



GLOBAL  
FINISHING  
SOLUTIONS



# GFS<sup>®</sup> Booth Connect

## Installation Manual

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*Read and keep this manual for future reference. All personnel operating the equipment described in this manual should review and understand all instructions before use.*

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# Introduction

## About Global Finishing Solutions LLC

### Leading the Industry in Paint Booth and Finishing System Technology

With decades of experience, Global Finishing Solutions is the leading manufacturer of paint booths and finishing systems for many industries, including automotive refinish, aerospace and defense, industrial manufacturing, woodworking, and large equipment. By combining high-quality components, strong relationships with paint manufacturers, and our experienced distribution network, GFS provides the best equipment and support to set your business up for success.

## Contacting Global Finishing Solutions

### General information

- Toll-free: 800-848-8738
- Fax: 715-597-2193
- Email: [info@globalfinishing.com](mailto:info@globalfinishing.com)
- Online: [www.globalfinishing.com](http://www.globalfinishing.com)

### Technical support

- Toll-free: 800-848-8738
- Fax: 715-597-8818
- Email: [techservices@globalfinishing.com](mailto:techservices@globalfinishing.com)

### Parts and filters

- Toll-free: 800-848-8738
- Fax: 888-338-4584
- Email: [parts@globalfinishing.com](mailto:parts@globalfinishing.com)

## Target audience

This document is intended for use by trained, experienced paint booth installers and maintenance technicians. If you have questions about the installation procedure described in this manual, contact GFS as described above.

## Conventions used in this manual

This section describes how information is presented, organized, and referenced within this manual.

### Safety notices

This manual uses the following standards to identify conditions related to safety hazards and equipment damage.

**Table 1. Safety notices**

Symbol	Description
<b>DANGER</b>	Indicates an imminent hazard that will result in death.
<b>WARNING</b>	Indicates a hazard that can result in serious personal injury or death.
<b>CAUTION</b>	Indicates a hazard that can result in personal injury.
<b>NOTICE</b>	Indicates a situation that can result in equipment or property damage, but poses no risk of personal injury.

### Information notices

In addition to the safety notices described above, this manual uses a boldface keyword to identify certain other types of information.

**Table 2. Information notices**

Keyword	Description
<b>NOTE</b>	Denotes general information that provides additional context or guidance.
<b>Important</b>	Denotes information to which you should pay special attention.
<b>Reference</b>	Directs you to related content in a separate document.
<b>Prerequisites</b>	Specifies other tasks that must be completed or conditions that must exist before you perform the current task.
<b>Scope</b>	Describes limitations to the current task or conditions under which the task applies or does not apply to the procedure.

# General safety

Follow all safety guidelines when assembling, operating, or servicing this product.

## **WARNING**

There are inherent hazards associated with the operation and service of this equipment. For your personal safety, observe all safety information. Failure to observe these safety practices can result in personal injury or death.

## **WARNING**

Operation and maintenance of this product must be performed properly by qualified personnel who observe the warnings in all documentation and notes provided with and on the product.

## **WARNING**

Follow all general standards for installation and safety for work on installations. Follow all good practices for the proper use of lifting tackle and equipment. The use of protective equipment such as safety goggles and protective footwear must be considered.

## **WARNING**

All persons who will operate, service, inspect, or otherwise handle this product must read and understand the safe operating practices, safety precautions, and warning messages in this documentation.

## **WARNING**

The roofs of GFS equipment are not designed or intended to be walked upon or to support weight of any kind. As designed and manufactured, equipment roofs do not meet the minimum requirements of a safe walking and/or working surface under OSHA 1910.22. Under no circumstances should the roof be used by maintenance personnel or others for walking, standing, or storage of any kind. When necessary, roof access should be secured through the use of a properly supported platform that satisfies the minimum load requirements specified by ASCE 7 (Minimum Design Loads and Associated Criteria for Buildings and Other Structures) and ASCE 37 (Design Loads on Structures during Construction). Additionally, personnel should always utilize appropriate fall safety protocols when using an elevated platform. Use of the roof in a contrary manner may result in injury and/or death.

## **WARNING**

Comply with OSHA guidelines and with all applicable local electrical, safety, and fire codes and standards.

