

# 240V Fan Controller

USER MANUAL



*INTENTIONALLY BLANK*

# TABLE OF CONTENTS

## INTRODUCTION

Customer Support .....	3
Manufacturer’s Warranty .....	4
Calian Limited Two-Year Warranty .....	4
What This Warranty Does Not Cover .....	4
How To Obtain Warranty Service .....	4
Contact Us .....	4
Safety .....	5
Standards.....	5

## OVERVIEW

Overview.....	6
Package Contents .....	6
240V Fan Controller Overview .....	7
Inside the 240V Fan Controller.....	8

## INSTALLATION

Installation .....	9
Fan Controller Mounting .....	9
Connecting a Fan Controller to Bin-Sense Master or Remote Units.....	9
Connecting to a Master/Remote Unit on the Bin Roof .....	9
Connecting to a Master/Remote Unit at Ground Level with a Fan Controller Combo Cable.....	11
Connecting Multiple Fan Controllers (Bins with Multiple Fans) .....	13
Setting the Fan ID .....	13
Fan Startup Delay .....	14
Enabling/Disabling Fan Start-Up Delay.....	15

## WIRING

Fan Controller Wiring .....	17
Fan Controller Wiring Connections .....	17
Aeration Fan Wiring Connections .....	18
Caldwell 230V 1 Phase .....	19
Caldwell 230V 3 Phase .....	20
Edwards/Grain Guard/AGI 230V 1 Phase .....	21
Edwards/Grain Guard/AGI 230V 3 Phase .....	22
GSI 230V 1 Phase.....	23
GSI 230V 3 Phase.....	24
GSI 460V and 575V 3 Phase.....	25

## TESTING

Testing .....	26
Fan Controller Wiring Testing.....	26
Testing Fan Controllers with Bin-Sense Direct.....	27
Tools Required .....	27
Testing an Individual Fan Controller .....	27
Testing Multiple Fan Controllers on the Same Bin .....	28

## FAN OPERATION

Fan Operation .....	30
---------------------	----

## TROUBLESHOOTING

Troubleshooting .....	31
-----------------------	----

## 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](http://www.binsense.com/locate-a-dealer)) or Calian Agriculture Ltd. at:



[support.agriculture@calian.com](mailto:support.agriculture@calian.com)



**1.833.570.7979**



[www.binsense.com](http://www.binsense.com)



## **MANUFACTURER'S WARRANTY**

### **CALIAN LIMITED TWO-YEAR WARRANTY**

Calian Agriculture Ltd. (Calian) 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, 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.

### **HOW TO OBTAIN WARRANTY SERVICE**

Please contact the local dealer you purchased the product from. For additional support, please contact Calian Agriculture Ltd. at 1.833.570.7979 or visit [www.calian.com](http://www.calian.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 Ltd. at [support.agriculture@calian.com](mailto: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 will use 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.**

## OVERVIEW

Bin-Sense Fan Controllers are an accessory device for Bin-Sense Live systems that allow Bin-Sense to remotely control grain bin aeration fans. Bin-Sense Fan Controllers serve as an interface between the high voltage wiring of aeration fans and the low voltage signal wiring of a Bin-Sense system.

Bin-Sense Fan Controllers are compatible with Bin-Sense Live Master units and Remote units and can also be tested with Bin-Sense Direct units.

Two different versions of Bin-Sense Fan Controllers (240V and 600V) are available depending on the voltage of the aeration fan electrical system. Make sure you have the correct Fan Controller for the fan and the correct user manual for the fan controller.

The Bin-Sense 240V Fan Controller works with aeration fans up to 240 V including:

- Single phase 120V
- Single/split phase 240V
- Three phase 208V
- Some models of 480V and 600V fans with a step-down transformer and 120V control wiring

The Bin-Sense 240V Fan Controller is designed to connect to an existing start/stop control circuit.

This manual is used in the installation and operation of Bin-Sense 240V Fan Controllers. For 600V Fan Controllers, refer to the Bin-Sense 600V Fan Controller Manual.

## PACKAGE CONTENTS

*Table 1: 240V Fan Controller Kit Contents*

Accessory	Qty	Use
Self-tapping tek screw, 10 x ½"	4	Mounting Fan Controller to Bin
Rubber Seal	8	Spacers for Mounting Feet (optional)
Mounting Foot Kit	1	Mounting Fan Controller to Bin
Cable Grip	1	Fan Electrical Cable Entry to Fan Electrical Box
Female Spade Connector	5	Electrical Connections to Fan
Fork Connector, #10, 14-16 AWG	1	Ground Wire Connection
Two-Position Lever Nut	2	Wherever Needed (optional)
Terminator Cap	1	Testing and/or spare Master Unit Solar Panel Connection (optional)



## 240V FAN CONTROLLER OVERVIEW

- A. AMBIENT CONDITION SENSOR
- B. VENT
- C. FAN CONTROL CABLE
- D. FAN POWER CABLE (OUTPUT) WITH CAP
- E. FAN ELECTRICAL CABLE - 6FT. 14/6 SOOW

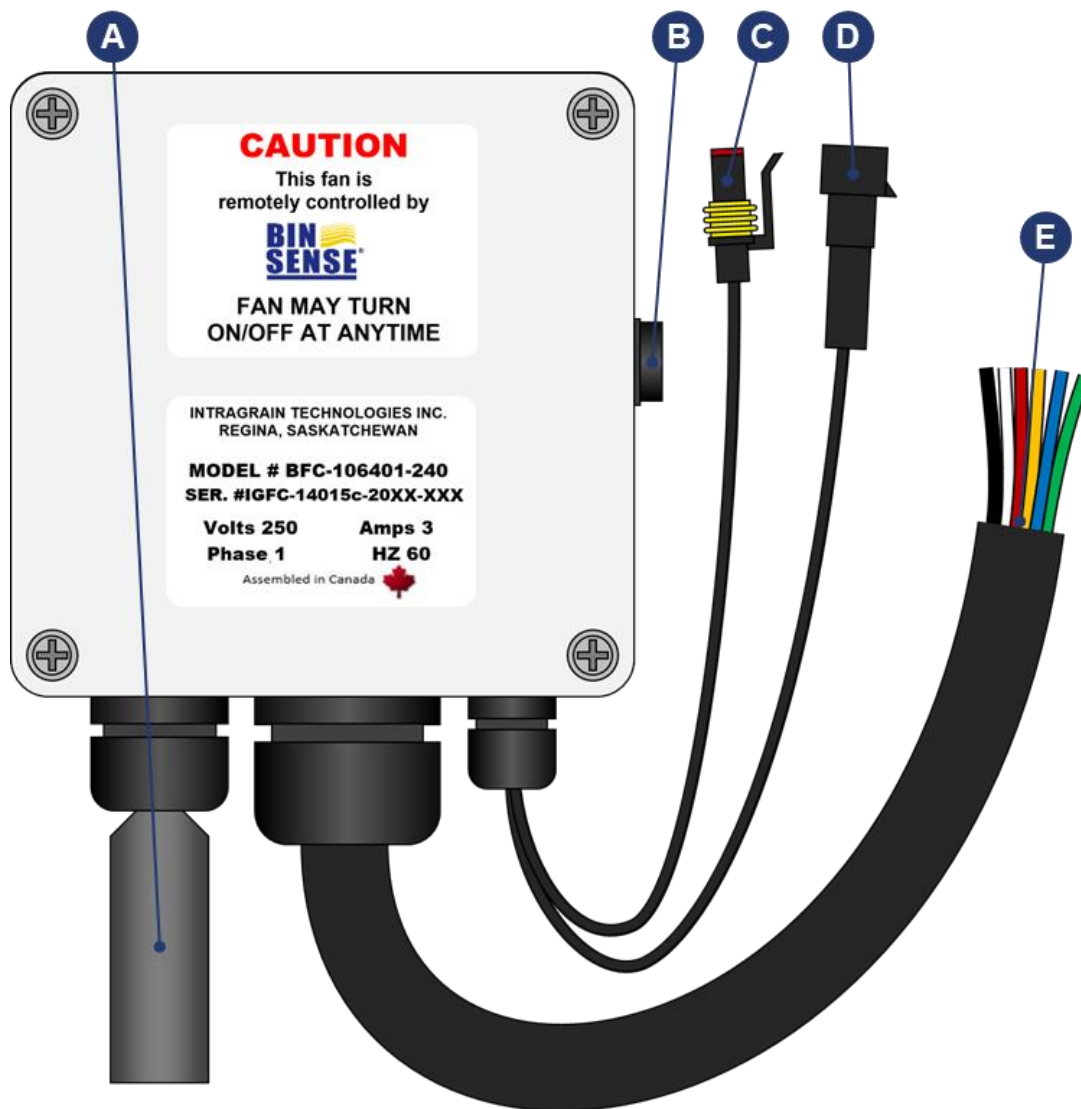


Figure 1: 240V Fan Controller Components

## INSIDE THE 240V FAN CONTROLLER

**WARNING: NEVER OPEN BIN-SENSE FAN CONTROLLER ENCLOSURES WHILE THE POWER IS CONNECTED. HAZARDOUS VOLTAGES EXIST INSIDE. ALWAYS DISCONNECT POWER BEFORE WORKING ON BIN-SENSE FAN CONTROLLERS.**

- A. Ambient Condition Sensor Connection
- B. Fan ID DIP Switches
- C. Fan Power Cable (Output) Connection
- D. Fan Control Cable Connection
- E. Power fuse - 3A, 240 VAC
- F. Control fuse - 3A, 240 VAC
- G. Aeration Fan Wiring Connections

