

waag
technology & society

HoLu kit v2

Basic / Extended

Zandaam, February 11 2020
Emma Pareschi

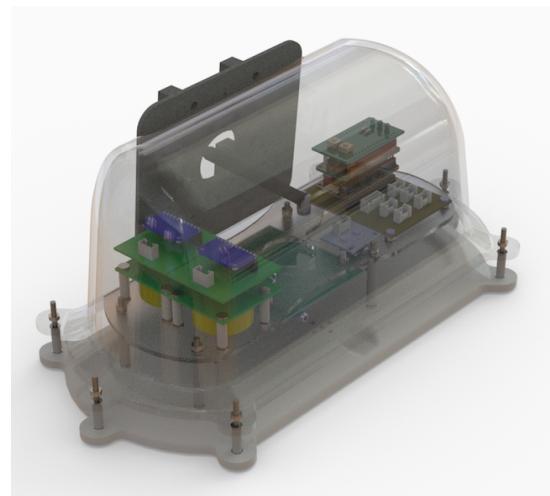
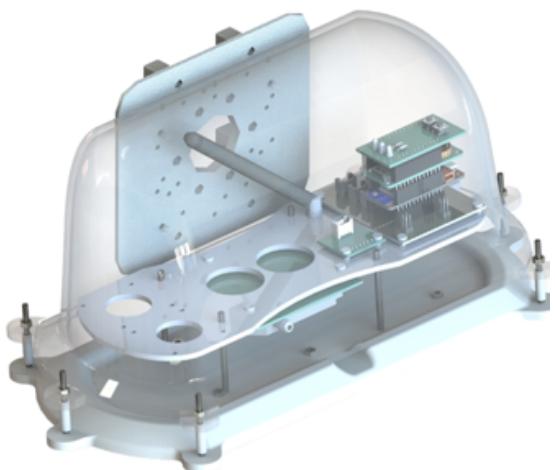
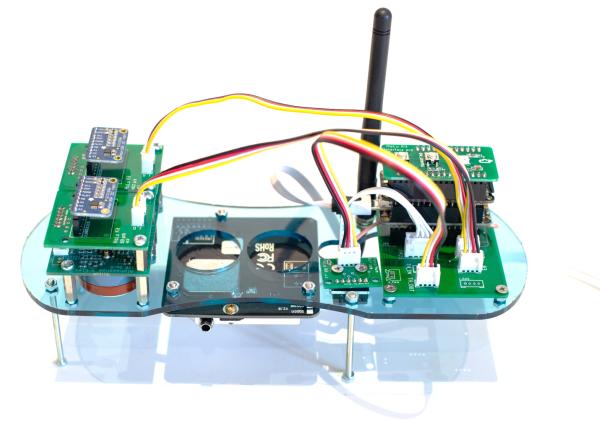
What is the HoLu kit?

HoLu kit v2 is an OPEN SOURCE modular sensors kit that allows you to measure and collect air quality/pollution data using low cost, off-the-shelf and customised components.

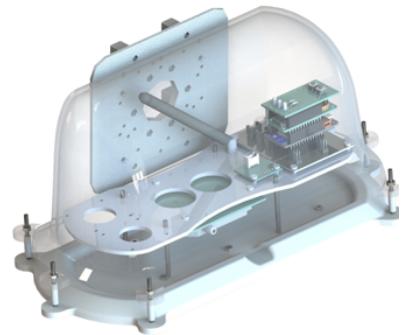
HoLu kit BASIC



HoLu kit EXTENDED



HoLu kit BASIC

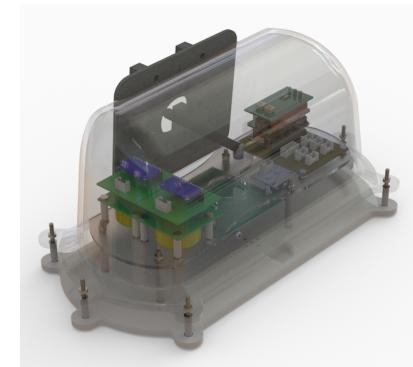
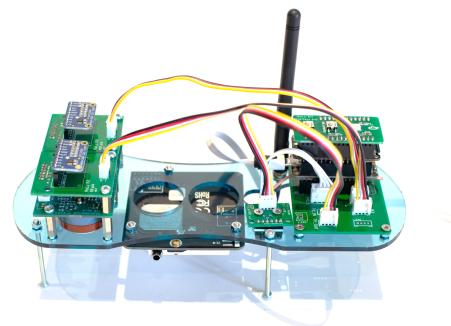


**It is provided as a kit
that must be assembled.**

It measures:

- PM2.5**
- PM10**

HoLu kit EXTENDED



It is already assembled.

