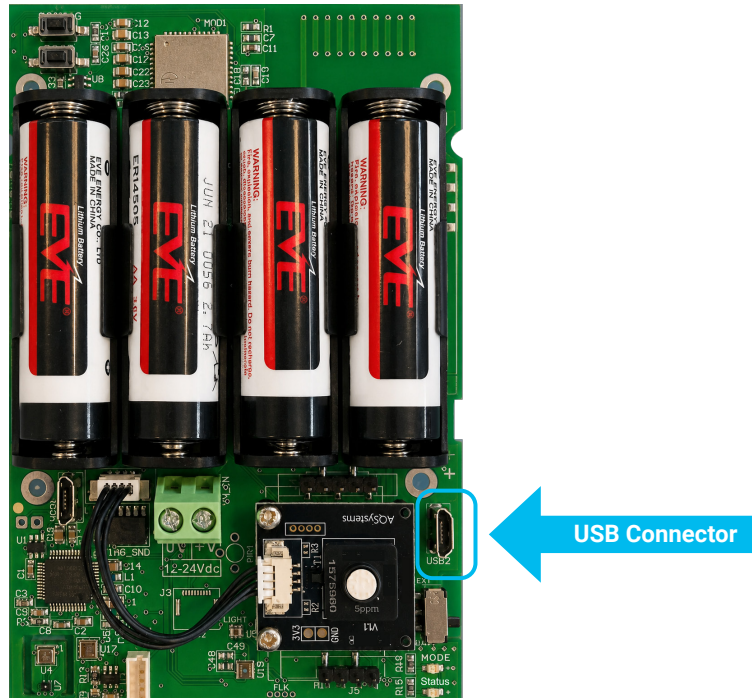
For many applications, Synetica can supply enLink OdourSense units with the LoRa **AppEUI** and **AppKey** parameters preconfigured to your requirements, whereby if the LoRa gateway has matching keys the join process will happen automatically once the OdourSense unit is in wireless range and switched on.

The DevEUI is always set at device manufacture and is unique. The device **AppEUI** and **AppKey** can easily be set via the USB connection as detailed below.

Remove the enLink OdourSense board from its enclosure as shown previously. Take care when removing the board from the front part of the enclosure and only use the slots provided at the bottom of the board to gently lift the board up and out of the enclosure.

Connect a micro USB cable to the enLink unit.

There are two USB connectors on the enLink OdourSense, so be sure to connect to the correct USB port as shown in the image below.

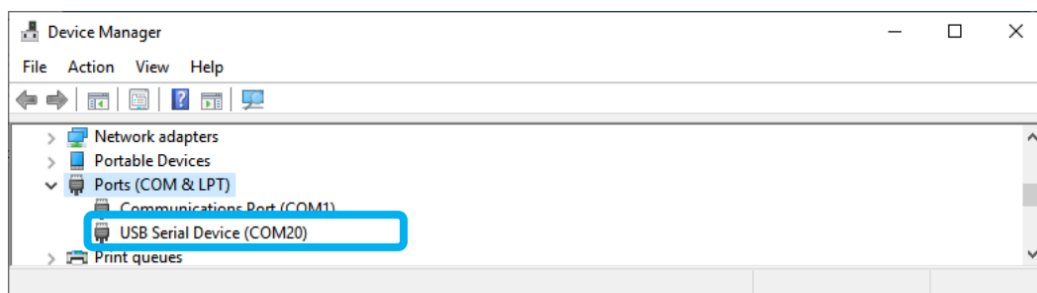


The device will attach to a COM port on your PC.

Using a terminal program (e.g. TeraTerm <https://github.com/TeraTermProject/teraterm/releases>) connect to the COM port used by the enLink device.

See Synetica document “Configuring enLink Devices Using Serial Terminal Applications” for more details, including using PuTTY and serial applications that will operate on Apple and Linux computers.

To verify which COM port is being used, check the Windows™ Device Manager (In Windows - Click the Start button, type device manager into the search box and tap Device Manager on the menu.) Expand the Ports (Com & LPT) menu as shown below.



In your terminal program press the **Enter** key. An enLink summary screen will appear as shown below. The default password is the last four digits of the displayed **DevEui**, in the screen below this is 1c11.

```

-----
Synetica - enLink :: Wireless Sensor Networks
-----
Region:      European band on 868MHz
Firmware Code: FW-ZNP-LVG
Firmware Ver: 7.21
Description:  enLink ZonePlus - Environmental Sensors
DevEui:      00-04-a3-0b-01-34-1c-11
-----

Password: ****

```

enLink Logon Screen

The screen below will show with the enLink Main Menu options. Enter **Q** to enter the **Quick Start Menu**.

```
enlink Main Menu:
=====
Q - Quick Start Menu
L - LoRa Radio Settings
C - Configure Device
P - Password and Security
T - Test Mode
R - Reboot
X - Log off

Select an option: 
```

enLink Main Menu

The **Quick Start Menu** contains only the parameters that normally need to be configured to setup the device and join the LoRa network. From the Quick Start Menu you can change the **AppEUI** and **AppKey**.

```
enlink Quick Start Menu:
=====
Status                               Joined 1m 15s ago
Join Check in                        18s

E - AppEui                           53-79-6E-00-00-00-00-00
K - AppKey                           9E-26-01-37-FD-08-4B-7C-92-C6-62-6F-25-A3-22-09
T - Transmit Interval                5 mins
X - Exit Menu

Select an option: 
```