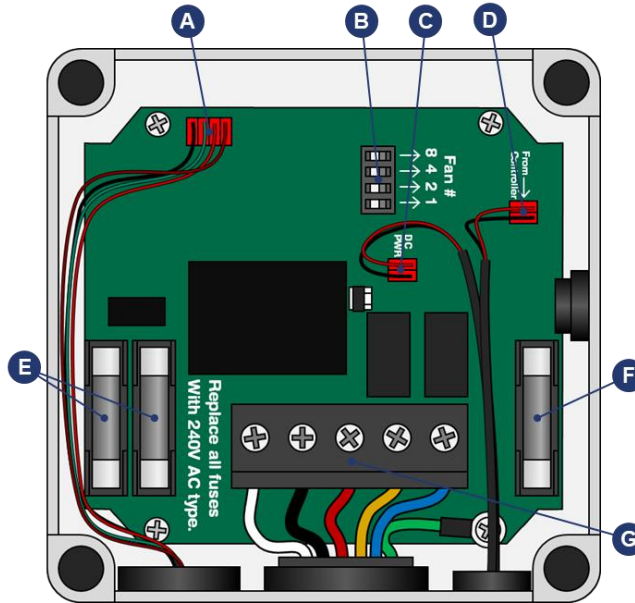


Figure 2: 240V Fan Controller Circuit Board

Table 2: High Voltage Wire Circuit Board Connections

Wire	Terminal Label
White	AC1
Black	AC2
Red	NO
Orange	COM
Blue	NC
Green	None – Ground screw

## INSTALLATION

**WARNING: NEVER OPEN BIN-SENSE FAN CONTROLLER ENCLOSURES OR ATTEMPT TO INSTALL FAN CONTROLLERS WHILE THE POWER IS CONNECTED. HAZARDOUS VOLTAGES EXIST INSIDE. ALWAYS DISCONNECT POWER BEFORE WORKING ON BIN-SENSE FAN CONTROLLERS.**

**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.**

**CAUTION: Do not mount the Bin-Sense Fan Controller directly on the aeration fan or fan electrical control box. Excessive vibration from the fan may cause premature failure of the Fan Controller.**

### FAN CONTROLLER MOUNTING

1. Select a location on the side of the bin for the Fan Controller. Ensure the fan electrical cable (6 feet long) can reach to the fan electrical control box.
2. Install the mounting foot kit on the Fan Controller.
3. Use the four self-tapping screws to mount the Fan Controller to the bin. Use the rubber seals to add space between the mounting feet and bin as required.

### CONNECTING A FAN CONTROLLER TO BIN-SENSE MASTER OR REMOTE UNITS

Bin-Sense Fan Controllers communicate with the rest of Bin-Sense Live systems through a connection to a Master unit or Remote unit. Fan Controllers use the same connection as Bin-Sense sensing cables. Fan controllers can also provide power to Master units or Remote units eliminating the need for batteries.

**Note: Avoid connecting large numbers of sensing cables or link cables on the same connection used by the Fan Controller. Always minimize the cable length between Fan Controllers and the Master or Remote unit. Fan Controllers are sensitive to interference created by other accessories and link cables.**

**Note: On tall bins and bins with more than four sensing cables, it is recommended that the Master or Remote unit be installed at ground level near the Fan Controller instead of on the bin roof. In this configuration, use a Bin-Sense Fan Controller Combo Cable or Commercial Master or Commercial Remote unit with two independent sensing cable connections.**

### CONNECTING TO A MASTER/REMOTE UNIT ON THE BIN ROOF

1. Run two link cables from the Fan Control Cable and the Fan Power Cable to the Master/Remote unit at the top of the bin.
  - Use the included p-clips to secure the link cables to the bin.
  - Ensure there is slack in the link cable so that it is not pulled tight or sharply bent over the roof eave.

- Note that the male and female connectors of the two link cables will be on opposite ends.
2. Use a splitter or a terminal box to connect the Fan Control Cable to the sensor link cable connection of the Master/Remote unit.
  3. For Remote units, disconnect the solar panel and connect the Fan Power Cable to the Solar link cable connection of the Remote unit.
  4. For Master units, disconnect both solar panels from the Master unit. Connect the Fan Power Cable to one of the Master unit Solar link cable connections. Connect the terminator cap to the other Master unit Solar link cable connection.
  5. If multiple Fan Controllers on the same bin need to be connected to the same Master/ Remote unit, use a splitter or terminal box at the bottom of the bin to connect the Fan Control Cable of each Fan Controller to the sensor link cable connection of the Master/Remote. Only connect the Fan Power Cable from one Fan Controller to the Master/Remote unit.

- A. Master/Remote unit
- B. Solar link cable
- C. Sensor link cable
- D. Splitter/Terminal box
- E. Terminator cap (used with Master unit only)
- F. Sensing cable(s)
- G. Fan power cable
- H. Fan control cable
- I. Bin-Sense Fan Controller
- J. Unused fan power cable

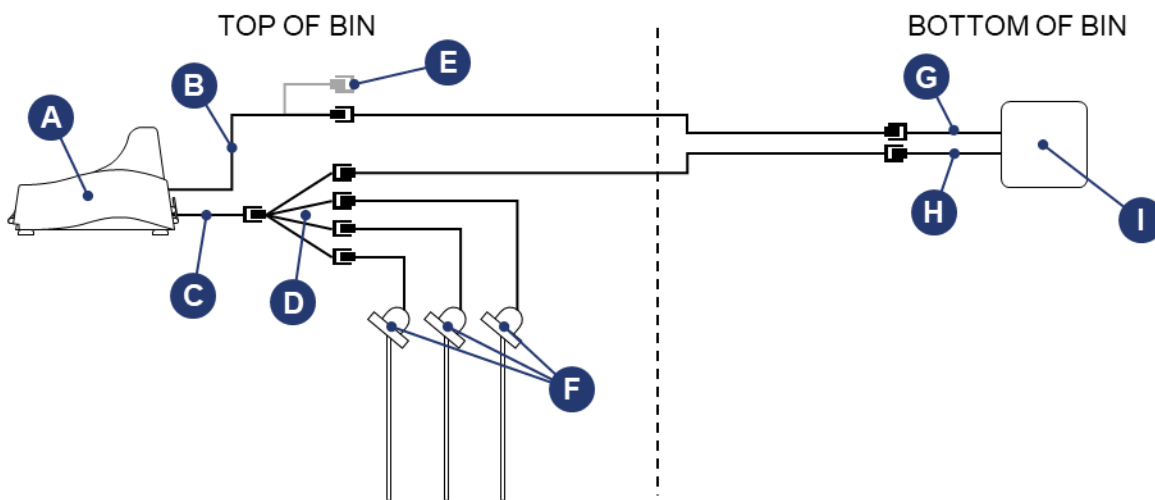


Figure 3: Single Fan Controller – Master/Remote on Bin Roof

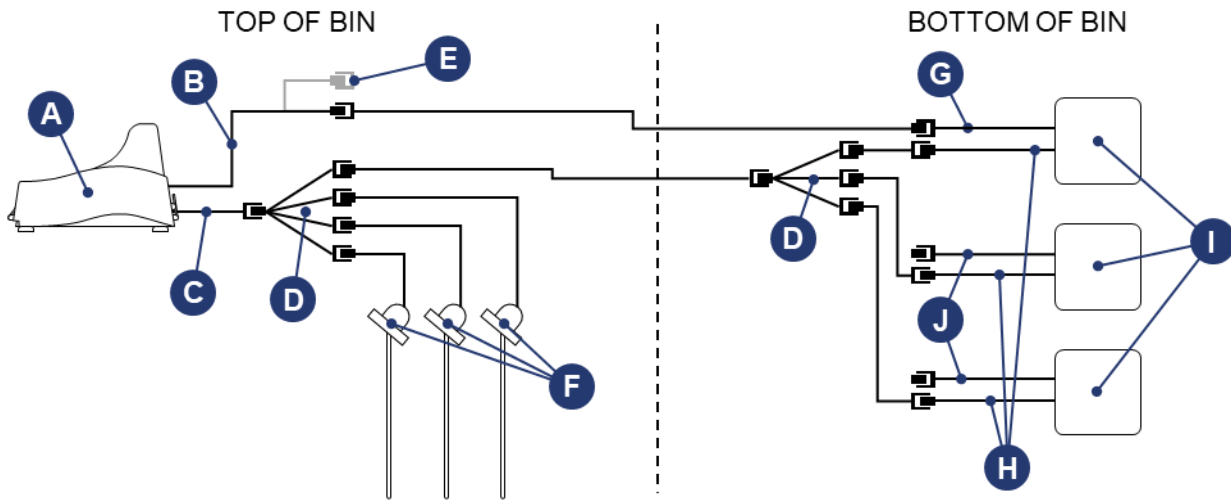


Figure 4: Multiple Fan Controllers – Master/Remote on Bin Roof

## CONNECTING TO A MASTER/REMOTE UNIT AT GROUND LEVEL WITH A FAN CONTROLLER COMBO CABLE

1. Replace the Master/Remote unit sensor link cable with a Fan Controller Combo Cable.
  - a. Open the Master/Remote unit enclosure.
  - b. Disconnect the connector from J1 on the circuit board.
  - c. Loosen the nut holding the sensor link cable grip in place and remove the sensor link cable assembly from the enclosure.
  - d. Install the new Fan Controller Combo Cable and tighten the cable grip nut to secure it in place.
  - e. Connect the connectors labeled J1 and J2 to their respective locations on the circuit board.
2. Run one link cable from the sensing cables at the top of the bin to the Master/Remote at the bottom of the bin.
  - Use a terminal box or splitter at the top of the bin to combine the link cables from each sensing cable into one link cable that runs down the bin.
  - Use the included p-clips to secure the link cable to the bin.
  - Ensure there is slack in the link cable so that it is not pulled tight or sharply bent over the roof eave.
3. Connect the link cable from the top of the bin to the sensor link cable of the Fan Controller Combo Cable.
4. Connect the fan control cable from the fan controller to the fan link cable of the Fan Controller Combo Cable.
5. For Remote units, disconnect the solar panel and connect the Fan Power Cable to the Solar link cable connection of the Remote unit.
6. For Master units, disconnect both solar panels from the Master unit. Connect the Fan Power Cable to one of the Master unit Solar link cable connections. Connect the terminator cap to the other Master unit Solar link cable connection.

