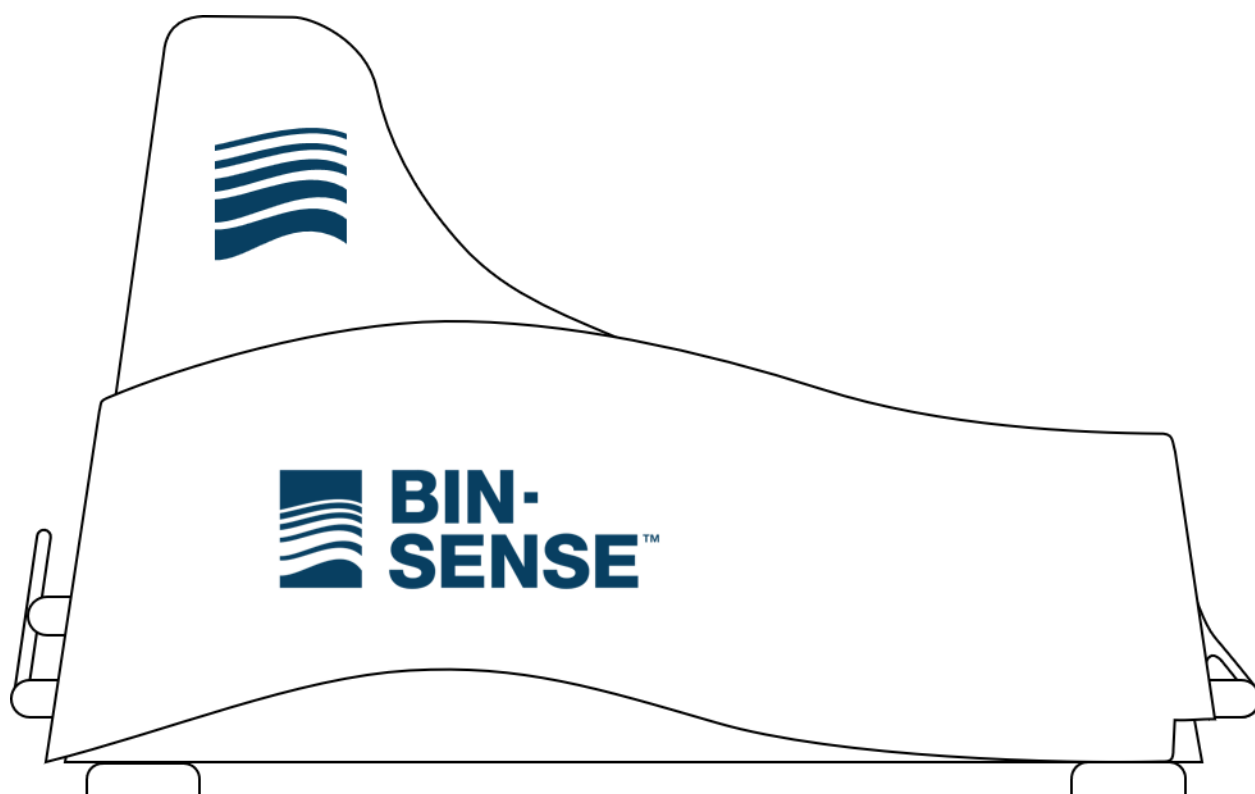




REMOTE UNIT

USER MANUAL

FOR THIRD GENERATION REMOTE UNITS



Ce manuel est également disponible en français.



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CUSTOMER SUPPORT

For warranty service, please contact your local dealer.

For product support, troubleshooting, or additional questions with your Bin-Sense™ device, please contact your local dealer (www.binsense.com/locate-a-dealer) or Calian Agriculture Ltd. at:



support.agriculture@calian.com



1.833.570.7979



www.binsense.com

BIN-SENSE REMOTE CERTIFICATIONS

FCC ID: 2AUTY-106103RU-V3

IC: 27173-106103RUV3

This device complies with Part 15 Subpart (C) of the FCC Rules and; ISED RSS-247 Issue 4.

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, and

(2) this device must accept any interference, including interference that may cause undesired operation of the device.

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

CAUTION: 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.

CAUTION: Radio-frequency radiation exposure risk. This equipment complies with radiation exposure limits prescribed for an uncontrolled environment for fixed and mobile use conditions. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and the body of the user or nearby persons. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter except as authorized in the certification of the product.



