



CPP 2025

PHYSICOCHEMICAL SENSORS

Digital Labs

I+D+i

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1. BACKGROUND

Since 2011, Centro Ceibal has made physico-chemical sensors available to Primary Education, Secondary Education and Education Training Centers with the purpose of addressing new didactic challenges by promoting learning and the application of scientific methodology. Through the collection and analysis of experimental data, these sensors constitute important tools for innovation and development of educational projects.

2. EDUCATIONAL CONTEXT

The main objective of the devices is to enhance learning processes mainly related to the area of science, in elementary and middle school students of our Public Education System. The target audience is students and teachers from 4th to 9th grade of EBI (age groups 9 to 16 years).

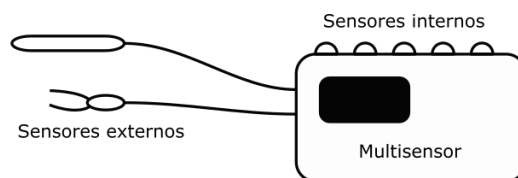
The equipment will be used in educational centers by teachers and students; therefore, the search is oriented to equipment of intuitive operation. Furthermore, they must be robust and durable, ensuring proper operation both indoors and outdoors. In this sense, it is of utmost importance that the device be a multisensor and integrate most of the sensors into the same element, in order to prevent the loss of parts and components.

Its application and use will be for educational purposes, allowing theoretical concepts to be demonstrated by obtaining relevant data for the interpretation of practical experiences, using the sensors both inside and outside the classroom. The data obtained from the physicochemical variables provided by the sensors facilitate the analysis and interpretation of the results, promoting critical thinking and scientific methodologies through the appropriation of experimental design through practical experiences.

3. CALL AIM

The aim of this tender is to acquire physicochemical multisensors, along with their data visualization and analysis software, ensuring their compatibility with Ceibal equipment (ANNEX III - Equipment Specifications).

A "multisensor" refers to a device with the following characteristics: it must be autonomous in operation (portable, with its own power and storage); incorporate at least 5 sensors; allow the reading of specific measurements and the configuration of records directly from the device; and enable the connection or linking of external sensors.



*Figure 1. Illustrative schematic only, which does not refer to or condition a specific design format and size of the hardware device.

4. REQUIREMENTS

The requirements of the educational multisensor products to be purchased are detailed below.

4.1 MANDATORY REQUIREMENTS

4.1.1 Mandatory Requirements of Hardware

Table I and Table II - Annex II detail the mandatory requirements to be met by the products offered.

TABLE I: Mandatory requirements: Type of sensors

item	Type of sensor	Specificities	Mandatory external accessories
1	pH	Pre-calibrated Allows calibration before use	Storage buffer solution together with the electrode (with technical specifications, indicating pH value and chemical formula) and instructions
2	External Temperature Probe	Pre-calibrated Submersible	Probe
3	Current	Pre-calibrated	Suitable measuring cables (banana)
4	Air pressure (barometric)	Pre-calibrated	Plastic tube
5	Relative humidity	Pre-calibrated	Not required
6	Light (light level)	Pre-calibrated	Not required

7	Sound (sound level)	Pre-calibrated	Not required
8	Distance	Pre-calibrated	Not required

In addition, other mandatory hardware and software requirements detailed below in TABLE II must be met.

