LOGIC 3 Control Panel (with Lenze VFD)

Operator Manual

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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
- Online: www.globalfinishing.com

Technical support

- Toll-free: 800-848-8738
- Fax: 715-597-8818
- Email: techservices@globalfinishing.com

Parts and filters

- Toll-free: 800-848-8738
- Fax: 888-338-4584
- Email: parts@globalfinishing.com

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
DANGER	Indicates an imminent hazard that will result in death.
WARNING	Indicates a hazard that can result in serious personal injury or death.
CAUTION	Indicates a hazard that can result in personal injury.
NOTICE	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
NOTE	Denotes general information that provides additional context or guidance.
Important	Denotes information to which you should pay special attention.
Reference	Directs you to related content in a separate document.
Prerequisites	Specifies other tasks that must be completed or conditions that must exist before you perform the current task.
Scope	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.

Operator interface terminal

The LOGIC 3A operator interface terminal provides pushbuttons for routine painting operations and an HMI touchscreen for monitoring booth performance and viewing or editing settings.

The operator interface terminal may be mounted on the outside of the booth or on a nearby wall.

Figure 1. LOGIC 3 Operator interface terminal

Operating modes

The pushbuttons below the touchscreen let you select one of the main operating modes: Spray (Start pushbutton), Flash, Cure, or Standby. These modes are described in Table 3, along with other booth modes.

Table 3. Operating modes

Mode	Description
Spray	Spray gun is active, allowing you to paint.
Economy	Booth operates at a reduced airflow to conserve energy when the spray gun is not used for a settable amount of time (minimum of 3 minutes). The booth automatically switches to Economy mode by the spray gun airflow switch.
Flash	Through temperature and air velocity manipulation, paint releases its solvents between paint applications or before cure.
Cure	Booth temperature is raised to cure the paint. During this mode, the spray gun is not active.
Purge	Contaminated air is removed before increasing the temperature for Cure mode. The Purge cycle starts when you initiate Cure mode.
Cool Down	Temperature decreases to the cool-down setpoint. This mode starts automatically at the end of Cure mode.
Standby	The booth controls are powered, but not operational. When powering on the booth, it first enters Standby mode but is not running. The booth must be in Standby mode to enter the setup screens or to shut down the booth.

Using the booth

This section describes how to use a booth that has LOGIC 3 controls.

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.

Applying power to the booth

Perform the following steps to apply power to the booth:

1. Turn on the power at the Main Power Disconnect. This disconnect is located on the air heater's main electrical enclosure.
2. Wait for the booth to complete its power-on sequence and perform its self-check.

    The operator interface terminal is ready when the touchscreen appears in Standby mode.
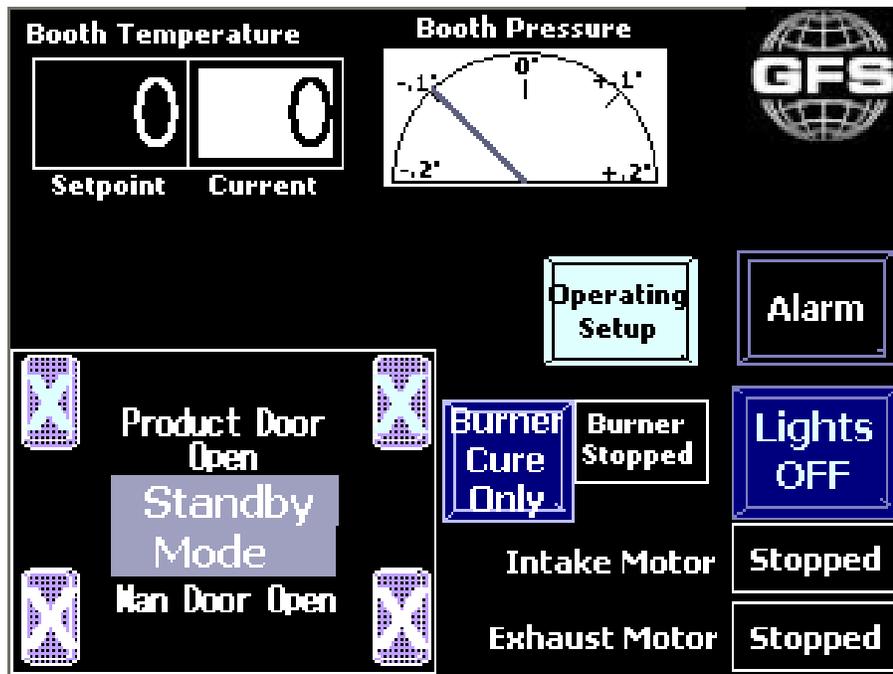
Figure 2. Standby Mode

3. On the touchscreen, tap the **Lights OFF** status button to turn on the booth lights.

The booth is now ready for use.

Starting the booth (Spray mode)

Perform the following steps to start the booth:

1. *If required:* Turn on booth power at the Main Power Disconnect.

    NOTE
    All product and personnel doors must be closecd to start the booth.

2. Press the green **Start** pushbutton.

    The booth starts. If available, booths with LOGIC 3 start in Economy mode. Otherwise, it starts in Spray mode.
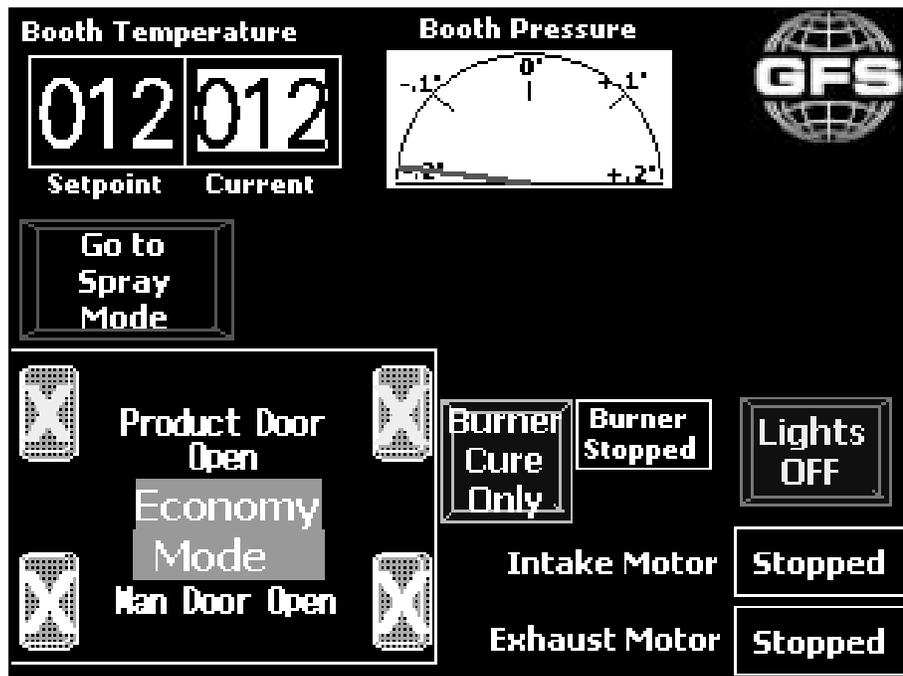

Figure 3. Economy Mode

3. If starting from the Economy mode screen, tap the **Go To Spray Mode** button. Otherwise, enter the booth, close the personnel doors securely, and start spraying.