MANUFACTURER'S WARRANTY

CALIAN AGRICULTURE LIMITED TWO-YEAR WARRANTY

Calian Agriculture Ltd. (Calian Agriculture) warrants that for a period of two (2) years from the date of original purchase, this product will be free from defects in material and workmanship. Calian Agriculture, at its option, will repair or replace this product or any component of the product found to be defective during this warranty period. Replacement will be made with a new or re-manufactured product or component. No warranty is provided for batteries.

WHAT THIS WARRANTY DOES NOT COVER

This warranty does not cover normal wear of parts or any damage resulting from any of the following: negligent use or misuse of the product; damage in transport, natural disaster, improper installation or use, improper abuse or improper handling. This warranty is limited to only those manufacturing defects that were caused or allowed by Calian Agriculture.

HOW TO OBTAIN WARRANTY SERVICE

Please contact the local dealer you purchased the product from. For additional support, please contact Calian Agriculture at 1.833.570.7979 or visit www.binsense.com

CONTACT US

For support questions, troubleshooting, or help with your Bin-Sense device, please contact your local dealer for more information and assistance, or Calian Agriculture at support.agriculture@calian.com or 1.833.570.7979.



SAFETY

READ AND FOLLOW ALL INSTRUCTIONS.

SAVE THESE INSTRUCTIONS.

Use the Bin-Sense device for its intended use only, as described in this manual. Do not use attachments not recommended by the manufacturer.

STANDARDS

This manual uses the following standard safety terms and conventions to indicate conditions:

WARNING: INDICATES A HAZARDOUS SITUATION RESULTING IN SERIOUS INJURY OR DEATH.

CAUTION: Indicates a hazardous situation which, if not avoided, could result in moderate injury and/or property damage.

Note: Indicates an important message not related to personal injury or property damage.

LEGAL

Ultimate Lithium is a trademark of Energizer Brands, LLC.

Velcro is a trademark of Velcro IP Holdings LLC.

OVERVIEW

Remote units serve as peripheral devices in a Bin-Sense Live system. Remote units read temperature and moisture sensing cables and communicate with a Master unit to collect grain temperature and moisture data for a single bin on a Bin-Sense Live site. The Master unit collects data from all the Remote units on a site and then sends that data to the Bin-Sense website through a cellular data connection.

PACKAGE CONTENTS

- Remote Unit
- 3 x Lithium AA batteries
- Solar panel
- Solar panel mounting plate
- 3 x Self-tapping screws for solar plate mounting

