Environment Sensor

User Manual

Table of contents

List of Figures

List of Tables

1. Environment Sensor Features

Cascoda's KNX IoT Environment Sensor provides environment measurements compliant to the Indoor Environmental Quality (IEQ) provisions of the EU Energy Performance of Buildings Directive (EPBD).

It is battery powered and includes a high-resolution E-Paper display and GUI users, installers, configuration settings & QR Code, and to show current environment values.

Measures the following environmental variables:

- Temperature
- Relative Humidity
- Atmospheric Pressure
- Carbon Dioxide (CO2)
- Volatile Organic Compound (VOC) Index

Other features:

- Wireless Thread, sleepy end device, using Chili2S with Industry leading receive sensitivity
- Immediate wake on button press
- Battery charge status indicator for any chemistry
- 10 minute measurement cycle (configurable with ETS)
- Menu options for showing overview, Temperature, Relative humidity, Atmospheric Pressure, Carbon Dioxide (CO2) and Air Quality Index
- Language options for English, French, German, Italian and Spanish
- Configurable with ETS6.3 or later

Specification:

- High-resolution E-Paper display
- Wall or panel mount options
- Dimensions 135 x 75 x 23mm
- Battery powered (3 AA)
- 5-year battery life on Alkaline (LR6)
- 6-year battery life on Lithium (FR6)

2. General information

2.1. Document Version information

This manual is amended periodically and will be brought into line with new software releases. The change status (date) can be found in the contents header. If you have a device with a later software version, please check www.cascoda.com to find out whether a more up-to date version of the manual is available.

2.1.1. Used Terms

Sign	Description
DANGER!	Indicates an immediately hazardous situation which will lead to death or severe injuries if it is not avoided.
CAUTION!	Indicates a potentially hazardous situation which may lead to trivial or minor injuries if it is not avoided.
WARNING!	Indicates a situation which may lead to damage to property if it is not avoided.
NOTE!	Indicates a situation which may lead to possible (known) side effects.

Table 1: *Used Terms*

2.2. Safety instructions

CAUTION! Risk of explosion if an incorrect battery is installed. Use consumer grade, non-rechargeable alkaline, zinc-carbon or lithium batteries.

CAUTION! The product is only suitable for mounting at heights of less or equal than 2 meters.

2.3. Issues

Questions about the product?

You can reach the technical service of Cascoda under Tel. +44 (0)2380 638 111 or support@cascoda.com.

We need the following information to process your service request:

- Type of appliance (model name or item number)
- Description of the problem
- Serial number or software version
- Source of supply (dealer/installer who bought the device from Cascoda)

For questions about KNX functions:

- Version of the device application
- ETS version used for the project

2.4. Contact information

info@cascoda.com
Threefield House,
Threefield Lane,
Southampton,
SO14 3LP, UK

3. Menu

The Environment Sensor has a build in Graphical User interface (GUI). The Buttons are used to navigate between the different pages of the GUI. The relevant part of the GUI is **Nav Menu**, e.g. showing the measurements. The **System Menu** part of the GUI is relevant for the installer. The navigation in the menu structure is depicted as follows:
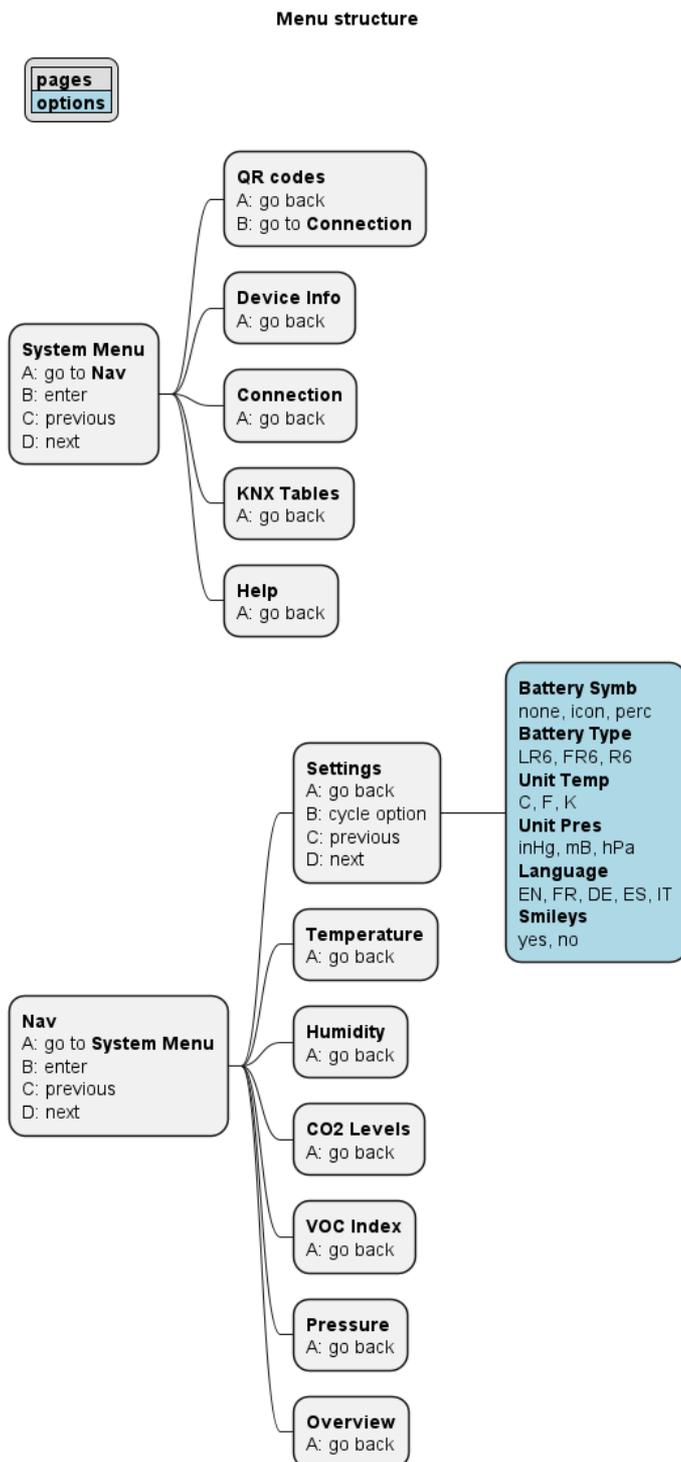

Fig 1: Navigation Menu

NOTE! A,B,C,D are referring to the buttons on the device.
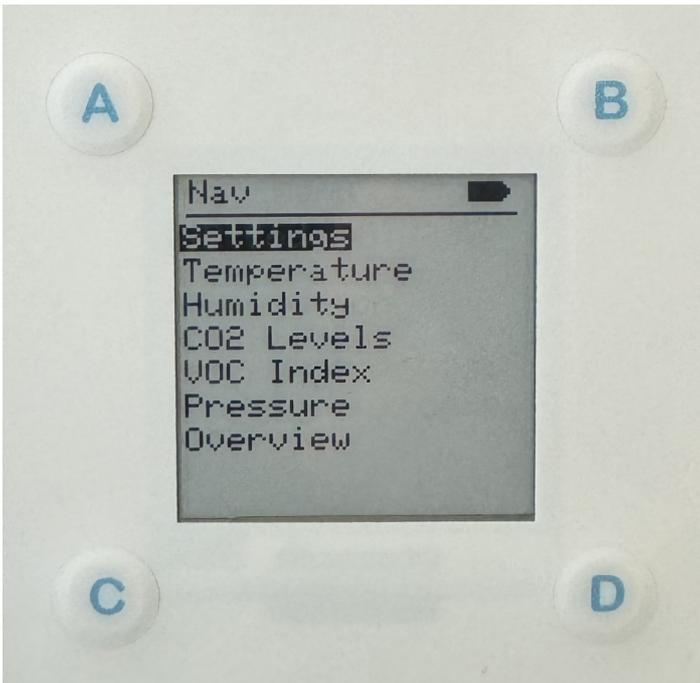
3.1. Nav menu

Fig 2: Navigation Screen

For the normal operation the following pages are important:

3.1.1. Settings

This page contains user settings for the Environment Sensor.