## **WARNING**

All field wiring provided must comply with local codes or, in the absence of local codes, the National Electrical Code (NFPA 70).

## **WARNING**

Electrical installation should be completed by a qualified electrician. Installation must meet all applicable national, state, and local electrical codes.

## **WARNING**

Ensure that all electrical components are grounded to a central ground.

**WARNING**

Disconnect and lock out the main electrical service before installing, adjusting, or servicing the product.

**WARNING**

Guards and covers that prevent contact with electrically energized or moving parts are required and must not be removed or left open during operation.

**WARNING**

Local fire and building codes require fire protection. Check with local inspector authorities for requirements.

**CAUTION**

Read and save these instructions before attempting to assemble, install, operate, or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage. Retain these instructions for future reference.

**CAUTION**

This manual contains statements that relate to worker safety. Read this manual thoroughly and comply as directed. Operate this equipment in accordance with the guidelines set forth in this manual. It is impossible to list all potential hazards of this equipment. Instruct all personnel involved with this equipment in the safe conduct and operation of the system. GFS recommends that only qualified personnel operate and maintain this equipment.

**CAUTION**

Safety signs, panels, and labels that are normally affixed to the product must be replaced immediately if illegible or missing.

**CAUTION**

New or replacement parts that are installed during repair or maintenance must include all safety signs, panels, and labels as specified by the manufacturer. These must be affixed to the new or replacement parts as specified by the manufacturer.

**CAUTION**

Where applicable, use earplugs or take other safety measures for hearing protection.

**NOTICE**

The product must be installed and serviced only by a trained, qualified service technician. Incorrect installation may void the warranty.

**NOTICE**

If you have questions about the warranty, please contact your distributor prior to contacting GFS.

# Product safety

For booth safety information, refer to the documentation that accompanied your equipment.

**NOTICE**

The values shown on the screens are for illustrative purposes only and are not intended to be correct or accurate representations of times and temperatures.

# Booth Connect description

GFS' Booth Connect unit provides remote monitoring and real-time alerts for any type of paint booth. Paint shops can use Booth Connect to monitor booth production and cycles, power usage, and track filter loading via a remotely accessible dashboard.

With one unit installed per paint booth, Booth Connect by GFS can convey data using an Ethernet connection, Wi-Fi, or a pre-wired cellular modem.



Figure 1. Booth Connect unit and HMI touchscreen



# Required materials

This section lists the tools required to place your pre-assembled Booth Connect unit.

**NOTE**

Depending on the unit's placement, additional tools or equipment may be required.

- Impact wrenches and socket set
- Screwdrivers, including:
  - Phillips-head screwdriver
  - Pen screwdriver
- Tek screws
- Tools required for anchoring Booth Connect unit to the side of the booth
- Wire stripper

# Installation procedure

This procedure describes how to install a Booth Connect standalone unit.

## Mount the Booth Connect Unit

### NOTE

This task covers only the mechanical installation of the unit; wiring should be performed by a qualified electrician.

1. Mount the booth monitoring unit either on the exterior booth wall or a building wall that is adjacent to the booth.

### NOTE

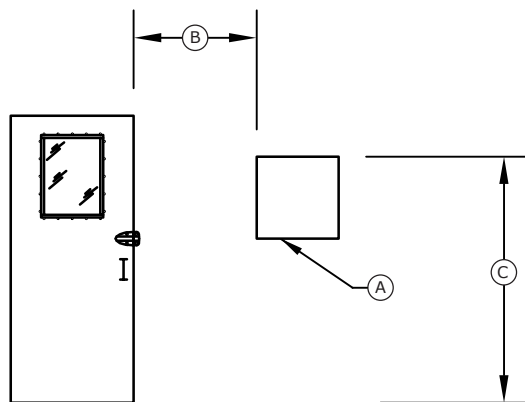
If you mount the Booth Connect unit to the side of the booth, GFS recommends that you use strut channel with strut hardware. You can cut the strut to span the distance between booth back brake flanges in the dimensions that will allow the unit to be mounted to the strut. **Strut channel is not provided by GFS.**

### NOTE

Position the Booth Connect unit so that its top is between 70 and 74 inches from the floor. The booth monitoring unit must be at least 36 inches (914 mm) from any booth opening.