REMOTE UNIT OVERVIEW

A. LID LATCH CLIPS

B. MAGNETIC FEET

C. SOLAR PANEL CONNECTORS

D. SENSOR LINK CABLE

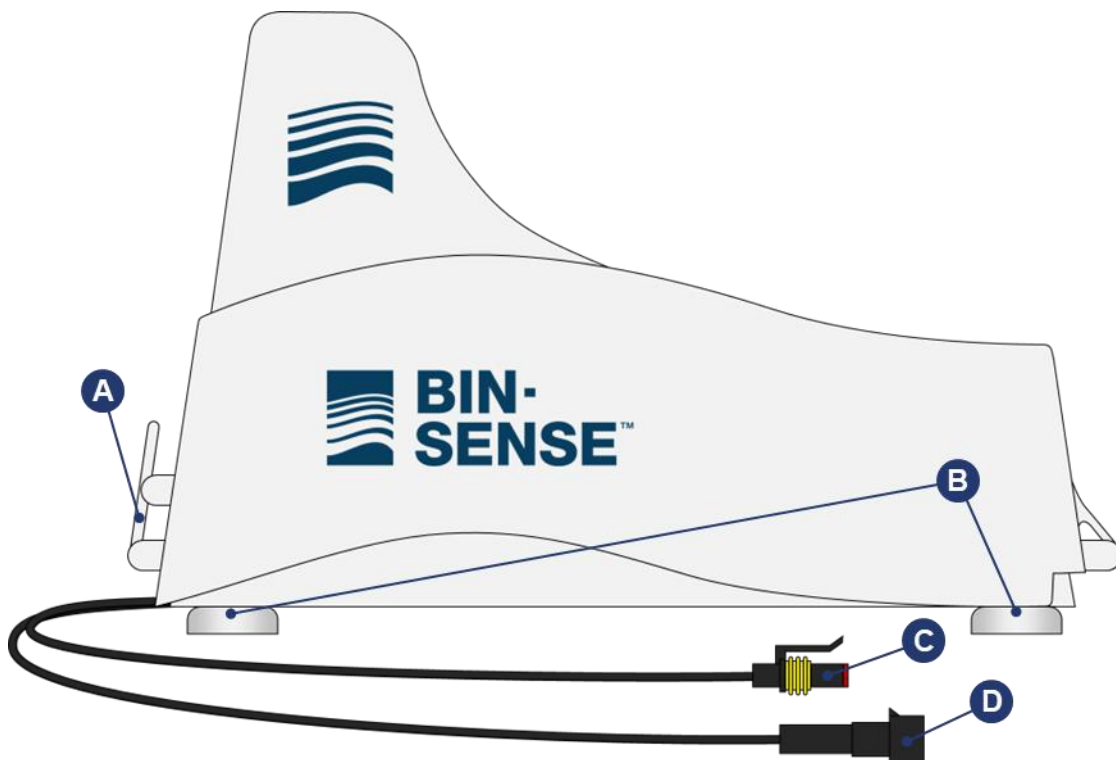


Figure 1: Remote Unit Components

INSIDE THE REMOTE UNIT

A. PRIMARY ANTENNA

- B. DIAGNOSTIC PUSHBUTTON
- C. DIAGNOSTIC LED
- D. J2 - SPARE SENSOR CABLE CONNECTION
- E. J1 - SENSOR CABLE CONNECTION
- F. J11 - SOLAR PANEL CONNECTION
- G. BATTERY VELCRO STRAP
- H. BATTERY HOLDER
- I. VENT
- J. RADIO CHANNEL DIP SWITCHES
- K. 3 X AA ULTIMATE LITHIUM BATTERIES (SINGLE USE)