- *Battery Symb*

  The battery indication can be changed between:

  - none, no battery indication.
  - icon, shows a rough indication of the battery level.
  - percentage, shows the battery level in percentage.

- *Battery Type*

  The *Battery Type* is important since it relates to the used battery curve to calculate the battery percentage. The following battery types are supported:

  - LR6 - Alkaline
  - FR6 - Lithium
  - R6 - Zinc-carbon

- *Unit Temp*

  The following temperature units are supported:

  - C - Celsius
  - F - Fahrenheit

- K - Kelvin

- *Unit Pres*

  The following pressure units are supported:

  - hPa - hectoPascal
  - inHg - inch of mercury
  - mB - miliBar

- *Language*

  The following Languages are support in the Menu:

  - EN - English
  - FR - French
  - DE - German
  - ES - Spanish
  - IT - Italian

- *Smileys*

Support of *Smileys* on the overview screen. This indicates whether the measured values are in the following brackets:

Measurement	Happy face	Straight face	Sad face
Temperature C	21.0 - 25.0	20 - 21	< 20.0
		26.0 - 27.0	> 27.0
Temperature F	70.0 - 77.0	68 - 70	< 68.0
		77.0 - 81.0	> 81.0
Temperature K	294 - 298	293 - 294	< 293
		298.0 - 300.0	> 300
Humidity	30 - 60	60 - 70	> 70
		20 - 30	< 20
CO2 level	< 900	900 - 1200	> 1200
VOC index	< 150	150 - 350	> 350

Table 2: *Measurement Accuracy*

in case *Smileys* indicating:

- Sad face: do something: leave the room, adjust temperature and or ventilation.
- Straight face: do something: adjust temperature and or ventilation.

Smileys options:

- yes, display *Smileys* on the **Overview** page.
- no, do not display *Smileys* on the **Overview** page.

  NOTE! The Smiley implemenation is using these fixed values, e.g. no relationship to the parameter trigger values!.

3.2. Presentation pages

When the device is configured, the device will measure the environment. To allow maximum battery life, set the device on one of the following presentation pages:

- **Temperature**
- **Humidity**
- **C02 Levels**
- **Pressure**
- **VOC Index**
- **Overview**

3.2.1. Temperature
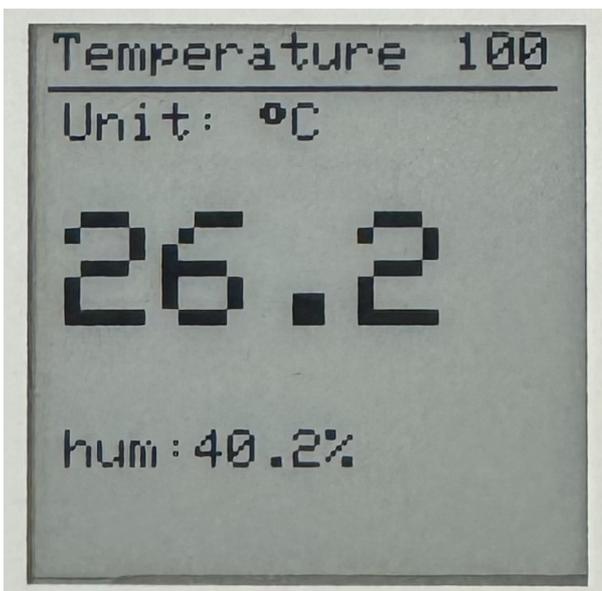
This page shows the Temperature.

Fig 3: The Temperature Screen

The Temperature Unit can be changed in the **Settings** page.