### NOTE

Do *not* mount the unit inside the booth enclosure.



**A:** Booth Connect unit

**B:** Minimum of 36-inches between the unit and any booth doors or openings

**C:** 70 to 74-inches from the floor to the top of the unit

2. Insert rubber grommets into the bottom of the unit to feed wiring and tubing through smoothly.

### NOTE

The grommets (and fillers to block any open holes) ship in a bag inside the Booth Connect unit.

## Place the Sensors for Booth Connect

Depending on the booth's airflow and configuration, install sensors at the following locations:

- In the intake plenum
- Inside the paint booth
- Inside the pit or in the exhaust plenum
- On both sides of the air heater's pre-filter
- On both sides of the air heater's post-filter

### NOTE

If there are sensors in place used by the booth's control panel, install the booth monitoring sensors as close to them as possible to ensure consistent measurements.

## Install the Booth Pressure Sensor Inside the Paint Booth

Place one sensor on the booth wall inside the paint booth. In the unit, there is a manifold that enables this single sensor to work with the sensor in the intake plenum (in a pressurized booth) to measure the pressure drop through the intake filters. Likewise, it will tie in to Pressure Sensor 3 to measure the pressure drop through the exhaust filters.

1. Drill a 1/4-inch hole through the booth wall panel at the location you want to mount the sensor.

### NOTE

Mount the sensor as close to the exhaust filters as possible.

2. Run tubing through the hole and into the paint booth.
3. Attach the sensor to the tubing.
4. Secure the booth pressure sensor to the cabin wall with screws.



5. Run the opposite end of the tubing back to the Booth Connect unit and insert it through the bottom of the unit.
6. Connect the tubing to the green fitting at the end of the manifold. The manifold has three lines coming off the top that connect to Pressure Sensor-1, Pressure Sensor-2, and Pressure Sensor-3.



## Install the Intake Plenum Sensor

### NOTE

This procedure only applies to pressurized paint booths.

Place the sensor on the inside of the paint booth's intake plenum *before* the intake filter bank. This sensor works with the booth pressure sensor mounted inside the booth to measure the pressure drop through the intake filters.

1. Drill a 1/4-inch hole through the intake plenum panel at the location you want to mount the sensor.

### NOTE

The intake plenum may be at the top of the booth (for downdraft, semi-downdraft, and side downdraft airflows) or at the front of the booth (for crossdraft airflows).

2. Run tubing through the hole and into the intake plenum.

### NOTE

An extension may be necessary to make sure the sensor reaches the interior of the plenum.

3. Attach the sensor to the tubing.
4. Secure the intake plenum sensor to the inside of the plenum with screws.
5. Run the opposite ends of the tubing back to the Booth Connect unit and insert it through the bottom of the unit.
6. For the pressure sensor labeled `Pressure Sensor-2, Diffusion | Ceiling` connect the inlet end of the tube to the green fitting.

### ***If applicable: Install the Exhaust Pit Sensor***

#### **NOTE**

This procedure applies to downdraft paint booths positioned over a pit or raised basement.

The exhaust sensor is placed in the pit beneath the exhaust filters. It works with the sensor located inside the paint booth to generate the overall booth pressure at the unit.

1. Near the floor, drill a 1/4-inch hole in one of the following locations:
  - **For a downdraft booth with a pit:** Through the metal plate at the base of the exhaust ductwork.
  - **For a downdraft booth on a raised basement:** Through the side of the basement near the center of the booth.
2. Run tubing through the hole and into the exhaust pit.

#### **NOTE**

An extension may be necessary to make sure the sensor reaches the interior of the plenum for dual-skin booths.

3. Inside the paint booth, remove the bar grating from the pit (or raised basement) and set it aside.

#### **WARNING**

Do not walk or drive over the pit or basement while the bar grating is removed.

4. Attach the sensor to the tubing.
5. Secure the sensor to the inside of the exhaust pit with screws.
6. Replace the bar grating on top of the pit or raised basement.

#### **NOTE**

Grating must be installed with cross rods on top.

#### **NOTE**

You can walk and drive over the pit or raised basement after the bar grating is installed.