The booth changes to Spray mode.
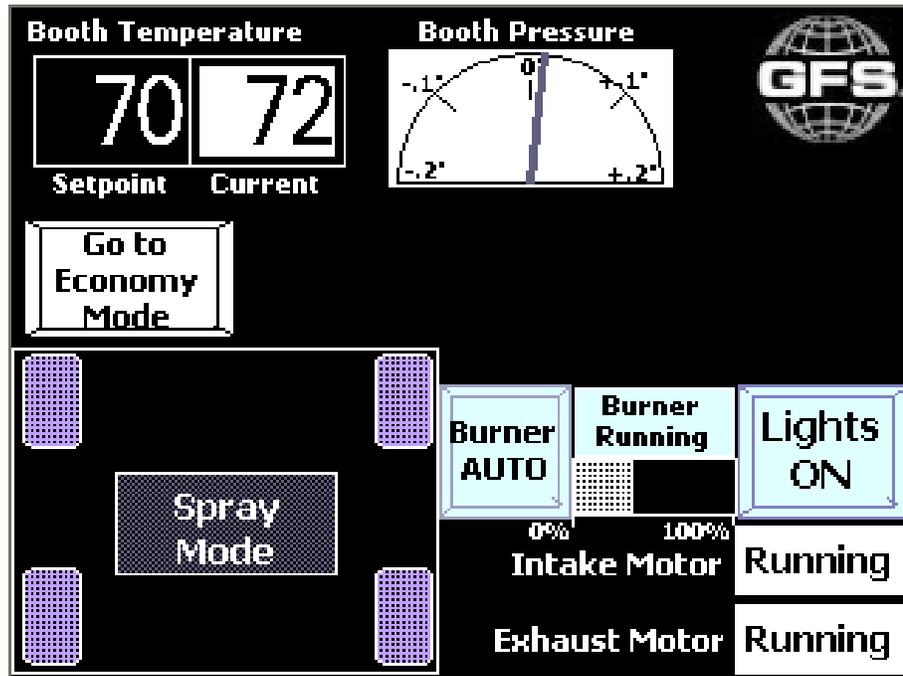
Figure 4. Spray Mode

Evaporating paint fumes (Flash mode)

Paint evaporates or releases its solvents during the Flash cycle, which can be started using the optional Flash puff switch or through the HMI.

Initiating Flash with the puff switch

If you have the optional Flash puff switch, you can use it to initiate the Flash cycle. If you do not have the puff switch or if you prefer to use the operator interface terminal, go to "Initiating Flash with the operator interface terminal" (page 13).

1. Press the white puff switch (located inside the booth) to start Flash mode with the most recent settings.

    If the booth uses a GFS AdvanceCure System, it turns on at this time. If the burner is in Auto, you can use an elevated Flash temperature.

2. The booth changes to Flash mode with the Flash timer counting down.

    Cure towers can be toggled on or off from the main screen. Tower boxes are in each corner, and, if applicable, the top and bottom middle.

3. Wait for the Flash cycle to complete. If the booth is using AdvanceCure, it turns off at this time. If you are using an elevated temperature, the temperature goes down to spray temperature.

    The booth automatically returns to Spray mode when the Flash cycle is completed.

4. Add additional coats and use the Flash cycle as needed until done painting.

Initiating Flash with the operator interface terminal

1. Exit the booth, and close the door securely.

2. Press the yellow **Flash** pushbutton.

    The Flash Selection screen appears with the most recent selection highlighted.
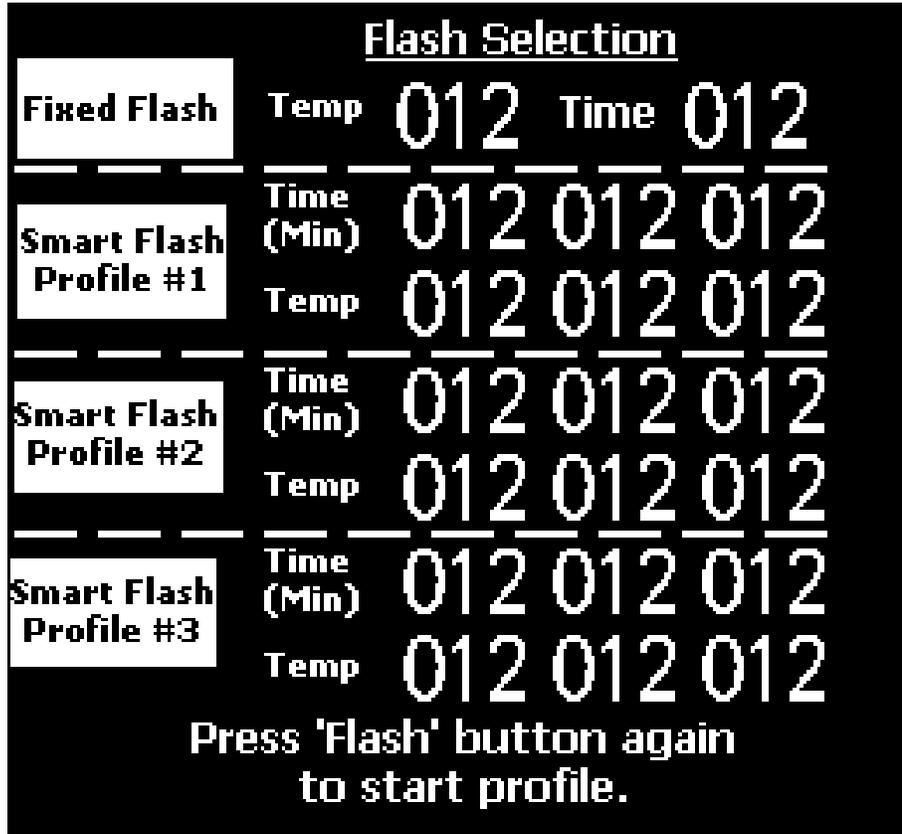

Figure 5. Flash Selection

3. Select the desired Flash settings and then start the Flash.

    a. To Flash with the most recent settings (the highlighted settings): Press the **Flash** pushbutton to start the Flash cycle.

    b. To use a SmartFlash profile: Tap the desired profile, and then press the **Flash** pushbutton to start the Flash cycle.

    c. To change the Fixed Flash settings and then use them: Tap the setting that you want to change, and then use the number dialog box to enter new value for the temperature (**Temp Setpoint**) or time (**Flash Time**), and then press the **Flash** pushbutton to start the Flash cycle.