Quick Start Settings Menu

From the **Quick Start Settings Menu**, access the **AppEUI** setting by entering **E**. Enter the 16 character **AppEUI** using numbers and letters A to F. Do not include spaces or any other characters. Pressing **S** will enter the default **AppEUI** which you can then edit. Press **Enter** when the key is correctly entered to return to the **Quick Start Settings Menu**.

```
Select an option: e
Current Setting: AppEui = 53-79-6E-00-00-00-00-00

Enter a new 16 character EUI using only numbers and the letters A to F (no separators)
Hit <S> to enter the default value: 53-79-6E-00-00-00-00-00
-----
New EUI: 53796E0000000000
```

AppEUI Setting

From the **Quick Start Settings Menu** access the **AppKey** setting by entering **K**. Enter the 32 character **Appkey** using numbers and letters A to F. Do not include spaces or any other characters. Pressing **S** will enter the default **AppKey** which you can then edit. Press **Enter** when the key is correctly entered to return to the **Quick Start Settings Menu**.

```
Select an option: k
Current Setting: AppKey = 9E-26-01-37-FD-08-4B-7C-92-C6-62-6F-25-A3-22-09

Enter a new 32 character EUI using only numbers and the letters A to F (no separators)
Hit <S> to enter the default value: 9E-26-01-37-FD-08-4B-7C-92-C6-62-6F-25-A3-22-09
-----
New EUI: 9E260137FD084B7C92C6626F25A32209
```

AppKey Setting

Press **X** from the **Quick Start Settings Menu** to return to the **enLink Main Menu**.

The header will show **** Reboot Required **** as shown below. The new key settings will not take effect until the enLink device is restarted. Enter **R** to reboot followed by **OK**. The device will restart with the entered **AppEUI** and **AppKey** and attempt to join the LoRa network.

```

enlink Main Menu:  ** Reboot Required **
-----
Q - Quick Start Menu
L - LoRa Radio Settings
C - Configure Device
P - Password and Security
T - Test Mode
R - Reboot
F - Factory Reset
X - Log off

Select an option: 

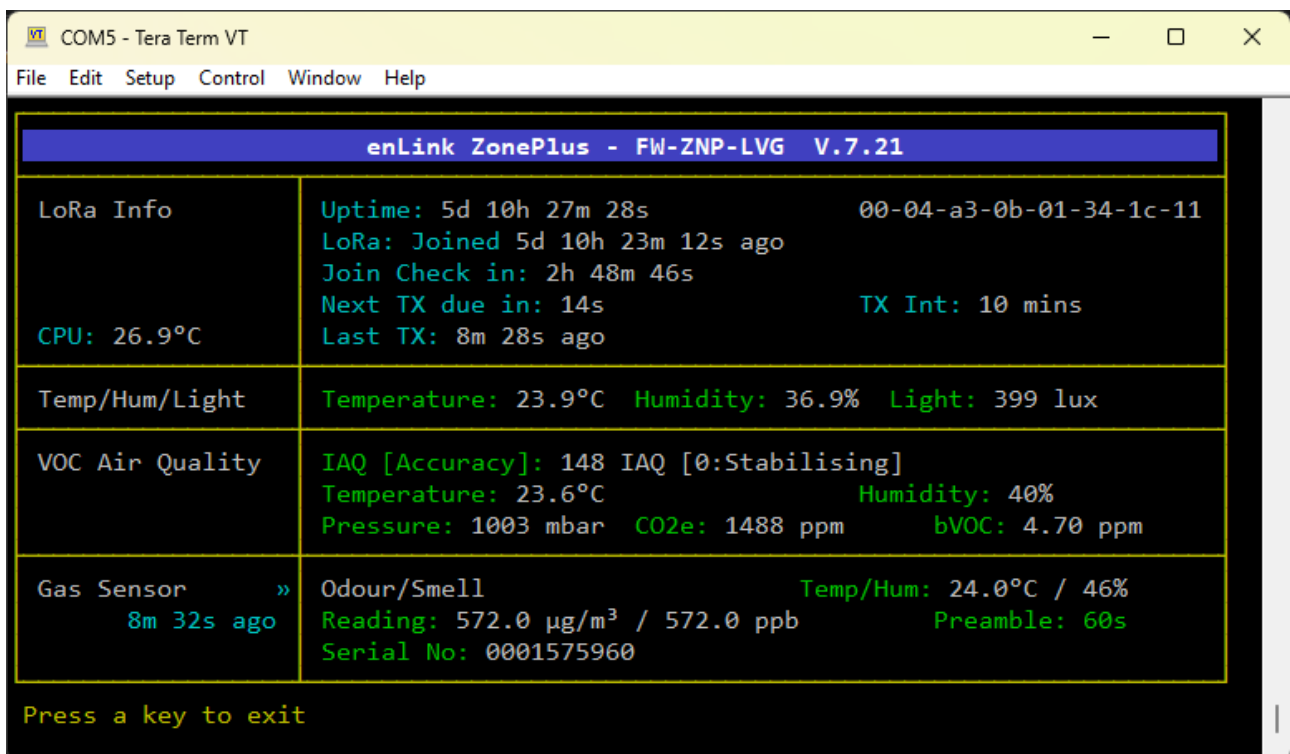
```

Reboot Required Notification

Check the Conduit **LoRaWAN -> Devices** menu detailed previously to verify that the enLink device has joined successfully.

