
MANUAL

LAC-12 /LAC-30



1 Table of contents

| | | |
|-----|--------------------------------------|----|
| 1 | Table of contents | 2 |
| 2 | General | 3 |
| 3 | Overview | 4 |
| 4 | Description | 5 |
| 5 | Installation | 6 |
| 5.1 | Dimensions | 6 |
| 5.2 | Instructions | 7 |
| 5.3 | Wifi AP login | 8 |
| 6 | Webapp- setting set points - reading | 10 |
| 7 | Faults and Troubleshooting | 25 |
| 8 | Technical specifications | 28 |

2 General

The LAC-12 is the next gen Collision avoidance system. Designed specifically for overhead cranes it has reflector less technology. Then paired with 2 120/240VAC relays, prewired pigtail it is and easy installation. With Wi-Fi built in the setting of set points is now done over Wi-Fi to get the technicians off the crane when setting the distances and making fine adjustments.

3 Overview

The LAC-12 is a collision avoidance product using 850nm (near infrared) wavelength LEDs and a eye with a 1mm photodetector and 3 deg beam angle for some misalignment.

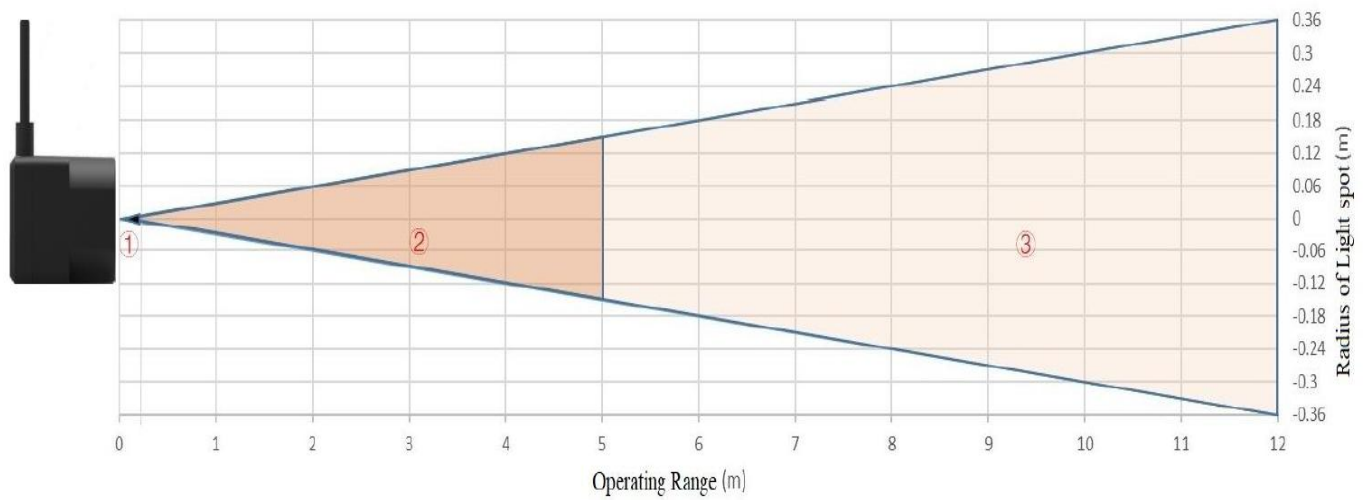
Basic:

1. Processor
2. 1 120V input
3. 2 NO/NC relay outputs
4. 90-240VAC Power supply
5. Sensor



The LAC-12 has a 12 Meter (36ft) Range with 2 relay setpoints
The relay setpoints are adjustable via the LAC-12 Webapp and real time distance is available in the webapp as well as the relay status of each relay.

4 Description



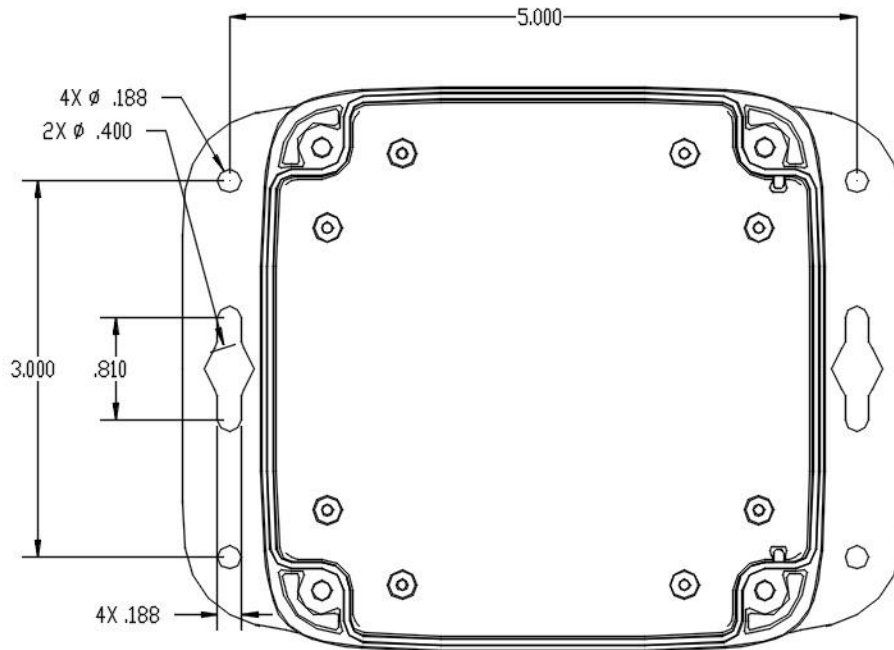
- ① Represents the detection blind zone, 0-10cm, within which the output data is unreliable.
- ② Represents the operating range detecting black target with 10% reflectivity, 0.1-4m.
- ③ Represents the operating range detecting white target with 90% reflectivity, 0.1-12m.