It measures:

- PM2.5**
- PM10**
- temp/hum**
- NO2**
- O3**

What and how does it
measure?

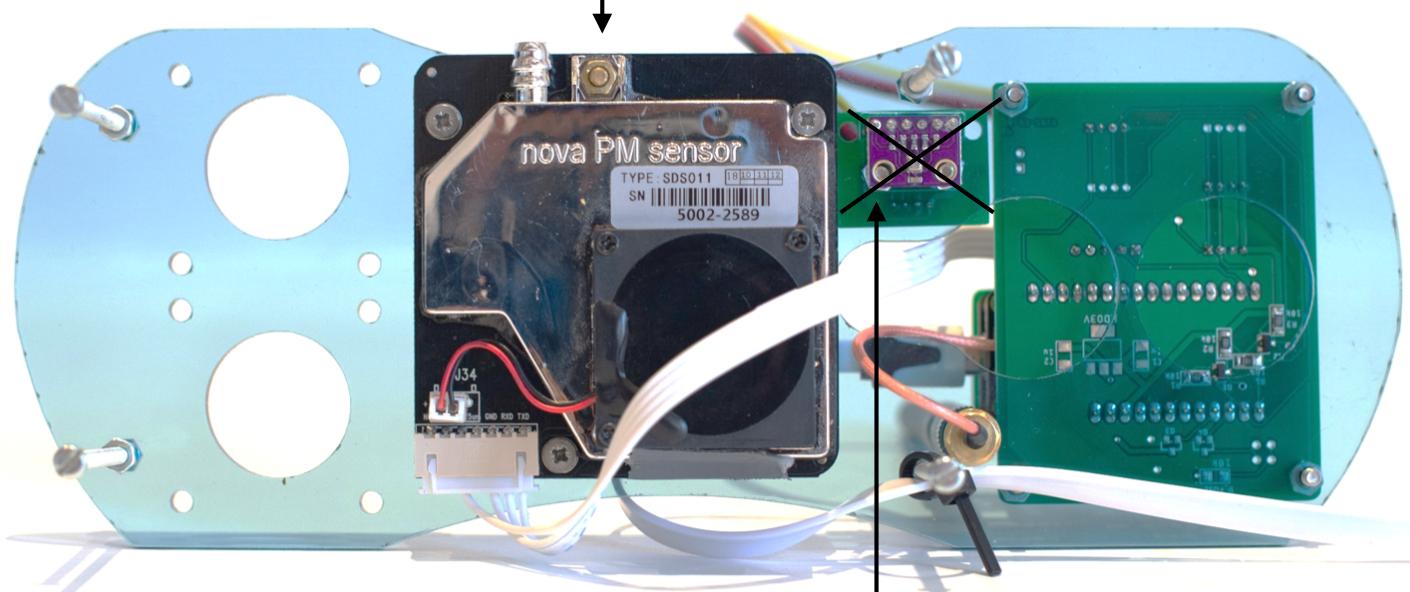
HoLu kit BASIC

Particulate Matter

sensor: SDS011

what it measures: PM2.5, PM10

unit: ug/m³



~~Weather conditions~~

sensor: BME280

what it measures: Temperature and Relative Humidity

units: °C and %

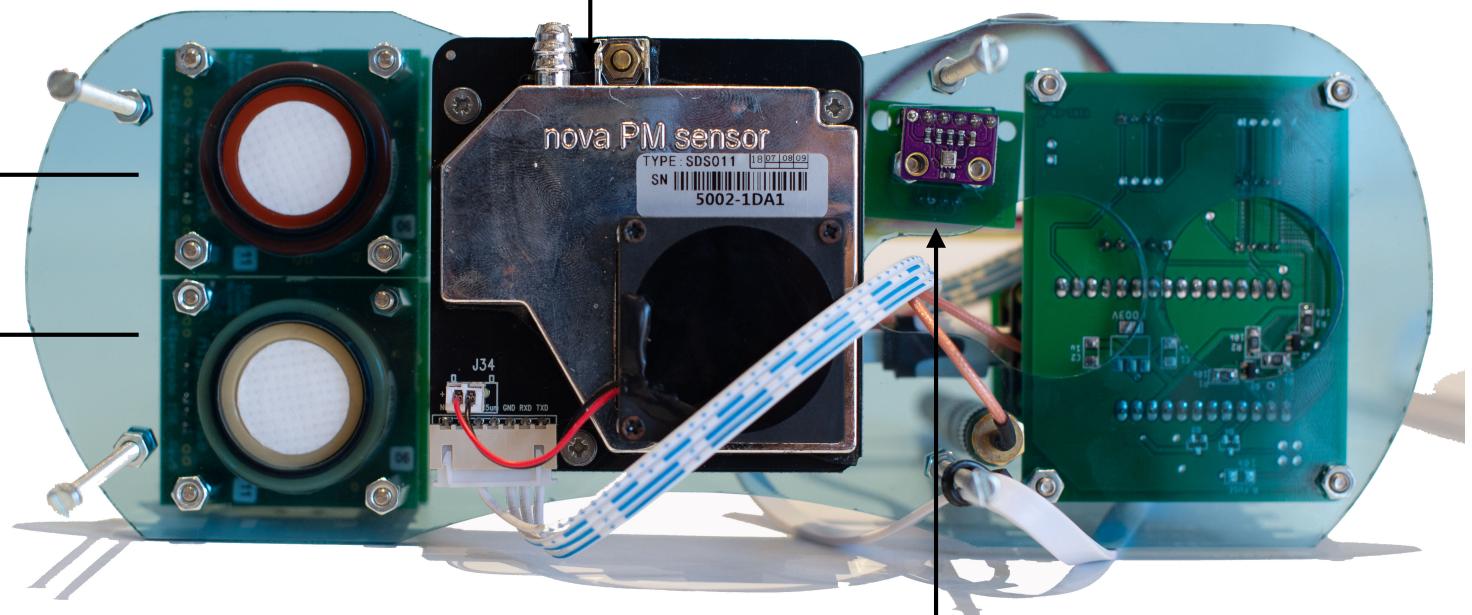
HoLu kit EXTENDED

Nitrogen Dioxide
sensor: NO2-B43F
what it measures: NO2
unit: ug/m³

Particulate Matter
sensor: SDS011
what it measures: PM2.5, PM10
unit: ug/m³

Ozone
sensor: OX-A431
what it measures: O3
unit: ug/m³

Weather conditions
sensor: BME280
what it measures: Temperature and Relative Humidity
units: °C and %



HoLu kit - LOW COST sensors



Nova SDS011 Hoge Precisie Laser Stofsensor

Snelle Verzending

Voor 17:00 uur besteld op werkdagen? [Zelfde dag verzonden!](#)

Bestelling afhalen in Eindhoven

Afhalen [op bestelling](#) ook mogelijk. Kijk hier voor meer informatie:

Afhalen

Model: SDS011

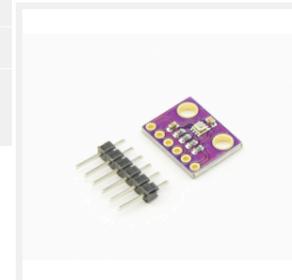
SKU: 001548

Beschikbaarheid: [Op voorraad](#)

1244 Stuk(s) Verkocht

€25,00

Excl. BTW: €20,66



Klik op de afbeelding om te vergroten



BME2
Vocht

Snelle Verzending

Voor 17:00 uur besteld op werkdagen? [Zelfde dag verzonden!](#)

Bestelling afhalen in Eindhoven

Afhalen [op bestelling](#) ook mogelijk. Kijk hier voor meer informatie:

Afhalen

Model: BME280MOD

SKU: 001511

Beschikbaarheid: [Op voorraad](#)

1003 Stuk(s) Verkocht

€4,50

Excl. BTW: €3,72



The sensors are not accurate as professional equipments, sometimes the data is not reasonable and the measurements are affected by external factors, such as sun or humidity.