3.2.2. Humidity

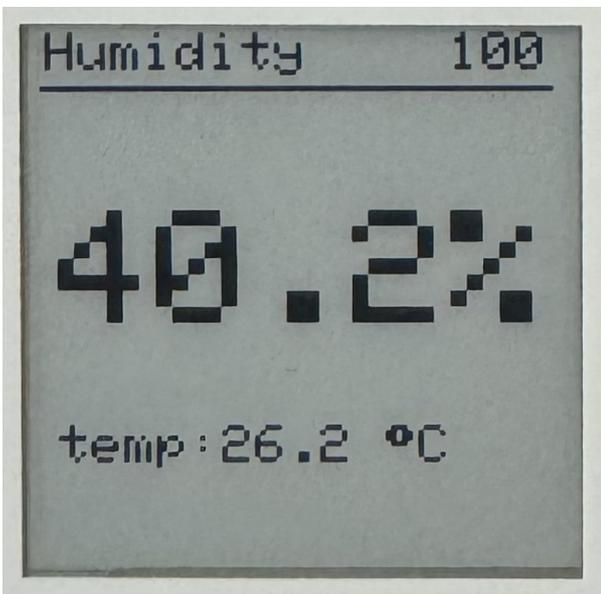This page shows the Humidity.

Fig 4: The Humidity Screen

The Humidity is the relative Humididy in percentage (%).

3.2.3. **C02 Levels**

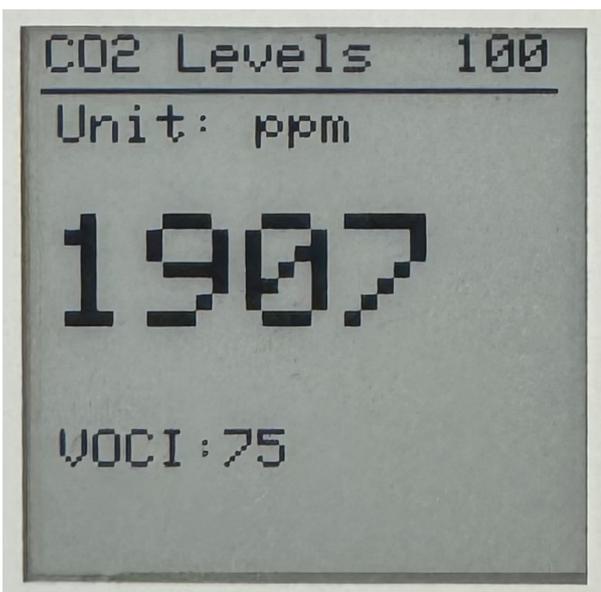This page shows the CO2 level.

Fig 5: The CO2 Level Screen

The CO2 measurement is pressure compensated.

3.2.4. **Pressure**

This page shows the Pressure.

Fig 6: The Atmospheric presure Screen

The pressure unit can be changed in the **Settings** page.

3.2.5. **VOC Index**
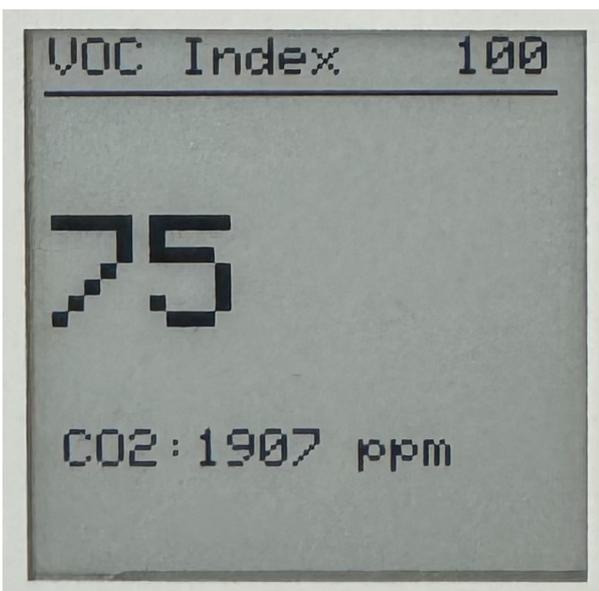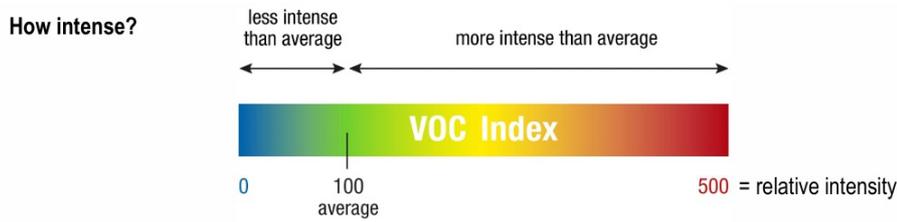
This page shows the VOC Index.