4. The booth changes to Flash mode with the Flash timer counting down.

    Cure towers can be toggled on or off from the main screen. Tower boxes are in each corner, and, if applicable, the top and bottom middle.
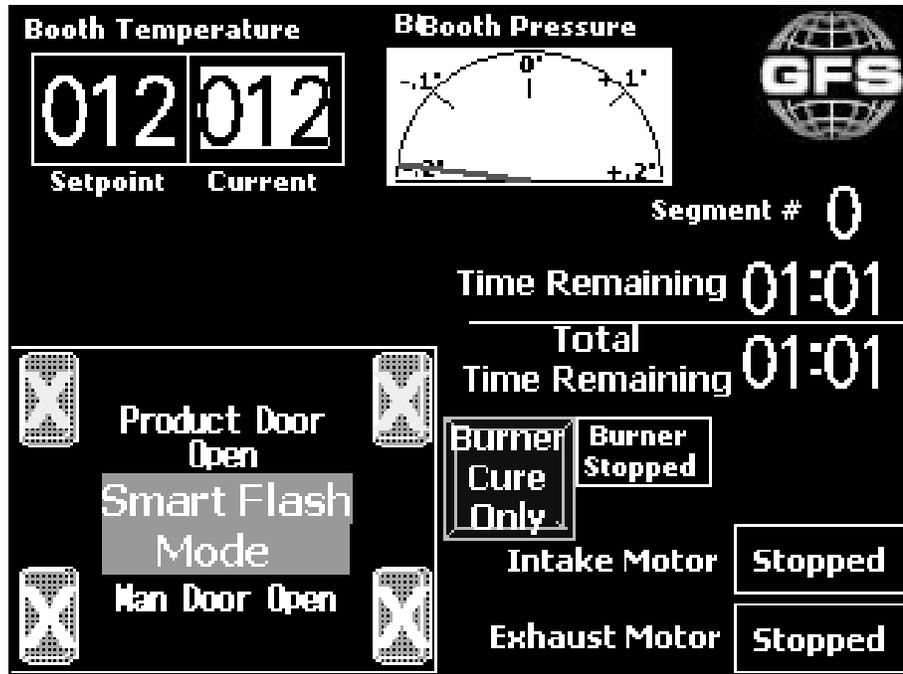
Figure 6. Flash Mode

The booth automatically returns to Spray mode when the Flash cycle is completed. You may also press the Puff switch or the Flash pushbutton again to return to Spray mode. If the booth is using AdvanceCure, it turns off at this time. If the burner is in Auto, you can use an elevated Flash temperature.

5. Add additional coats and use the Flash cycle as needed until done painting.

Curing the product (Cure mode)

Perform the following steps to cure the product:

1. Make sure no one is in the booth and the personnel and product doors are closed securely.

2. Press the blue **Cure** pushbutton.

   The Cure Selection screen is displayed with the most recent selection highlighted.
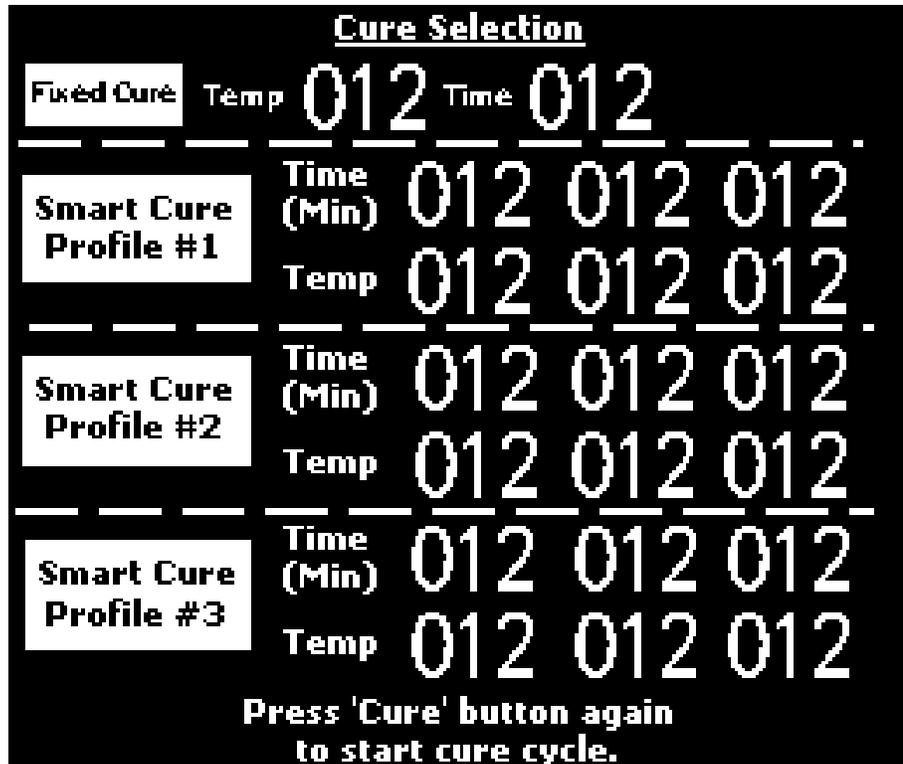
Figure 7. Cure Selection

3. Select the desired Cure settings and then start the Cure.

    a. To Cure with the most recent settings (the highlighted settings): Press the **Cure** pushbutton to start the curing process.

    b. To use a SmartCure profile: Tap the desired profile, and then press the **Cure** pushbutton to start the curing process.

    c. To change the Fixed Cure settings and then use them: Tap the setting that you want to change, and then use the number dialog box to enter new value for the temperature (**Temp Setpoint**) or time (**Cure Time**), and then press the **Cure** pushbutton to start the curing process.

4.   The booth goes into a Purge cycle, which is the first step in the curing process. During this time, solvents and paint fumes are removed from the air so the temperature can be increased to Cure temperature.
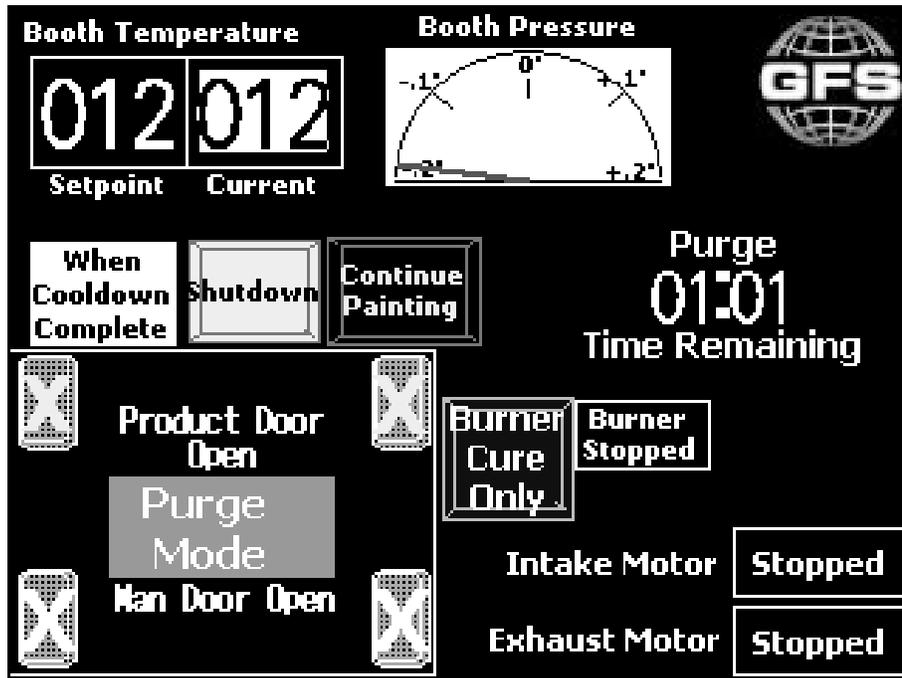
Figure 8. Purge Mode

NOTE
The minimum purge time is 3 minutes. Purge time starts from the last instance of spraying in the booth.