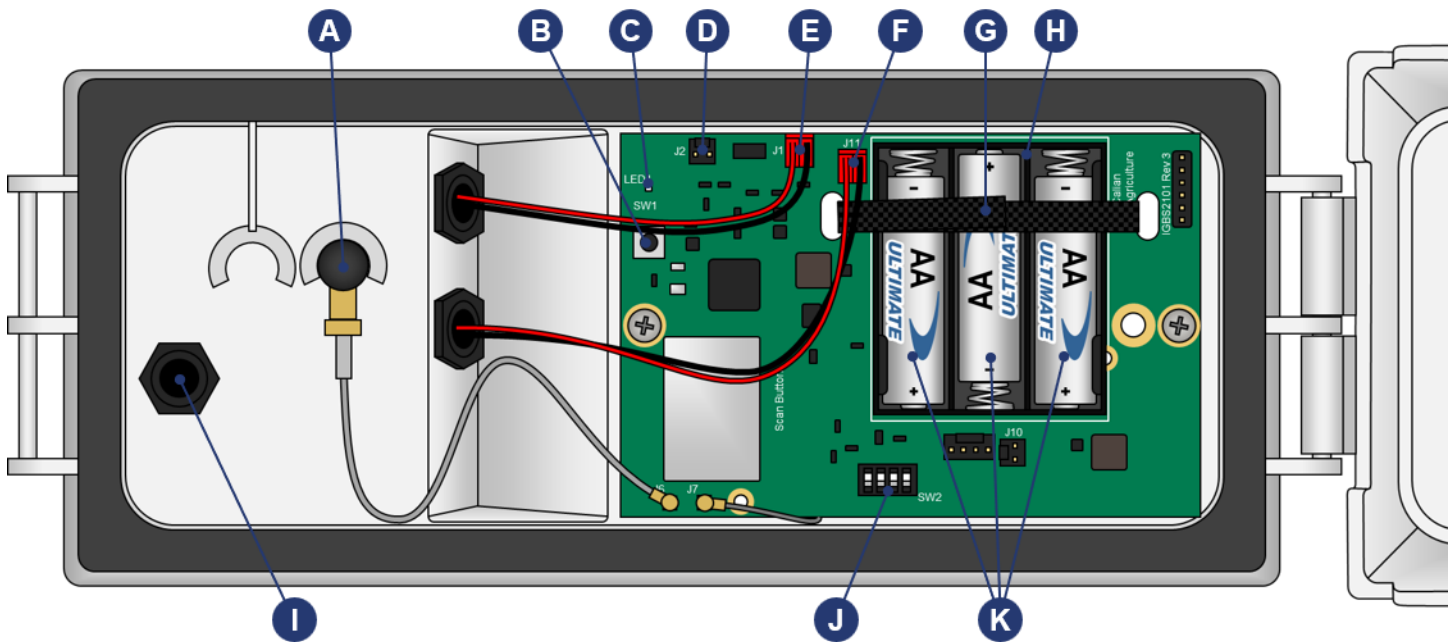


Figure 2: Remote Unit Circuit Board

INSTALLATION



WARNING: FALL HAZARD - EXTREME CARE AND CAUTION MUST BE USED WHEN CLIMBING IN A BIN OR SILO. BE SURE TO USE APPROVED SAFETY PROCEDURES AND MATERIALS. WHEN WORKING ABOVE 1.2 METERS, WEAR A SAFETY HARNESS OR PERSONAL PROTECTIVE EQUIPMENT. AN APPROVED TOOL BELT MUST BE WORN TO KEEP BOTH HANDS FREE WHEN CLIMBING UP AND DOWN A LADDER.

INSTALLATION TIPS

- When possible, position the Remote unit near the bin roof ladder so that it is easily accessible for future service and maintenance.
- The batteries in a Remote unit typically last for two to three years, after which they must be replaced. Battery life will vary based on solar exposure, and the number of temperature and moisture cables attached. The solar panel provides an alternate power source to preserve battery life but does not recharge the batteries.
- Whenever possible, secure link cables so that they run downward, away from the enclosure and cable grips. This will prevent water from running along the cable and towards the Remote unit enclosure.
- If you open the enclosure lid during installation, make sure you prevent moisture (e.g. rain, snow) from entering the enclosure.
- When finished with the installation, make sure the enclosure lid is closed and latched securely and there are no wires, tags, or other objects caught between the lid and the enclosure which could cause water ingress.
- Ensure Remote units are located within 600 m of the Master unit and have a clear line of sight to the Master unit antenna.
- If possible, install the Remote unit so that it sits flat with the internal antenna pointing straight upward to ensure the strongest wireless signal.

REMOTE UNIT INSTALLATION

Carry the Remote unit and all included accessories to the top of the bin in a backpack or by using another method that allows you to keep both hands free to safely climb the bin.

1. Place the Remote unit on the top of the bin with the lid latches and link cables pointing towards the ground.
2. Place the unit where it has clear line of site to the Master unit external antenna and is easily accessible for future service and maintenance. The magnetic feet will hold the unit in place on the roof of the bin.
3. Select a location on the bin roof for the solar panel and ensure that the link from the solar panel reaches to the Remote unit.
4. Install the solar panel mounting plate on the bin roof using the included self-tapping screws. It can be mounted to the side of a roof rib to give additional clearance in snowy areas, or mounted to the top of a roof rib to allow the panel to be angled appropriately.