Fig 7: The VOC Index Screen

The VOC Index is a relative value of air pollution over the last 24 hours. It detects the relative intensity of VOC events. It can not distinguish between different VOC compounds.

How intense?

less intense than average → more intense than average

VOC Index

0   100   500   = relative intensity
average

VOC Index…

❑ …shows changes of intensity relative to the history in the room

❑ …is referenced to the average of VOCs present over the last 24 h in the room

❑ …behaves similar to a human nose, a MOX sensor is not able to detect the absolute VOC concentration

❑ …starts going back to average VOC Index after 3 h for very long events – adapts to background

Fig 8: The VOC Index explained

Interpretation of the measured value is depicted in the following graph:

VOC Index notifies end users or air treatment devices when air pollution changes. Notifications are actionable in environments with low and high VOC backgrounds independent of the absolute VOC concentrations.

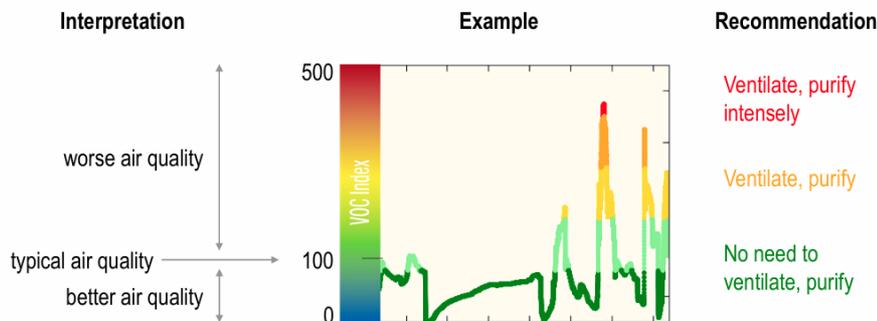| Interpretation	Example	Recommendation
worse air quality		Ventilate, purify intensely
		Ventilate, purify
typical air quality		No need to ventilate, purify
better air quality		

Fig 9: The VOC Index interpretation

Images provided by Sensirion.

more info available at Sensirion and Sensirion VOC Index.

The VOC Index measurement is Temperature and Humidity compensated.

3.2.6. Overview

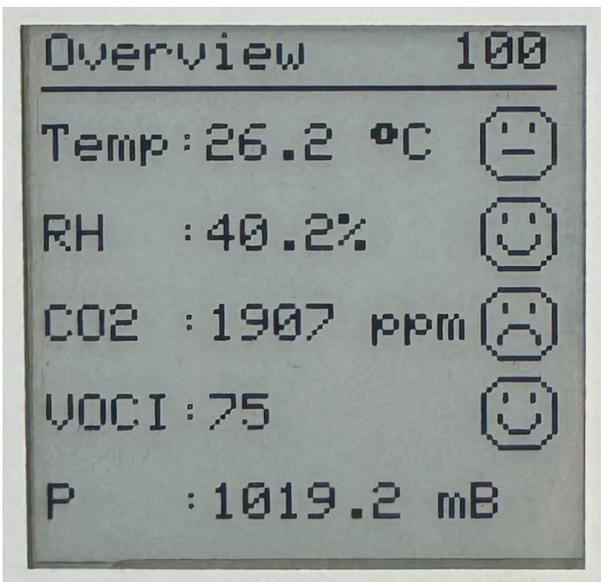This page shows all measured information in one glance.