6. Live Menu

enLink OdourSense incorporates a live data screen which shows all readings and device status for easy data validation. To enter the Live status screen, from the **Main Menu** enter **C** for Configure Device followed by **D** for Live readings display. A screen similar to the one below will show. The sensors will vary according to the enLink OdourSense model and the installed sensors.



```

COM5 - Tera Term VT
File Edit Setup Control Window Help

enLink ZonePlus - FW-ZNP-LVG V.7.21

LoRa Info      Uptime: 5d 10h 27m 28s      00-04-a3-0b-01-34-1c-11
                LoRa: Joined 5d 10h 23m 12s ago
                Join Check in: 2h 48m 46s
                Next TX due in: 14s      TX Int: 10 mins
                Last TX: 8m 28s ago
CPU: 26.9°C

Temp/Hum/Light  Temperature: 23.9°C  Humidity: 36.9%  Light: 399 lux

VOC Air Quality  IAQ [Accuracy]: 148 IAQ [0:Stabilising]
                Temperature: 23.6°C      Humidity: 40%
                Pressure: 1003 mbar  CO2e: 1488 ppm  bVOC: 4.70 ppm

Gas Sensor      »  Odour/Smell      Temp/Hum: 24.0°C / 46%
    8m 32s ago  Reading: 572.0 µg/m³ / 572.0 ppb  Preamble: 60s
                Serial No: 0001575960

Press a key to exit

```

Live Display

7. Configuration Menu

The enLink OdourSense configuration menu allows you to view current sensor readings and also to change various functions of their behaviour such as calibration data. To enter the **Configure Device menu** press **C** from the main menu. A screen similar to the one below will show. The exact parameters shown will vary according to the device model and sensors fitted.

```

Sensor Readings (Page 1):
-----
    TH Sensor Serial          12EAF154
    Temperature/Humidity      23.8°C / 36.1%
-- Light Level Sensor
    Light Level: Raw/Scaled    371.8 / 624 lux
-- VOC Air Quality Sensor
    Temperature                23.6°C
    Humidity                   40%
    Pressure                   1003 mbar
    CO2e Estimate              1488 ppm
    bVOC Estimate              4.70 ppm
    IAQ [Accuracy]             148 IAQ [0:Stabilising]

<Return> - Next page, 2 of 2
  
```

```

Sensor Readings (Page 2):
-----
-- Gas Sensor
    Serial No                  0001575960
    Gas Type                    0x32 - Odour/Smell
    Max Range                   10 ppm
    Temperature/Humidity        23.8°C / 42%
    Reading Vol/Conc.           225 µg/m³ / 225 ppb

<Return> - Previous page, 1 of 2
  
```

8. VOC Monitoring

In both indoor and outdoor environments, poor air quality can greatly impact our health and well-being. Volatile Organic Compounds (VOCs) concentration in an indoor space is a key indicator for air pollution measurement

Official air quality monitoring stations provide only consolidated or averaged data for the outdoor environment without the corresponding indoor air data. They do not generate personalised information.

The enLink OdourSense unit incorporates a highly sensitive VOC sensor for air pollution measurement. Gases that can be detected by the VOC sensor include: Volatile Organic Compounds (VOCs) from paints (such as formaldehyde), lacquers, paint strippers, cleaning supplies, furnishings, office equipment, glues, adhesives and alcohol.

The table below illustrates the IAQ Index parameter with a description of the air quality, its impact and suggested action for that level / banding. The unit also outputs a bVOC parameter which is the total VOCs expressed as a parts per million (PPM) value instead of an index (see section 16 below for more details).

IAQ Index	Air Quality	Impact (long-term exposure)	Suggested action
0 – 50	Excellent	Pure air, best for wellbeing	No measures needed
51 – 100	Good	No irritation or impact on wellbeing	No measures needed
101 – 150	Lightly polluted	Reduction of wellbeing possible	Ventilation suggested
151 – 200	Moderately polluted	More significant irritation possible	Increase ventilation with clean air
201 – 250 ¹	Heavily polluted	Exposition might lead to effects like headache depending on type of VOC	Optimise ventilation
251 – 350	Severely polluted	More severe health issue possible if harmful VOC present	Contamination should be identified if level is reached even without the presence of people; maximise ventilation and reduce attendance
> 351	Extremely polluted	Headaches, additional neurotoxic effects possible	Contamination needs to be identified; avoid presence in room and maximise ventilation

Indoor air quality (IAQ) classification and colour coding ¹

¹ According to the guidelines issued by the German Federal Environmental Agency, exceeding 25 mg/m³ of total VOC leads to headaches and further neurotoxic impact on health.

Compliant to the ISO16000-29 standard "Test methods for VOC detectors".

9. PIR Sensor Operation

The PIR Sensor incorporated within some variants of the enLink OdourSense can be used to indicate occupancy status within an area.

The implementation incorporates two incrementing counters PIR_COUNT and PIR_OCC_TIME to represent the occupied/unoccupied historical profile.

The PIR has a concept of an 'inactivity timeout'. This is set to 30 seconds.