5 Installation

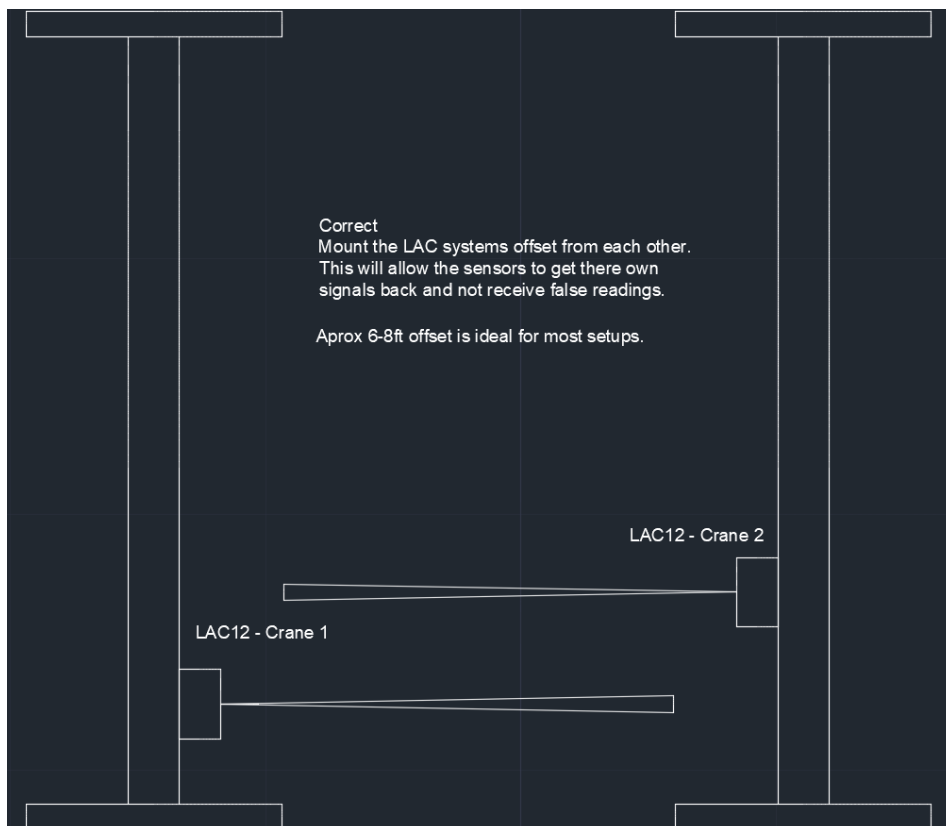
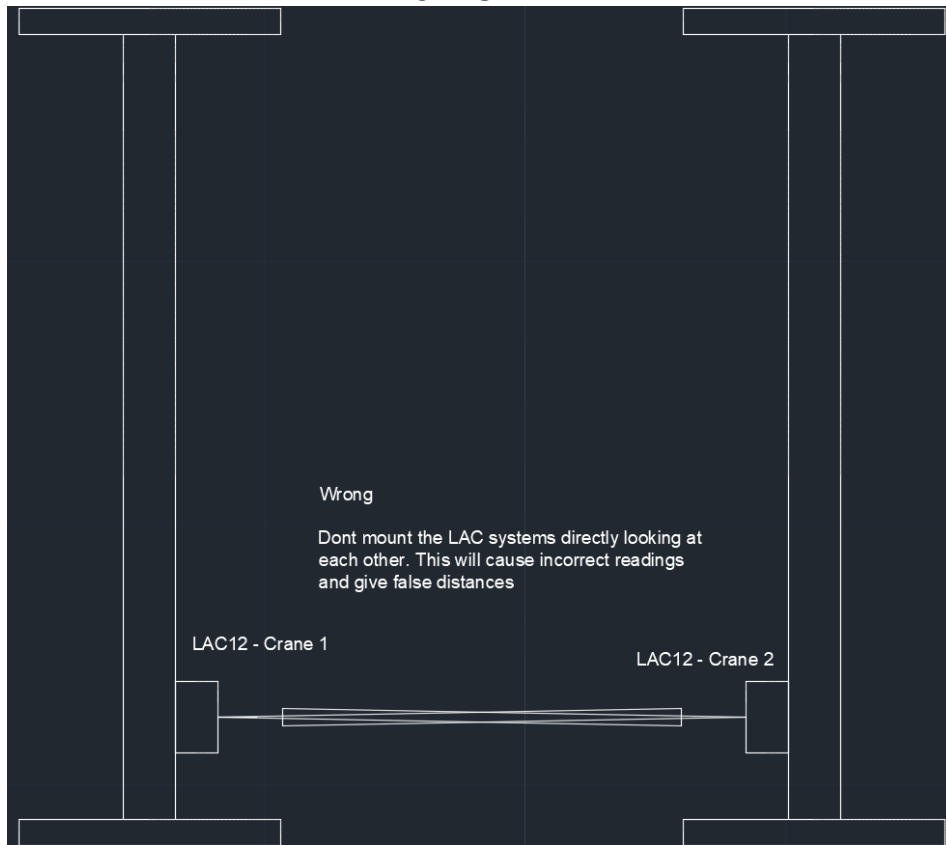
Follow the instructions as described in this manual for the installation of this product.