7. If multiple Fan Controllers on the same bin need to be connected to the same Master/ Remote unit, use a splitter or terminal box at the bottom of the bin to connect the Fan Control Cable of each Fan Controller to the fan controller cable of the Fan Controller combo cable. Only connect the Fan Power Cable from one Fan Controller to the Master/Remote unit.
- A. Sensing cable(s)
  - B. Splitter/Terminal box
  - C. Terminator cap (used with Master unit only)
  - D. Fan control cable
  - E. Fan power cable
  - F. Fan Controller Combo Cable – Fan link cable
  - G. Fan Controller Combo Cable – Sensor link cable
  - H. Solar link cable
  - I. Bin-Sense Fan Controller
  - J. Master/Remote unit
  - K. Unused fan power cable

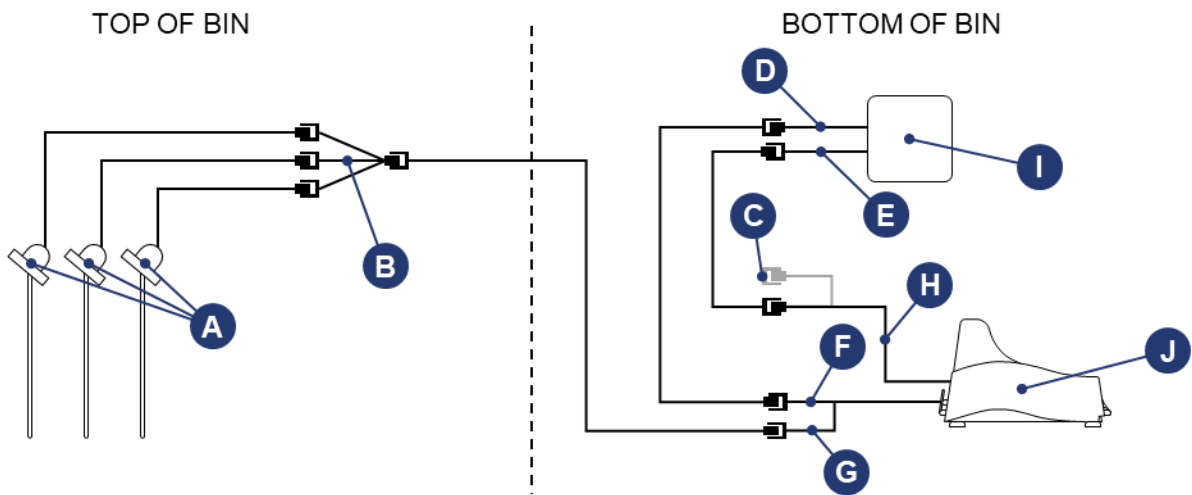


Figure 5: Single Fan Controller - Ground Level with a Fan Controller Combo Cable

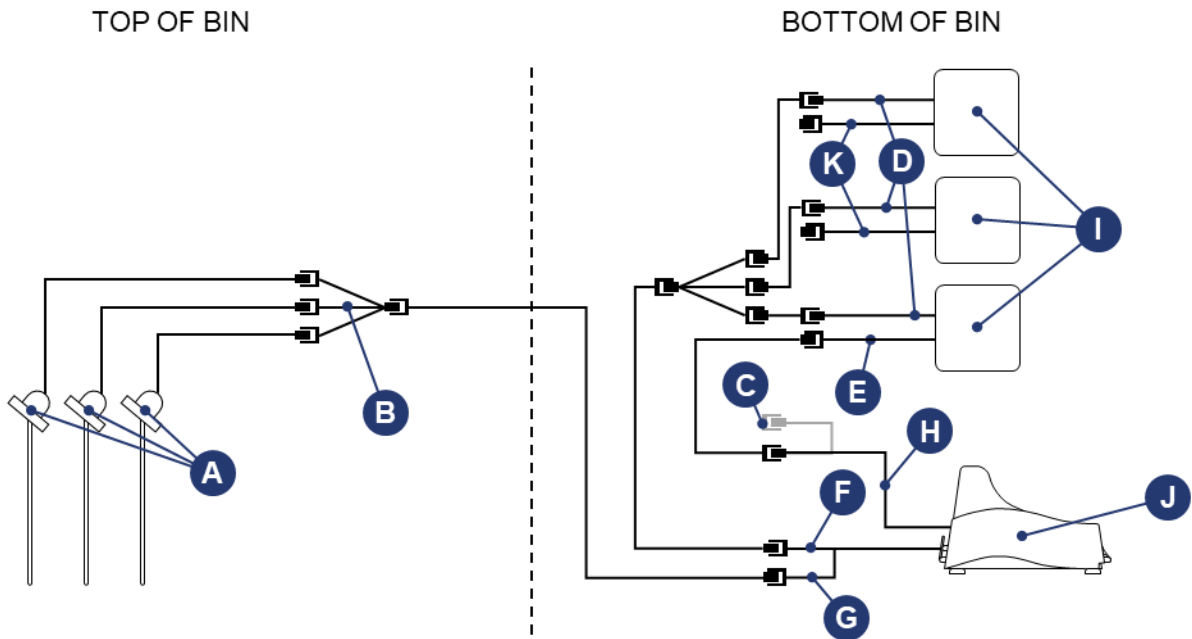


Figure 6: Multiple Fan Controllers - Ground Level with a Fan Controller Combo Cable

## CONNECTING MULTIPLE FAN CONTROLLERS (BINS WITH MULTIPLE FANS)

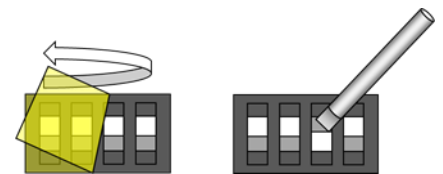
**WARNING: NEVER OPEN BIN-SENSE FAN CONTROLLER ENCLOSURES OR ATTEMPT TO CHANGE THE FAN ID WHILE THE POWER IS CONNECTED. HAZARDOUS VOLTAGES EXIST INSIDE. ALWAYS DISCONNECT POWER BEFORE WORKING ON BIN-SENSE FAN CONTROLLERS.**

When multiple aeration fans are installed on the same bin, each fan requires its own Bin-Sense Fan controller. Each fan controller connected to the same Master/Remote unit must have a unique Fan ID. When started, fans will turn on in 15 second intervals to prevent tripping breakers with the electrical inrush current surge.

### SETTING THE FAN ID

The Fan ID is set by adjusting the DIP switches inside the Fan Controller. The default Fan ID on new Bin-Sense Fan Controllers is ID 0. On each bin, start with the first fan as ID 0 and then increase by one for each subsequent fan. A maximum of 10 Fan Controllers can be connected to one Master or Remote unit.

1. Disconnect power to the Fan Controller by turning off the circuit breaker.
2. Remove the front cover from the Fan Controller enclosure.
3. Use a small screwdriver to carefully set the DIP switches to the desired Fan ID. Refer to the table below for the different DIP switch configurations. It may be helpful to remove the translucent yellow film from the DIP switches.
4. Once the desired Fan ID is set, replace the Fan Controller enclosure front cover.
5. Restore power at the circuit breaker.



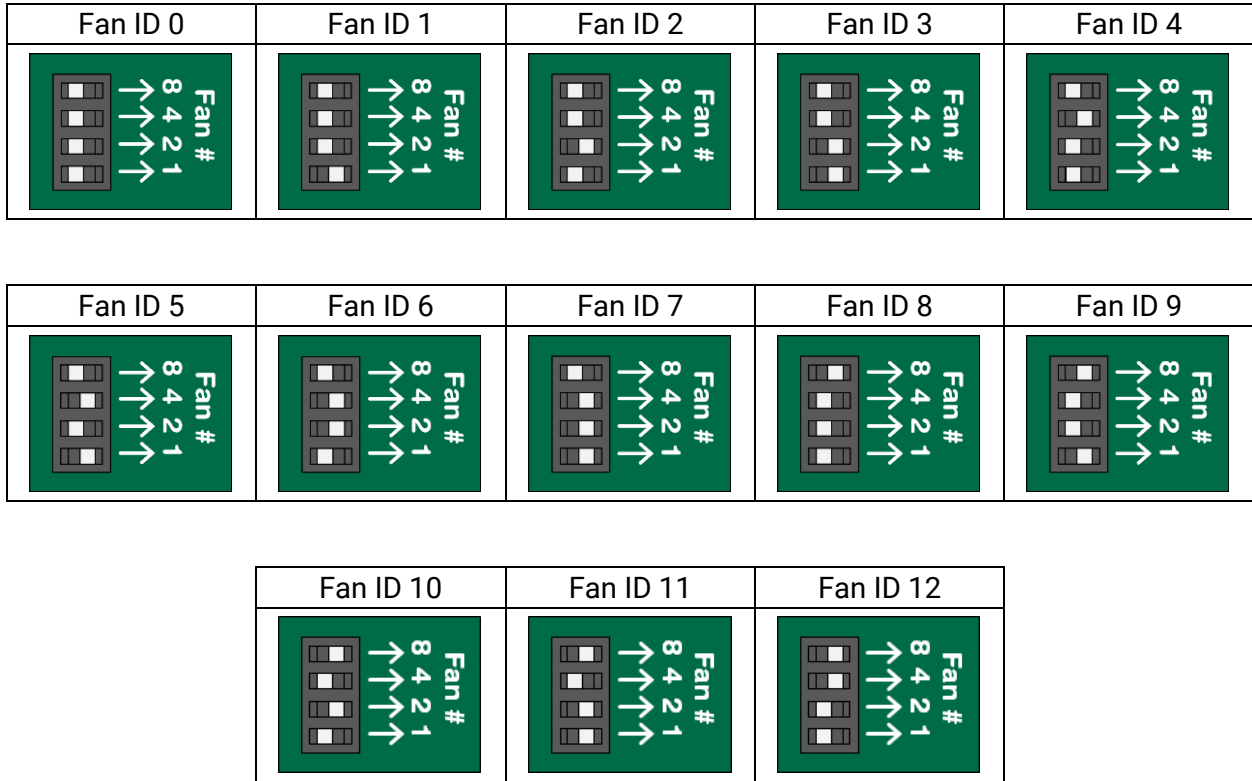


Figure 7: Fan ID DIP switch configurations

## FAN STARTUP DELAY

Aeration fans draw a large electrical current when they are first powered on known as inrush current. Multiple aeration fans starting at the same time can draw enough inrush current to trip circuit breakers. To alleviate this, Bin-Sense Fan Controllers add a startup delay of 15 seconds between fans on the same bin.