7. Run the opposite ends of the tubing back to the Booth Connect unit and insert it through the bottom of the unit.
8. For the component pressure sensor labeled `Pressure Sensor-3, Floor | Exhaust` connect the tubes to the red fitting.

### ***If applicable: Install the Exhaust Plenum Sensor***

#### **NOTE**

This procedure applies to semi-downdraft, side downdraft, and crossdraft paint booths.

The exhaust sensor is placed in the exhaust plenum behind the exhaust filters. It works with the sensor located inside the paint booth to generate the overall booth pressure at the unit.

1. Drill a 1/4-inch hole through the exhaust plenum panel at the location you want to mount the sensor.
2. Run tubing through the hole and into the exhaust plenum.

**NOTE**

An extension may be necessary to make sure the sensor reaches the interior of the plenum.

3. Run tubing through the hole and into the exhaust plenum.
4. Attach the sensor to the tubing.
5. Secure the sensor to the inside of the plenum with screws.
6. Run the opposite end of the tubing back to the Booth Connect unit and insert it through the bottom of the unit.
7. For the component pressure sensor labeled `Pressure Sensor-3, Floor | Exhaust` connect the tubes to the red fitting.

## Install the Air Heater Pre-Filter Sensors

Install one sensor on each side of the pre-filter in the air heater/air make-up unit (AMU) to monitor filter loading.

1. Access the booth's air heater.

**NOTE**

It may be located on top of or alongside the paint booth. Some may be located outside of the building.

2. Drill two 1/4-inch holes through the air heater on either side of the pre-filter bank.

**NOTE**

Mount the sensors as close to the pre-filters as possible.

3. Run the tubing through the holes and into the air heater.
4. Lift the filters out of the way and attach each of the sensors to its tubing.
5. Secure the sensors to the bottom of the air heater with screws as shown below.



6. Run the opposite ends of the tubing back to the Booth Connect unit and insert it through the bottom of the unit.
7. For the pressure sensor labeled `Pressure Sensor-4, Pre-Filter` connect the air entry end of the tube to the green fitting and air exit end the tube to the red fitting.

### ***If applicable: Install the Air Heater Post-Filter Sensors***

Install one sensor on each side of the pre-filter in the air heater/air make-up unit (AMU) to monitor filter loading.

1. Access the booth's air heater.

#### **NOTE**

It may be located on top of or alongside the paint booth. Some may be located outside of the building.

2. Drill two 1/4-inch holes through the air heater on either side of the post-filter bank.

#### **NOTE**

Mount the sensors as close to the post-filters as possible.

3. Run the tubing through the holes and into the air heater.
4. Lift the filters out of the way and attach the sensors to the tubing.
5. Secure the sensors to the bottom of the air heater with screws as shown below.
6. Run the opposite ends of the tubing back to the Booth Connect unit and insert it through the bottom of the unit.
7. For the pressure sensor labeled `Pressure Sensor-5, Post-Filter` connect the inlet end of the tube to the green fitting and the other end of the tube to the red fitting.

## Wire the Temperature Probe

Perform the following steps to wire the temperature probe and mount it to the inside of the paint booth's cabin:

1. On one end of a shielded cable, use a wire stripper to remove the insulation and separate the black and white wires.
2. Inside the temperature probe, connect the black wire to the plus (positive).



### NOTE

There are white and red wires already inside the probe.

3. Connect the white wire to the minus (return).
4. Drill a 1/4-inch hole through the booth wall panel at the location you want to mount the temperature probe.

### NOTE

Mount the probe as close to the existing temperature probe as possible.

5. Run wire through the hole and mount the temperature probe inside the paint booth.
6. Run the opposite end of the wire back to the Booth Connect unit and insert it through the left-most hole at the bottom of the unit.
7. Use a wire stripper to trim off excess wire and remove the wire's insulation, then separate the black and white wires.
8. Locate the terminal strip in the Booth Connect unit.
9. At wire number 24v, press your pen screwdriver to open the terminal. Insert the black wire and the terminal clamps down, securing the wire in place.
10. At wire number 21, repeat the process above to insert the white wire.