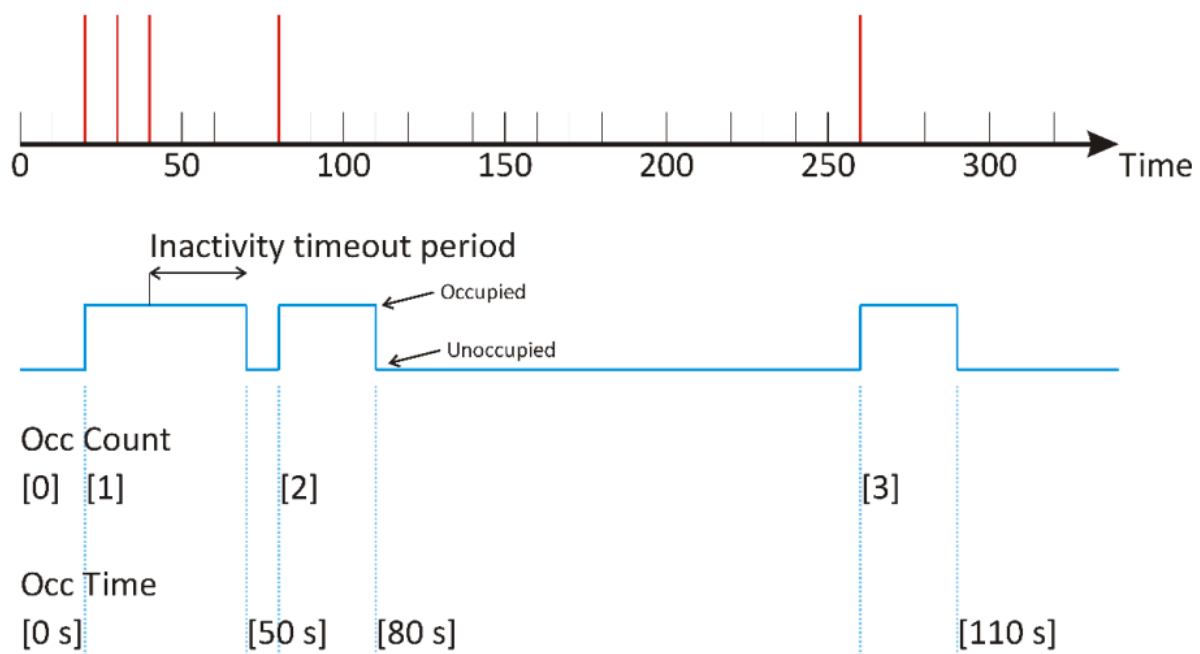
When the PIR detects movement (possibly multiple times) the internal occupancy state changes to the 'occupied' state. If the PIR does not detect any movement for a period of 30 seconds the internal state changes to 'unoccupied' (see diagram below).

The sensor has two LoRa wireless data parameters associated with the PIR operation:

- PIR_COUNT – the number of changes from the 'unoccupied' state to the 'occupied' state. This is reported in the data packet as Type 0x13 (Detection Count)
- PIR_OCC_TIME – the total time period spent in the 'occupied' state in seconds. This is reported in the data packet as Type 0x14 (Total Occupied Time).

Each counter is implemented as a 32 bit number so the maximum PIR_COUNT is 4,294,967,295 and the PIR_OCC_TIME is over 49 thousand days. The counters are stored in non-volatile memory but can be reset via the configuration menu.

PIR Activity over time



PIR data transmission interval

Depending on the enLink OdourSense settings the PIR_COUNT and PIR_OCC_TIME messages will be sent at a fixed time interval or when the status changes (within constraints of the regulatory wireless duty cycle).

In some applications it is useful to receive a wireless notification when the PIR state changes without waiting for the transmit interval. This is known as “Adaptive Transmission Interval”.

When set to a fixed time interval the unit will send a wireless message containing the PIR status at the set Transmit Interval.

When set to “Adaptive” transmit interval the unit will send a wireless message containing the PIR status when the status changes with the following constraints:

- The message will be transmitted immediately providing at least the time in the **Adaptive Min Interval** has passed. So, for example if the **Adaptive Min Interval** is set to 5 mins then if the last message was sent 4 minutes ago transmission will be delayed until the 5 minutes have passed. This prevents messages being sent more frequently than the **Adaptive Min Interval** setting.
- If the occupancy state does not change then a wireless message will be sent at the **Adaptive Max Interval**. This in effect acts as a heartbeat message.

Please note that LoRa operates in unlicensed radio spectrum and therefore each device must obey regulatory duty cycle regulations. If messages are sent too frequently then the device will delay transmission to comply with the duty cycle limits.

The transmission interval is configured from within the **Quick Start Menu** of the OdourSense unit (note that this setting is only present in models incorporating the PIR). To configure the transmit interval, follow the steps below:

- Remove the enLink OdourSense board from its enclosure. Take care when removing the board from the front part of the enclosure and only use the slots provided at the bottom of the board to gently lift the board up and out of the enclosure.
- Connect a micro-USB cable to the enLink unit. The device will attach to a COM port on your PC. Refer to section 5 for details on connecting to the USB menu.

From the **Main Menu**, enter **Q** to enter the **Quick Start Menu**.

```
enlink Quick Start Menu:
=====
      Status                Joined 2m 27s ago
      Join Check in         3h 26m 25s

E - AppEui                  53-79-6E-00-00-00-00-00
K - AppKey                  9E-26-01-37-FD-08-4B-7C-92-C6-62-6F-25-A3-22-09
T - Transmit Interval       15 mins
X - Exit Menu

Select an option: █
```

Quick Start Settings Menu

Access the **Transmit Interval** setting by entering **T**.


```

Transmit Interval:
=====
1 - 30 s
2 - 1 min
3 - 2 mins
4 - 5 mins
5 - 10 mins
6 - 15 mins <==
7 - 20 mins
8 - 30 mins
9 - 60 mins
10 - 2 hours
11 - 3 hours
A - Adaptive
I - Adaptive Min interval: 5 mins
M - Adaptive Max interval: 60 mins
X - Exit Menu

Enter Selection: 

```

Transmit Interval Settings

To select a fixed transmit interval select the required interval from the menu options.

To select **Adaptive Transmit Interval** select the **A** option and then change the settings for the **Adaptive Min Interval** and **Adaptive Max Interval** as required.

With adaptive transmit interval set, when a change of PIR status occurs a wireless message is sent immediately, however messages will not be sent more frequently than the **Adaptive Min Interval**.

The **Adaptive Max Interval** acts like a heartbeat, so if no change of PIR state occurs then a message is sent at the **Adaptive Max Interval**.

Press **Enter** when the key is correctly entered to return to the **Quick Start Settings Menu**.

The Transmission Interval may also be changed by using a LoRaWAN downlink message. See "<https://github.com/synetica/enlink-decoder?tab=readme-ov-file#downlink-message-index-tables>" for more details and example downlink messages.