TABLE II: Mandatory Requirements of Hardware: Performance Specifications	
Item	Feature
1	It should allow you to configure experiments (selecting sensors, sampling rate or frequency) and store the obtained data (logging).
2	It must have the capacity to store data obtained autonomously. It must have an internal memory with a minimum capacity to store at least 500,000 samples (using at least three sensors simultaneously).
3	Recorded data must be expressed in units from the International System of Units (SI). Except for temperature, which must be expressed in degrees Celsius (C°).
4	It must support simultaneous use of sensors: the equipment must be able to record simultaneous measurements from any subset of at least 3 of the mandatory sensors installed.
5	Connectivity with laptops and tablets (see Annex III) to export the data obtained with the hardware (USB, Bluetooth, WIFI among others).
6	If connectivity is via USB, it must include a USB cable that transfers data from the multisensor to the device.
7	Powered by a built-in, rechargeable internal battery, excluding externally rechargeable batteries. A full battery charge should support 24 hours of continuous operation (measurements).
8	The electrical connection of the equipment or its chargers must comply with the following: the plug must be CEE 7/16 type, with two insulated cylindrical pins; the power supply must be 230V nominal, 50Hz.
9	The equipment must comply with standards applicable to information technology equipment, such as UL1950/IEC950/EN60950. Safety regulations must be declared in the offer.
10	That the multi-sensor equipment has an integrated display (screen) for instant visualization of selected sensors and a record configuration menu.

4.1.2 Mandatory Software Requirements - Table III Annex II

The software associated with the device is a tool for representing and visualizing the data recorded and obtained by the sensors located in the hardware. It allows the sensors selected in the hardware to be visualized and recognized, expanding the possibilities for classroom work with this technology.

The software associated with the hardware allows the different behaviors of the variables to be studied with the device to be analyzed using graphs and tables.

The communication between the software and the hardware expands the possibilities for use and application of the device in learning processes across different curriculum subjects. It strengthens data interpretation and the correct presentation of experimental results, which guides scientific methodology.

The following functionalities apply both to experiments whose data are communicated in real time from the multisensor hardware, as well as to the study and visualization of previously saved experiments. The features and mandatory requirements of the software for visualization, analysis, and measurement recording are detailed below.

TABLE III: Mandatory Software Requirement	
Item	Feature
1	The software must be compatible with the operating systems (Windows and Android) of the devices delivered by Ceibal (see Annex III).
2	The software (and its updates) must be free to download and use, without requiring additional licensing costs or procedures for the user, and must include a clear explanation of the download and installation procedure.
3	The software should allow you to work with the data obtained without having to have the multi-sensor hardware connected, allow you to download the records obtained, and allow you to export the data in CSV format.
4	User interfaces must be configurable in Spanish.
5	The software must be usable offline: Data usage and visualization functions must not require an internet connection. This is notwithstanding that other additional features may require an internet connection (e.g., functions for sharing experiments or generating reports).

6	The recorded data must be expressed in units of the International System of Units (SI), except for temperature, which must be expressed in degrees Celsius.
7	The sensors used must be automatically detected
8	Graphical representation of data: it must be possible to select the sensors to be graphically represented.
9	Numerical representation of data: sensor records must be able to be displayed in tabular form.

4.2 DESIRABLE REQUIREMENTS

TABLE IV details the desirable requirements.

The desirable hardware requirements and the availability of these sensors and features will demonstrate the possibility of expansion and additional features for the base multisensor product. The desirable product packaging requirements consider the educational purpose of the product and its storage in educational centers, avoiding misplacement, damage, and loss of multisensor components and additional sensors.

The measurement ranges and sampling rates indicated are desirable reference values to guide the selection of sensors to be offered; different operating ranges will be studied during the evaluation.

Sampling rates are expressed in samples per second (spm).

TABLE IV: Desirable requirements	
4.2.1 Desirable hardware requirements	
1	The multi-sensor device must have a voltage sensor with a range of at least $\pm 20V$. Alligator-clip cables are a plus.
2	A temperature probe with a measurement range of $-20^{\circ}C$ to $120^{\circ}C$ and a minimum frequency of 100 measurements per second (mps) will be considered favorable. A default unit of measurement of degrees Celsius ($^{\circ}C$) will also be positively valued, with the option of incorporating other units such as Kelvin (K) and Fahrenheit ($^{\circ}F$).
3	It will be considered favorable that the current sensor has a measurement range of $\pm 0.5 A$ and a minimum frequency of 10 mps.