5.   Wait for the purge timer to reach zero.

The booth changes to Cure mode. Because the Cure temperature is usually much greater than the Spray temperature, the **Booth Not Up to Temperature** banner might be displayed.

Figure 9. Booth Not Up to Cure Temperature

When the booth temperature is within 10 °F of the Cure temperature, the banner goes away and the cure timer starts counting down.

NOTE
To skip the warm-up process and start the timer immediately, tap the **Start Timer** button.

NOTE

Cure towers can be toggled on or off from the main screen. Tower boxes are in each corner, and, if applicable, the top and bottom middle.

6. Wait for cure timer to reach zero.
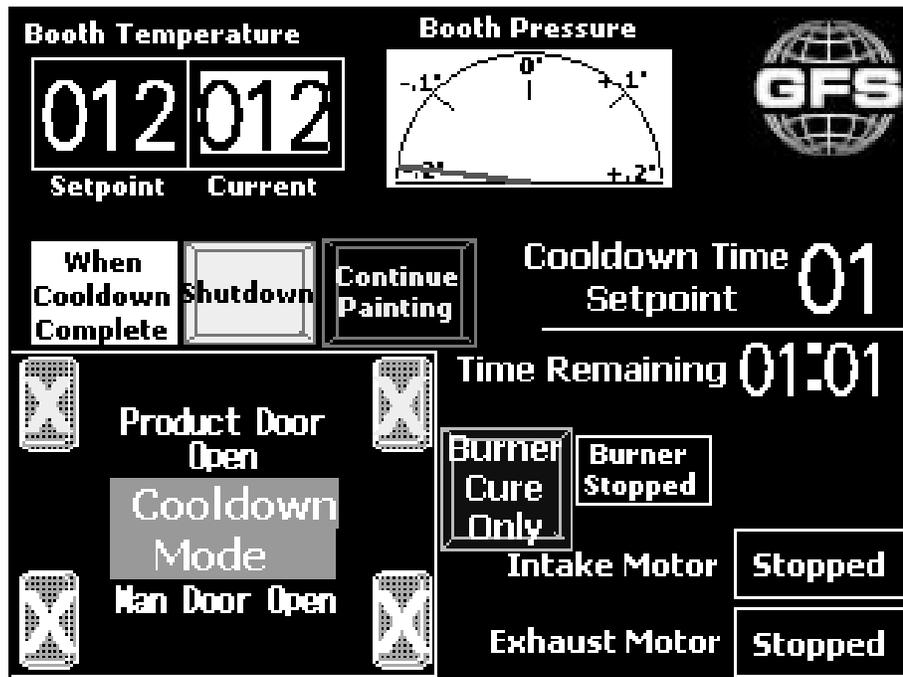
    The booth goes to Cooldown mode.

Figure 10. Cooldown Mode

7. Wait for the cooldown timer to reach zero. Depending on the button highlighted in **When Cooldown Complete**, the booth either shuts down or returns to Spray mode.

Alarms

If faults occur while the booth is running, the booth shuts down and the Alarms screen is displayed on the HMI.

If an alarm screen appears, see "Troubleshooting" (page 36).


```
                    ALARMS
 TIME    MESSAGE
 11:59   BOOTH NEGATIVE PRESSURE
 11:59   E-STOP PRESSED
 11:59   FIRE PROTECTION TRIPPED




                              RETURN
```
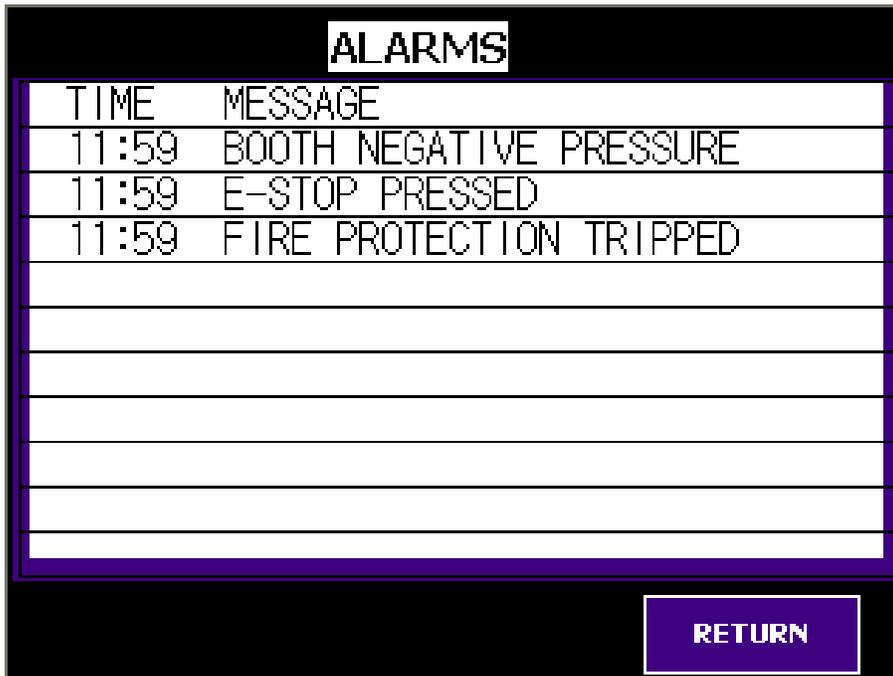
Figure 11. Alarms screen

Shutting down the booth

Perform the following steps to shut down the booth.

1. Press the **Stop** pushbutton.

    The booth begins transitioning from the current mode to the Standby mode.

2. When the booth is in Standby mode, tap the **Lights ON** button to turn off the booth lights.

3. *If required:* Turn off the booth power at the Main Power Disconnect.

Emergency shutdown

In case of emergency, press the yellow **System Stop** pushbutton to stop all equipment immediately. The System Stop button bypasses the normal ramp shutdown and should only be used in an emergency.

Settings

Booth temperature, air pressure, and fan speeds can be set for each operating mode.

Typically, fan speeds and air pressure set points are set during start up. Temperatures and times for Spray, Flash, and Cure (as well as SmartFlash and SmartCure) should be set per the paint manufacturer's recommendations.