## Wire the Flame Safeguard to the Booth Connect Unit

The type of flame safety control used in the paint booth's air heater or air make-up unit (AMU) may vary based on the booth's age and manufacturer.

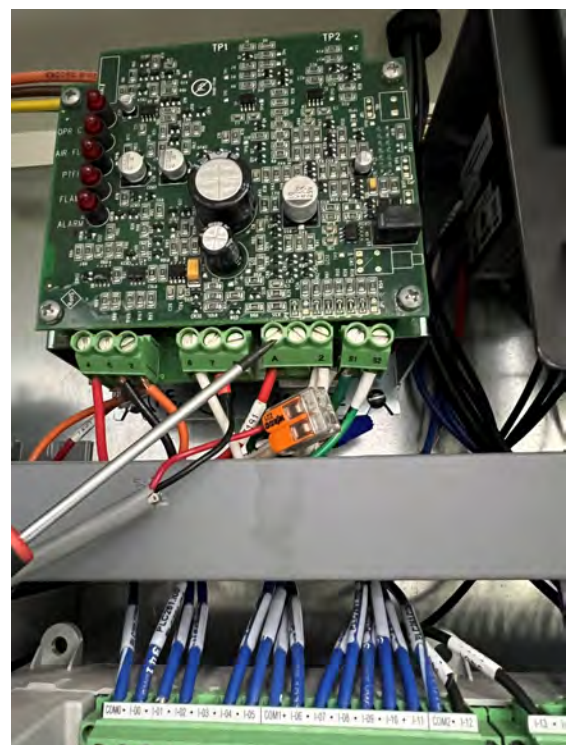
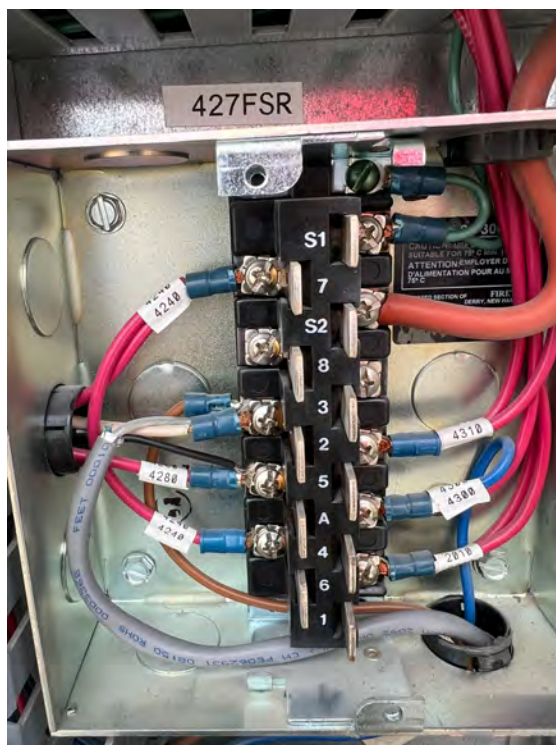
Complete the steps in the one of the following sections to wire the Fireye, Honeywell, or Siemens flame safeguard to the Booth Connect to trigger a relay if the flame is out in the air heater.

### ***If applicable: Connect to the Fireye Flame Safeguard***

#### **NOTE**

There are different versions of the Fireye Flame Safeguard that may be installed in the booth's air heater.

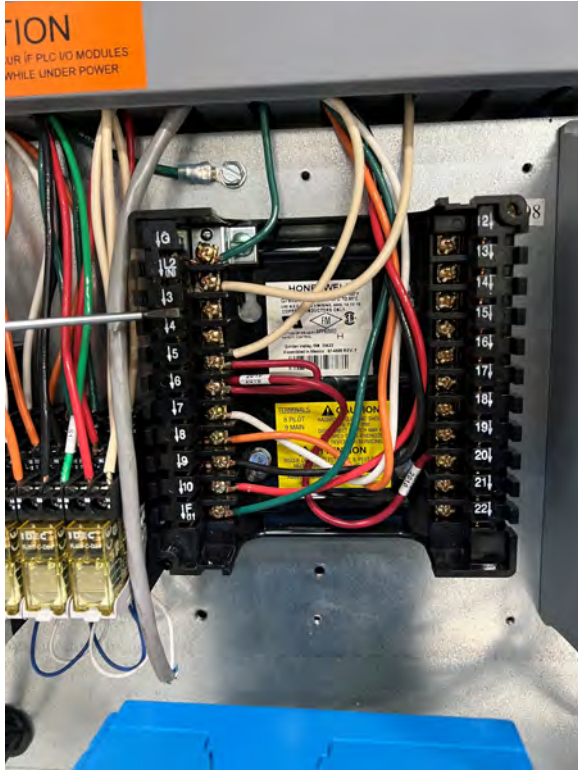
1. Access the air heater control panel.
2. On one end of a shielded cable, use a wire stripper to remove the insulation and separate the black and white wires. Connect the black wire to alarm and the white wire to neutral.



