



PARHyS Permanent Analysis of Renewable Hydrogen with Sensors User Guide

[Home](#) » [PARHyS](#) » PARHyS Permanent Analysis of Renewable Hydrogen with Sensors User Guide 

Contents

- [1 PARHyS Permanent Analysis of Renewable Hydrogen with Sensors](#)
- [2 Permanent Analyses of Renewable Hydrogen with Sensors](#)
- [3 Hazard warnings and safety symbols](#)
- [4 System Components](#)
- [5 Installation Instructions](#)
- [6 Problems and Solutions During Installation](#)
- [7 OBJECTIVE](#)
- [8 SYSTEM COMPONENTS](#)
- [9 Installing PARHyS sensor into the soil](#)
- [10 Balloon/bag installation procedure](#)
- [11 PROBLEMS AND SOLUTIONS DURING INSTALLATION](#)
- [12 PRODUCT SPECIFICATION SHEET](#)
- [13 GENERAL INFORMATION – CERTIFICATION](#)
- [14 UE Declaration of Conformity](#)
- [15 Documents / Resources](#)
- [16 Related Posts](#)



PARHyS Permanent Analysis of Renewable Hydrogen with Sensors



Permanent Analyses of Renewable Hydrogen with Sensors

This document provides information and instructions for using PARHyS, a device used to recover gas from the ground via a balloon and measure various components of the gas, including hydrogen, using gas chromatography. PARHyS uses the LoRaWan network (public or private) and Bluetooth communications.

Hazard warnings and safety symbols

Information in this manual may affect the safety of users. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Important/useful information and instructions are shown clearly throughout the manual in a note format.

System Components

The PARHyS sensor includes the following components:

- Globe
- Inox sampling tubing
- On/Off button
- Bluetooth button
- Identification label
- Air vent silencer
- Gas path
- Hydrophobic filter

Installation Instructions

Before installation, ensure that the path gas tube is not crushed and is around 20 cm up to the soil.

Follow these steps to install PARHyS into the soil:

1. Push the On/Off button.

2. Wait for 2 LED flashes consecutively.
3. Rapid flashing of power will occur when PARHyS sensor is started (around xx seconds).
4. Push the Bluetooth button again if necessary since for energy saving, the BLE switches off.

To install the balloon/bag, follow these steps:

1. Push the Bluetooth button at the bottom of the globe.
2. Start up the Smartphone Apps Nanotech.
3. Stop the automatic data transmission if in progress via the Apps.
4. Place the balloon/bag at the vent either by:
 - Inserting a latex balloon directly onto the air vent silencer, or
 - Unscrewing the air silencer and screwing a balloon/bag with an M5x0.8 male connector directly to the vent filter.

Problems and Solutions During Installation

If PARHyS sensor does not activate after pushing the On/Off button, refer to the troubleshooting section of the manual for solutions.

