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HSS-100 Operational Manual

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1. Table of Contents

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2. Revision History

Rev. #	Description	Date
01	Initial release	February 26, 2024
02	Updated ISED, FCC statements, recommended battery list	March 26, 2024

3. Document Links

Document #	Document Name
N/A	N/A

4. Acronyms

BLE   Bluetooth Low Energy
LED   Light Emitting Diode
WBGT   Wet-Bulb Globe Temperature

5. ISED Non-Interference Disclaimer

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

This device complies with the Canadian ICES-003 Class A specifications. CAN ICES-003(A) / NMB-003 (A).

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempt de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

6. FCC Class A Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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. Please note that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Changes or modifications not expressly approved by Electronics4All Inc. could void the user's authority to operate the equipment.

7. RF Exposure Statement

This equipment complies with FCC and ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. In order to avoid the possibility of exceeding the FCC and ISED RSS-102 radio frequency exposure limits, this equipment should be installed and operated with minimum distance 20 cm (7.8 inches)

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between the antenna and your body during normal operation. Users must follow the specific operating instructions for satisfying RF exposure compliance.

Cet équipement est conforme aux limites d'exposition aux rayonnements FCC et ISED CNR-102 établies pour un environnement non contrôlé. Cet émetteur ne doit pas être installé ou utilisé en conjonction avec une autre antenne ou un autre émetteur. Afin d'éviter la possibilité de dépasser les limites d'exposition aux radiofréquences FCC et ISED, cet équipement doit être installé et utilisé avec une distance minimale de 20 cm (7.8 pouces) entre l'antenne et votre corps pendant le fonctionnement normal. Les utilisateurs doivent suivre les instructions spécifiques d'utilisation pour respecter la conformité à l'exposition aux RF.

8. Safety

1. Operate the device only with the specified internal batteries and accessories.
2. The device is intended for use only in a clean and dry indoor environment.
3. Always wear personal protective equipment appropriate to the environment where the device is installed and operated.
4. The device contains no user serviceable parts. Do not attempt to repair the device. See the Contact Information section for support or repair.

9. Installation

9.1. Intended Use

The device is intended to be installed and operated in an indoor industrial environment. The wireless system is Class A equipment and may cause radio interference in residential areas.

10. Product Disposal

10.1. Batteries

The HSS-100 contains primary lithium batteries. Do not dispose of spent batteries with general waste. Contact your local government for directions on the proper disposal methods.

10.2. Product

The HSS-100 may be recycled by Electronics4All Inc. See the Contact Information section to recycle the HSS-100 or any supplied accessories.

11. Maintenance and Cleaning

Clean the enclosure using a clean dry cloth.

12. Contact Information

Electronics4All Inc.
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1-613-595-0303

13. HSS-100

The HSS-100 is a wireless Heat Stress Sensor designed to monitor heat stress environments.

The HSS-100 contains a high accuracy humidity and thermal radiation sensor which are used to determine the Wet-Bulb Globe Temperature (WBGT), which is an environmental heat measurement as it affects humans.

The HSS-100 is installed in locations where the WBGT is a concern for workers. The device periodically samples the humidity and temperature of the environment and broadcasts the measurements back to a compatible wireless Gateway.

Compatible Gateways

The HSS-100 is compatible with the following Gateways manufactured by Electronics4All Inc.

Part Number	Description
GTW-BL100	Wireless Bluetooth 5.0 Receiver, LAN TCP/IP Communication, Integrated Ambient Temperature and Humidity Sensor
GTW-200	Wireless Bluetooth 5.0 Receiver, 900 MHz LoRa WAN Long Range Repeater Network, LAN TCP/IP Communication, Ambient Temperature and Humidity Sensor, PoE Compatible
P-GTW-BL300	Wireless Bluetooth 5.0 Portable Datalogger, Android X-Lab Database Application, Adjustable Sensor Reporting Interval