**NOTE: When multiple fans on the same bin are started at different times, fans after the first fan may require louvers or other measures to prevent back-spinning. Starting a fan that is spinning backwards due to air pressure from other fans may cause circuit breakers to trip or may damage fans.**

**NOTE: While Bin-Sense does have options to alleviate inrush current, Bin-Sense does not manage running load of aeration fans. Ensure the site's electrical system is able to supply all fans without overload or tripping breakers.**

The Fan startup delay is determined by the Fan ID setting. The startup delay (in seconds) can be determined by multiplying the Fan ID by 15.

Bins with only one fan should be set to Fan ID 0 which has no startup delay.



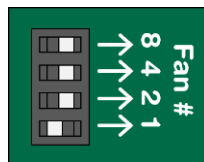
Table 3: Fan Start-Up Delay

Fan ID	Start-Up Delay
0	None
1	0:15
2	0:30
3	0:45
4	1:00
5	1:15
6	1:30
7	1:45
8	2:00
9	2:15
10	2:30
11	2:45
12	3:00

## ENABLING/DISABLING FAN START-UP DELAY

If required, the fan startup delay can be disabled for applications where all fans need to start at the same time. When startup delay is disabled, the Fan Controller will start the fan immediately upon receiving the signal from the Master or Remote unit.

1. Turn off power to the Fan Controller at the circuit breaker.
2. Remove the front cover from the Fan Controller enclosure.
3. Note the Fan ID DIP switch setting of the Fan Controller.
4. Set the DIP switches to the following position with the switches labelled 2, 4, and 8 engaged.



5. Turn on power to the fan controller. The fan controller will toggle the state of the Startup Delay. The LED on the Fan Controller circuit board will either be flashing or solid to indicate the Startup Delay state.
  - LED solid on indicates Startup Delay is enabled (default setting).
  - LED flashing indicates Startup Delay is disabled.
6. Turn off power to the fan controller.

7. Repeat steps five and six until the desired Startup Delay setting is achieved.
8. Return the DIP switches to the Fan ID setting noted in step three.
9. Replace the Fan Controller enclosure front cover.
10. Restore power at the circuit breaker.

## FAN CONTROLLER WIRING

**WARNING: ELECTROCUTION HAZARD. RISK OF SERIOUS INJURY OR DEATH. INSTALLATION AND SERVICE SHOULD ONLY BE PERFORMED BY A LICENSED ELECTRICIAN AND MUST BE IN ACCORDANCE WITH ALL LOCAL CODES AND STANDARDS.**

**WARNING: ELECTROCUTION HAZARD. ENSURE POWER IS DISCONNECTED BEFORE ATTEMPTING TO INSTALL BIN-SENSE FAN CONTROLLERS.**

**CAUTION: Bin-Sense Fan Controller wiring is polarity sensitive. Follow wiring diagrams and instructions carefully.**

### FAN CONTROLLER WIRING CONNECTIONS

Bin-Sense 240V Fan Controllers have six wires that connect into the aeration fan electrical control box and contactor coil. 240V Fan Controllers use a normally open START contact that closes for two seconds to start the fan, and a normally closed STOP contact that opens for two seconds to stop the fan.

- AC1 - WHITE - AC power to the Fan Controller. Fused with 240V 3A fuse.
- AC2 - BLACK - AC power to the Fan Controller. Fused with 240V 3A fuse.
- NO - RED - Normally open START contact. Connects to COM for two seconds to start the fan.
- COM - ORANGE - Common connection between N/O START contact and N/C STOP contact. Fused with 240V 3A fuse.
- NC - BLUE - Normally closed STOP contact. Disconnects from COM for two seconds to stop the fan. Also senses the voltage of the contactor coil (with reference to AC1 - WHITE) to determine the fan status.
- GND - GREEN - Ground.

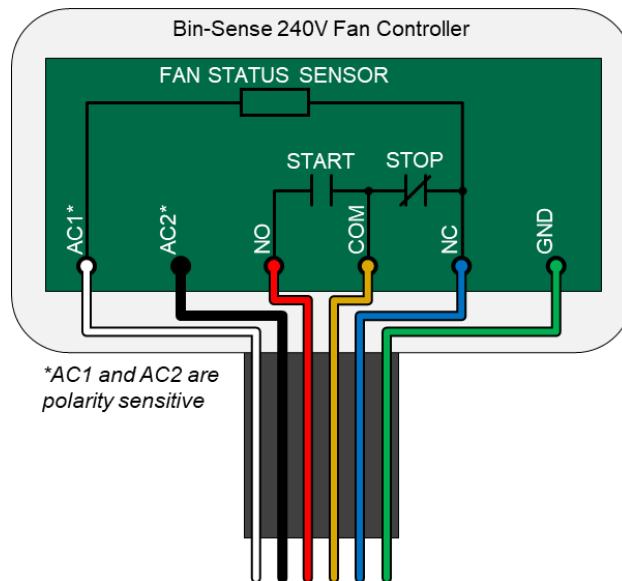


Figure 8: 240V Wiring Connections

## **AERATION FAN WIRING CONNECTIONS**

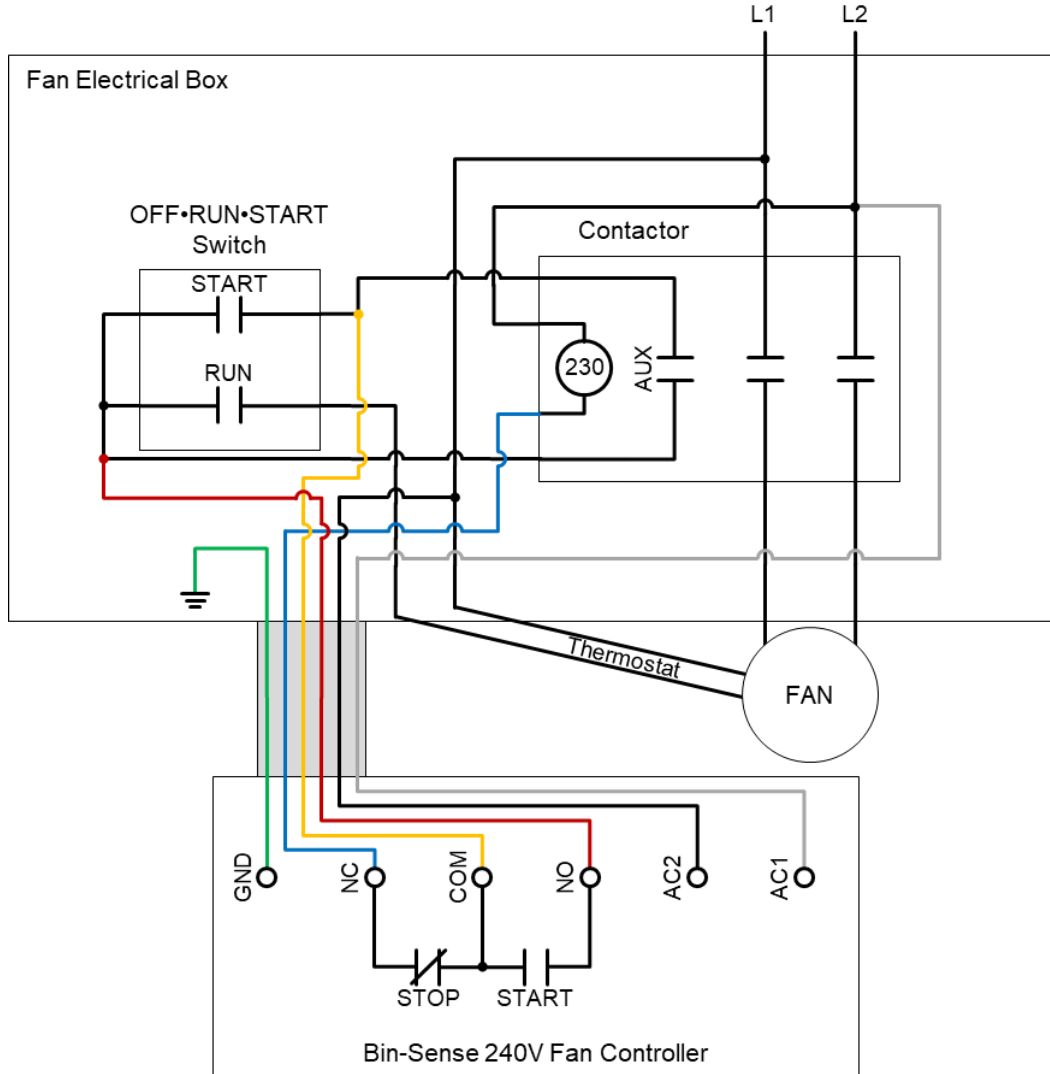
Wiring diagrams and connection details are included in this manual for connecting Bin-Sense Fan Controllers to a number of commonly available aeration fans.