Hazard warnings and safety symbols

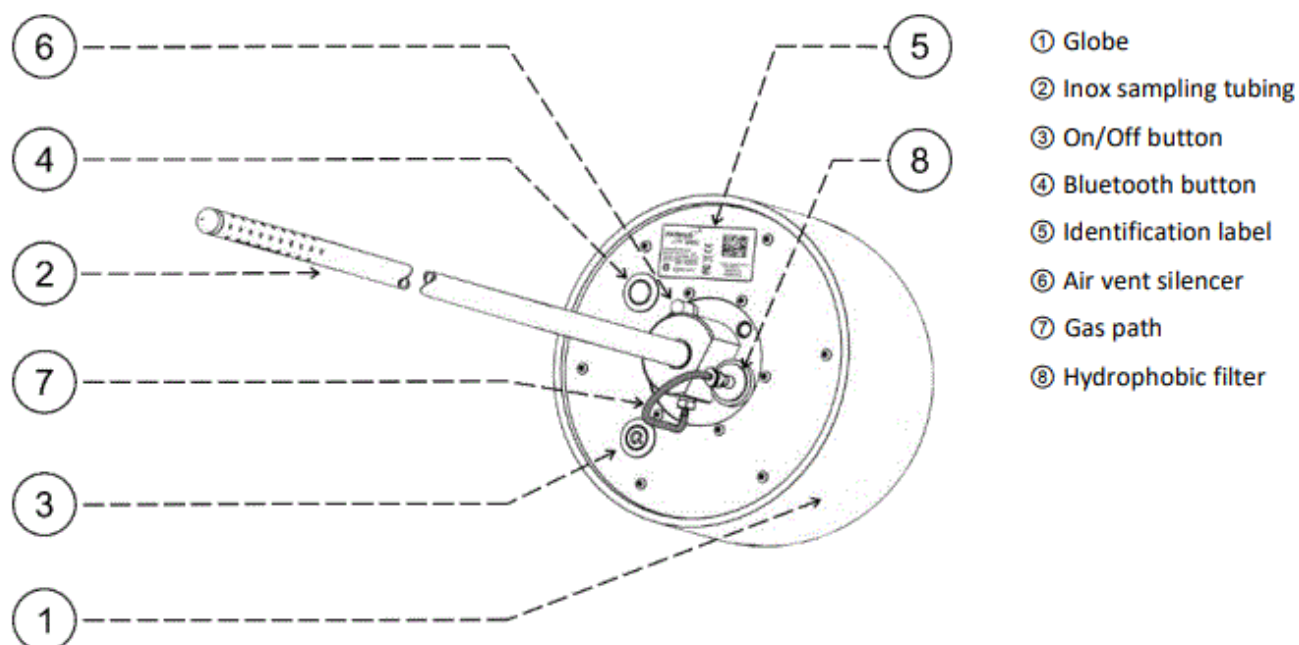
warning	Information in this manual that may affect the safety of users. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired
note	Important/useful information and instructions are shown clearly throughout the manual in a note format.

OBJECTIVE

- Hydrogen is a key component of the energy transition movement and natural hydrogen could be part of it.
- Indeed, emanations coming out of the ground have been detected in several places in the world.
- However, this molecular hydrogen is extremely diffuse and requires dedicated instrumentation to be detected.
- PARHyS instrument is designed to remotely and continuously monitor natural hydrogen emanations in the soil at a depth up to 1 meter. This measurement may be realized at regular interval (1h to 24h).
- PARHyS use LoRaWan network (public or private) and Bluetooth communications.
- PARHyS also allows the recovery of gas from the ground via a balloon that can be placed at the vent. The various components of the gas other than hydrogen can thus be measured by gas chromatography.