5.1 Dimensions

The following diagram shows the mounting dimensions for the **LAC-12**

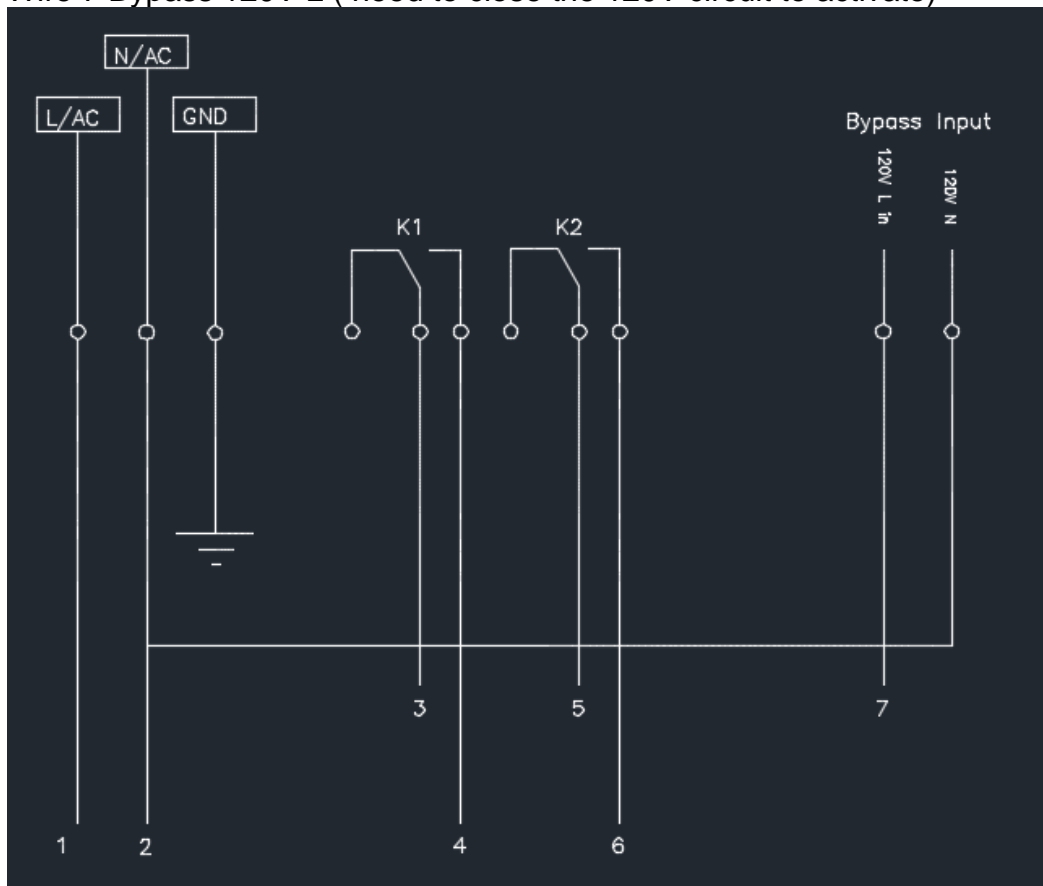


OFFSET :



5.2 Instructions

- Turn off the power supply.
- Locate a suitable place to install the **LAC-12**, with clear line of site to the opposite crane you are trying to stop the collision. Align the LAC-12 so the sensor is facing a clear free surface to reflect the light back without obstructions. (like the girder of the 2nd crane.)
- Connect the input power wires LAC-12 pigtail.
- **Wire 1 L**
- **Wire 2 N**
- Connect the relay output cables to the corresponding connections on crane function you want to slow and stop.
- Wire 3 Motion voltage Common (Stop)
- Wire 4 Motion voltage output (Stop)
- Wire 5 Motion voltage Common (Slow)
- Wire 6 Motion voltage output (Slow)
- Wire 7 Bypass 120V L (need to close the 120V circuit to activate)



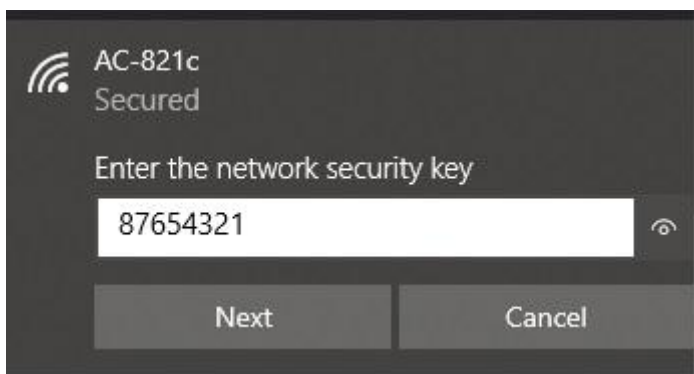
5.3 Wifi log in

Open your phone/tablet/PC and look for accessible wifi hotspots



Select AC - **** where the **** is the last 4 digits of the units mac address.