10. Battery Installation / Replacement

enLink OdourSense devices use 4 x SAFT LS14500 or EVE ER14505 AA size 3.6 Volt Lithium Thionyl Chloride (Li-SOCl₂) batteries (non-rechargeable) or direct equivalent.

No other batteries are approved for use in the device.

Lithium Thionyl Chloride batteries have very high energy capacity and must be used and handled with care observing the guidance below.

WARNING!



Risk of death or serious injury from explosion or fire

- Keep out of sight and reach of children.
- Fire, explosion and burn hazard - do not recharge, short circuit, crush, disassemble, incinerate.
- Due to the high terminal voltage (3.6V), they are not suitable as direct replacements for other battery technologies in the same can sizes.
- When not in use the Batteries must be stored in a non-hazardous area.
- Do not change batteries in an explosive gas atmosphere.
- When installing batteries, do not snag the battery terminal on the clip or the battery may be damaged. Do not apply excessive force.
- Do not drop. Dropping the battery may cause damage. If a battery is dropped, do not install the dropped battery into the unit
- Dispose of dropped battery promptly per local regulations or per the battery manufacturer's recommendations.

Guidance

- Always install the batteries correctly as per instructions taking great care to observe the battery polarity.
- Ensure that the contact points are clean and conductive.
- All batteries must be the same model from the same manufacturer.
- Do not mix old and new batteries or batteries from different manufacturers.
- Do not heat or attempt to recharge the battery.
- Do not dispose of in a fire.
- Only install approved batteries: SAFT LS14500 or EVE ER14505 Lithium-thionyl chloride AA battery 3.6 volt, or direct equivalent.

Safe Disposal



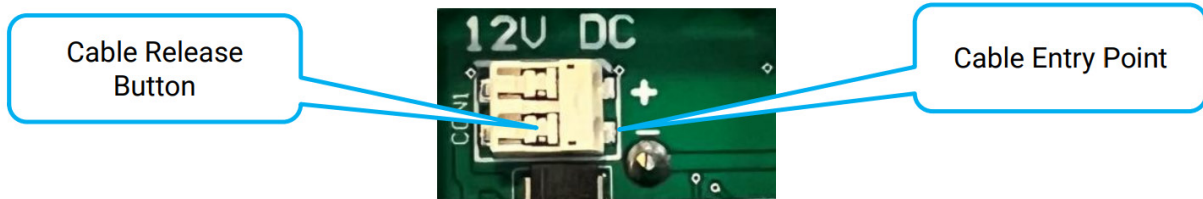
- Please recycle responsibly, a wide range of schemes are available.
- Do not dispose of in normal waste or in a fire.

11. External Power

The OdourSense may be powered from an external power source if required. The unit requires 12 – 24V DC at 200mA or greater.

Power is supplied to the unit via a 2 pole Molex push button connector as shown below.

The conductor size should be 18-26 AWG (1mm – 0.5mm diameter, 0.82mm CSA – 0.13mm CSA). Strip the cable to expose 5mm of conductor.

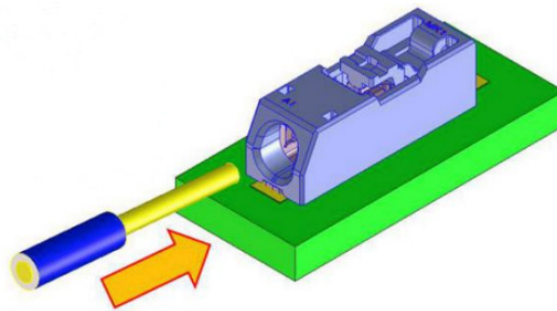


OdourSense External Power Connector

Push the stripped end of the power cable into the connector taking great care to observe the correct polarity. The positive cable should connect to the terminal marked (+) and the negative cable to the terminal marked (-).

Wire is directly inserted and pushes open low-insertion force gate-style terminal, which “traps” wire in place.

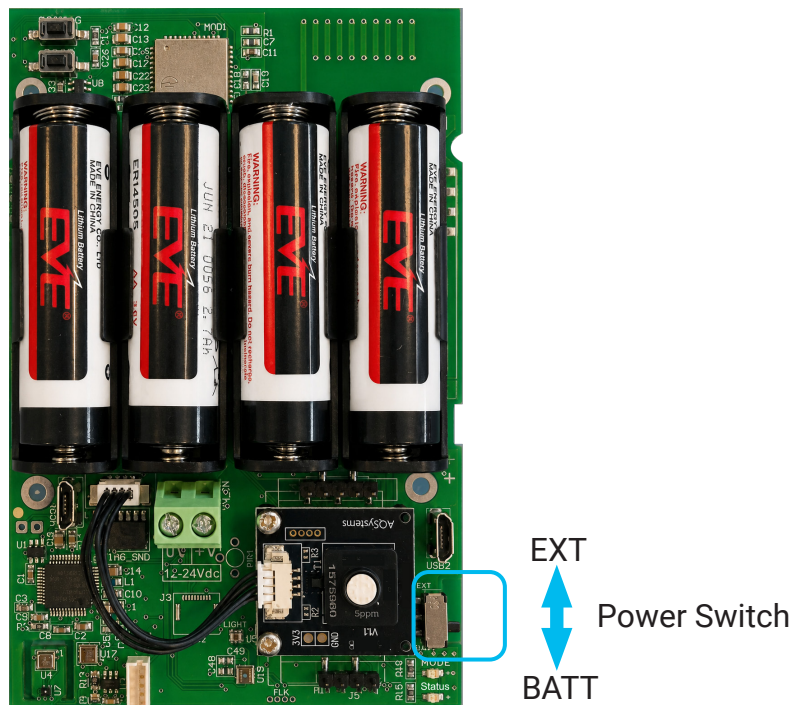
Wire strip length is 5mm.