SYSTEM COMPONENTS

Bottom view of PARHyS sensor



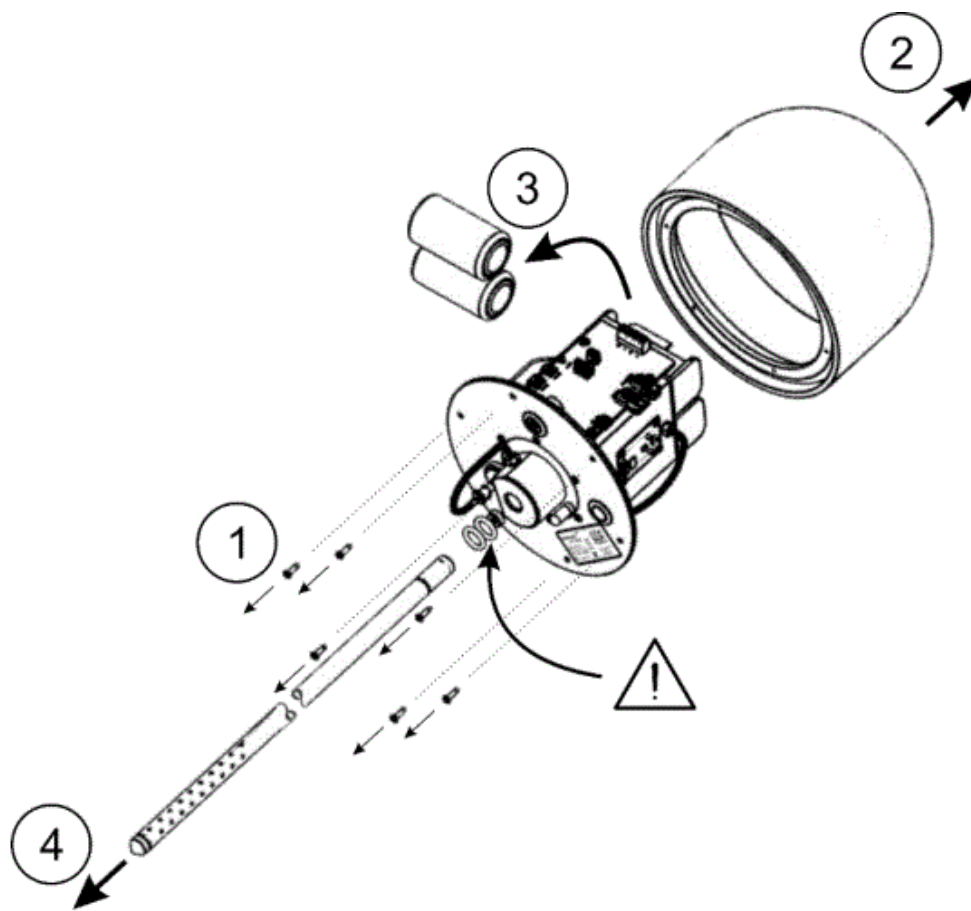
Parts included in the package

- PARHyS sensor packed.
- Inox sampling tubing not plugged.
- User Guide.

Tools box (not included in the package)

- 2 Thionyl Chloride 3.6 V – Size D.
- Screwdriver Philips medium to remove/install the top of the globe.
- Portable perforator.
- Drill 12×1000 mm.
- Smartphone Android 10+.
- Smartphone Apps,
- Option: Gas sampling flask or bag with a minimum volume of 0.5 l.

First preparation before installation



- Remove the 6 screws on the bottom ① to remove the top of the globe ②.

- Place the 2 batteries – type 3.6V-19Ah Thionyl Chloride respecting the polarities ③.
- Replace the top of the globe.
- Switch the PARHyS sensor by pushing the On/Off button:
 - 2 LED flashing consecutively.
 - When PARHyS sensor is started (around xx seconds) : rapid flashing of the power button LED.
- Start Apps Nanotech on your Smartphone (refer to Nanotech Apps documentation load on www.website.Crigen.com).
- Pair PARHyS sensor by pressing the Bluetooth button.
 - BLE connectable: slow flashing of the BLE button LED.
 - BLE connected: rapid flashing of the BLE button LED.
- If PARHyS Sensor is connected to the Gateway, the 2 LED simultaneous status are :
 - Transmission of the join request: 1 flash.
 - Failure of the join procedure: 2 flashes
 - Reception of the join successful: 4 flashes.
 - First frame received: 6 flashes.
- Plug the sampling inox tubing with the globe ④. A mark on the sampling inox tubing indicates the ideal pushing length.

The two O-rings must not be removed from their location. They are shown to indicate that providing the gas tight seal their presence should be checked.

Installing PARHyS sensor into the soil

Check on your smartphone that the module has been paired.

- A hole about 1000 mm depth and 12 mm in diameter is drilled in the ground with a portable perforator.
- Insert sampling tubing into the hole to a depth of 1000 mm (or less).

Ensure the path gas tube is not crushed, around 20 cm up to the soil.

Measurement procedure (refer to Smartphone Apps User Guide)

- Start the Manual measurement mode in the Smartphone Apps: data retrieved as a csv file on the Smartphone directly.
- Start the Automatic measurement mode in the Smartphone Apps: data retrieved every hour from a server.

NOTE

It could be necessary to Push Bluetooth button again since for energy saving the BLE switches off.

Balloon/bag installation procedure

PARHyS makes it possible to collect a punctual sample of gas from the soil for chromatographic analysis with a balloon.