HoLu kit - LOW COST sensors - Dust

Nova SDS011 Hoge Precisie Laser Stofsensor

Snelle Verzending
Voor 17:00 uur besteld op werkdagen? [Zelfde dag verzonden!](#)

Bestelling afhalen in Eindhoven
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Model: SDS011
SKU: 001548
Beschikbaarheid: **Op voorraad**

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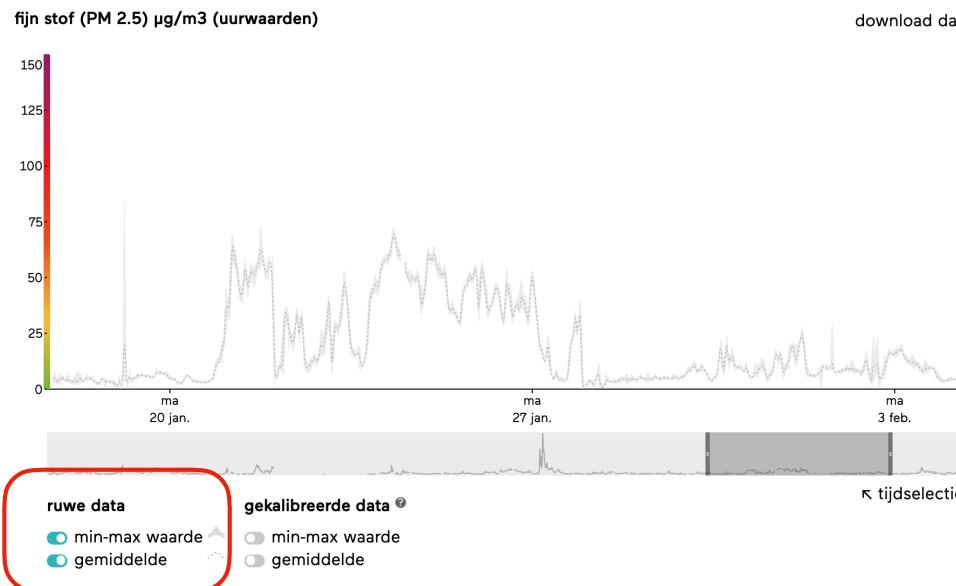
€25,00
Excl. BTW: €20,66

Klik op de afbeelding om te vergroten

HOLU-sensor 194: Toon Hermanslaan

Dit is een extended HOLU-meetstation. Dit prototype meet PM2.5 en PM10 en ook NO2 en O3. Als onderdeel van de pilot wordt er onderzoek gedaan naar de kwaliteit van de data afkomstig van deze meetstations.

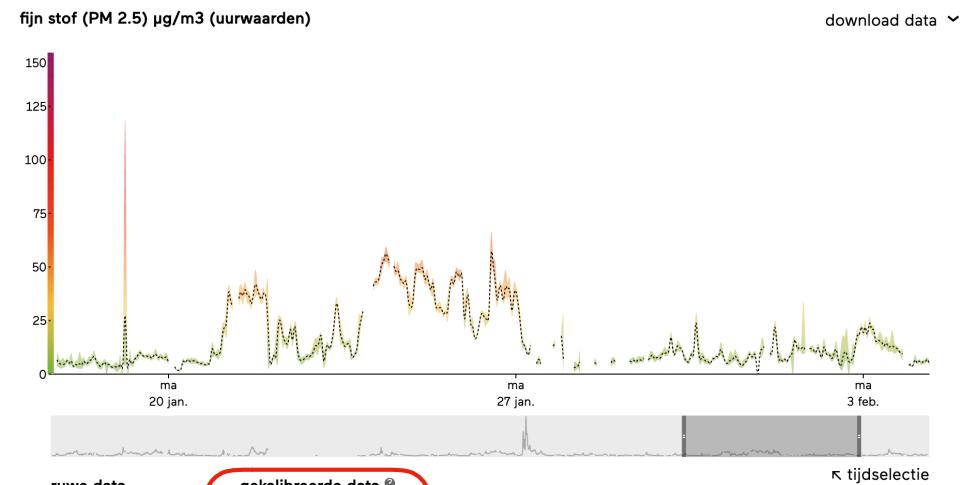
> [Lees meer over de HOLU kit](#)



HOLU-sensor 194: Toon Hermanslaan

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> [Lees meer over de HOLU kit](#)