4	It will be considered favorable that the air pressure sensor (barometric) has a measurement range of 0 to 250 kPa and a minimum frequency of 10 mps.
5	It will be considered favorable that the relative humidity sensor has a measurement range of 0 to 100% RH and a minimum frequency of 100 mps.
6	It will be considered favorable that the light sensor (light level) has a measurement range of 0 to 100,000 Lx and a minimum frequency of 10 mps.
7	It will be considered favorable that the sound sensor (sound level) has a measurement range of 20 to 110 dB[SPL] with A weighting and a minimum frequency of 10 mps.
8	It will be considered favorable that the distance sensor has a measuring range of 0 to 10 m and a minimum frequency of 10 mps.
9	The multi-sensor device must have a GPS global positioning sensor (GNSS systems: GPS, Galileo, GLONASS, BeiDou). A sampling frequency of at least 1 Hz is an important consideration.
10	Additional sensors beyond those mentioned in mandatory requirements will be considered if they are integrated into the device itself.

4.2.2 Desirable software requirements

11	It should allow downloading of data in additional formats besides CSV.
12	Graphical representation of data: in addition to selecting the sensors to be represented, it should be possible to modify the time intervals to be displayed (scrolling along the time axis and zooming in/out).
13	The graphical representation of the data should allow the display of the values obtained from one sensor on the Y axis, and the values recorded by another sensor on the X axis. Both sets of data should be able to be recorded simultaneously, facilitating the analysis of their relationship in real time.
14	The display of coordinates obtained by the device (if equipped with GPS) will be positively valued, as well as the software's integration with Google Maps for representation and analysis.

4.2.3 Desirable packaging and accessories requirement

15	The packaging of the multisensor device must contain (in a single package) all the components that are part of the purchased product.
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16	The inclusion of supports or accessories that facilitate the implementation of experimental designs with the multisensor will be valued. For example, the provision of elements that allow the multisensor to be secured to the laboratory bench will be positively considered, thus contributing to improved device stability and data collection accuracy.
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4.3 OPTIONAL SENSORS

These sensors can be integrated into the multisensor or connected to it.

4.3.1 Optional sensors:

TABLE V: Hardware Options: Sensor Type				
Item	Sensor type	Units, ranges, maximum sampling rate (for reference)	Specificities	Mandatory external accessories
1	Carbon dioxide gas	0 to 10,000 ppm, 100 mps	Pre-calibrated	CO2 probe connected to the sensor body by a rubber-coated cable. Glass bottle and/or container that accompanies the sensor design for conducting experiments.
2	Dissolved oxygen	0 to 15 (mg/L), 100 mps 0 to 125%, 100mps	Pre-calibrated	DO (Dissolved Oxygen) calibration solution and DO (Dissolved Oxygen) sensor filling (1 M KCl) and replacement membrane.
3	Turbidity	0 to 200 NTU, 100 mps	Pre-calibrated	Cuvettes or buckets for correct measurement in the sensor cell.
4	UVA radiation	0 to 65000 mW/m2 100 mps	Pre-calibrated	
5	UVB radiation	0 to 1,500 mW/m2 aprox 290 to 320 nm 100 mps	Pre-calibrated	
6	Electrical conductivity of	Unit: S/m (siemens per	Pre-calibrated	

	liquids	meter) Operating range: 0 to 20.00 μ S/cm 100 mps	Parallel graphite carbon electrodes	
7	Soil moisture	0 to 100% in the temperature range of 203 $^{\circ}$ K – 323 $^{\circ}$ K,	Pre-calibrated	
8	IMU (Inertial Measurement Unit)	Sampling rate of at least: Accelerometer: 1kHz Gyroscope: 1kHz Magnetometer: 1Hz	With some of the following functions: accelerometer, gyroscope and magnetometer	

5. OFFER

The offer must be submitted according to the specifications detailed in this section. Centro Ceibal reserves the right to reject any offer that does not meet the mandatory specifications.

The offer must be presented according to the quotation table in Annex I, and indicate compliance with the mandatory and desirable requirements requested in sections 3 and 4 using the tables in Annex II.