3. Run the opposite end of the wire back to the Booth Connect unit and insert it through the hole on bottom of the unit.
4. Use a wire stripper to trim off excess wire and remove the wire's insulation.
5. Locate A1 and A2 on the relay.
6. Connect the black wire to A1 and the white wire to A2 and use a Phillips-head screwdriver to secure the wires in the connectors.

**If applicable: Connect to the Honeywell Flame Safeguard**

1. Access the air heater control panel.
2. On one end of a shielded cable, use a wire stripper to remove the insulation and separate the black and white wires. Connect the black wire to wire 3 (alarm) and the white wire to L2 (neutral).



3. Run the opposite end of the wire back to the Booth Connect unit and insert it through the hole on bottom of the unit.
4. Use a wire stripper to trim off excess wire and remove the wire's insulation.
5. Locate A1 and A2 on the relay.
6. Connect the black wire to A1 and the white wire to A2 and use a Phillips-head screwdriver to secure the wires in the connectors.

**If applicable: Connect to the Siemens Flame Safeguard**

1. Access the air heater control panel.
2. On one end of a shielded cable, use a wire stripper to remove the insulation and separate the black and white wires. Connect the black wire to wire 3 (alarm) and the white wire to L2 (neutral).
3. Run the opposite end of the wire back to the Booth Connect unit and insert it through the hole on bottom of the unit.
4. Use a wire stripper to trim off excess wire and remove the wire's insulation.
5. Locate A1 and A2 on the relay.
6. Connect the black wire to A1 and the white wire to A2 and use a Phillips-head screwdriver to secure the wires in the connectors.

## Wire the Current Transformer (CT)

The current transformer clamps around incoming power lines. If lighting to the booth is run through one of the lines, use that line to measure the current.



1. On one end of a shielded cable, use a wire stripper to remove the insulation and separate the black and white wires.
2. On the underside the CT, connect the black wire to S1.



3. Connect the white wire to S2.
4. Drill a 1/4-inch hole through the booth wall panel at the location you want to mount the CT.
5. Run wire through the hole and mount the temperature probe inside the paint booth.
6. Run the opposite end of the wire back to the Booth Connect unit and insert it through the bottom of the unit.
7. Use a wire stripper to trim off excess wire and remove the wire's insulation, then separate the black and white wires.

8. Locate the two pink wires in the terminal strip.
9. At wire I, press your pen screwdriver to open the terminal. Insert the black wire and it clamps down, securing it in place.
10. At wire K, repeat the process above to insert the white wire.