- Caldwell 230V 1 Phase
- Caldwell 230V 3 Phase
- Edwards/Grain Guard/AGI 230V 1 Phase
- Edwards/Grain Guard/AGI 230V 3 Phase
- GSI 230V 1 Phase
- GSI 200V 3 Phase
- GSI 460V & 575V 3 Phase

## CALDWELL 230V 1 PHASE

**NOTE: The OFF-RUN-START switch must be left in the RUN position for Bin-Sense Fan Controllers to control the fan.**

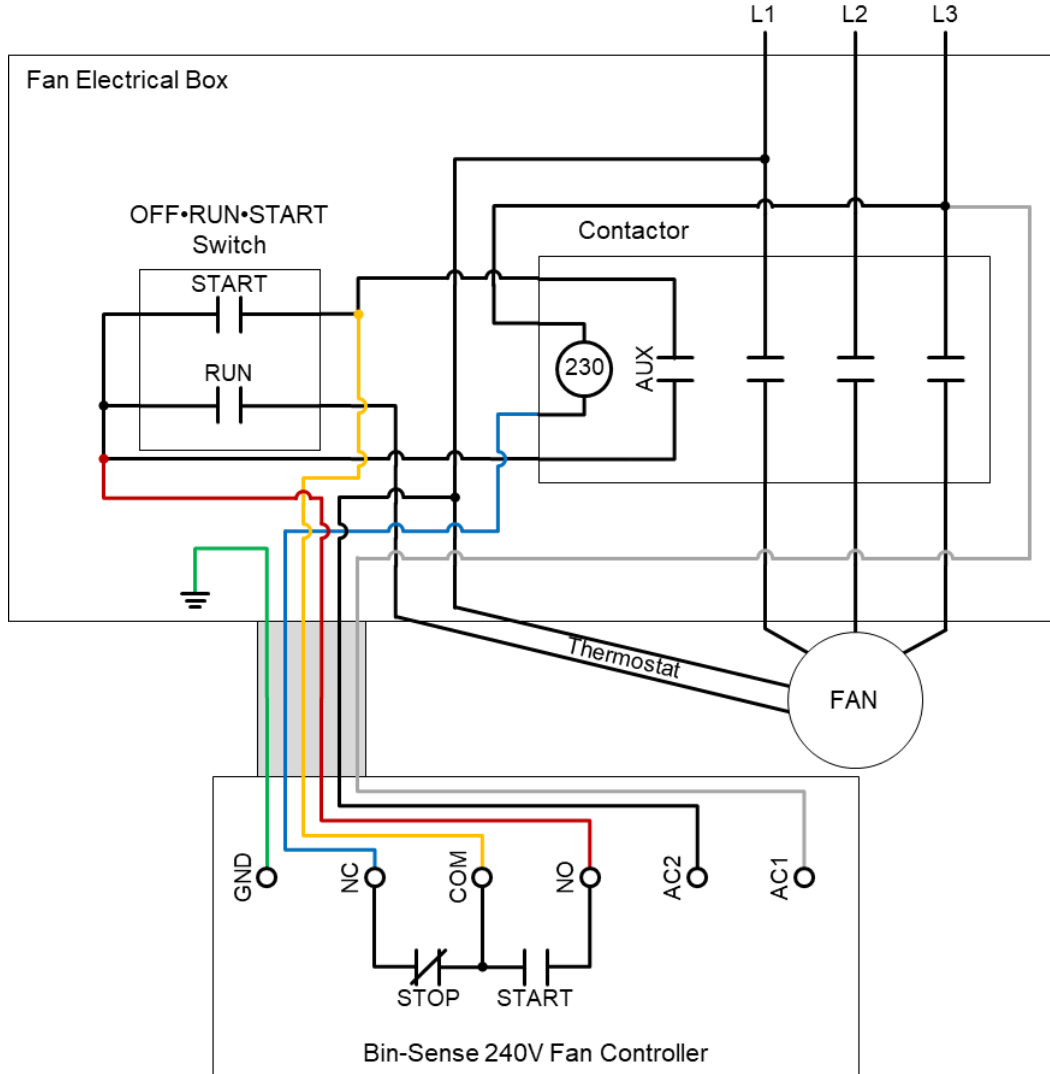
- AC1 - WHITE - Connects to L2.
- AC2 - BLACK - Connects to L1.
- NO - RED - Connects to the load side of the RUN contact of the OFF-RUN-START switch.
- COM - ORANGE - Connects to the load sides of the START contact of the OFF-RUN-START switch, and the AUX holding contact of the contactor.
- NC - BLUE - Connects to the contactor coil. Must be the only connection to the switched side of the contactor coil.
- GND - GREEN - Connects to ground.



## CALDWELL 230V 3 PHASE

**NOTE: The OFF-RUN-START switch must be left in the RUN position for Bin-Sense Fan Controllers to control the fan.**

- AC1 - WHITE - Connects to L3.
- AC2 - BLACK - Connects to L1.
- NO - RED - Connects to the load side of the RUN contact of the OFF-RUN-START switch.
- COM - ORANGE - Connects to the load sides of the START contact of the OFF-RUN-START switch, and the AUX holding contact of the contactor.
- NC - BLUE - Connects to the contactor coil. Must be the only connection to the switched side of the contactor coil.
- GND - GREEN - Connects to ground.

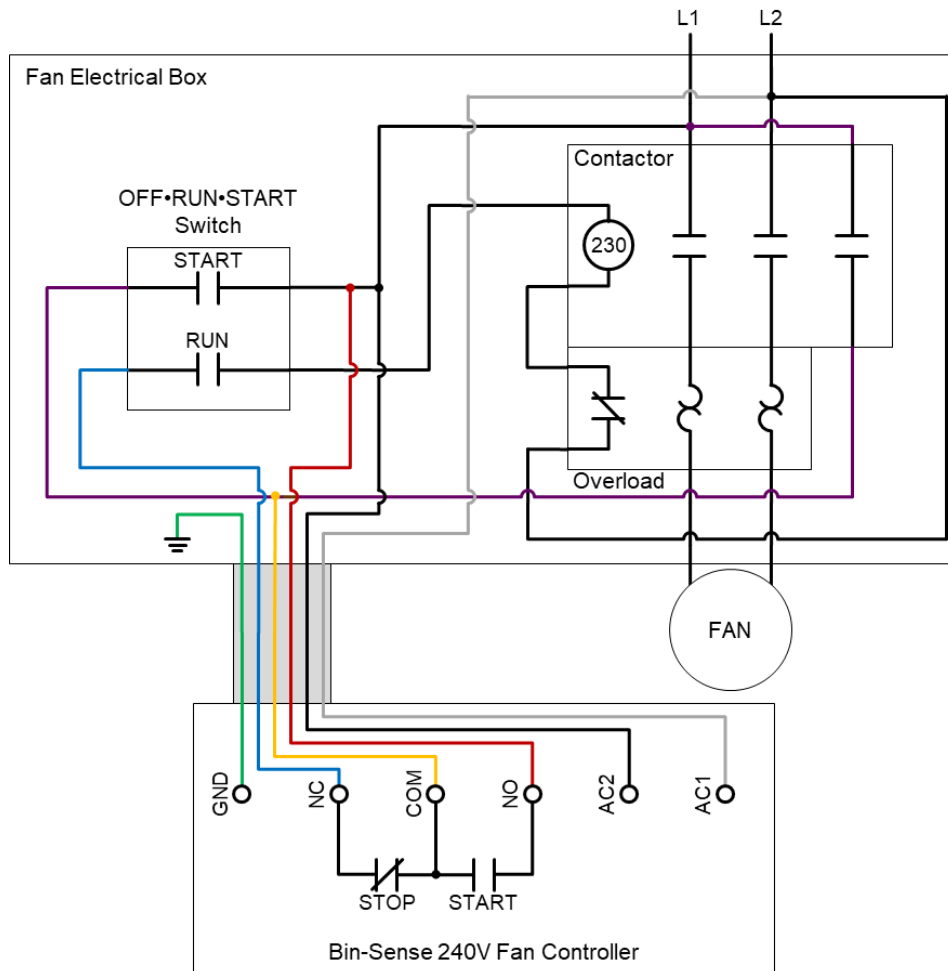


## EDWARDS/GRAIN GUARD/AGI 230V 1 PHASE

**CAUTION:** Existing fan wiring must be modified to use a non-loaded contact as the holding contact. Do not use a loaded power contact as a holding contact.

**NOTE:** The OFF-RUN-START switch must be left in the RUN position for Bin-Sense Fan Controllers to control the fan.

- AC1 – WHITE – Connects to L2.
- AC2 – BLACK – Connects to L1.
- NO – RED – Connects to L1.
- COM – ORANGE – Connects to the load side of the START contact of the OFF-RUN-START switch, and the load side of the third contact of the contactor.
- NC – BLUE – Connects to the line side of the RUN contact of the OFF-RUN-START switch. Must be the only connection to the line side of the RUN contact. The load side of the RUN contact must be the only connection to the switched side of the contactor coil.
- GND – GREEN – Connects to ground.
- PURPLE – Indicates modifications to existing wiring.