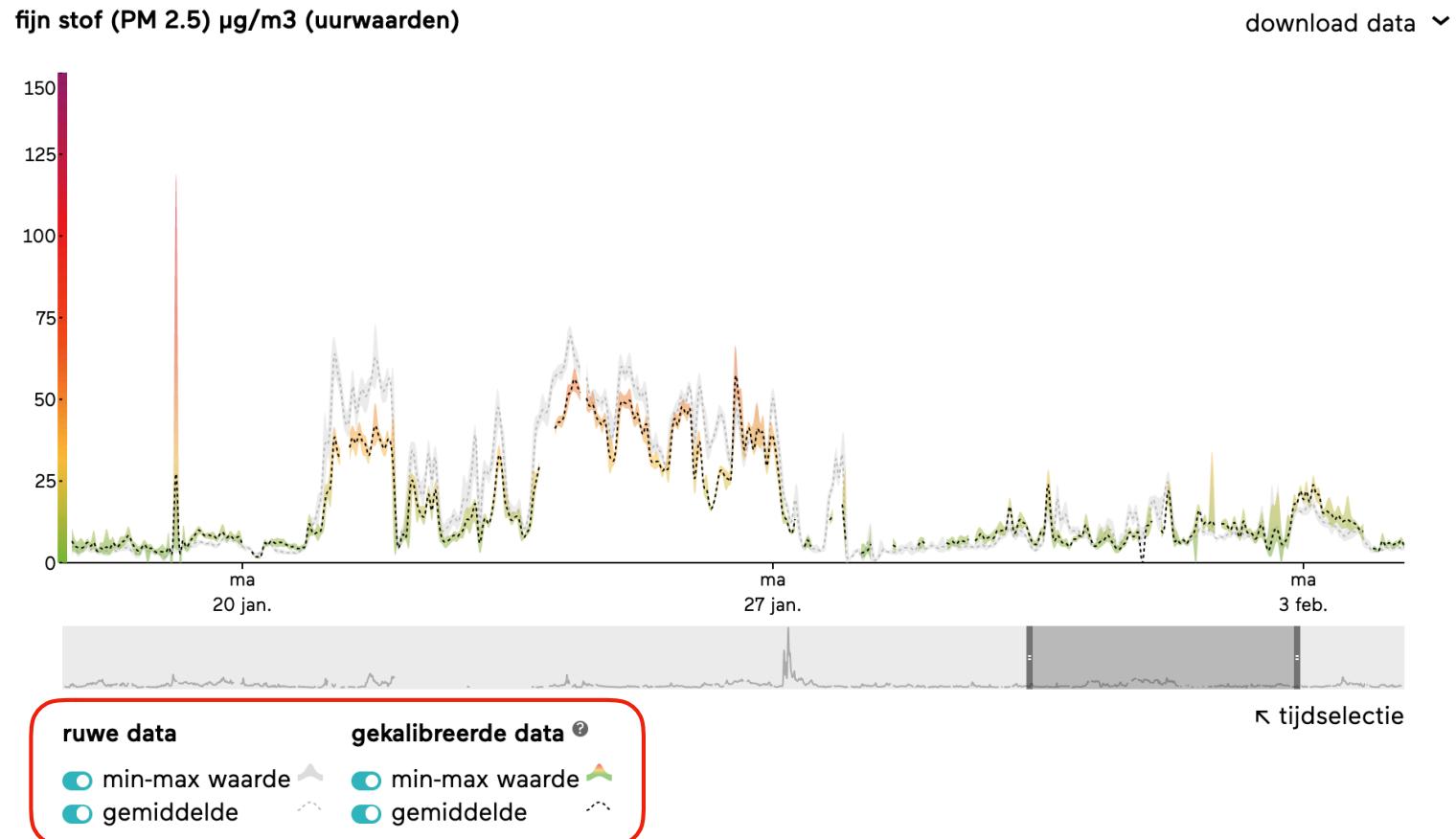


HoLu kit - LOW COST sensors

HOLU-sensor 194: Toon Hermanslaan x

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> Lees meer over de HOLU kit