- Push Bluetooth button at the bottom of globe.
- Start up the Smartphone Apps Nanotech.
- Stop the automatic data transmission if in progress via the Apps.
- Place the balloon/bag at the vent either by :
 - Inserting a latex balloon directly onto the air vent silencer.
 - Unscrewing the air silencer and screwing a balloon/bag with a M5x0.8 male connector directly to the vent filter.
- Start the Balloon mode in the Apps.
- Remove the balloon/bag after collecting the gas.

PROBLEMS AND SOLUTIONS DURING INSTALLATION

Good practices for transport and storage

- Drive to the site with PARHyS sensor inside the vehicle, not in the trunk, where it could be subjected to extreme temperatures and possible shocks.
- Do not place PARHyS sensor against a hot object (e.g. in a car left in the sun during the summer).
- Protect PARHyS sensor from direct sunlight and heavy rain when installing to avoid temperature rising in PARHyS's measurement chamber which may result in erroneous readings.

Problems encountered	Solutions
After pushing the On/Off button PARHyS sensor does not activate.	Check that the batteries are properly installed in the battery compartment and/or their status. Check that the On/Off button is not damaged.
Sampling inox tube is not properly inserted.	Check that the O-Rings and/or the mark on the sampling tubing are correctly positioned.
Pairing between PARHyS sensor and the Smartphone Apps fails.	Check that the smartphone is in Bluetooth mode. Press the BLE button under the globe.
Pairing between Parhys and the Gateway fails.	Switch off Parhys sensor by pressing the On/Off button and repeat the procedure Before installation (\$3) .

For further problems contact CRIGEN-NSWLab@engie.com

PRODUCT SPECIFICATION SHEET



	Description	Values	Units	Remarks
General	Supply Voltage	3.6	V	
	Range	1 000	meter	Between PARHyS and LoRaWan gateway – free space
	Operating Temperature	-5 to + 50	°C	
	Storage Temperature	-10 to +75	°C	
	Operating Humidity	10 to 95	%	
	Storage Humidity	5 to 95	%	Best storage environment 0-20°C, 50%HR wo condensing
	Battery type	Thionyl Chloride 3.6 V		2 x Type D (SL-2780)
	Battery capacity	19	Ah	
	Battery replaceable	Yes		
	Battery time life	1	year	PARHyS –1 sample every 4 hour – 1 transmission by sample
	Upload interval range	1 to 24	hours	LoraWan configurable 1 to 24 time/day
	Sample interval range	1 to 24	hours	Configurable by customer or smartphone Apps

	Warranty	1	year					
Measurement	H2 concentration	0 to 1 000	ppm					
	Accuracy	< ± 10	%	Temperature between 22 and 39°C				
	Temperature	-5 to + 50	°C					
	Humidity	10 to 95	%					
Communication	Communication	LoraWan , BLE						
	Protocol	LORA EU	LORA US	LORA AU	Bluetooth BLE			
	Frequency	863-870 MHz	902-928MHz	915-928 MHz	2402-2480MHz			
Receive sensitivity	-137dBm	-132dBm	-137dBm	-90dBm à 1 Mbps				
RF output power	+14dBm max, 25 mW	+18dBm max, 63mW	+18dBm max, 63 mW	+4dBm max, 2.5 mW				
Antenna gain: peak gain	-3.2dBi	-3.0dBi	-3.0dBi					
Antenna Type	Omni directional	dBi						
Certification	General	CE						
	Communication	FCC, IC, RED						
	Equipment	ROHS		Cat 9				
Mechanical	Globe height	147	mm					
	Globe diameter	154	mm					
	Globe material	ABS-PMMA						
	Globe color	White glossy						
	Sample tubing height	1100	mm					
	Sample tubing diameter	10.5	mm					

c al			
	Sample tubing material	Inox 316L	
	Connection tubing-globe		Two O-rings ensure the seal
	Weight	1051.2	g Without battery.
A d d e n d u m	Smartphone Apps	Android 8.1 +	Standalone measurements with csv data. Receiving flash local memory (up to 8000 samples). Configuration.
	LEGEND communication	Contact us	Private LoRaWan gateway with Iridium satellite communication and energy harvesting. LEGEND gateway: 100 PARHyS over 1 km distance. This solution is recommended out of Lora network.
	Public LoRaWan	Orange business LoRaWan Bouygues Objenious Other network contact us	Native language of public operators.