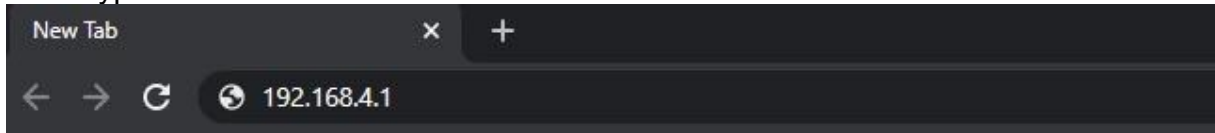
the Password is 87654321



6 Webapp

Once you are connected to the LAC hotspot you can then proceed to open your browser on your device. Chrome, Opera, Firefox

Then type in the IP of the unit which is 192.168.4.1



If you are connected properly the webapp should look like and you should see the following.

| | |
|---|---|
| A screenshot of a mobile application interface titled 'AC Webapp'. The interface has a green header bar with a menu icon (three horizontal lines) and the text 'AC Webapp' with a red number '8' next to it. Below the header, there are several rows of controls: 'Distance: 0 FT' with a red '1' next to 'FT'; 'Stop: 10' with a 'Submit' button and a red '2' next to it; 'Slow: 20' with a 'Submit' button and a red '3' next to it; 'Units: ' followed by a dropdown menu and a red '4' next to it; 'Relay 1: off' with a red '5' next to 'off'; 'Relay 2: off' with a red '6' next to 'off'; and a 'Start' button with a red '7' next to it. At the bottom, there is a text prompt 'Press start to get reading'. The entire interface is shown within a mobile browser window with a status bar at the top showing '7:18', 'No internet connection', and battery level '86%'. | <ol style="list-style-type: none">1. Distance reading once you press start2. Stop setting , changeable3. Slow setting, changeable4. Units selection, mm or FT5. Relay 1 status ON or OFF6. Relay 2 status ON or OFF7. Start button to get the reading8. Navigation menu to go to other pages |
|---|---|

Row 2 & 3 are the slow and stop setpoints. They will populate on the page load of the current settings.

| | | |
|-------|---------------------------------|---------------------------------------|
| Stop: | <input type="text" value="10"/> | <input type="button" value="Submit"/> |
| Slow: | <input type="text" value="20"/> | <input type="button" value="Submit"/> |

To change the setting put your cursor in the box you want to change and delete the old settings. Then put in your new setting and press the submit button beside the slow / stop that you are changing.

| | | |
|-------|--------------------------------|---------------------------------------|
| Stop: | <input type="text" value="1"/> | <input type="button" value="Submit"/> |
| Slow: | <input type="text" value="2"/> | <input type="button" value="Submit"/> |

The relay status will also show if the relays are on or off. Items 5 & 6

| | |
|----------|----------------------------------|
| Relay 1: | <input type="text" value="off"/> |
| Relay 2: | <input type="text" value="off"/> |

To go to start the readings of the distance sensor press start.

7:32 No internet connection 84%

192.168.4.1/index.htm

AC Webapp

Distance: ← FT

Stop:

Slow:

Units:

Relay 1:

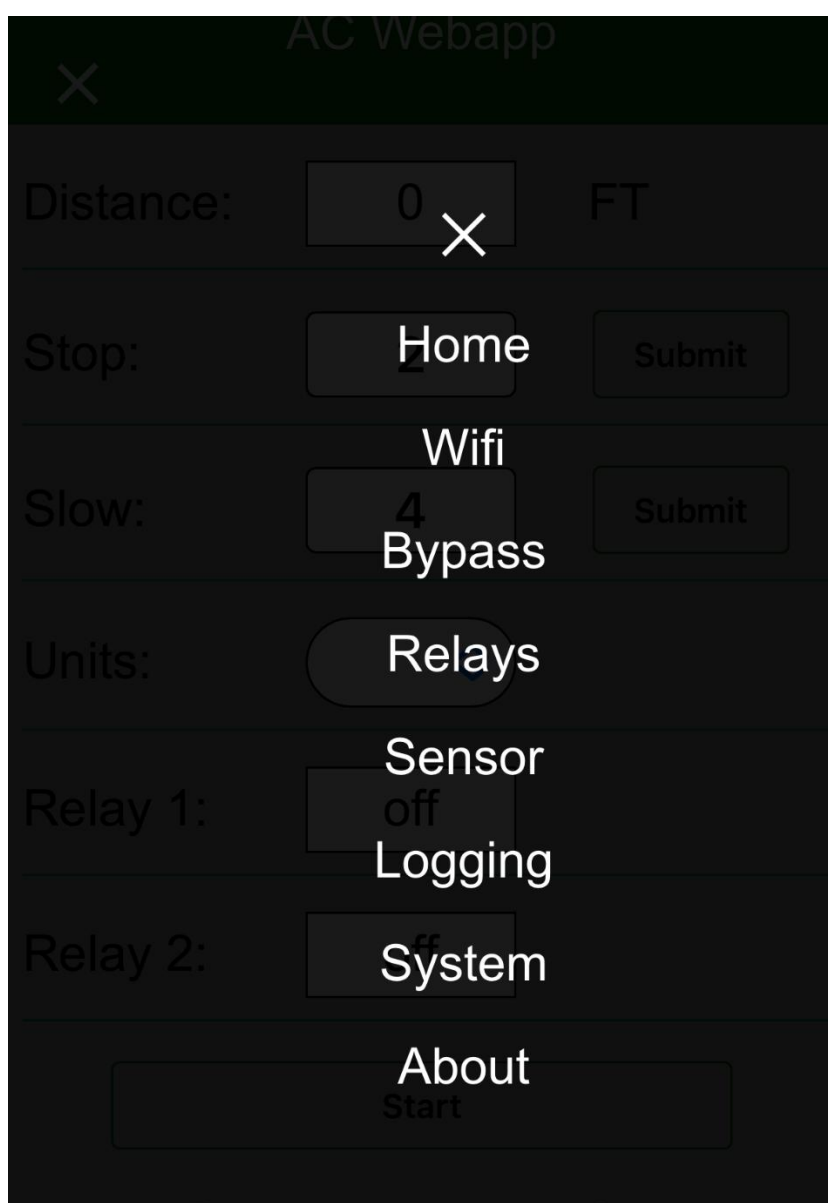
Relay 2:

Press start to get reading

To move to other page settings click the navigation menu 8.



Once you press the navigation menu it will open like this.



If you click the Wifi tab it will bring you to the wifi settings page.

7:19 No internet connection 86%

192.168.4.1/web.html

AC Webapp

Enter the new SSID name of this device

New SSID:

Enter the new SSID name and password to connect to

SSID:

Password

The Default SSID of the unit is AC-**** where the 4 * are the last 4 digits of the mac address. If you have multiple units in the same facility it can be hard to keep track of the SSID you are logging into.

Here you can change the name of this LAC wifi access point. To Something more recongizable onsite Like the Crane number. To do this click in the new name area change to the new name you want and press submit.

Enter the new SSID name of this device

New SSID:

New ssid

Submit

The LAC and can also connect to a wifi network. To do so enter the SSID and PASSWORD of the network you want to join.

Enter the new SSID name and password to connect to

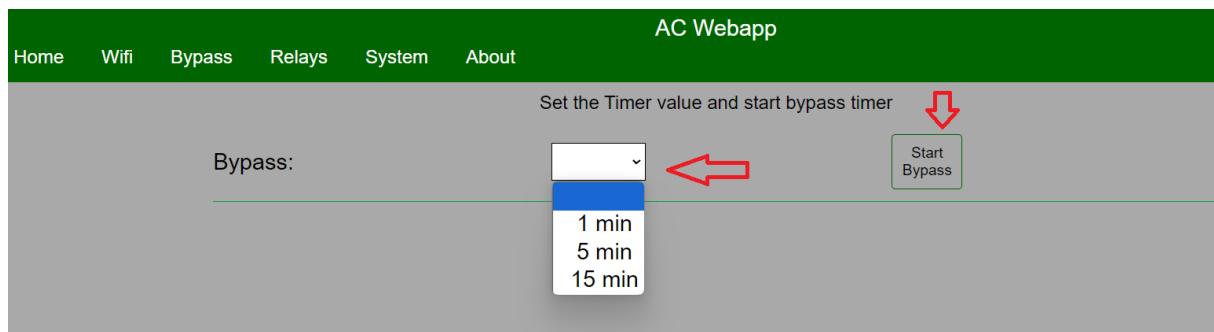
SSID:

Submit

Password

Submit

You can choose to bypass the system by clicking the bypass button



The Bypass button is not permeant due to safety reasons. You can choose 4 settings for bypass to help move the crane if it is stuck or if you haven't finished installing the system yet and need to move the crane.

Pressing Start Byass without choosing a time will default to 30 sec

Other options are

1 min

5 min

15 min.

Once you press start bypass the relays will stay closed until the timer is up.
The LED on the unit should be White while its in bypass mode.

The System is setup with the relays turning on using normally open contacts. So these contacts will close during normal operation.

Sometimes the crane cant except this wiring and it either needs to be rewired to the NC contacts or we have a way to switch the relay operation in the software without rewiring the outputs.

The screenshot shows the 'AC Webapp' interface with a green header bar containing navigation links: Home, Wifi, Bypass, Relays, System, and About. The main content area is grey and titled 'Change the relay state to NO or NC'. It contains four relay configuration sections, each with a label and a dropdown menu. A red arrow points to the first dropdown menu. The labels are: 'Relay1 operation: NC is default', 'Relay2 operation: NC is default', 'Relay3 operation: NC is default', and 'Relay4 operation: NC is default'. The dropdown menus show 'NC' and 'NO' options. Below the relay sections are two more configuration sections: 'Hysteris: 1ft is default' and 'FSA Mode: On is default', each with a dropdown menu.

To Change the operation of the relay Pick the relay you want to swap the contact via the drop down menu and change it from NC to NO

Now the relay will not close on startup and will turn on when the setpoint has been reached.

Hysteris: when the setpoint has been reached we add a hysteresis so the relay will not continuously turn on / off when it is right at the edge of the setpoint. So for the relay to change state you need to be back the other way by default 1ft. if for some reason the reflection of is not stable and you have the signal bouncing more you can change this up to 5ft.