Power Wire Insertion

Gently pull on the cable to ensure that it is correctly inserted. Ensure that no uninsulated cable is showing.

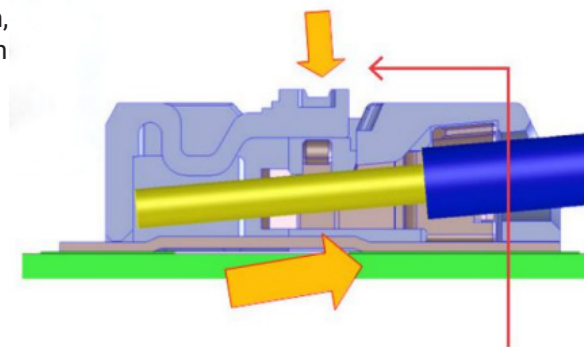
Once complete, move the power switch to the EXT position for external power as shown below. The unit will power up and attempt to join the LoRaWAN network.



OdourSense Power Switch, Select EXT Position

To release the cable, gently press down on the button lever, as shown below and the cable will release freely.

Button-style lever is pushed down, style terminal opens, and wire can freely pulled out.



Release Power Cables

12. Installation Guidance

enLink OdourSense is designed to monitor washroom odour conditions in real time and provide meaningful trend data for cleaning, ventilation, and facilities management. Correct installation is important to ensure the sensor measures the overall washroom environment rather than short-term localised spikes. enLink OdourSense Plus units are lightweight (approx. 300g) and can be fixed to indoor walls or partitions using a variety of methods including double sided adhesive tape, Velcro, Nano tape, screws and ties.

Sensor Positioning

The enLink OdourSense should typically be wall mounted within the main washroom area at a height of approximately 1.5 to 2.0 m above finished floor level. The preferred location is one where the sensor is exposed to normal room air movement and is representative of the overall occupied space, while remaining accessible for commissioning, inspection, and maintenance.

In most installations, the optimum position will be within the shared washroom airspace, away from direct sources of contamination, direct airflow, and splash risk.

For best performance, install the unit:

- within the main occupied washroom zone
- in a location representative of the overall room environment
- at approximately 1.5 to 2.0 m above floor level
- on a suitable wall surface with good exposure to mixed room air
- where the unit can be accessed for battery replacement or service if required

The sensor should not normally be mounted immediately above or adjacent to toilets, urinals, sinks, sanitary bins, or other concentrated odour sources, as this may result in readings that are not representative of the wider washroom condition.

Locations to avoid

To maintain stable and meaningful measurements, avoid installing the unit:

- directly beside or above toilets, urinals, sinks, or waste bins
- in direct airflow from supply grilles, extract vents, hand dryers, heaters, or open windows
- immediately next to doors or entrances where frequent air exchange may influence readings
- in corners, alcoves, or other stagnant air pockets
- in areas exposed to water spray, condensation, steam, or routine cleaning chemical spray
- directly on, or immediately adjacent to, large metal surfaces or service infrastructure that may impair LoRaWAN performance

As a general guide, the unit should be positioned at least 1 m from strong airflow sources and clear of routine splash zones.

Optimum installation within the washroom

The best location is usually between the principal odour sources and the room extract path, but not directly adjacent to either. This allows the sensor to respond to the general condition of the washroom rather than extreme localised effects.

Where the washroom includes distinct areas, such as separate cubicle and urinal zones, the installation position should be selected to reflect the area of greatest operational interest. In larger or more complex spaces, more than one sensor may be required.

Sensor Orientation

Fix the OdourSense unit to the wall or partition and ensure that the ventilation grills are at the top and bottom of the enclosure to allow air to pass over the internal sensors.



Units with Optional PIR Occupancy Detection

Some enLink OdourSense units are fitted with an optional PIR occupancy detector. Where this option is provided, the device should be positioned so that the PIR has a clear view of the general occupied area of the washroom.

- position the unit so the PIR views the main circulation space or entrance area
- avoid directing the sensor towards heaters, hand dryers, or HVAC discharge points
- avoid locations where doors, partitions, or fittings obstruct the field of view

The PIR function is intended to provide indication of overall washroom occupancy and usage patterns. It is not intended for monitoring individual cubicle use. For units with a PIR motion detector, please refer to the product data sheet which details the PIR sensor detection pattern and range.

Units with Optional LUX Sensor

Some units are also fitted with an optional LUX sensor to monitor ambient light levels. Where fitted, the device should be installed so that the light sensor is exposed to representative room lighting conditions.

Avoid mounting the unit:

- in deep shadow or recessed locations
- behind partitions or obstructions
- directly beneath a spotlight or light fitting that may give an unrepresentatively high reading

The LUX sensor can provide useful contextual information, including lighting status, occupancy correlation, and out-of-hours activity patterns.

LoRaWAN Installation Considerations

As with all LoRaWAN devices, radio performance should be verified at the intended installation location.

For best wireless performance:

- avoid mounting directly onto large metal surfaces where possible
- avoid locations screened by ductwork, risers, mirrored panels, or other metallic structures
- confirm adequate network coverage at the final mounting position during commissioning

Small changes in mounting location can significantly improve signal quality and network reliability.

Recommended Number of Sensors

The number of enLink OdourSense units required depends primarily on the washroom layout, occupancy level, and ventilation arrangement rather than floor area alone.