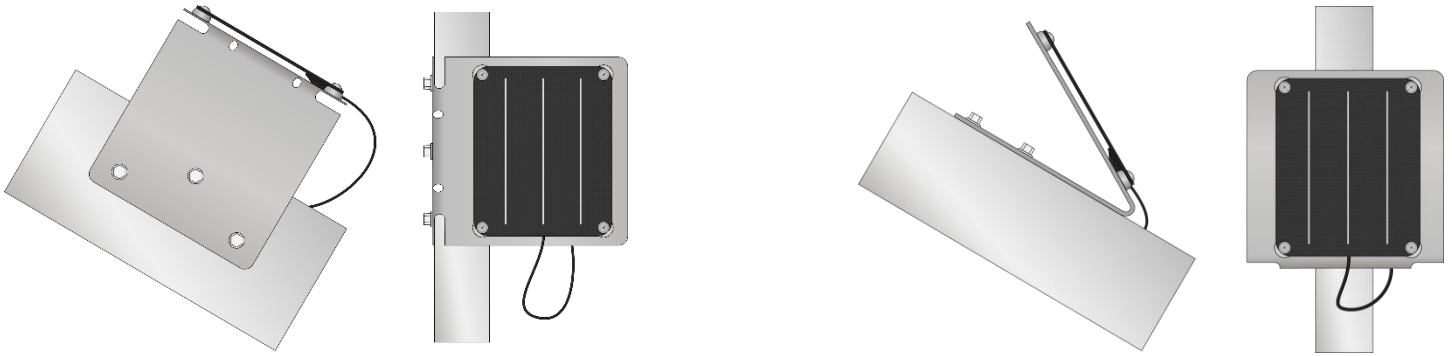


Figure 3: Solar panel on mounting plate in raised configuration (left) and bent configuration (right)

5. Connect the Remote unit sensor link cable to all the sensing cables and to any other Bin-Sense accessories (e.g. Fan Controllers). You'll need to use a terminal box or splitter to connect more than one device to the sensor link cable.

Note: For bins with more than four sensing cables, bins where there is more than 50ft of link cable between the Remote unit and a Bin-Sense Fan Controller, and on bins on commercial sites with powered grain handling equipment located near the Bin-Sense system, use a Sensor Lead Grounding Cable installed between the sensing cables/accessories and the sensor link cable.

6. Pull the "REMOVE BEFORE USE" tab from the battery holder. The diagnostic LED should begin flashing (see LED Diagnostics on page 12 for more details). Ensure all batteries are securely seated in the battery holder and that the Velcro strap is tightened around the batteries.
7. Close the enclosure lid and secure both lid latches.
8. Connect the Remote unit solar panel connection to the solar panel.
9. Refer to the Bin-Sense Live Startup Manual for further instruction on how to get the Bin-Sense Live system up and running.

OPERATION

CONNECTING TO A MASTER UNIT

Remote units connect wirelessly to a Bin-Sense Master unit using a radio system similar to Wi-Fi. To connect to a Master unit, the units must be associated through the Bin-Sense website and must be on the same radio channel. Associations must be performed through the Bin-Sense app or website.

The radio channel is set using the radio channel DIP switches. Channels 12 through 23 are available with the default channel being 23. The radio channel only needs to be changed if there are other Bin-Sense Live systems installed nearby (within roughly 2 km).

12	13	14	15	16	17
↓1 ↓2 ↓3 ↓4	↓1 ↓2 ↓3 ↓4	↓1 ↓2 ↓3 ↓4	↓1 ↓2 ↓3 ↓4	↑1 ↓2 ↓3 ↓4	↑1 ↓2 ↓3 ↓4
18	19	20	21	22	23
↑1 ↓2 ↓3 ↓4	↑1 ↓2 ↓3 ↓4	↑1 ↓2 ↓3 ↓4	↑1 ↓2 ↓3 ↓4	↑1 ↑2 ↑3 ↓4	↑1 ↑2 ↑3 ↑4

Figure 4: DIP Switch Settings

Note: Remote units should be located no more than 600 meters from the Master unit and must have a clear line of sight to ensure a consistent wireless connection.

More details about connecting to a Master unit can be found in the Bin-Sense Live Startup Manual.

REMOTE UNIT CYCLE TIMELINE (BIN-SENSE LIVE)

Remote units configured for a Bin-Sense Live system operate on a repeating 68-minute cycle. In each cycle, the Remote unit will communicate with the Master unit, send commands to any connected Fan Controllers, and then read any attached cables. The readings from the cables and attached Fan Controllers are sent to the Master unit at the beginning of the next hour. When not performing one of these tasks, the Remote unit will enter a low-power sleep mode to preserve battery life.

REPLACING REMOTE UNIT BATTERIES

The batteries in a Remote unit typically last for two to three years, after which they must be replaced. Battery life will vary based on solar exposure, and the number of temperature and moisture cables attached. The solar panel provides an alternate power source to preserve battery life but does not recharge the batteries.

Remote unit batteries must only be replaced with non-rechargeable Lithium/Iron Disulfide batteries often branded as “Ultimate Lithium”.

Follow these steps to replace the batteries in a Remote unit:

1. Open the Remote unit enclosure lid.
2. Open the Velcro strap securing the batteries.
3. Remove the batteries from the battery holder.