14. Interfaces
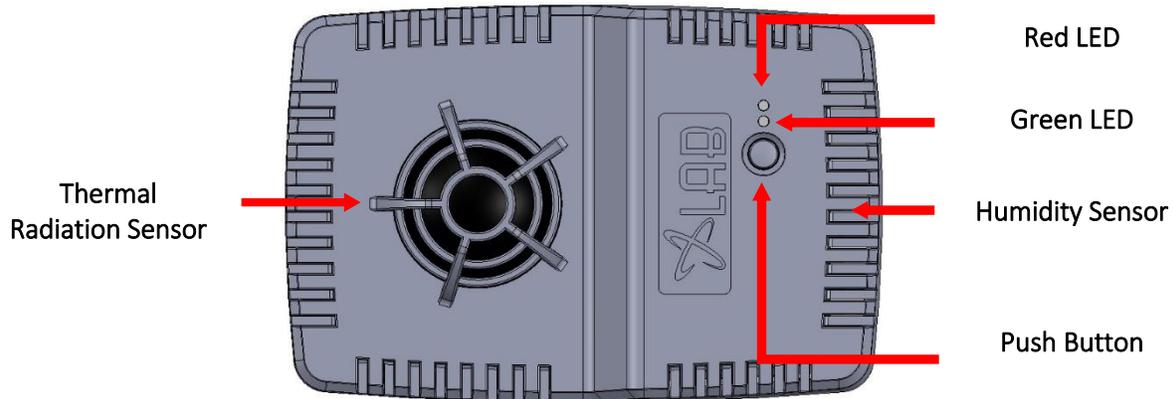
14.1. Pushbutton

A single push button is located on the top of the sensor. The push button is used to pair the sensor to a compatible Gateway. See the Pairing section for operation.

14.2. LEDs

Two LEDs (Red, Green) are located on the top of the sensor. The LEDs are used to indicate the status of the pairing operation, and to provide a visual indication when the sensor sends a wireless broadcast.

Operation	LED Pattern
Device Reset	Red (1 second), Green (1 second), OFF (1 second), Green (1 second)
Single Button Press	Red (1 second): Device Not Paired to Gateway Green (1 second): Device Paired to Gateway
Pairing	Red (1 second), Green (1 second): Successful Pairing Red (1 second): Unsuccessful Pairing
Unpairing	Green (5 seconds), Red (Fast Flashing), Then Device Reset

14.3. Thermal Radiation Sensor

The HSS-100 contains a thermal radiation sensor which consists of a PT-100 RTD temperature sensor enclosed in a sealed globe. The temperature measurement range is -30 °C to 75 °C. The sensor is manufacturer calibrated to within ± 0.2 °C.

14.4. Humidity Sensor

The HSS-100 contains an internal humidity sensor with a 1.5 % Relative Humidity (RH) accuracy, and an operating relative humidity range measurement of 0 % to 100 % RH.

15. Battery Installation and Replacement

The sensor is powered from two (2) non-rechargeable CR123A Lithium / Manganese Dioxide (Li/MnO2) batteries.

Under normal operation, the internal batteries should last for between 4 to 5 years using the default reporting interval of 5 minutes.

As part of the broadcast data packet back to the Gateway, the sensor reports current battery voltage. The batteries should be replaced once the voltage drops below 2.0 VDC.

If a sensor fails to broadcast, one of the LEDs no longer lights when pressing the push button, or the sensor appears to continually reset, the batteries should be replaced.

15.1. Recommended Battery Part Numbers

The following battery manufacturers are recommended by Electronics4All Inc.

Manufacturer	Part Number	Capacity	Manufacturer	Part Number	Capacity
Tenergy	CR123A	1400 mAh	Energizer	123	1500 mAh
Duracell	123	1600 mAh	Ultralife	CR123A	1500 mAh
Panasonic	CR123A	1550 mAh			

Note that while the HSS-100 accepts two (2) batteries, the device will operate on a single battery cell, albeit with half the expected run time. However, it is strongly advised that two batteries cells are installed, and both batteries should be replaced at the same time.

CR123A batteries from other manufacturers may be used, however it should be noted that their capacity may be lower and/or the internal impedance of the battery may be higher, either of which will result in a reduced runtime.

Do not mix batteries from different manufacturers.