Typical guidance

One sensor is normally suitable for:

- a single accessible WC
- a small washroom
- a standard washroom with a simple layout and reasonably uniform airflow

Two sensors are recommended where the washroom:

- is large or elongated
- has separate cubicle and urinal areas
- has partitions or geometry that reduce air mixing
- has more than one distinct odour or ventilation zone

Three or more sensors may be appropriate where the washroom:

- is very large
- serves high footfall environments
- is divided into multiple sections
- requires more localised monitoring for cleaning or ventilation control

As a practical starting point, Synetica recommends one sensor per washroom for most standard applications, increasing to one sensor per distinct odour or ventilation zone where coverage requirements are more complex.

Sensor Calibration

The OdourSense unit features high accuracy, long life sensors. The temperature, relative humidity, VOC, PIR and light level sensors all have an operational life in excess of 5 years.

The odour sensor is an intelligent digital gas sensor module which combines a smart onboard microprocessor, advanced algorithm processing, and highly reliable solid-polymer electrochemical sensing technology to deliver selective detection of a wide range of odorous gases. The sensor has a long life of > 5 years and can be replaced by the user if required.

Maintenance considerations

To maintain reliable performance:

- keep the enclosure clean and free from obstruction
- do not spray cleaning chemicals directly onto the unit
- inspect periodically for contamination, obstruction, or physical damage
- replace batteries in accordance with the product power configuration and reporting interval
- recheck positioning if the washroom layout or airflow pattern changes

13. Interpreting the data

enLink OdourSense provides actionable insight into washroom environments, helping facilities managers understand usage patterns, odour levels, air quality conditions and ventilation performance throughout the day.

By continuously monitoring odour levels in real time, enLink OdourSense helps identify when and where intervention is required. This enables cleaning teams to move from fixed schedules and reactive responses to a more targeted, data-driven approach. The result is improved hygiene management, better ventilation oversight, reduced complaints and a more comfortable experience for washroom users.

enLink OdourSense is suitable for commercial buildings, retail environments, transport hubs, stadiums and venues, offices, hospitality settings and other high-traffic facilities. Its scalable design allows facilities teams to monitor individual washrooms, groups of washrooms or wider building estates, providing real-time visibility and control over washroom conditions.

Traditional washroom air quality monitoring often relies on ammonia detection. However, ammonia does not always correlate well with perceived odour. Many of the most noticeable and objectionable washroom odours are caused by compounds that can be detected by people at extremely low concentrations, including methyl mercaptan, dimethyl sulfide, hydrogen sulfide and trimethylamine.

enLink OdourSense is designed to target these key odour-related compounds, providing a more representative indication of human-perceived odour. This allows facilities teams to assess washroom conditions based on the odours users actually experience, rather than relying only on general air composition measurements.

Target gas detection

The sensor detects a wide range of odour-causing gases:

Gas	Formula	Odour Threshold (ppm, Lev1)	Odour Strength
Methyl Mercaptan	CH ₄ S	0.0001	Extremely strong odour
Methyl Sulfide	C ₂ H ₆ S	0.0001	Extremely strong odour
Trimethylamine	C ₃ H ₉ N	0.0001	Extremely strong odour
Dimethyl Disulfide	C ₂ H ₆ S ₂	0.0003	Very strong odour
Hydrogen Sulfide	H ₂ S	0.0005	Very strong odour
Carbon Disulfide	CS ₂	0.0274	Moderate odour
Styrene	C ₈ H ₈	0.03	Moderate odour
Ammonia	NH ₃	0.1	Weak (relative) odour

Gases Detected and Relative Odour Intensity

enLink OdourSense detects key compounds commonly associated with unpleasant washroom odours, including methyl mercaptan, dimethyl sulfide, hydrogen sulfide and trimethylamine. These gases can be noticeable at very low concentrations, so OdourSense provides a practical indication of relative odour intensity and helps identify when cleaning or ventilation action may be required.

The table below shows the concentration of each gas required to achieve the stated odour intensity level.

Gas		Ammonia	Hydrogen Sulfide	Methyl Mercaptan	Methyl Sulfide	Carbon disulfide	Dimethyl Disulfide	Trimethyl-amine	Styrene	Average odour Level
Chemical Formula		NH ₃	H ₂ S	CH ₄ S	C ₂ H ₆ S	CS ₂	C ₂ H ₆ S ₂	C ₃ H ₉ N	C ₈ H ₈	
Molecular Weight		17.031	34.08	48.10	62.13	76.14	94.20	59.11	104.15	
Level	Unit									
Lev1	mg/m ³	0.0697	0.0007	0.0002	0.0003	0.0853	0.0012	0.0002	0.1278	0.0357
	ppm	0.1000	0.0005	0.0001	0.0001	0.0274	0.0003	0.0001	0.0300	0.0198
Lev2	mg/m ³	0.4179	0.0084	0.0014	0.0051	1.0240	0.0116	0.0024	1.7038	0.3968
	ppm	0.6000	0.0060	0.0007	0.0020	0.3288	0.0030	0.0010	0.4000	0.1677
Lev2.5	mg/m ³	0.6965	0.0279	0.0039	0.0254	1.0240	0.0347	0.0121	1.7038	0.4410
	ppm	1.0000	0.0200	0.0020	0.0100	0.3288	0.0090	0.0050	0.4000	0.2219
Lev3	mg/m ³	1.3931	0.0835	0.0079	0.1016	2.0520	0.1156	0.0484	3.4076	0.9012
	ppm	2.0000	0.0600	0.0040	0.0400	0.6590	0.0300	0.0200	0.8000	0.4516
Lev3.5	mg/m ³	3.4826	0.2788	0.0197	0.5082	5.1310	0.3853	0.1692	8.5190	2.3117
	ppm	5.0000	0.2000	0.0100	0.2000	1.6477	0.1000	0.0700	2.0000	1.1535
Lev4	mg/m ³	6.9653	0.9757	0.0590	2.0328	10.263	1.1558	0.4835	17.038	4.8717
	ppm	10.0000	0.7000	0.0300	0.8000	3.2961	0.3000	0.2000	4.0000	2.4158
Lev5	mg/m ³	27.8611	4.1814	0.3934	5.0819	5.1310	11.5577	7.2524	8.5190	8.7472
	ppm	40.0000	3.0000	0.2000	2.0000	1.6477	3.0000	3.0000	2.0000	6.8560