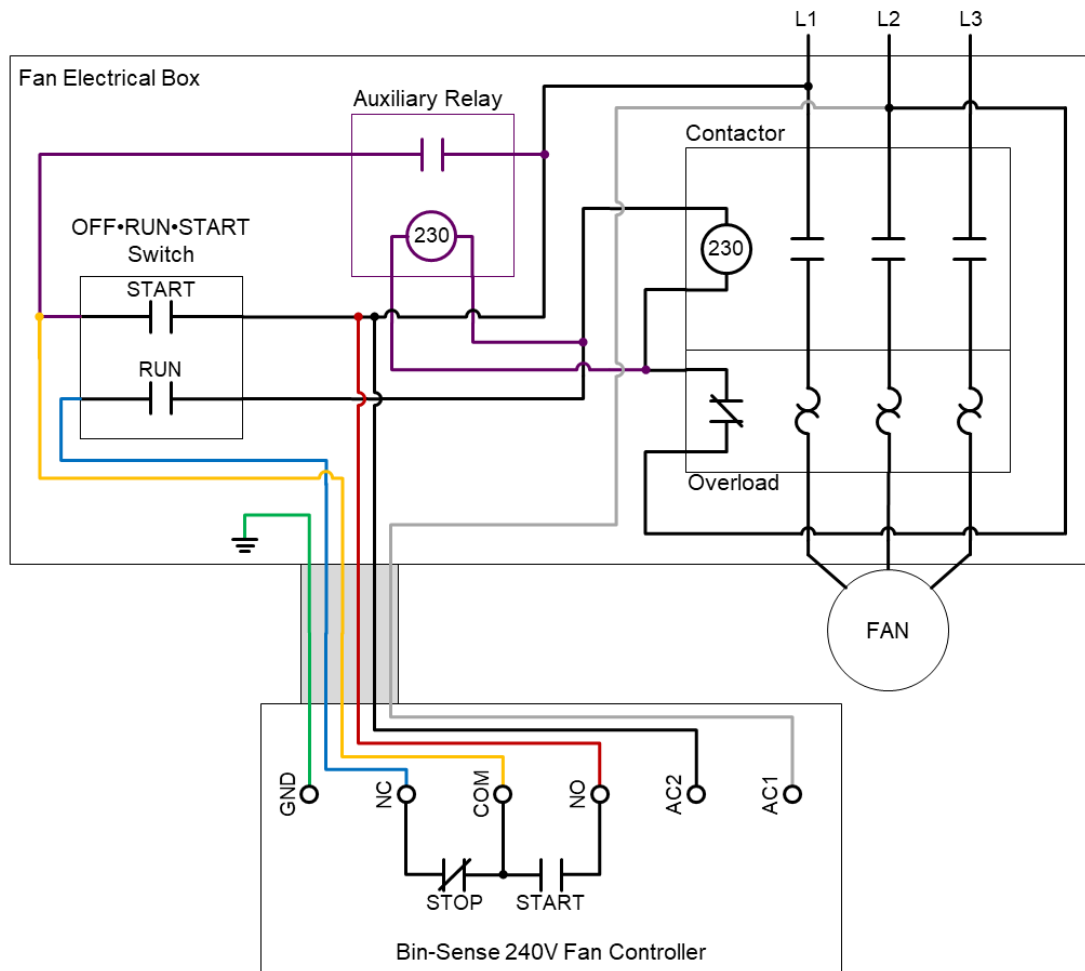


## EDWARDS/GRAIN GUARD/AGI 230V 3 PHASE

**CAUTION:** Existing fan wiring must be modified to add a SPST auxiliary relay with a 230V coil. Do not use a loaded power contact as a holding contact.

**NOTE:** The OFF-RUN-START switch must be left in the RUN position for Bin-Sense Fan Controllers to control the fan.

- AC1 – WHITE – Connects to L2.
- AC2 – BLACK – Connects to L1.
- NO – RED – Connects to L1.
- COM – ORANGE – Connects to the load side of the START contact of the OFF-RUN-START switch, and the load side of the auxiliary contact
- NC – BLUE – Connects to the line side of the RUN contact of the OFF-RUN-START switch. Must be the only connection to the line side of the RUN contact. The load side of the RUN contact must be the only connection to the switched side of the contactor coil and auxiliary relay coil.
- GND – GREEN – Connects to ground.
- PURPLE – Indicates modifications to existing wiring.

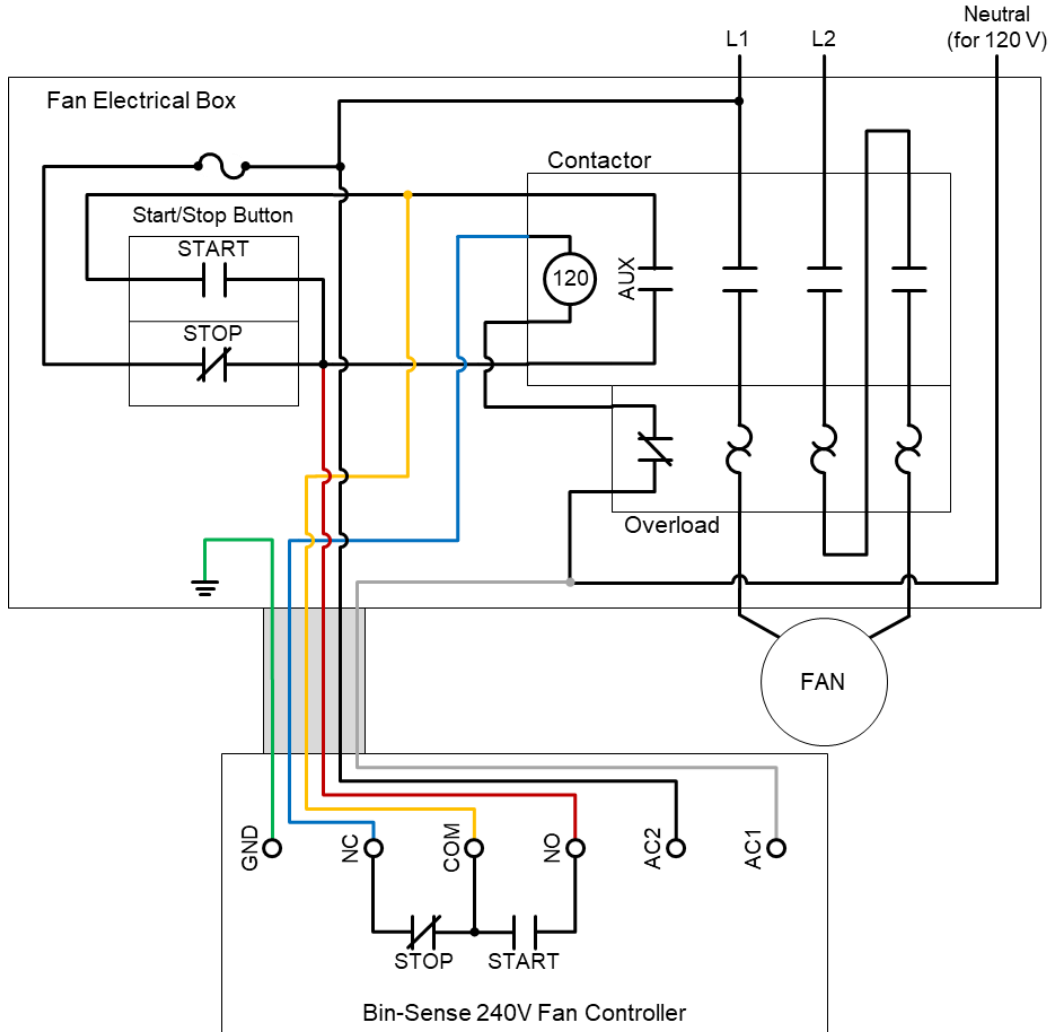




## GS1 230V 1 PHASE

**CAUTION: Fan must be disconnected at the field disconnect to disable Bin-Sense Fan Controller remote control.**

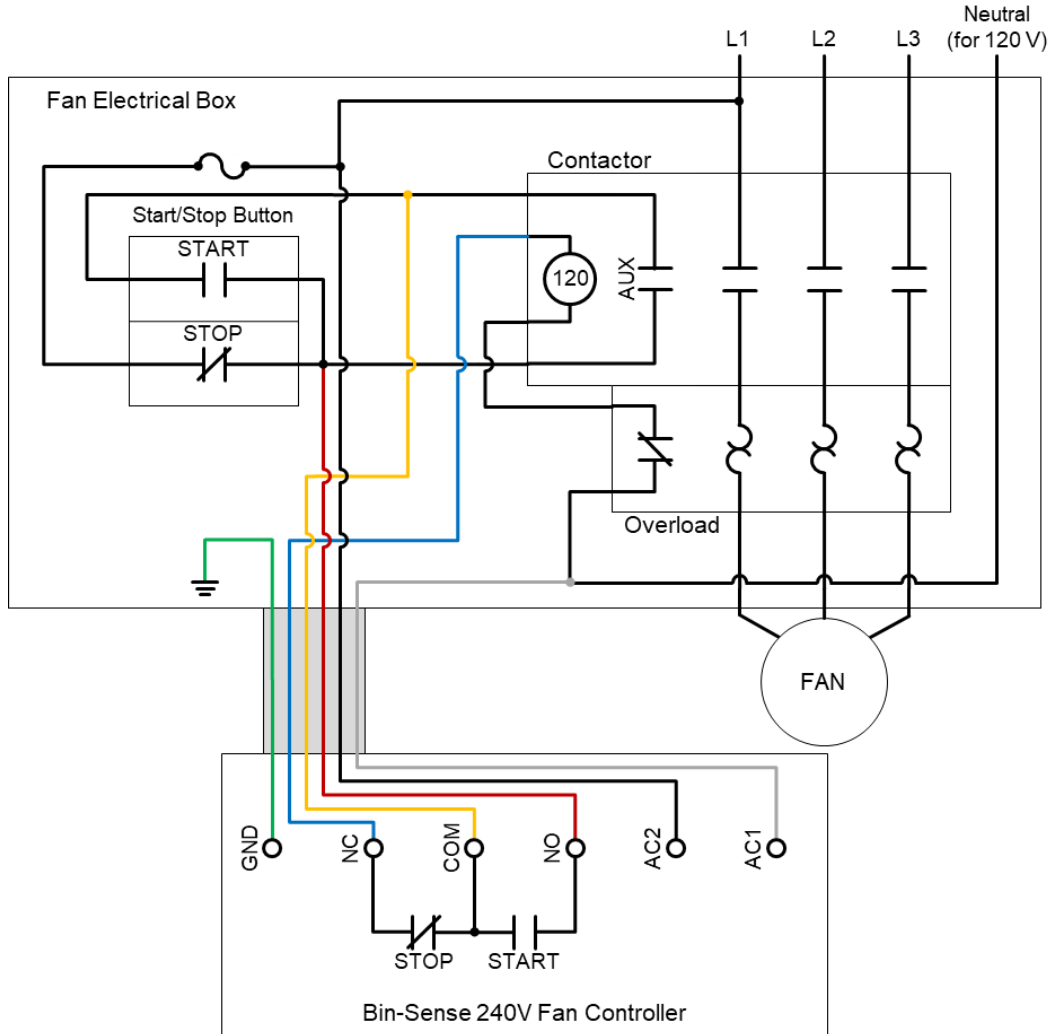
- AC1 – WHITE – Connects to neutral to provide 120 V to the Fan Controller.
- AC2 – BLACK – Connects to L1.
- NO – RED – Connects to the load side of the normally closed STOP contact of the stop button.
- COM – ORANGE – Connects to the load side of the normally open START contact of the start button, and the load side of auxiliary contact.
- NC – BLUE – Connects to the contactor coil. Must be the only connection to the switched side of the contactor coil.
- GND – GREEN – Connects to ground.