AC Webapp

Home Wifi Bypass Relays System About

Change the relay state to NO or NC

Relay1 operation: NC is default

Relay2 operation: NC is default

Relay3 operation: NC is default

Relay4 operation: NC is default

Hysteris: 1ft is default

FSA M default

1
2
3
4
5

you change this setting until you find where the relay unwantedly is turning on / off to save the contacts of the LAC and the contactors / controls on the crane.

FSA mode: Full speed away mode is a feature that allows the crane to go fast in the opposite direction once it detects it is moving away from the crane we are avoiding. The program counts the distance readings to determine if it is going towards the crane or away from the crane. Once we determine we are moving away from the crane. Then we turn the high speed relay back on so the crane can move fast in the opposite direction without clearing the full setpoint. Example if the slow was set to 20ft and the stop was set to 10ft. once you hit the stop you have to travel 10ft in slow until it clears the slow zone. But with FSA on once you hit 11ft in the opposite direction to turns the high speed relay back on. Once you travel towards the crane again it will go back into slow mode.

This feature is on in V2.6 and beyond. So if you don't want this to be on just go and turn it off. Then the system will operate within its setpoints regardless of direction.

AC Webapp

[Home](#)[Wifi](#)[Bypass](#)[Relays](#)[System](#)[About](#)

Change the relay state to NO or NC

Relay1 operation: NC is default

Relay2 operation: NC is default

Relay3 operation: NC is default

Relay4 operation: NC is default

Hysteris: 1ft is default

FSA Mode: On is default

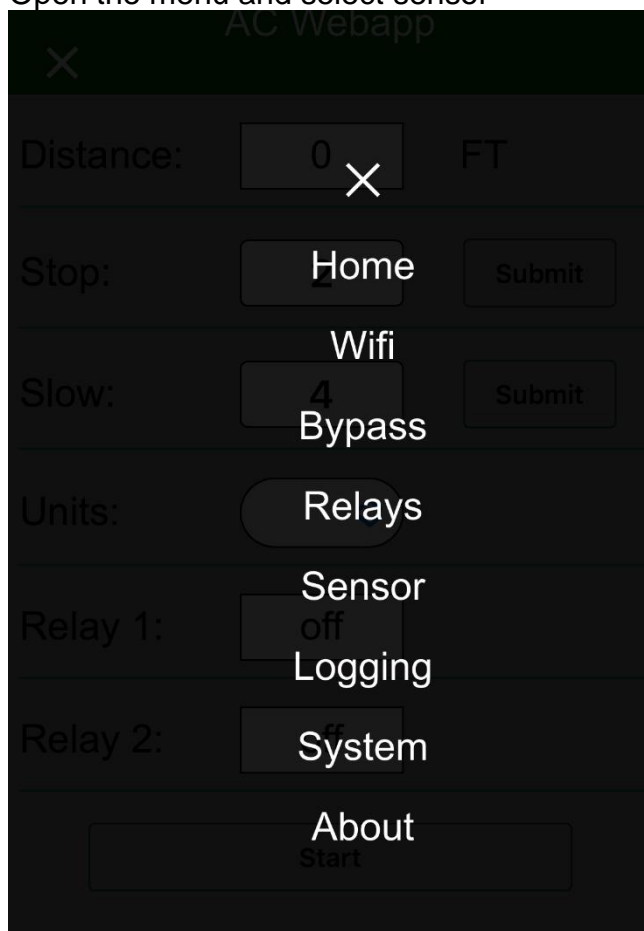
on

off

Sensor Page.

The sensor page is a new page to program and read more info from the sensors settings. This will now include the signal strength of the sensors reading, you will still see the distance on this page just like the home page. You will have the option to update the sensors read frequency. Default will be 10hz (10 reads per second) you can go as low as 1 hz or max 1000hz. There is also now a signal strength limit we can apply. This will help stop bad misreads due to the environment and any unwanted bad reads the sensor may get. Since the signal strength is determined by the reflectivity of the objects it sees this is not a 1 setting fits all applications. For example a white background object will have a much higher signal strength then a black object. We already have some filtering in the program to get rid of bad reads. For example if a good read is 30 and we get 1 reading of 4 we will ignore that 4. As we expect the next valid reading around 30 in the +- direction. We added Robust mode which makes the sensor get 2 good reads instead of one to strength the robustness of the signal. We can turn this on if we are in not optimal environments or applications to help stop bad misreads.

Open the menu and select sensor



When the page is open you will get this.

The screenshot shows the AC Webapp interface. At the top is a green header with a white hamburger menu icon and the text 'AC Webapp'. Below the header are five input sections, each separated by a thin green horizontal line. The first section is 'Distance:' with a text input field containing '0' and the unit 'FT' to its right. The second section is 'Strength:' with a text input field containing '0'. The third section is 'Set frequency in hz:' with a text input field containing '10' and a green 'Submit' button to its right. The fourth section is 'Signal strength limit:' with a text input field containing '200' and a green 'Submit' button to its right. The fifth section is 'Robust Mode:' with a toggle button labeled 'True' and a green 'Submit' button to its right. Below these sections is a large green 'Start' button. At the bottom of the interface is the text 'Press start to get reading'.