HoLu kit - LOW COST sensors - Gases



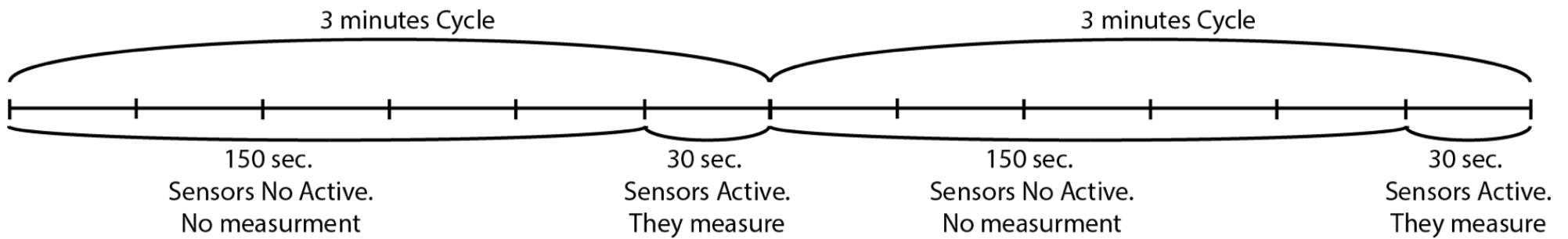
They need to be calibrated:
to find the right relation between the electric signal and the gas concentration.



We placed 30 extended HoLu kits on top of the official monitoring station in Vondelpark, Amsterdam, and we let the kits running for about 5 weeks.

Some tech features.

HoLu kit - measurement cycle

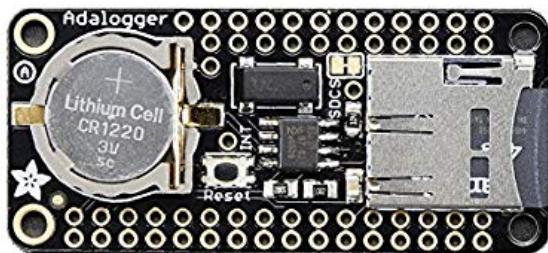




Connectivity

Feather M0 LoRa Radio

It publishes every 3minutes the data over LoraWAN Network of The Things Network.



Feather Adalogger

Every 3 minutes the data are also saved on the SD-card embedded on this module

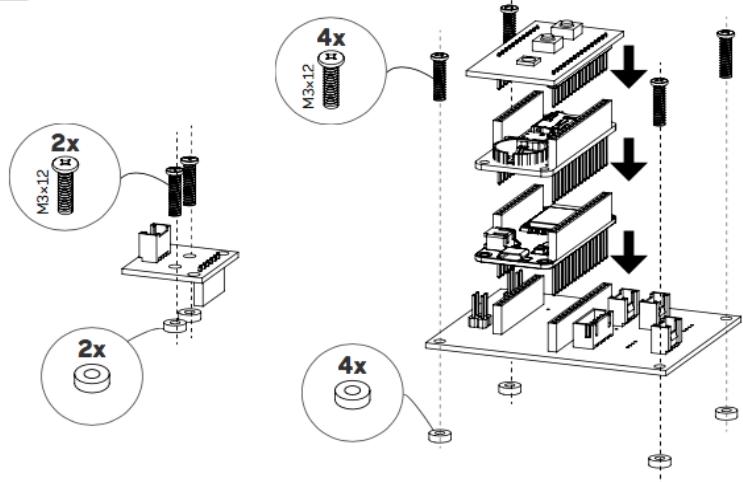


Power supply

HoLu kit is supplied by a micro USB cable (1.8m long). The charger is not waterproof, it must stay inside or well protected.

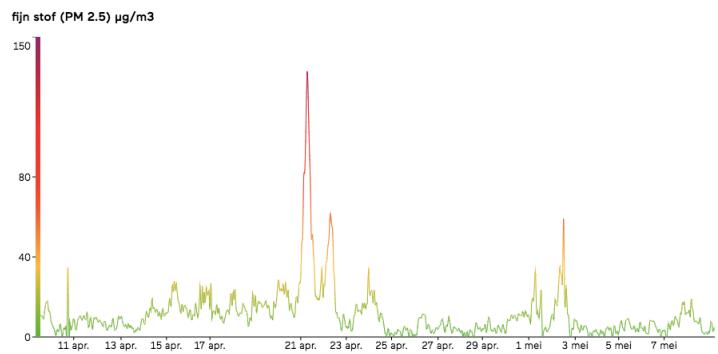
How to use it.

2



Station: Amsterdam-Vondelpark

Meetstation Vondelpark, aan de noordrand van het Vondelpark, is een stadsachtergrondstation. Op deze locatie wonen veel mensen en er zijn geen drukke wegen, havens of industriegebieden in de buurt. De Overtoom ligt op ongeveer 64 meter met gemiddeld ongeveer 15000 voertuigen per dag. In opdracht van de gemeente Amsterdam meet de GGD Amsterdam hier de luchtkwaliteit.