## Turn on the Booth Connect HMI

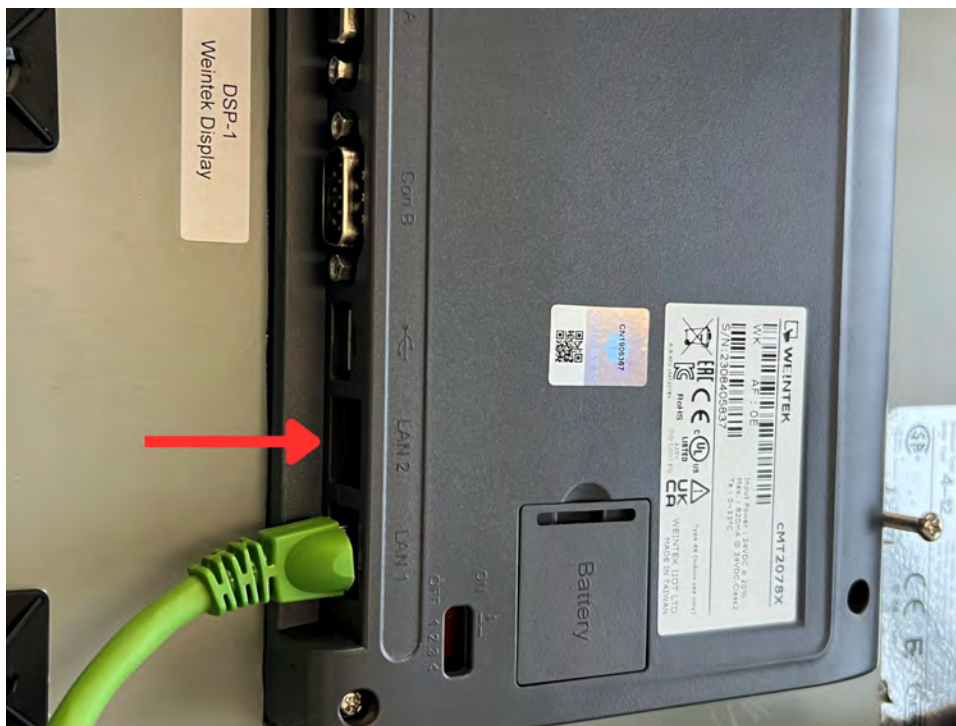
1. Plug the unit into a wall outlet using the 120V.
2. Press the power button to turn on the HMI.
3. On the HMI touchscreen, verify that there is a temperature reading for the paint booth.

## Connect the Ethernet Cable

1. Plug the Ethernet cable into the LAN2 port at the back of the HMI.

### NOTE

This step must be completed even if the customer is using a Cellular Modem.

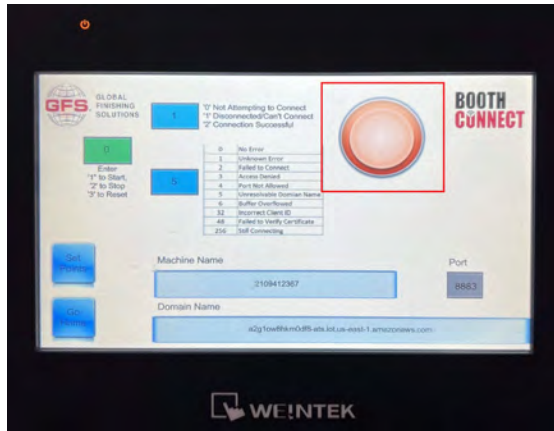


2. Confirm that there is a good connection using the screen or Ethernet modem.

### NOTE

If there is a good connection, the circle icon on the screen as well as the signal lights on the modem should be green where shown in the images below.





## ***If applicable:* Mount the Antenna and Connect the Cellular Modem**

If Booth Connect uses a cellular modem for its internet connect, an antenna will be included inside the box when it is shipped.

### **NOTE**

The SIM card used to form the cellular connection is installed by GFS.

Recommendation: Unplug the Ethernet cable from the unit while the cellular signal gains its connection, then plug the Ethernet cable back into the HMI to serve as a backup connection.

1. Use the included screws to secure the antenna to the top of the unit.
2. Make sure the antenna is connected to the modem inside the unit.
3. Verify the connection.

### **NOTE**

The green circle on the HMI screen will turn green when there is sufficient signal.

# Take Static Pressure Measurements

Complete the following steps to capture the initial static pressure measurements. This data will be used to alert you as the filters load.

**NOTE**

GFS recommends that clean filters are installed in the booth to ensure accurate measurements.

1. At the control panel, turn on the paint booth.
2. Capture the initial static drop reading and calculate it against the test data of the filter.

**NOTE**

Refer to the filter manufacturer's recommendations for filter loading. This example shows five filter types with a recommended final filter load pressure of 1-inch w.c. when the filter is dirty. Actual filter loading values vary based on manufacturer, material, and performance.

3. On the unit's HMI, enter 75 percent of the fully-loaded filter value (yellow indicator).
4. Enter 100 percent of the fully-loaded filter value (red indicator).