4. Install the new batteries following the orientation shown in figure 5. Use only Lithium/Iron Disulfide batteries.
5. Secure the new batteries in place with the Velcro strap.
6. Close the enclosure lid and secure both lid latches.
7. If the Master unit on site is not a third generation unit, visit the Bin-Sense website or mobile app and use the “Find My Remotes” button to ensure that the Master unit searches for the Remote unit.
8. Recycle the old batteries.

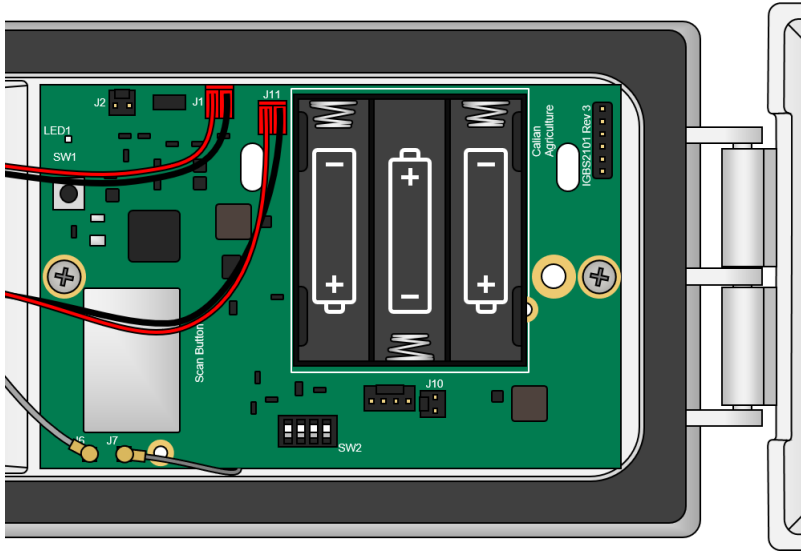


Figure 5: Remote Unit Battery Orientation

DIAGNOSTICS

LED DIAGNOSTICS

The diagnostic LED on the Remote unit circuit board flashes different patterns to give information about what the device is connected to. Most of the information is related to what the unit detects on the sensor cable interface.

The diagnostic LED will automatically start the flashing pattern after the Remote unit finishes scanning all the attached cables and accessories. The flashing pattern can be triggered at any time by pressing and holding the diagnostic button for four seconds.

The diagnostic LED flashes different colors to convey different information. Red flashes indicate what equipment is being scanned, and orange and green flashes indicate the number of items. The LED will flash red first, and then orange and/or green. The process will repeat until all the information has been communicated.