The following must also be submitted with the offer:

- **Sample** of the multisensors offered for measurement testing and performance evaluation (1 per model) with their respective accessories. The sample submitted must be exactly as detailed in the quote and in its original sealed presentation (packaging and contents). Samples of both mandatory and optional sensors are required, according to section 5.1.
- Access to the measurement **software** and graphics.
- **Technical documentation** containing sensor specifications and characteristics of the mandatory and optional requirements detailed in section 4.
- **Economic offer** through the price table in **Annex I** and the mandatory and desirable requirements **compliance tables** in **Annex II**.
- **Background information** according to section 5.4.

5.1 SAMPLE OF SENSORS OFFERED

- A sample of the complete product offered must be submitted for testing in practical experiences linked to the curriculum of our public education system, and for evaluation of the proper functioning and accuracy of the values obtained by each sensor. Sensors or optional features without samples will not be evaluated.
- If the sensors require calibration or storage solutions (pH, dissolved oxygen, conductivity, etc.), a sample of these solutions and a technical specification of the composition of that solution and/or buffer must be available.
- Some tests performed on the samples could result in their total or partial destruction, or alter the conditions in which they were delivered. Undamaged samples may be returned in different conditions than those in which they were delivered.
- The bidder will have 4 weeks from the award to collect the submitted samples. After the aforementioned deadline has expired and all samples of the products offered have not been collected, Centro Ceibal may freely dispose of them, without the bidder having the right to claim them.
- In exceptional cases, and when Ceibal deems justified reasons, the bidder may defer delivery for a reasonable period, which Ceibal will evaluate.
- Samples must be delivered to the Ceibal Supply Office (Av. Italia 6201, LATU Building, Los Ceibos, CP 11500). Customer service hours are Monday through Friday, 9:30 a.m. to 4:00 p.m. Samples must be submitted before the bidding opening date. Ceibal may extend the deadline for reasonable reasons at its discretion.

5.2 REQUIRED TECHNICAL DOCUMENTATION

The offer must specify and include at least the following information, and may also include brochures and manuals, both physical and/or digital, with additional information.

- Hardware user manual with technical specifications and user guide in Spanish (physical and/or digital)
- Specific calibration manual for those sensors that require calibration prior to use. This must include instructions for preparing the storage and calibration buffer solution for the pH, dissolved oxygen, and any other sensors that require it.
- Examples of educational experiences or practices that can be carried out with the sensors offered.

5.3 ECONOMIC OFFER

The offer must specify the CIF Montevideo unit quote for each product offered, according to the following volume ranges, specifying deadlines following the **PRICE TABLE in ANNEX I.**

The quote for mandatory sensors must be submitted in PRICE TABLE A, including mandatory sensors that are not included in the multisensor and are external. The included multisensors (both mandatory and non-mandatory but cannot be separated from the multisensor) must be specified in the comments box.

Optional sensors must be quoted in PRICE TABLE B, respecting the volume ranges. The discounts considered for a bundle of different sensors must be specified in the comments box (for example: 10+20+15+30).

5.4 BACKGROUND

The bidder must present the following background information:

- Folder with factory background information, detailing the factory that will produce the devices offered.

- Folder with background information on educational projects in which the applicant has participated.

6. DELIVERY PERIOD

The bidder must specify the delivery time for the products, to be met from the date of notification of the award. Complete delivery is expected within 90 calendar days of the purchase order being issued.

If these deadlines cannot be met, the bidder must specify the delivery times in their offer, allowing partial deliveries.

Centro Ceibal may request to adjust the arrival schedule with the successful supplier.

7. WARRANTY

The bidder must include in their proposal the conditions, procedures, and deadlines for filing warranty claims for all elements included in the product. The bidder guarantees that the products supplied under the contract are new, complete, unused, and free of defects attributable to design, materials, manufacturing, storage conditions (packaging, appropriate temperature, and humidity), transportation, or any act or omission of the bidder that may occur during normal use of the products under the conditions prevailing in the country.