1. Press the start button to get the readings. You can update the values without pressing start if you know what you want to set it to.
2. the distance reading from the sensor
3. the signal strength from the sensor
4. the frequency setting choose between 1-1000hz and press submit. Note: the faster the frequency the more misreads could happen.
5. signal strength limit. If you have bad readings with no objects in front of the sensor at the desired ranges. Get the crane to the location you are getting misreads. Press the start button and watch the signal strength and distance. If the signal strength is low but about the default setting (350) but is enough to get a reading then change the signal strength limit to that value you are seeing plus a little bit more. Then if the signal strength is below that limit the system will ignore this value. Don't worry about

it affecting your good reads as if you get the other crane close you will see the signal strength will be much higher. But to double check you can get the crane in the slow an stop zones you want and check the signal strength at these distances.

6. The robust mode will add extra filtering to the system to make it so we get 2 good reads before accepting the distance value in the program. Its off by default.

AC Webapp

Distance:

5

FT ← 2

Strength:

2632

← 3

Set frequency in hz:

10

Submit

↓ 4

Signal strength limit:

200

Submit

↓ 5

Robust Mode:

True

Submit

↓ 6

Start

← 1

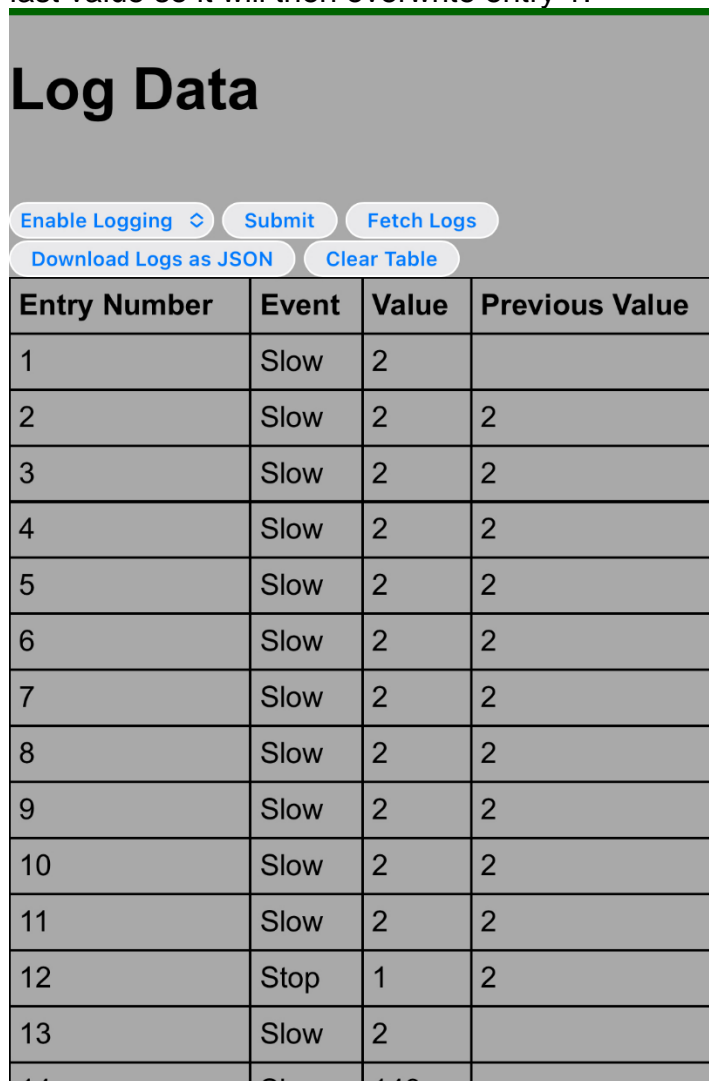
Press start to get reading

Logging Page.

If you find yourself in a situation where once and a while your crane slows / stops when it shouldn't and you can't quite track down the reason. You can turn on logging so we can see the last 500 logs and try to see where the crane is getting bad reads and what they were. This feature is off by default as it decreases the performance a little bit of the system as it has some extra processing to do. Go to the log page. Then press enable logging and press submit.

Then the logging is activated. Now after some time where you see the relays have triggered you can open this page and click fetch logs. Here the data will populate. It will get the Entry number 1-500 then the event (slow or stop) the value (the distance) then the last registered distance value before the event.

The system will log 500 events then overwrite its oldest data. Where entry 500 is the last value so it will then overwrite entry 1.



The screenshot shows a web interface titled "Log Data". Below the title are four buttons: "Enable Logging" (with a dropdown arrow), "Submit", "Fetch Logs", and "Download Logs as JSON". Below these buttons is a table with four columns: "Entry Number", "Event", "Value", and "Previous Value". The table contains 14 rows of data. The first 11 rows show "Slow" events with a "Value" of 2 and a "Previous Value" of 2. The 12th row shows a "Stop" event with a "Value" of 1 and a "Previous Value" of 2. The 13th row shows a "Slow" event with a "Value" of 2 and a "Previous Value" of 2. The 14th row is partially visible and shows a "Slow" event with a "Value" of 2.

| Entry Number | Event | Value | Previous Value |
|--------------|-------|-------|----------------|
| 1 | Slow | 2 | |
| 2 | Slow | 2 | 2 |
| 3 | Slow | 2 | 2 |
| 4 | Slow | 2 | 2 |
| 5 | Slow | 2 | 2 |
| 6 | Slow | 2 | 2 |
| 7 | Slow | 2 | 2 |
| 8 | Slow | 2 | 2 |
| 9 | Slow | 2 | 2 |
| 10 | Slow | 2 | 2 |
| 11 | Slow | 2 | 2 |
| 12 | Stop | 1 | 2 |
| 13 | Slow | 2 | |
| 14 | Slow | 2 | |

1. Enable logging
2. Submit to enable logging
3. After the logging has been running fetch the logs

-
- Download the log values for future review.