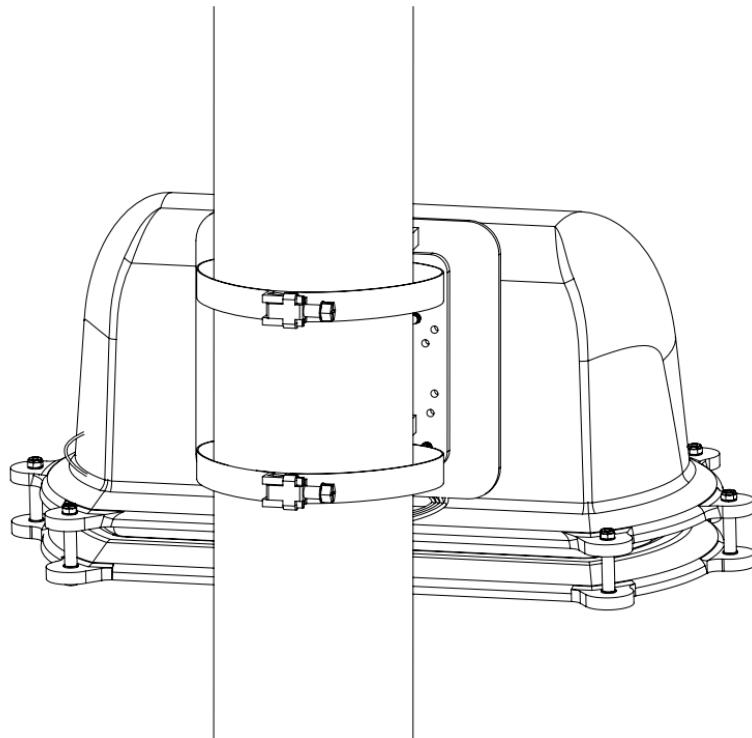


1) Only for HoLu kit basic: assemble the kit following the assembling manual. Don't forget to write down the ID of your kit.

2) Locate the HoLu kit in your desired place and power it. If the light turns green, it is connected.

3) Look at the data on Hollandse Luchten map.

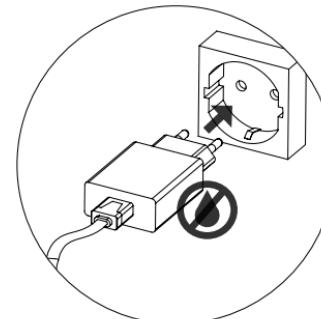
INSTALLATION



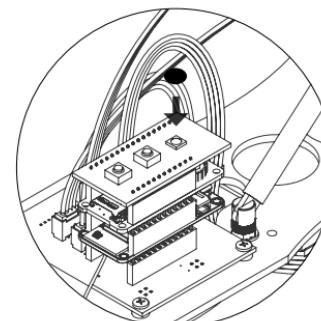
Suggestion: To instal HOLU kit on the pipe outdoor with provided hose clamps.

✗ Do not install in direct sunlight and above water.

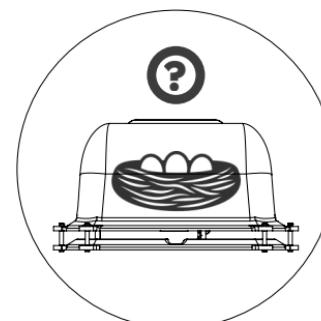
O Install at least 2 meter above ground.



The USB adapter is not waterproof so it can't be placed outdoor without protection. The easier solution is to plug in the adapter indoor.

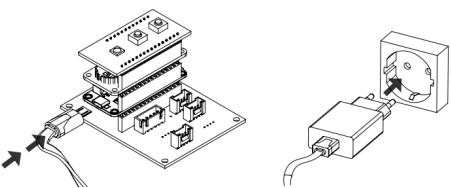


If you would like to hide the light generated by the kit, you can use the black sticker provided with the kit and place it on top of the light.



Every three months you should check if any animals found shelter inside the HoLu kit, clean potential dirt from the enclosure using a dry cloth.

It doesn't work!



What does the light mean?