Operator Setup screen

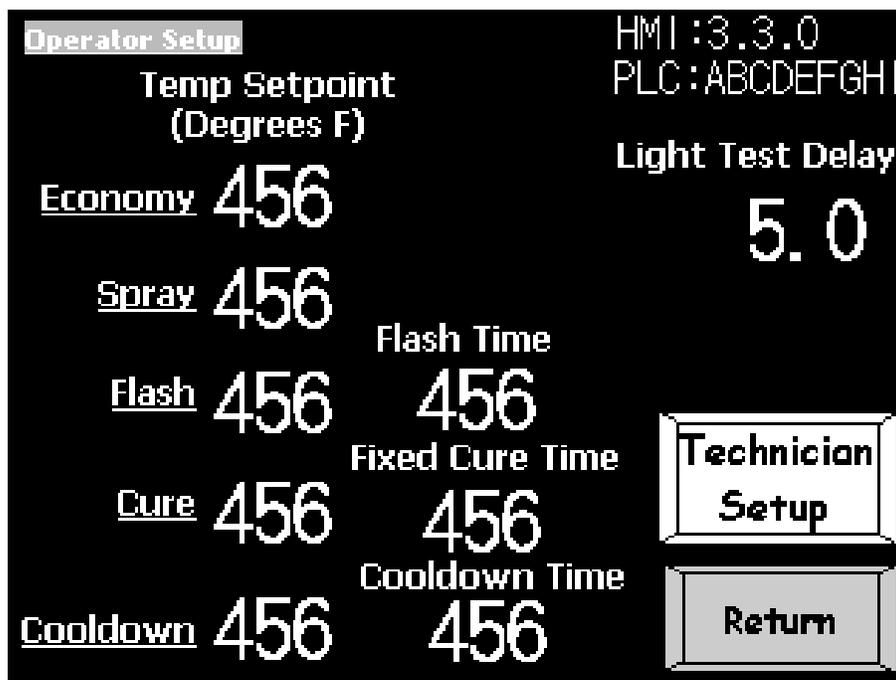The Operator Setup screen is accessible only from the Standby screen. These times and temperatures can be set here and also be modified during operation.

Figure 12. Operator setup screen

On this screen, you can:

• Set the Temp for Economy, Spray, Fixed Flash, Fixed Cure, and Cooldown, and set the times for Fixed Flash, Fixed Cure, and Cooldown.

• Access the Technician Setup area (password protected).

• Verify the HMI and PLC version numbers, which should match on all new GFS booths.

• Use the Light Test Delay to set the number of minutes the booth's lights should turn off for after pressing the lighting puff switch.

Perform the following steps for each setting you want to change:

1. Tap the setting that you want to change.

2. Use number dialog box to enter new value.

3. When you have made all your changes, tap the **Return** button to go back to the Standby screen.

# Accessing the Technician Setup screen

1. If not already in Standby mode, press the **Stop** pushbutton to enter Standby mode.

2. Tap the **Operating Setup** button.

3. Tap the **Technician Setup** button.
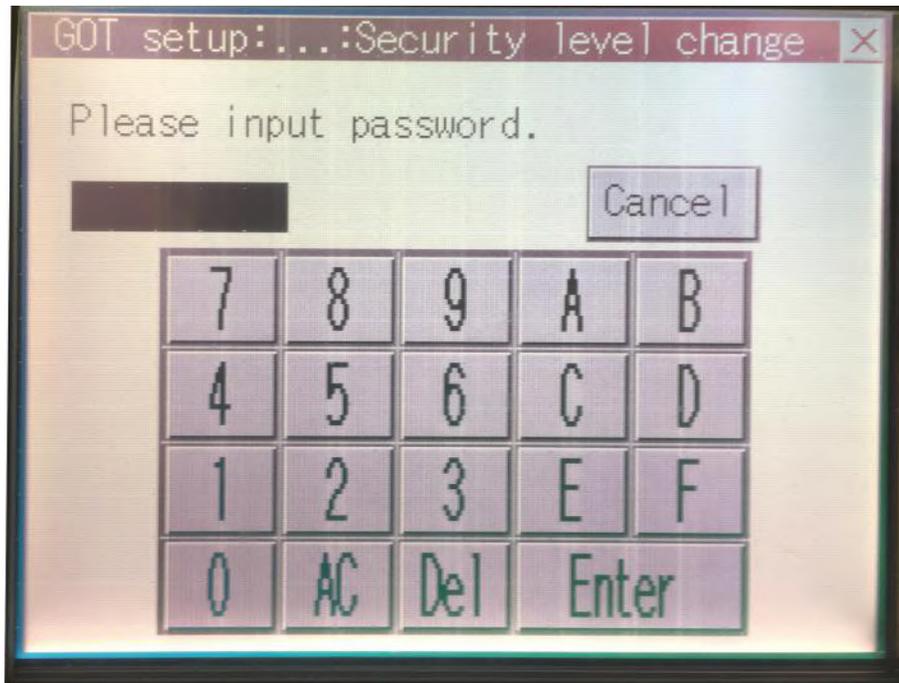
4. Enter your password, and then tap **Enter**.

    You will receive a security level change success notification.

5. Tap the **OK** button, and then tap the **X** to close the password screen.

    The Technician Setup screen appears.

Technician Setup screen

Use the Technician Setup screen to customize the booth's operating environment.
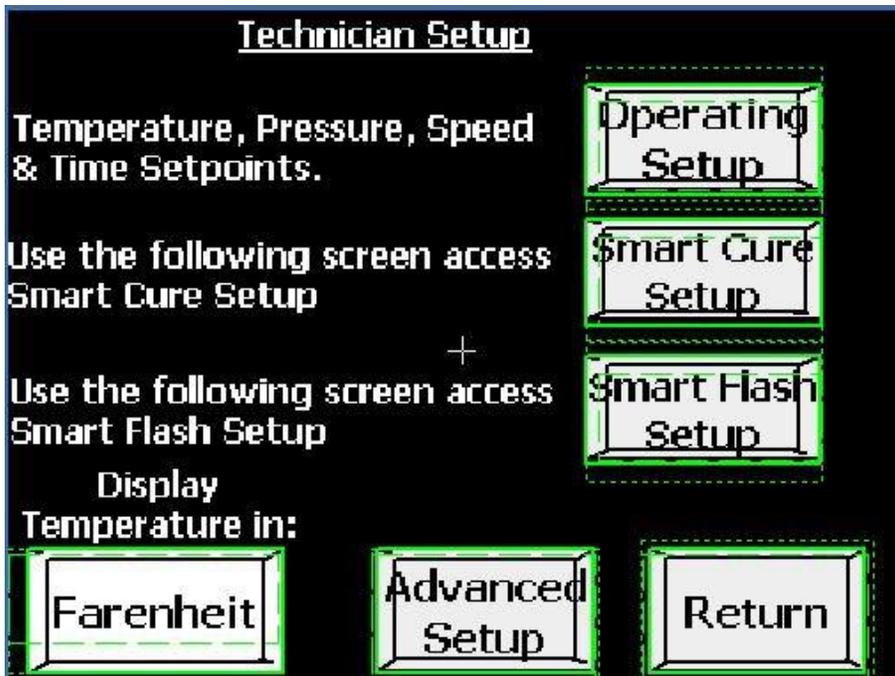
From this screen, tap a button to select one of the following options:

- Operating Setup: See "Technician Operating Settings screens" (page 22)
- Smart Cure Setup: See "SmartCure setup" (page 23).
- Smart Flash Setup: See "SmartFlash setup" (page 23).
- Fahrenheit: Toggles to set displayed temperatures in degrees Fahrenheit or Celsius.
- Advanced Setup: See "Advanced settings" (page 24).
- Return: Go back to the Operator Setup screen.