GENERAL INFORMATION – CERTIFICATION

General product information

	Separate collection, handling and disposal for waste electrical and electronic equipment and its components.		
---	--	---	--

Calibration gases

- The sensors are delivered with a calibration information.
- It is however possible to check the calibration with a standard H2 gas injected at 25°C and 50%RH.

Service

- PARHyS should be regularly serviced by ENGIE to ensure correct and accurate operation.

- At the end of the life, request RMA (Return Material Authorization) before returned to ENGIE for WEEE procedures.

Warranty policy

This instrument is guaranteed, to the original end user purchaser, against defect in materials and workmanship for a period of 2 years from the date of the shipment to the user. During this period ENGIE will repair or replace defective parts on an exchange basis. The decision to repair or replace will be determined by ENGIE.

RF information

Changes or modifications not expressly approved by ENGIE could void the user's authority to operate the equipment.

FCC Part 15 compliance statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined by turning the equipment off and on, the user is encouraged to try to correct interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help. License-Exempt Radio Apparatus (ISED)

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's

license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device. Appareils radio exempts de licence (ISDE)

Radio Frequency (RF) Exposure Compliance of Radiocommunication for mobile Apparatus

To satisfy FCC and IC RF Exposure requirements for mobile devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

UE Declaration of Conformity

Document Number: M.

We, the undersigned, Manufacturer or representative: ENGIE SA

Address: 1 Place Samuel Champlain, 92400 CCOURBEVOIE

Country: FRANCE Phone number +33 149 225

E-mail: CRIGEN-NSWlab@engie.com

Designated product,

Description: Brand name or trade mark: ENGIE Identification / Designation: PARHyS Sensor Restrictive use: None

Frequency band for BLEI 2400-2483.5MHz

Max power: 10mW e.i.r.p

Frequency band for LORA: 863-870MHz

Max power: 25mW e.r.p

Certify and declare under our sole responsibility that the designated product is in conformity with the essential requirements and provisions Of the following European Directives:

Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonization of the laws Of the Member States relating to the making available on the market of radio equipment (RED). The conformity of the designated product(s) with the provisions of this European Directive is given by the compliance with the following European Standard(s):

Essential requirements of article 3.1a) of RED: (Safety, electrical)	EN 61010-1 (2010+A1/2019)
Essential requirements of article 3.1a) of RED: (Safety, health)	EN 62311 (2020)
Essential requirements of article 3.1b) of RED: (Electromagnetic Compatibility)	EN 61326-1 (2021) ETSI 301 489-1 (V2.2.3) ETSI 301 489-3 (V2.1.1) ETSI 301 489-17 (V3.2.4)
Essential requirements of article 3.2) of RED: (Efficient use of radio spectrum)	ETSI EN 300 328 (V2.2.2) ETSI EN 300 220-1 (V3.1.1) ETSI EN 300 220-2 (V3.1.1)

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances (ROHS) in electrical and electronic equipment.

Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).

Name and position of person binding the manufacturer or his authorized representative

Name: DUTERQUE Adeline Position: Head of ENGIE Lab CRIGEN

Address: 4 Rue Josephine BAKER, 93240 Stains –


FRANCE Email: CRIGEN-NSWlab@engie.com Signature



ENGIE Lab CRIGEN
4 rue Joséphine Baker
93240 STAINS (France)
Tel : +33 (0) 1 44 22 00 00

This document is the exclusive property of ENGIE. Any inappropriate use contrary to its original purpose, any dissemination, part or full publication of this document is prohibited without the prior written consent of ENGIE owner of this document.

Documents / Resources

 <p>User Guide</p>	<p>PARHyS Permanent Analysis of Renewable Hydrogen with Sensors [pdf] User Guide 2A9GC03664411000133, 2A9GC03664411000133, 03664411000133, Permanent Analysis of Renewable Hydrogen with Sensors, Renewable Hydrogen Permanent Analysis, Renewable Hydrogen with Sensors, Renewable Hydrogen</p>
---	--