The screenshot shows the 'AC Webapp' interface with a green header. Below the header, the title 'Log Data' is displayed. Four numbered red arrows indicate the workflow: 1 points to the 'Enable Logging' button, 2 points to the 'Submit' button, 3 points to the 'Fetch Logs' button, and 4 points to the 'Download Logs as JSON' button. Below the buttons is a table with four columns: 'Entry Number', 'Event', 'Value', and 'Previous Value'. The table body is currently empty.

AC Webapp

Log Data

1 Enable Logging 2 Submit 3 Fetch Logs 4 Download Logs as JSON

Download Logs as JSON Clear Table

| Entry Number | Event | Value | Previous Value |
|--------------|-------|-------|----------------|
|--------------|-------|-------|----------------|

7 Faults and troubleshooting

| LED status light | Possible Problem | Output status | Solution if it is not in a normal condition |
|------------------|--|---|--|
| Green | The system is getting a distance reading beyond the current setpoints (e.g., setpoints at 5ft, reading at 10ft) and less then its out of range (e.g 12M) | All relays are on and the crane can travel in both speeds | LAC is receiving a reading but might be misaligned. Check what the LAC is detecting and realign accordingly. |
| Pulsing Green | The system is not receiving a return signal (e.g., other crane is farther than 39ft,12M) | All relays are on and the crane can travel in both speeds | Ensure the sensor is aligned with the other crane and that everything is level. |
| Purple | The system is in its first setpoint (e.g., slow setpoint is set to 10ft, and crane is 10ft or closer) | Relay 1 is on and relay 2 is off | Verify that the sensor is not detecting another object, such as a wall column if mounted close to the rails. Additionally, consider if the hysteresis hasn't reached its value yet. Double check the slow setting is correct |

| | | | |
|------------|--|---|---|
| Light Blue | The system is in its second setpoint (e.g., stop setpoint is set to 10ft, and crane is 10ft or closer) | Relay 1 and 2 is off | Verify that the sensor is not detecting another object, such as a wall column if mounted close to the rails. Additionally, consider if the hysteresis hasn't reached its value yet. Check for debris on the lid, Double check the stop setting is correct |
| Red | System can't detect the sensor | Relay 1 and 2 will hold its last known state. e.g if the crane was far away Relay 1 & 2 will be closed if the crane was in the stop zone Relay 1 & 2 will be open | The sensor may not be communicating with the motherboard. Check the connection; the plug might be loose, or the sensor could be defective. Consider replacing the system if necessary. |
| No light | System not functioning | Relay 1 and 2 are open | This could be due to a power supply issue/ cable is unplugged or cut or a faulty processor. Investigate the power source and processor functionality. |

DANGER

ELECTRIC SHOCK

- Be sure to remove ALL power from ALL devices before connecting or disconnecting inputs or outputs to any terminal or installing or removing any hardware.
- Be sure to connect the grounding wire to a proper ground.

Failure to follow this instruction will result in death, serious injury, or equipment damage.

WARNING

FAILURE OF OUTPUTS

- If outputs should fail, outputs may remain on or off. Where personnel and or equipment hazards exist, use appropriate safety interlocks.

Failure to follow this instruction can result in death, serious injury, or equipment damage.

8 Technical Specifications

8.1 *General Data*

- 0.1-12M Range
- Accuracy +- 1%
- FOV 3 deg
- LED sensor power consumption 85mW-550mW

8.2 Electrics/electronics

| Function | Description |
|--------------------------|--|
| Digital inputs | <ul style="list-style-type: none">• 1 optical isolated inputs• 120VAC input |
| Relay outputs | <ul style="list-style-type: none">• 2 change-over relays• max 250Vac - 3A |
| Supply | <ul style="list-style-type: none">• 90-230Vac \pm 10%• optional 100-240Vac |
| Power consumption | <ul style="list-style-type: none">• max 3W |

8.3 Mechanical data

| Function | Description |
|-------------------|--|
| Dimensions | <ul style="list-style-type: none">• 4.50 x 4.50 x 2.44 in / 114.30 x 114.30 x 61.98 mm |
| Mounting | <ul style="list-style-type: none">• Thur hole |
| Weight | <ul style="list-style-type: none">• 0.6 lbs |
| Housing | <ul style="list-style-type: none">• PC/ABS |

8.4 Ambient data

| Function | Description |
|--------------------------|---|
| Temperature range | <ul style="list-style-type: none">• operational : -10°C to +60°C• storage : -40°C to +85°C |
| Relative Humidity | <ul style="list-style-type: none">• 10 to 95% (without condensation) |
| protection | <ul style="list-style-type: none">• Nema 4X IP68 |

GT1 Systems Inc

sales@gt1systems.com

www.gt1systems.com