Technician Operating Settings screens

Use the Technician Operating Settings screens to customize the booth's operating environment and set temperature, pressure, and speeds for each operating mode.
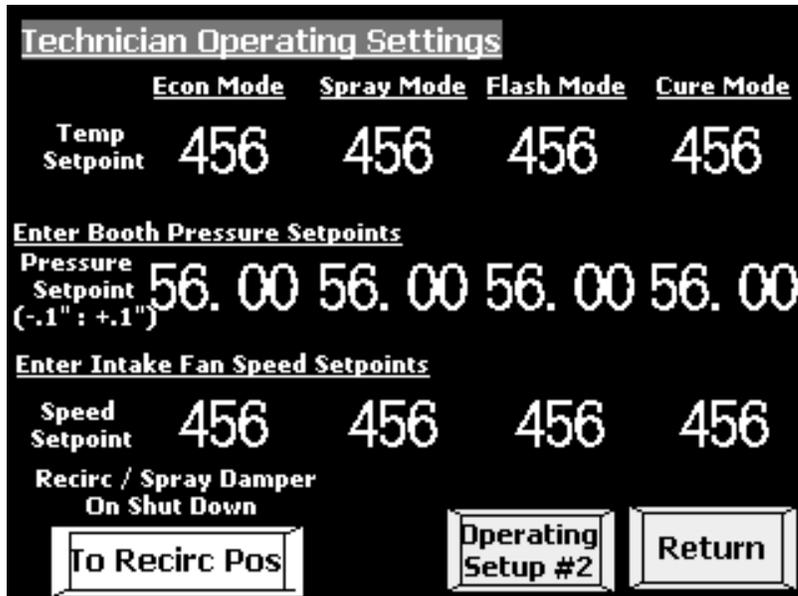
Figure 13. Technician Operating Setup 1
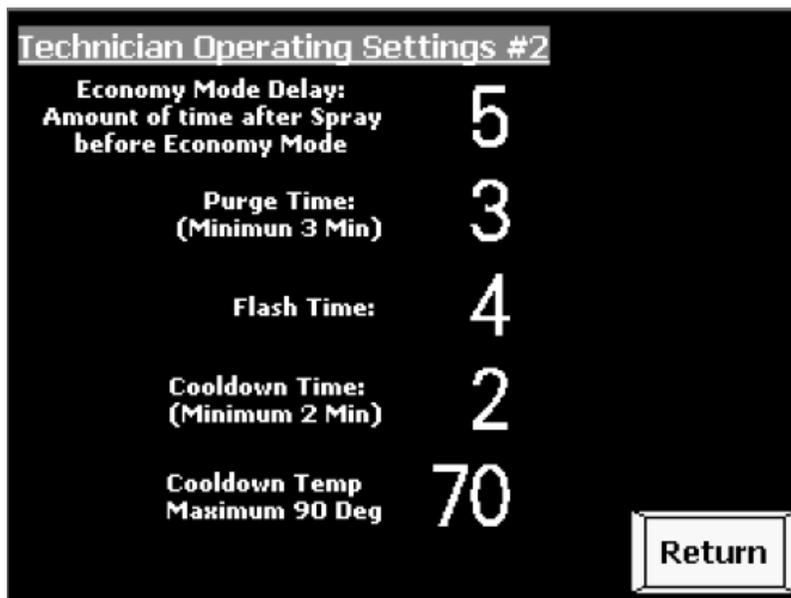
Figure 14. Technician Operating Setup 2

SmartCure setup

On this screen, you set up the SmartCure profiles that are shown on the Cure Selection screen.

1. Tap **Smart Cure Setup** on the Technician Setup screen.

   The Smart Cure Profile Settings screen appears.
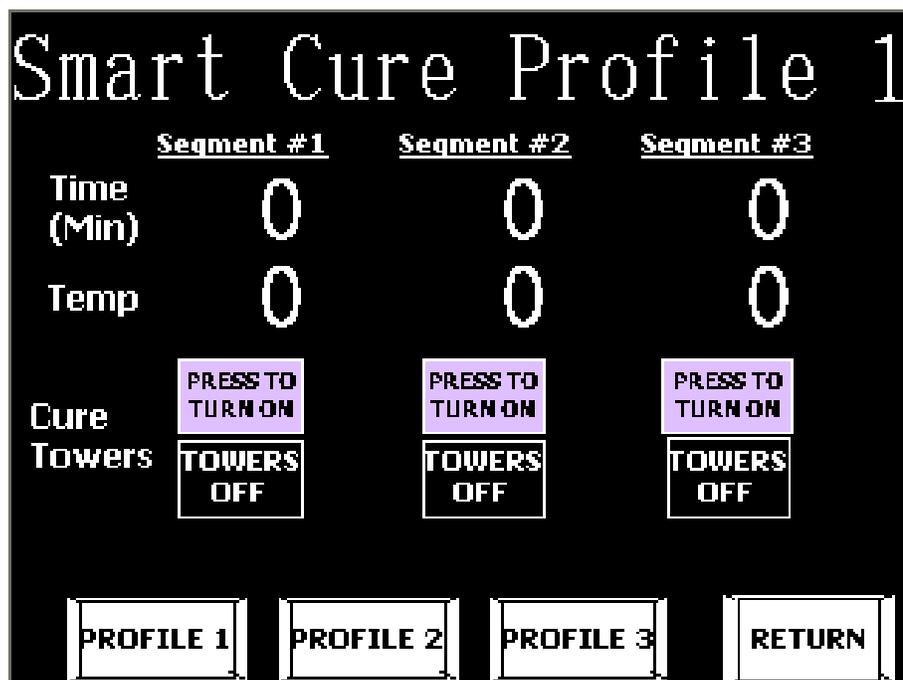
You can enter up to three SmartCure profiles.

2. For each segment, enter:
   - Time (0 if segment not needed)
   - Temperature
   - AdvanceCure tower behavior, if applicable

   NOTE
   If AdvanceCure towers are set to ON, the towers selected on the main screen will run during Cure mode and can be toggled ON/OFF as needed. If the towers are set to OFF, they do not run in Cure mode and cannot be toggled ON/OFF.

3. If you want to set up another profile, tap the button for the profile you want to set up, and then enter the parameters.

4. Tap **Return** to go back to the Technician Setup screen.

SmartFlash setup

On this screen, you set up the SmartFlash profiles shown on the Flash Selection screen.

1. Tap **SmartFlash Setup** on the Technician Setup screen.

The Smart Flash Profile Settings screen appears.

You can enter up to three SmartFlash profiles.

2. For each segment, enter:

    • Time (0 if segment not needed)

    • Temperature

    • Intake fan speed

    • Cabin pressure

    • AdvanceCure tower behavior, if applicable

    • Damper position

    NOTE
    If AdvanceCure towers are set to ON, the towers selected on the main screen will run during Flash mode and can be toggled ON/OFF as needed. If the towers are set to OFF, they do not run in Flash mode and cannot be toggled ON/OFF.