Odour Intensity Level and Sensitivity to different gases

Level	Sensor PPB Reading	Meaning
Lev1	19.8	Very weak odour / just detectable
Lev2	167.7	Weak but noticeable odour
Lev2.5	221.9	Between weak and moderate
Lev3	451.6	Moderate odour
Lev3.5	1,153.5	Between moderate and strong
Lev4	2,415.8	Strong odour
Lev5	6,856.0	Very strong odour

Odour Intensity Level Interpretation

Synetica plug-in gas sensors are natively calibrated in ppm/ppb. Any mg/m³ or µg/m³ values are derived calculations, based on the molecular weight of the specific gas being measured.

The odour gas sensor is designed to be broadly sensitive to all odorous gases and is likewise calibrated in ppb/ppm. However, it is non-selective and cannot determine which individual gases are present (in the same way that a VOC sensor cannot identify specific compounds). As a result, the sensor reports the mg/m³ value as numerically equivalent to the ppb/ppm value, rather than performing a gas-specific mass conversion.

14. LoRaWAN Payload Decoder

The latest LoRaWAN payload decoders and guides are available on the Synetica GitHub repository:

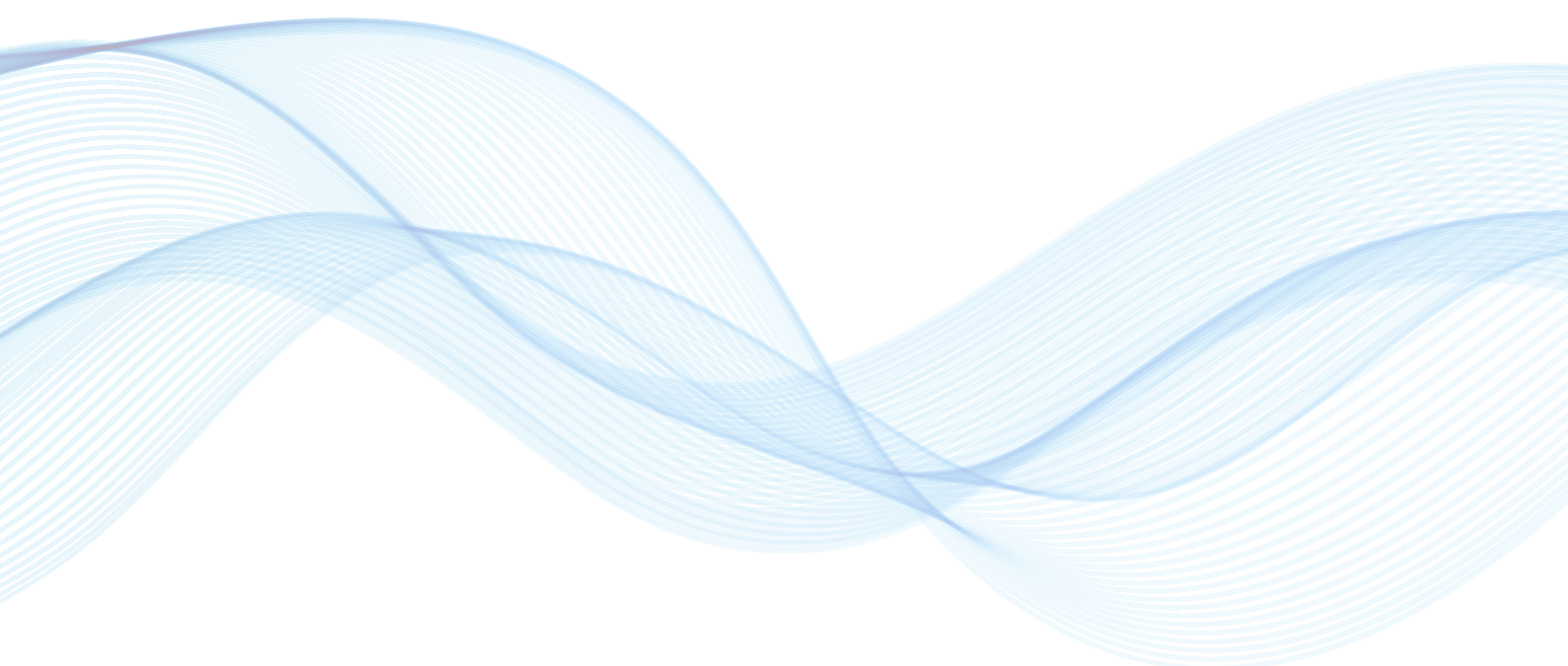
<https://github.com/synetica/enlink-decoder>

A live payload decoder which allows you to paste LoRa payloads in Hexadecimal or Base 64 and see the correctly decoded results can be found at the link below:

<https://synetica.github.io/enlink-decoder/>

15. Technical Support

For technical assistance, please visit the downloads section of our web site at www.synetica.net or email us at support@synetica.net



About us

Synetica was established in 2008 with the simple idea to revolutionise air quality monitoring, energy usage and remote asset monitoring. Our global customer base relies on our expertise to help them reduce emissions and clean up the air they breathe by allowing them to monitor their energy usage and key environmental parameters via the touch of a button.

www.synetica.net

T: +44 (0)1785 818919 **E: enlink@synetica.net**

Synetica Limited, Hilton House, 40 High Street, Stone, Staffordshire. ST15 8AU UK

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