## GS1 230V 3 PHASE

**CAUTION: Fan must be disconnected at the field disconnect to disable Bin-Sense Fan Controller remote control.**

- AC1 – WHITE – Connects to neutral to provide 120 V to the Fan Controller.
- AC2 – BLACK – Connects to L1.
- NO – RED – Connects to the load side of the normally closed STOP contact of the stop button.
- COM – ORANGE – Connects to the load side of the normally open START contact of the start button, and the load side of auxiliary contact.
- NC – BLUE – Connects to the contactor coil. Must be the only connection to the switched side of the contactor coil.
- GND – GREEN – Connects to ground.

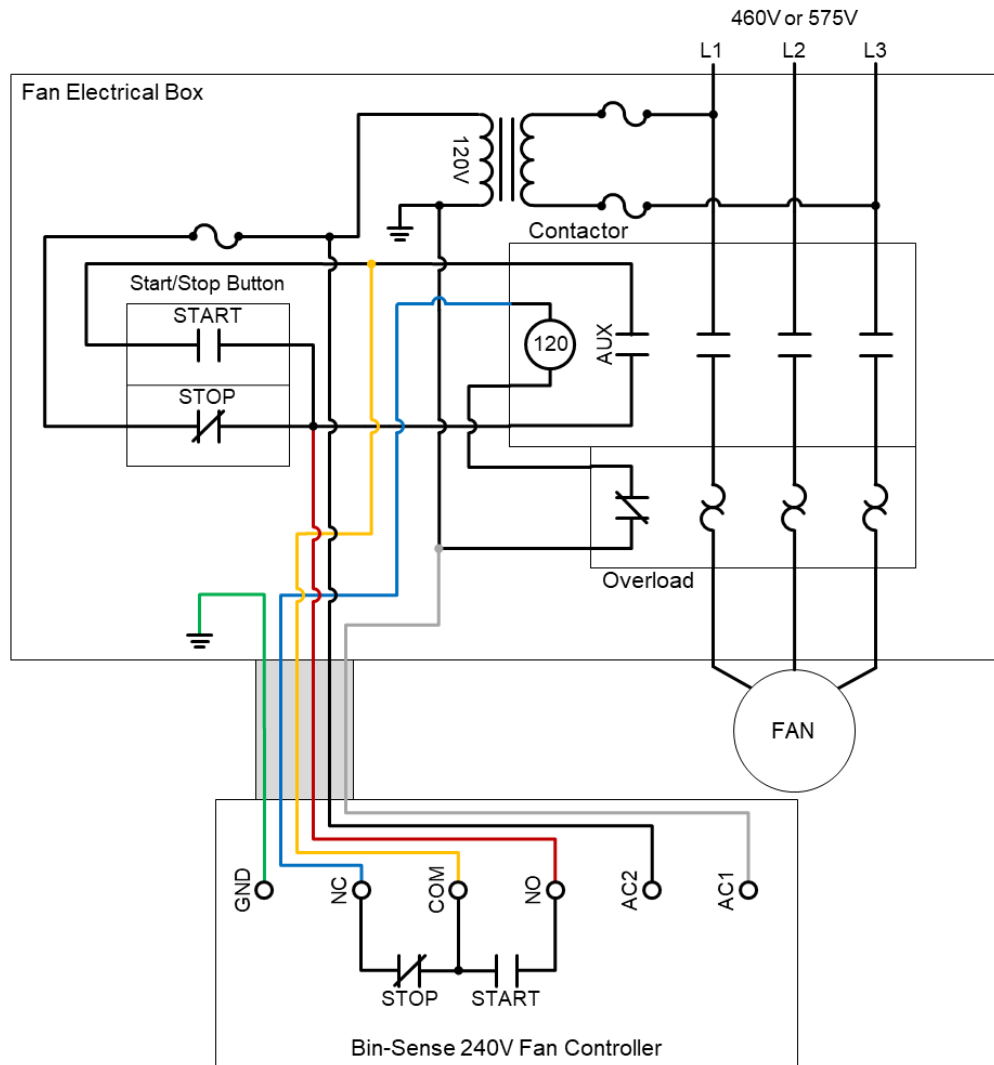


## GSI 460V AND 575V 3 PHASE

**NOTE:** GSI 460V and 575V aeration fans use a 120V transformer for control wiring and require a Bin-Sense 240V Fan controller instead of a Bin-Sense 600V Fan Controller.

**CAUTION:** Fan must be disconnected at the field disconnect to disable Bin-Sense Fan Controller remote control.

- AC1 – WHITE – Connects to the grounded/neutral side of the 120V transformer.
- AC2 – BLACK – Connects to the hot side of the 120V transformer.
- NO – RED – Connects to the load side of the normally closed STOP contact of the stop button.
- COM – ORANGE – Connects to the load side of the normally open START contact of the start button, and the load side of auxiliary contact.
- NC – BLUE – Connects to the contactor coil. Must be the only connection to the switched side of the contactor coil.
- GND – GREEN – Connects to ground.



## TESTING

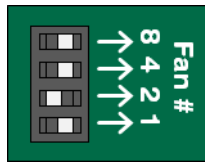
### FAN CONTROLLER WIRING TESTING

Bin-Sense Fan Controllers with firmware R3 and newer include built-in testing features to allow electricians and installers to test that Fan Controllers are wired properly. The test features allow users to trigger Fan Controllers to start and stop fans as well as see the detected state of the fan. Test mode does not require any additional tools and uses only parts included with the Fan Controller.

**WARNING: NEVER ATTEMPT TO CHANGE THE FAN ID WHILE THE POWER IS CONNECTED. HAZARDOUS VOLTAGES EXIST INSIDE. ALWAYS DISCONNECT POWER BEFORE WORKING INSIDE BIN-SENSE FAN CONTROLLERS.**

**CAUTION: This test will turn fans on. Ensure fans are clear of obstructions and that operating fans will not cause damage to the bin before starting fans.**

1. Disconnect the Fan Control link cable from the rest of the Bin-Sense system. There must be no connection to the Fan Control link cable to enter test mode.
2. Shut off power to the Fan Controller.
3. Note the fan ID switch setting and change the fan ID switches so that the 8, 4, and 1 switches are engaged.



4. Turn on the power to the Fan Controller. The Fan Controller will take five seconds to start up and then enter test mode.
5. Compare the LED on the Fan Controller circuit board to the LED status table and ensure the LED indicates the detected fan state is off.
6. Connect the terminator cap (included in the Fan Controller kit) to the Fan Control link cable. The fan should turn on.
7. The LED should indicate the detected fan state is on.
8. Disconnect the terminator cap from the Fan Control link cable. The fan should turn off.
9. The LED should indicate the detected fan state is off.
10. Repeat as necessary to verify the fan controller is working properly. Refer to wiring diagrams and troubleshooting steps if the fan does not operate as expected.
11. Shut off power to the Fan Controller.
12. Return the fan ID switches to the state noted in step 3.
13. Reconnect the Fan Control link cable to the rest of the Bin-Sense system.
14. Restore power to the fan controller.

Table 4: Test Mode LED Status

LED Pattern	Status
Off	No power OR Connection on Fan Control link cable—cannot enter test mode
Solid on	Starting up—lasts for five seconds
Short blink	Fan detected off
Long blink	Fan detected on

## TESTING FAN CONTROLLERS WITH BIN-SENSE DIRECT

A Bin-Sense Direct unit (handheld cable scanner) can be used to test the operation of Bin-Sense Fan Controllers and ensure the high voltage wiring is correctly connected.

### TOOLS REQUIRED

- Bin-Sense Direct unit
- Bluetooth-enabled smartphone or tablet loaded with the Bin-Sense Mobile App

### TESTING AN INDIVIDUAL FAN CONTROLLER

1. To test an individual Fan Controller, disconnect the Fan Control link cable from the rest of the system, and plug it into the two-pin connector on the top of the Bin-Sense Direct unit. Note where the Fan Control cable is disconnected from so that it can be reconnected properly after testing is complete.
2. Open the Bin-Sense Mobile App on the smartphone or tablet.
3. Navigate to the Bin-Sense Direct section of the app.
  - If you have a Bin-Sense account, log in to your account, tap the three dots menu button in the top right corner of the app, and then select “Bin-Sense Direct”.
  - If you don’t have a Bin-Sense account, tap “Guest Mode” on the login screen.
4. In the “Bluetooth Settings” tab, select the serial number of your Bin-Sense Direct unit. The seven-character serial number can be found on a sticker on the back of the Direct unit.
5. Once connected to the Direct unit, tap the “Fan Test” tab, and then tap “Scan for Fan Controllers”. The Direct unit will scan for any fan controllers connected.
6. The app will show the attached Fan Controller as well as the fan state and the fan controller state.
7. Tap “Start Fan” and check that the fan begins running. Note that fans with startup delay will not start immediately. See the [Fan Startup Delay](#) section for more details on startup delay.



8. Tap “Stop Fan” and check that the fan stops running.
9. While testing fan operation, ensure the “Fan is” and the “Fan should be” states match the actual state of the fan. The fan arrow icon will appear red if the “Fan is” and the “Fan should be” states do not match. If this occurs, check that the fan wiring matches the corresponding diagram, and that the polarity is correct for the white and black AC1 and AC2 wires.