Fig 10: The overview page

There is an option in the **Settings** page to enable or disable the *Smileys*.

The Units can be changed in the **Settings** page.

3.3. System Menu

The **System** menu contains all pages that are relevant for commissioning the device:

- **QR codes**

This page shows the QR code as explained above

- **Connection**

All the information in the Connection page is updated in real time. The Connection page shows whether the Environment Sensor is connected to the Thread network. When connected to the Thread network then the Environment Sensor pings its parent in the network. Hence this information can be used to see where the device is located in the network. The information shown is the following:

- Serial number
  - This is KNX terminology. This number is assigned to each device before leaving the factory. It allows writing or reading the individual address of a device without having to press the programming button of the device. This is supported in ETS 6 versions.
- Individual Address (15.15.255 means not configured)
  - Described in section about the Connection screen.
- EUI-64 of the device
  - This is Thread terminology. It stands for 64-bit Extended Unique Identifier, and it uniquely identifies a device's Thread interface.
- RLOC16 of the device
  - This is Thread terminology. It is a 16-bit encoding for the Routing Locator (RLOC),

which identifies the location of a Thread interface within a Thread Network Partition. For example, if a "Child" becomes a "Router", its RLOC16 will change. Or, if a "Child" changes parents, then its RLOC16 might change as well.

- Individual Address (15.15.255 means not configured)
  - This is KNX terminology. The individual address is assigned to a device upon downloading a configuration with ETS. It uniquely identifies the device in a KNX installation.
- Role of the device
  - This is Thread terminology. The role indicates whether the device is a Child, a Router, or a Leader.
- Information about how many ping requests were sent, and how many replies were received. Note that the number of replies received may be greater than the number of requests sent. This is because the ping requests are multicast to all nodes on the network. If the number of replies is less than the number of requests, it means that the device is not well connected to the Thread network.
- RSSI of the last received message from the parent, and LQI
  - RSSI stands for Received Signal Strength Indicator, and it is a measure of the power present in the received radio signal. So by looking at this value, you are able to determine how good the signal strength is between the device and its parent. The higher the number (closer to 0) the better, and as a rule of thumb, see the table below for an indication of how to interpret the values.

  - LQI stands for Link Quality Indicator. It is a number between 0 and 3 that indicates how good the link is between a device and its parent. 0 is the worst, and 3 is the best. In practice, any link quality below 3 is an indicator of a bad and unreliable link.

RSSI	Signal Strength
> -70 dBm	Excellent
-70 dBm to -85 dBm	Good
-86 dBm to -100 dBm	Fair
< -100 dBm	Poor
-110 dBm	No signal

Fig 11: RSSI classification

WARNING! Prolonged staying on this page will drain the battery life.

- **KNX Tables**

The **KNX Tables** page shows the following KNX information: - Load status

- **Device Info**

The **Device Info** page shows the following KNX information:

- **S** Serial number
  - This is KNX terminology. This number is assigned to each device before leaving the factory. It allows writing or reading the individual address of a device without having to press the programming button of the device. This is supported in ETS 6 versions.
- **IA** Individual Address (15.15.255 means not configured)
  - Described in section about the Connection screen.
- **HW** Hardware version
- **SW** Software version, will change with software updates
- **HWT** hardware type
- **Model** the model name
- **RLOC16** the RLOC16 of the device
  - Described in the section about the Connection screen.

4. Replacing batteries

The batteries should be replaced with the same type as inserted at install time. When other types are used, then the *Battery Type* in **Settings** must be changed accordingly.

> **NOTE!** When the batteries are replaced, please dispose of the used batteries in a responsible way.

The battery compartment is at the back side of the device. See image:

Fig 12: Battery Cover

After replacing the batteries, the device will automatically resume measuring the environment.