15.2. Replacement Instructions
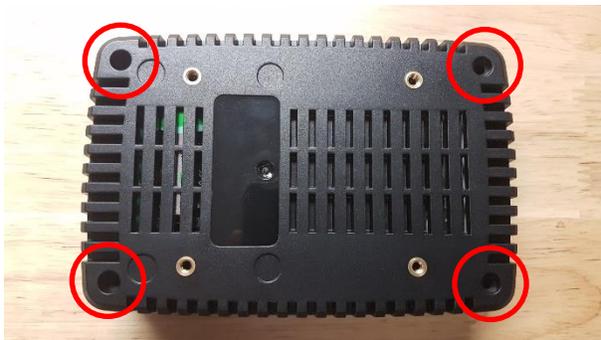
1   Remove the four (4) Phillips machine screws on the bottom of the enclosure.

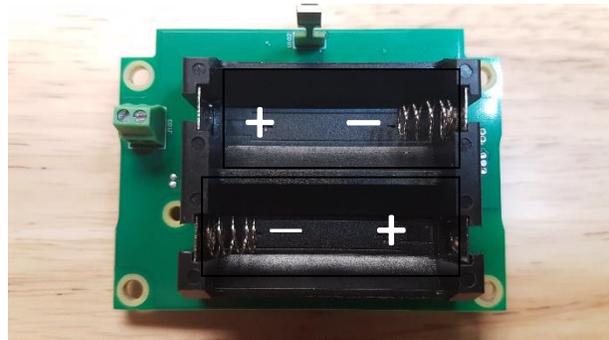2   Lift off the lid of the enclosure.

3 | It is recommended to lift off the push button top and set it aside, as it may fall off when removing the circuit board assembly.

4 | Remove the four (4) Phillips machine screws securing the circuit board assembly to the enclosure.

5 | Flip the circuit board assembly over to access the batteries.

6 | When replacing the batteries, observe correct polarity.

7 | Reverse steps 5 to 1 to close the HSS-100.

8 | Push and release the button to test operation. The red LED should turn on for 1 second.

16. Mounting

The HSS-100 is designed to be operated on a flat, level surface. To secure the device or to operate the HSS-100 in other orientations, magnetic mounting feet may be supplied which permits attachment to a steel structure.

17. Pairing

17.1. Paring Status

To determine if the sensor has been paired with a Gateway, press and release the push button. If the green LED turns on for 1 second, the sensor is paired with a Gateway. If the red LED turns on for 1 second, the sensor is not paired with a Gateway.

17.2. Pairing a Sensor to a Gateway

1. Place the target Gateway in Pairing Mode by pressing and releasing the PB1 push button on the Gateway. The green COM LED will turn on. Refer to the specific Gateway User Manual for more information on Bluetooth sensor pairing.

Gateway in Pairing Mode (GTW-BL100 Shown)

HSS-100 Pairing to Gateway

2. Press and hold the push button on the sensor. The red LED on the sensor will turn on for 1 second. Release the push button on the sensor when the LED turns off.

3. If pairing was successful, the green LED on the sensor will then turn on for 1 second, and the green COM LED on the Gateway will turn off.

4. If pairing was not successful, the green LED on the sensor will not turn on and the green LED on the Gateway will remain on. If this occurs, reattempt step 2.

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17.3. Unpairing A Sensor to a Gateway

To unpair a sensor from a Gateway, press and hold the push button. After 5 seconds, the red LED will start to flash rapidly. The push button may then be released. The sensor is now no longer paired to the Gateway.

18. Specifications

18.1. Certifications

FCC ID	2AXVKHSS01
Industry Canada Certification Number	26661-HSS01
Safety	IEC 61010-1

18.2. Bluetooth

Frequency Range	2404 MHz to 2480 MHz
Channels	0 -39
Communication Range	125 m Line of Sight

18.3. Power

Battery Type	2 × CR123A 1500 mAh Li/MnO$_2$
Average Current Consumption	22 µA
Typical Battery Life	5 Years, 5 Minute Reporting Interval

18.4. Mechanical

Dimensions (No Attachments)	132 mm (L) × 36.6 mm (H) × 88 mm (W)
Weight (With Batteries and Magnets)	250 g

18.5. Environmental

Ingress Protection Rating	IP30
Pollution Degree	2
Operating Temperature	-20 °C to 60 °C
Storage Temperature	-40 °C to 85 °C
Permissible Humidity	20 % to 85 % RH (Operation and Storage)
Maximum Altitude	2000 m

18.6. Accessories

Magnetic Mounting Feet	J & K Magnetics Inc. MM-A-16