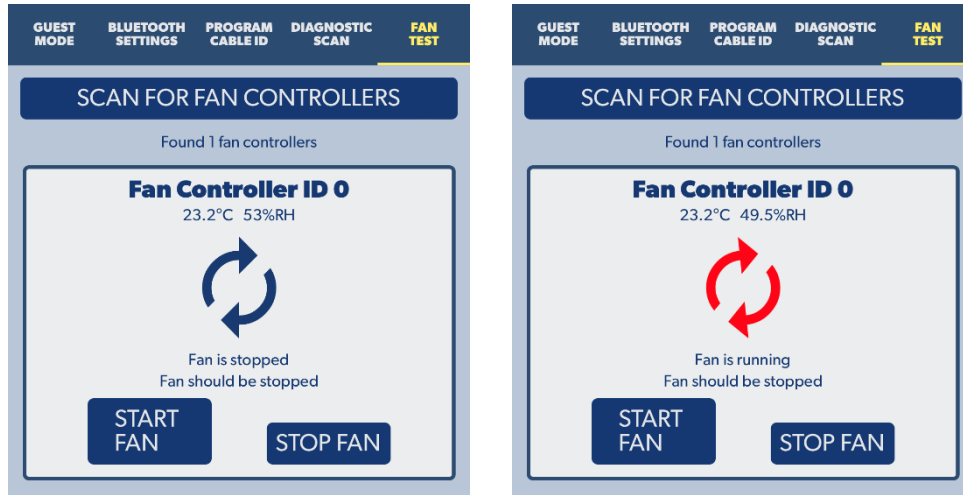
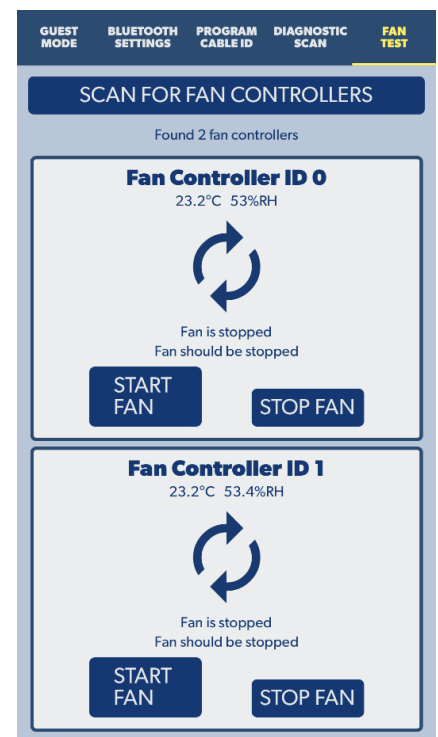


Figure 9: Normal vs Mismatched Fan States

## TESTING MULTIPLE FAN CONTROLLERS ON THE SAME BIN

1. To test multiple Fan Controllers together, disconnect the link cable that is plugged into either the Fan Controller Combo Cable Fan link cable, or to the Remote unit Sensor Link cable. Note the existing cable connection location so that it can be returned to normal later. See the [Connecting a Fan Controller to Bin-Sense Master or Remote Units](#) section for more details.
2. Open the Bin-Sense Mobile App on the smartphone or tablet.
3. Navigate to the Bin-Sense Direct section of the app.
  - If you have a Bin-Sense account, log in to your account, tap the three dots menu button in the top right corner of the app, and then select “Bin-Sense Direct”.
  - If you don’t have a Bin-Sense account, tap “Guest Mode” on the login screen.
4. In the “Bluetooth Settings” tab, select the serial number of your Bin-Sense Direct unit. The seven-character serial number can be found on a sticker on the back of the Direct unit.
5. Once connected to the Direct unit, tap the “Fan Test” tab, and then tap “Scan for Fan Controllers”. The Direct unit will scan for any fan controllers connected.
6. The app will show all attached Fan Controller as well as the fan states and the fan controller states. Additionally, all attached cables (if any) can be viewed in the “Diagnostic Scans” section.
7. For the first fan, tap “Start Fan” and check that the fan begins running.



8. Repeat step seven for all other Fan controllers on the same bin. Note that fans with startup delay will not start immediately. See the [Fan Startup Delay](#) section for more details on startup delay.
9. Tap “Stop Fan” for each fan and check that the fans stop running.
10. While testing fan operation, ensure the “Fan is” and the “Fan should be” states match the actual state of the fan. The fan arrow icon will appear red if the “Fan is” and the “Fan should be” states do not match. If this occurs, check that the fan wiring matches the corresponding diagram, and that the polarity is correct for the white and black AC1 and AC2 wires.
11. After testing is complete, reconnect the Fan Controller Combo Cable Fan link cable, or the Remote unit Sensor Link cable to its original connection location noted in step one.

## FAN OPERATION

Bin-Sense Fan Controllers allow fans to be operated remotely through the Bin-Sense website and app, or locally from the existing start/stop station. Both Bin-Sense control and local control options can be used at same time with no need to switch between different operating modes.

- To operate the fan manually from the local start/stop station, use existing controls the same as before the Bin-Sense Fan Controller was installed. Depending on the fan type, this may be an off-run-start switch or start and stop buttons. Consult the manual for your fan for more details.
- To remotely operate the fan using the Fan Controller, use the Bin-Sense website or mobile app to start and stop the fan. For fans with an off-run-start switch, the switch must be left in the “RUN” position to allow the Fan Controller to run the fan.
- Note that because of the operating timeline of Bin-Sense Live systems, it may take up to two hours for fans to start or stop from the Bin-Sense website or app.



## TROUBLESHOOTING

Problem	Possible Cause	Suggested Solutions
<b>No power at Fan Controller (LED on Fan Controller circuit board not flashing).</b>	Circuit breaker is off or tripped.	Check that the fan circuit breaker is on and not tripped.
	Fan controller power fuses are blown.	Check that the power fuses in the Fan Controller are not blown. Replace if necessary.
	Fan Controller is not properly wired.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams, paying close attention to the connection of the black and white wires.
<b>Fan Controller repeatedly blows power fuses.</b>	Wrong model of Bin-Sense Fan Controller for the fan voltage.	Ensure the proper model of Fan Controller is being used for the fan voltage.
	Fan Controller is not properly wired.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the black and white wires.
<b>Fan Controller not detected by Bin-Sense Live system.</b>	Fan Controller not powered on.	Ensure Fan Controller is powered on.
	Fan Control cable is not connected to Master/Remote unit.	Check that the Master/Remote unit Sensor Link cable or Fan Controller Combo cable is properly plugged into the Master/Remote unit circuit board. Check that the Fan Control cable is connected to the Master/Remote unit. Check that the Fan Control cable is plugged into the connector on the Fan Controller circuit board.
	Multiple Fan Controllers connected to the same Master/Remote have the same Fan ID.	Ensure each Fan Controller connected to the same Master/Remote unit has a unique fan ID. See <a href="#">Setting the Fan ID</a> for details.
<b>Fan Controller not powering Master/Remote unit.</b>	Master unit solar terminator cap is not installed.	For Master units only, check that the terminator cap is firmly connected to the spare solar panel connector.
	Fan Power cable is not connected to the Master/Remote unit.	Check that the Fan Power cable is connected to the Master/Remote unit. Check that the Fan Power cable is plugged into the connector on the Fan Controller circuit board. Check that the Master/Remote unit solar cable is properly plugged into the Master/Remote unit circuit board.

Problem	Possible Cause	Suggested Solutions
<b>Fan Controller cannot start the fan.</b>	Off-Run-Start switch is in the "Off" position.	For fans with an Off-Run-Start switch, the switch must be left in the "Run" position to allow the Fan Controller to remotely control the fan.
	Fan Controller is not wired properly.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the red, orange, and blue wires.
	Fan Controller control fuse is blown.	Replace the Fan Controller control fuse if it is blown.
	Fan motor field disconnect is open.	Ensure the field disconnect is closed.
<b>Fan Controller starts fan for two second and then fan stops.</b>	Fan Controller is not wired properly.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the red, orange, and blue wires.
<b>Fan cannot be manually started.</b>	Fan Controller is not wired properly.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the orange and blue wires.
	Fan Controller control fuse is blown.	Replace the Fan Controller control fuse if it is blown.
	Fan motor field disconnect is open.	Ensure the field disconnect is closed.
<b>Fan Controller can start the fan but cannot stop the fan.</b>	Fan Controller is not wired properly. Multiple paths to the contactor coil.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the orange and blue wires.
<b>Fan Controller stops fan for two second and then fan starts again.</b>	Fan Controller is not wired properly.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the orange and blue wires.
<b>Fan cannot be manually stopped.</b>	Fan Controller is not wired properly. Multiple paths to the contactor coil.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the orange and blue wires.
<b>Fan runs for some time and then stops.</b>	Fan run timer is expired.	Use the Bin-Sense website or app to start the fan again. Set a longer run time if desired.
	Fan overload is tripping.	Consult the manual for the aeration fan for more information about fan overload tripping.

Problem	Possible Cause	Suggested Solutions
<b>Fan Controller repeatedly blows control fuse.</b>	Fan Controller is not wired properly.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the red, orange, and blue wires.
	A loaded power contact is being used as the holding contact.	Existing fan wiring may need to be modified to use a different holding contact or add an auxiliary relay. See appropriate wiring diagrams for details.
<b>Website/App shows fan is running when it is stopped and vice versa.</b>	Fan Controller is not wired properly. Reversed connection of white and black AC1 and AC2 wires.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the black, white, and blue wires.
<b>Website/App shows fan is always running.</b>	Fan Controller is not wired properly. White wire connected to wrong source phase.	Check that all electrical connections are properly connected and follow the appropriate wiring diagrams. Pay close attention to the connection of the black and white wires.
<b>Fans trip circuit breaker when starting.</b>	Fan startup delay is disabled.	See "FAN START-UP DELAY" on page 30 for details on how to enable startup delay.
	Fans are back-spinning when attempting to start.	Ensure fans after the first fan are equipped with a means to prevent back-spinning.
	Fans are starting out of order.	Ensure fan without louvers is set to Fan ID 0.

**Manufactured in Canada by**



**Head Office:**  
**Calian Agriculture Ltd.**  
118 Husum Road  
RM of Sherwood, SK CANADA  
S4K 0A4

[support.agriculture@calian.com](mailto:support.agriculture@calian.com)

1-833-570-7979

[www.binsense.com](http://www.binsense.com)