The product warranty period must be informed by the bidder, with a minimum warranty period of one year. If the warranty period is not specified, Centro Ceibal will consider a warranty period of at least one year.

8. SENSOR EVALUATION

The evaluation consists of a technical evaluation and an economic evaluation, which will be weighted according to the following technical-economic formula:

Aspects to be evaluated	Weight
Technical offer	60%
Price	40%

The **technical evaluation** verifies compliance with all mandatory requirements, and a minimum score of 60/100 points, equivalent to 60%, is set.

The technical evaluation will assess the suitability of the sensors for the operating environment to which they will be exposed and the work dynamics intended to be achieved in educational centers. These points are categorized by weighting percentages defined based on their relevance to Ceibal, in light of the expected learning objectives. During the evaluation stage, Ceibal may also request a product demonstration from the bidder.

Therefore, the total of 100 points is divided in the evaluation as follows:

Technical Evaluation- 100 points

1. Adaptation to the educational context - 25%
 - Usability
 - Accessibility
 - Adaptability for both teachers and students
 - Activity guides or educational support materials specific to the device
2. Hardware technical characteristics - 35%
 - Autonomy (battery life)
 - Portability
 - Robustness (rigidity, resistance to dust, water, intensive use, etc.)
 - Recording capacity and sample memory
 - Precision and accuracy of measurements recorded by the sensors
 - Sensor calibration appropriate for the educational context
 - Other non-mandatory components incorporated into the multi-sensor equipment
 - Voltage sensor and desirable features
 - External temperature probe and desirable features
 - Current sensor and desirable features
 - Air pressure sensor (barometric) and desirable features
 - Relative humidity sensor and desirable features
 - Light sensor (light level) and desirable features
 - Distance sensor and desirable features
 - GPS global positioning sensor and desirable features
3. Software - 25%
 - Communication with hardware
 - Usability
 - Data analysis tools
 - Real-time measurement visualization
4. Packaging and accessories- 15%

9. ANNEX I – PRICE TABLES

Unit prices in USD - CIF Montevideo

Quote mandatory sensors as a single multisensor and according to the ranges:

PRICE TABLE A (unit prices USD- CIF MVDO.)		
MANDATORY		
Physicochemical Multisensor <i>(including mandatory sensors external to the multisensor)</i>	Multisensor <i>Model</i>	Delivery time
Offer Range 1: 0 to 50 Multisensors		
Offer Range 2: 51 to 150 Multisensors		
Offer Range 3: More than 151 Multisensors		
Comments: <i>Sensors included in multisensor</i>		

- In all cases, the delivery time for each item must be specified according to each range in case it varies.

Unit prices in USD - CIF Montevideo

Please quote optional extras separately and according to the range:

PRICE TABLE B (unit prices USD- CIF MVDO.)		
MANDATORY		
Optional sensors	Sensor(s) not required	Delivery time
Educational complements	Hands-on experience and training for using the multisensor	
Offer Range 1: 0 to 50 Multisensors	Model A . . . Model N	
Offer Range 2: 51 to 150 Multisensors		
Offer Range 3: More than 151 Multisensors		

- For optional sensors, if there is a discount for a bundle of different sensors (e.g. 10+20+15+30), please specify this in the comments box.

10. ANNEX II - COMPLIANCE TABLES

The bidder must complete the compliance tables for all requested requirements. For the evaluation team's reference, they must also indicate where in the submitted bid the information corresponding to the requirement is located in the Observations field.

The COMPLIANCE column for mandatory requirements must be completed with the Yes/No options. For optional requirements, it may be completed with the Yes/No/Partial options. If compliance is partial, the information in the OBSERVATIONS column is expanded.