LED FLASH SEQUENCE

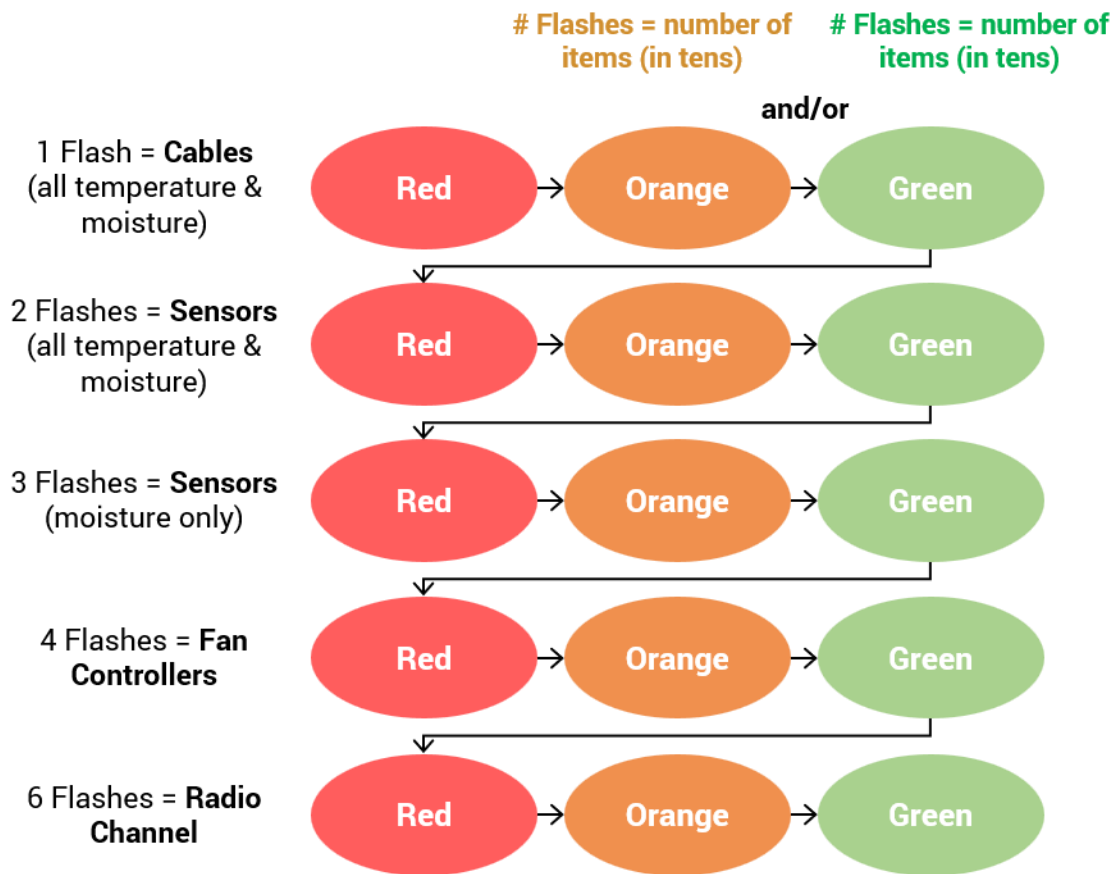


Figure 6: Diagnostic LED Sequence

The diagnostic LED will only flash a specific number of red flashes if the corresponding number is not zero. For example, if there are no moisture cables connected to the Remote unit, the LED will not flash three red flashes. If nothing is detected on the sensor cable interface, the LED will flash one red flash followed by a long pause, and then six red flashes for the radio channel.

EXAMPLE:

If you have one eight-sensor temperature cable, and one eight-sensor moisture cable connected to a Remote unit that is set to radio channel 22, you would expect the following flashing pattern:

- **One** red flash (for total temperature & moisture cables) followed by two green flashes (for number of cables).
- **Two** red flashes (for the total number of sensors) followed by one orange flash (for 10) and six green flashes (for a total value of 16).
- **Three** red flashes (for the number of moisture sensors) followed by eight green flashes (for eight).
- **Six** red flashes (for the radio channel) followed by two orange flashes (for 20) and two green flashes (for a total value of 22).

TROUBLESHOOTING

Problem	Possible Cause	Suggested Solutions
Unit won't power on.	Battery tab is not removed.	Ensure the battery tab is fully removed from the battery holder.
	Batteries are not installed properly.	Ensure all three AA batteries are fully pushed in place. Batteries may sometimes look installed but be dislodged and not making electrical connection. Ensure batteries are installed in the correct orientation.
	Solar panels are not connected properly.	Ensure the solar link cable connection is connected to J11 on the PCB. Ensure the link cable from the external solar panel is securely connected to the Remote unit solar panel link cable.
Remote unit does not detect sensing cables.	Link cables are not connected properly.	Ensure all link cable connections are secure. Use a Bin-Sense Direct unit to check whether the sensing cables can be read at each connection, starting as close as possible to the sensing cable and working towards the Remote unit.
	Cable wiring short circuit or defective cable.	Check wiring for obvious signs of a short circuit. Disconnect all sensing cables but one and test if the Remote unit reads the cable. Reconnect sensing cables one at a time testing for reading after each to single out the defective cable.

Problem	Possible Cause	Suggested Solutions
Battery voltage is lower than expected.	Solar panel is not connected properly.	Ensure the solar link cable connection is connected to J11 on the PCB. Ensure the link cable from the external solar panel is securely connected to the Remote unit solar panel link cable.
	Remote unit is located too far away from the Master unit and can't maintain a consistent wireless connection.	Remote units should be located no more than 600 meters from the Master unit and must have a clear line of sight to ensure a consistent wireless connection.
	Incorrect batteries installed.	Remote units require Lithium/Iron Disulfide AA batteries often branded as "Ultimate Lithium". Other battery chemistries will not work long term and will cause Remote units to report low battery.

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