3. If you want to set up another profile, tap the button for the profile you want to set up, and then enter the parameters.

4. Tap **Return** to go back to the Smart Flash Setup screen.

Advanced settings

Advanced settings are a one-time setup and configuration of the system. They cannot be changed except by a qualified service technician. However, you can view the settings. When talking with a GFS technical service representative, they may ask you to navigate to these screens to review the settings and provide information.

Advanced Setup

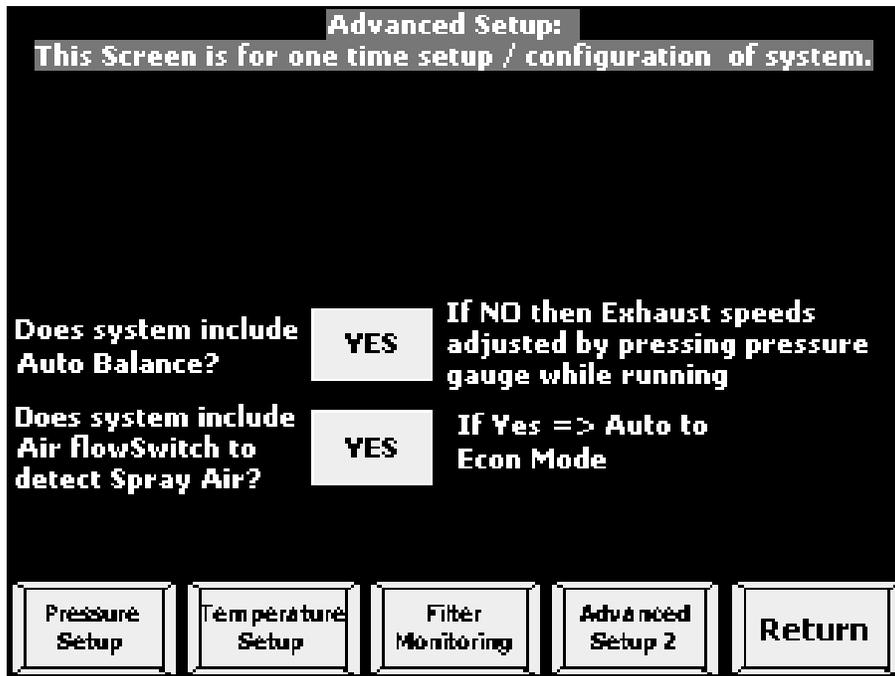This screen shows the parameters that allow the booth to operate properly.

Figure 15. Advanced Setup screen

Advanced Setup #2

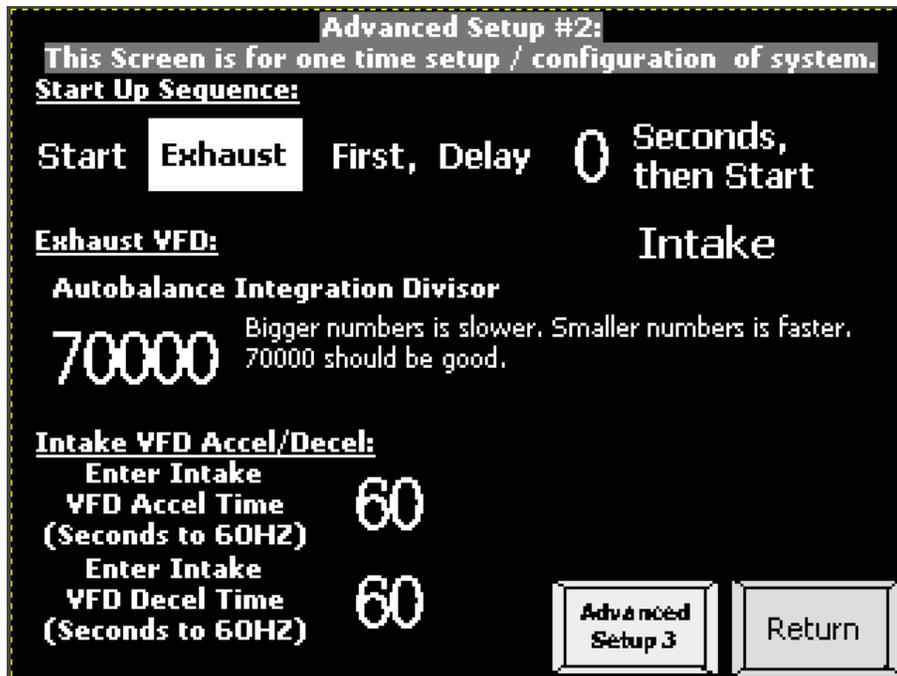These settings adjust to achieve good pressure control for different applications.

Figure 16. Advanced Setup #2 screen

Advanced Setup #3

The Advanced Setup #3 screen can be used to adjust the following settings:

- The recirc damper speed can be adjusted with Pulse Width Modulation (PWM). The Recirc Damper Duty Cycle Period selects the duration of a cycle.

  NOTE
  By default, the damper is on 50 percent of the time every 4 seconds. This is the same as 2 seconds off and 2 seconds on. A larger duty cycle will make the damper move faster.

- The Recirc Damper Spray Movement Time selects how long to use PWM when moving to the Spray position. After the given time, the PLC will output a solid signal.

- The Recirc Damper Cure Movement Timer selects how long to use PWM when moving to the Cure position. After the given time, the PLC will output a solid signal.

Figure 17. Advanced Setup #3 screen

If applicable: Filter monitoring

These settings determine when the Spray Mode screen shows the filter monitoring values in flashing red instead of green.

Figure 18. Filter Monitoring Setup screen

Temperature control gains

These settings show how the gas valve reacts to differences between the setpoint temperature and the current temperature.

Figure 19. Temperature control gains

NOTE
Change the placeholder value for P and I to 600, and the ramp rate to 60.

Booth pressure calibration

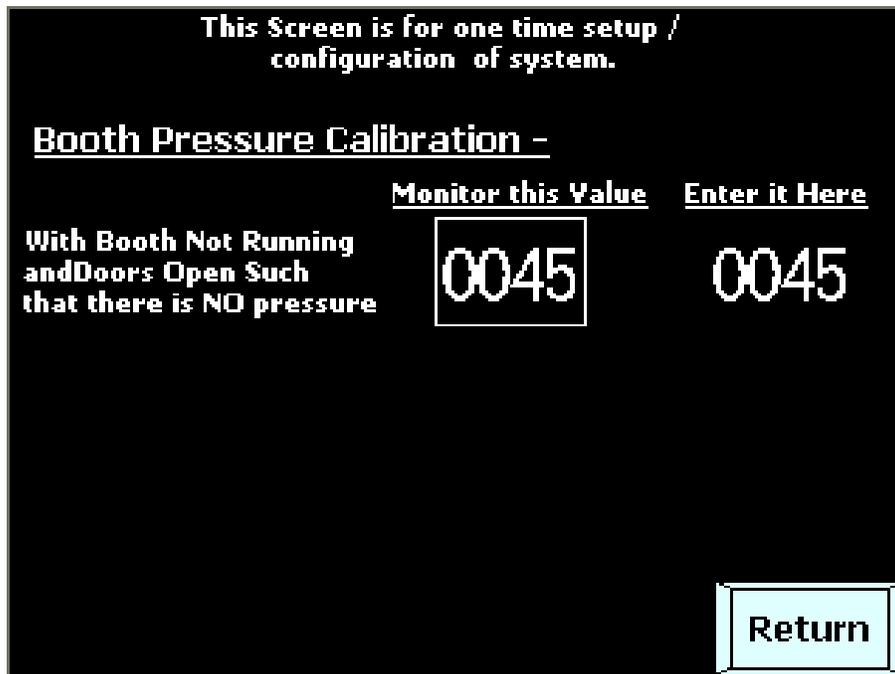These settings show the booth pressure calibration.