TABLE I: Mandatory requirements Hardware: Type of sensors

Item	Sensor type	Specificities	Mandatory external accessories	COMPLIANCE YES / NO	OBSERVATIONS
1	pH	Pre-calibrated Allows calibration before use	Storage buffer solution together with the electrode (with technical specifications, indicating pH value and chemical formula) and instructions		
2	External Temperature Probe	Pre-calibrated Submersible	Probe		
3	Current	Pre-calibrated	Suitable measuring cables (banana)		
4	Air pressure (barometric)	Pre-calibrated	plastic tube		
5	Relative humidity	Pre-calibrated	Not required		
6	Light (light level)	Pre-calibrated	Not required		
7	Sound (sound level)	Pre-calibrated	Not required		
8	Distance	Pre-calibrated	Not required		

TABLE II: Mandatory Hardware Requirements: Operating Specifications

Item	Feature	COMPLIANCE YES / NO	OBSERVATIONS
1	It should allow you to configure experiments (selecting sensors, sampling rate or frequency) and store the obtained data (logging).		
2	It must have the capacity to store data obtained autonomously. It must have an internal memory with a minimum capacity to store at least 500,000 samples (using at least three sensors simultaneously).		
3	Recorded data must be expressed in units from the International System of Units (SI). Except for temperature, which must be expressed in degrees Celsius (C°).		
4	Must support simultaneous use of sensors: the equipment must be able to record simultaneous measurements from any subset of at least 3 of the mandatory sensors installed.		
5	Connectivity with laptops and tablets (see Annex III) to export the data obtained with the hardware (USB, Bluetooth, WIFI among others).		
6	If connectivity is via USB, it must include a USB cable that transfers data from the multisensor to the device.		
7	Powered by a built-in, rechargeable internal battery. A full battery charge should support 24 hours of continuous operation (measurements).		
8	The electrical connection of the equipment or its chargers must comply with the following: the plug must be CEE 7/16 type, with two insulated cylindrical pins; the power supply must be 230V nominal, 50Hz.		
9	The equipment must comply with applicable standards for information technology equipment, such as UL1950/IEC950/EN60950. Safety regulations must be declared in the offer.		
10	That the multi-sensor equipment has an integrated display (screen) for instant visualization of selected sensors and a record configuration menu.		

TABLE III: Mandatory Software Requirements

Item	Feature	COMPLIANCE YES / NO	OBSERVATIONS
1	The software must be compatible with the operating systems (Windows and Android) of the devices delivered by Ceibal (see Annex V).		
2	The software (and its updates) must be free to download and use, without requiring additional licensing costs or procedures for the user, and must include a clear explanation of the download and installation procedure.		
3	The software should allow you to work with the data obtained without having to have the multi-sensor hardware connected, allow you to download the records obtained, and allow you to export the data in CSV format.		
4	User interfaces must be configurable in Spanish.		
5	The software must be usable offline: Data usage and visualization functions must not require an internet connection. This is notwithstanding that other additional features do require an internet connection (e.g., functions for sharing experiments or generating reports).		
6	The recorded data must be expressed in units of the International System of Units (SI), except for temperature, which must be expressed in degrees Celsius.		
7	The sensors used must be automatically detected.		
8	Graphical representation of data: it must be possible to select the sensors to be graphically represented.		
9	Numerical representation of data: Sensor records must be able to be displayed in tabular form.		