Power ON sequence

- 1. White
HoLu kit is powered and starts to run.

- 2. Blinking blue
SD card detected

- 3. Red
HoLu kit is in registration mode, trying to access the network, and it starts to measure. This can take a few minutes, be patient.

Operation routine

- Green
HoLu kit joined the network and is measuring.

- Blinking blue
Happens every 3 minutes and it means that the data is saved in the SD card.

- Blinking Green
Happens every 3 minutes and it means that

board and on the sticker provided with the kit. To download the data from the HOLU kit, follow these steps:

1. Visit the website <https://hollandseluchten.waag.org/>
2. find your HOLU kit on the map, and click on it
3. In the detailview (graph) click on the button "Download data" to apply the settings you prefer.
4. At this point a file with your data will be downloaded.

Download the data from the SD card

You can also get the data of your HoLu kit from the SD Card of your kit. Turn OFF the kit and remove the card from Feather Adalogger module. Using the card adapter in the kit, you can read and download the data on your computer.

TROUBLE SHOOTING

→ If the registration takes more than 6 minutes, you can unplug and plug in again the kit (disconnect and reconnect the USB cable). If the kit keeps staying in registration mode, with the RED light on, for more than 10 minutes, it means there is no network and you need to contact the support.

→ If the data of your kit is abnormal, for example the temperature shows 0 degrees when it is August, or when the values (temperature, humidity and PM 2.5) stay the same for a few minutes, most probably the kit needs to be reset: unplug and plug again the kit (disconnect and reconnect the USB cable). If still the data of the sensor is abnor-

Check the manual.

Veelgestelde vragen

Heb je een vraag over Hollandse Luchten? Kijk dan eerst even bij de veelgestelde vragen:



contact

Heb je vragen over de pilots, het project of andere zaken? Stuur ons een bericht:

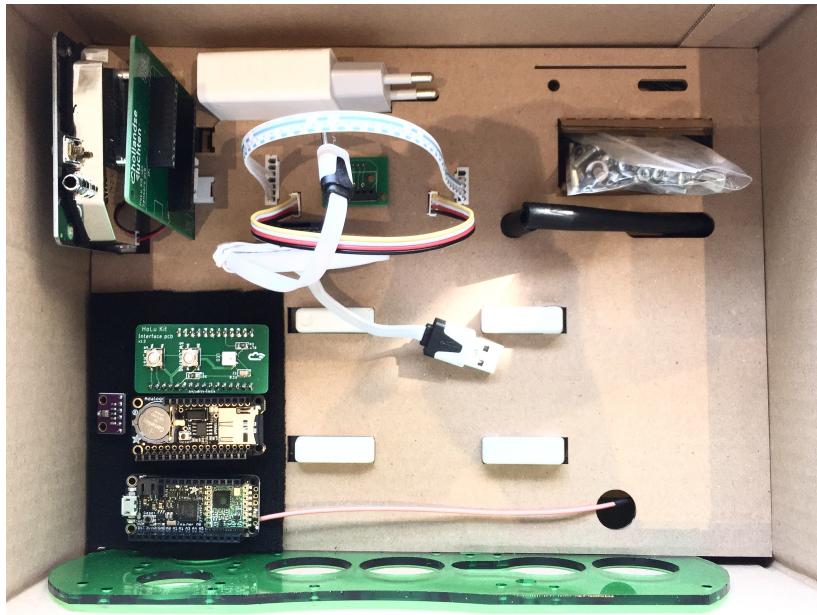
naam

e-mailadres

Check the “vragen” online page.

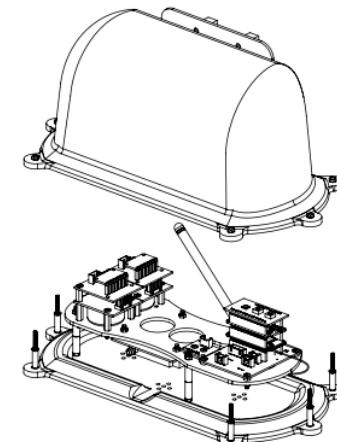
Contact us through the online form.

In the HoLu basic kit package you find all the parts and tools to assembly the kit.



HOLU

Air Quality Sensor Kit
BASIC/EXTENDED



To visualise your kit on the map we need to register it. With the data you will provide with the contract, we will register your kit on the map. You will need to wait 24h.