TABLE IV: Desirable requirements

4.2.1 Desirable hardware requirements		COMPLIANCE YES / NO	OBSERVATIONS
1	The multi-sensor device must have a voltage sensor with a range of at least $\pm 20V$. Alligator-clip cables are a plus.		
2	A temperature probe with a measurement range of $-20^{\circ}C$ to $120^{\circ}C$ and a minimum frequency of 100 measurements per second (mps) will be considered favorable. A default unit of measurement of degrees Celsius ($^{\circ}C$) will also be positively valued, with the option of incorporating other units such as Kelvin (K) and Fahrenheit ($^{\circ}F$).		
3	It will be considered favorable that the current sensor has a measurement range of $\pm 0.5 A$ and a minimum frequency of 10 mps.		
4	It will be considered favorable that the air pressure sensor (barometric) has a measurement range of 0 to 250 kPa and a minimum frequency of 10 mps.		
5	It will be considered favorable that the relative humidity sensor has a measurement range of 0 to 100% RH and a minimum frequency of 100 mps.		
6	It will be considered favorable that the light sensor (light level) has a measurement range of 0 to 100,000 Lx and a minimum frequency of 10 mps.		
7	It will be considered favorable that the sound sensor (sound level) has a measurement range of 20 to 110 dB[SPL] with A weighting and a minimum frequency of 10 mps.		
8	It will be considered favorable that the distance sensor has a measuring range of 0 to 10 m and a minimum frequency of 10 mps.		
9	The multi-sensor device must have a GPS global positioning sensor (GNSS systems: GPS, Galileo, GLONASS, BeiDou). A sampling frequency of at least 1 Hz is an important consideration.		
10	Additional sensors beyond those mentioned in mandatory requirements will be considered if they are integrated into the device itself.		

4.2.2 Desirable software requirements			
11	Allow downloading of data in additional formats besides CSV.		
12	Graphical representation of data: in addition to selecting the sensors to be represented, it should be possible to modify the time intervals to be displayed (scrolling along the time axis and zooming in/out).		
13	The graphical representation of the data should allow the display of the values obtained from one sensor on the Y axis , and the values recorded by another sensor on the X axis. Both sets of data should be able to be recorded simultaneously, facilitating the analysis of their relationship in real time.		
14	The display of coordinates obtained by the device (if equipped with GPS) will be positively valued, as well as the software's integration with Google Maps for representation and analysis.		
4.2.3 Desirable packaging and accessories requirement			
15	The packaging of the multisensor device must contain (in a single package) all the components that are part of the purchased product.		
16	The inclusion of supports or accessories that facilitate the implementation of experimental designs with the multisensor will be valued. For example, the provision of elements that allow the multisensor to be secured to the laboratory bench will be positively considered, thus contributing to improved device stability and data collection accuracy		

TABLE V: Optional Features Hardware: Sensor Type

Item	Sensor type	Units, ranges, maximum sampling rate (for reference).	Specificities	Mandatory external accessories	COMPLIANCE YES / NO	OBSERVATIONS
1	Carbon dioxide gas	0 to 10.000 ppm, 100 mps	Pre-calibrated	CO2 probe connected to the sensor body by a rubber-coated cable. Glass bottle and/or container that accompanies the sensor design for conducting experiments.		
2	Dissolved oxygen	0 to 15 (mg/L), 100 mps 0 to 125 %, 100 mps	Pre-calibrated	DO (Dissolved Oxygen) calibration solution and DO (Dissolved Oxygen) sensor filling (1 M KCl) and replacement membrane.		
3	Turbidity	0 to 200 NTU, 100 mps	Pre-calibrated	Cuvettes or buckets for correct measurement in the sensor cell.		
4	UVA radiation	0 to 65000 mW/m2 100 mps	Pre-calibrated			
5	UVB radiation	0 to 1,500 mW/m2 aprox 290 a 320 nm 100 mps	Pre-calibrated			
6	Electrical conductivity of liquids	Unit: S/m (siemens per meter) Operating range: 0 to 20.00 µS/cm 100 mps	Pre-calibrated Parallel graphite carbon electrodes			
7	Soil moisture	0 to 100% in the temperature range of 203 °K – 323 °K,	Pre-calibrated			

8	IMU (Inertial Measurement Unit)	Sampling rate of at least: Accelerometer: 1kHz Gyroscope: 1kHz Magnetometer: 1Hz	With some of the following functions: accelerometer , gyroscope, magnetometer			
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11.ANNEX III–EQUIPMENT SPECIFICATIONS

EQUIPMENT SPECIFICATIONS

See device details at the following link:

<https://ceibal.edu.uy/dispositivos-soporte/tablets-y-laptops/>