Figure 20. Booth Pressure Calibration screen

Diagnostics

To display the Diagnostics screen with real-time information, press and hold the GFS logo in the top-right corner of the screen for three seconds. These screens are used in troubleshooting.
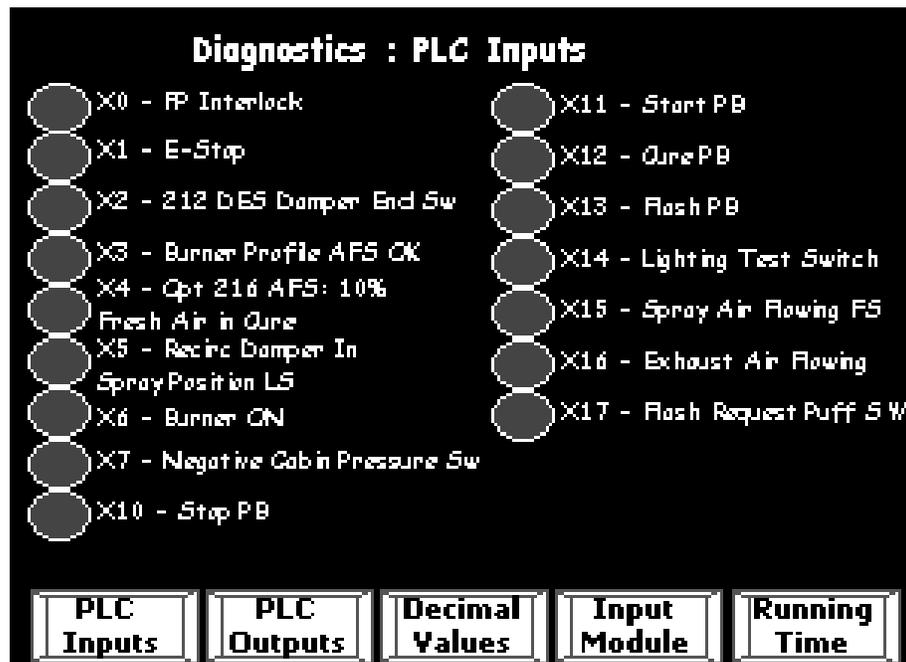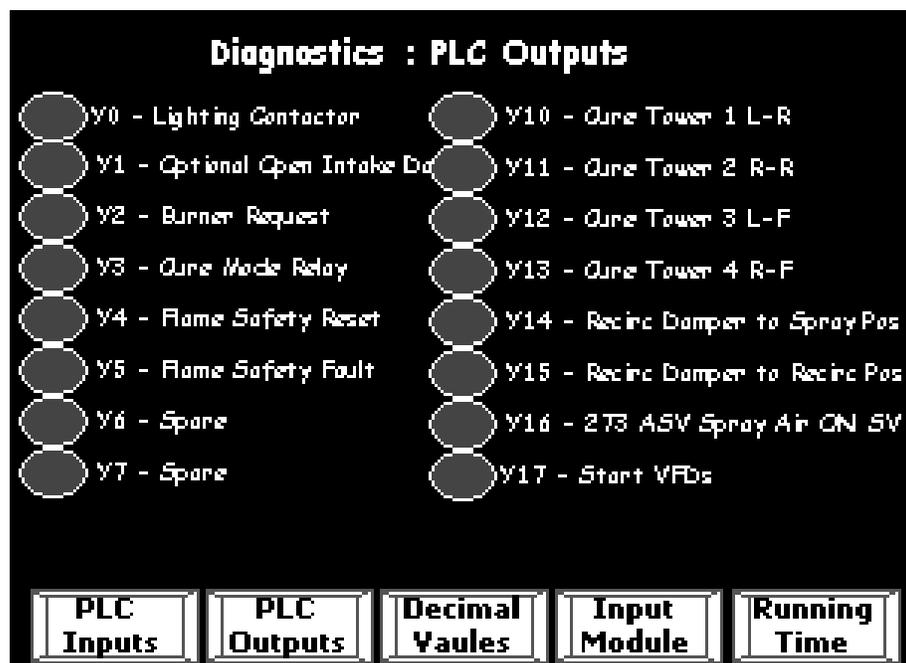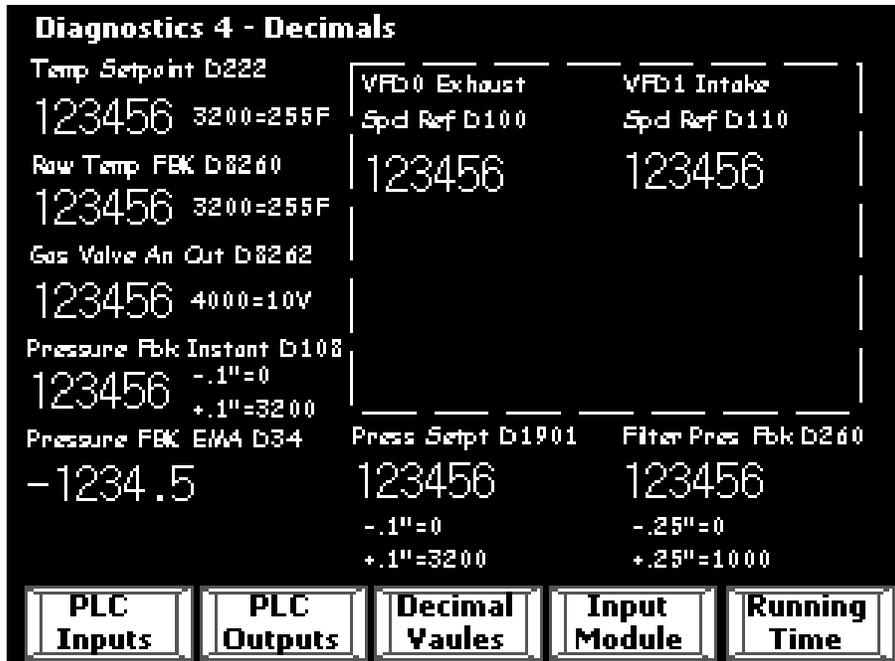

Figure 21. PLC Inputs screen

Figure 22. PLC Outputs screen

NOTE

Temperatures are in degrees Fahrenheit.
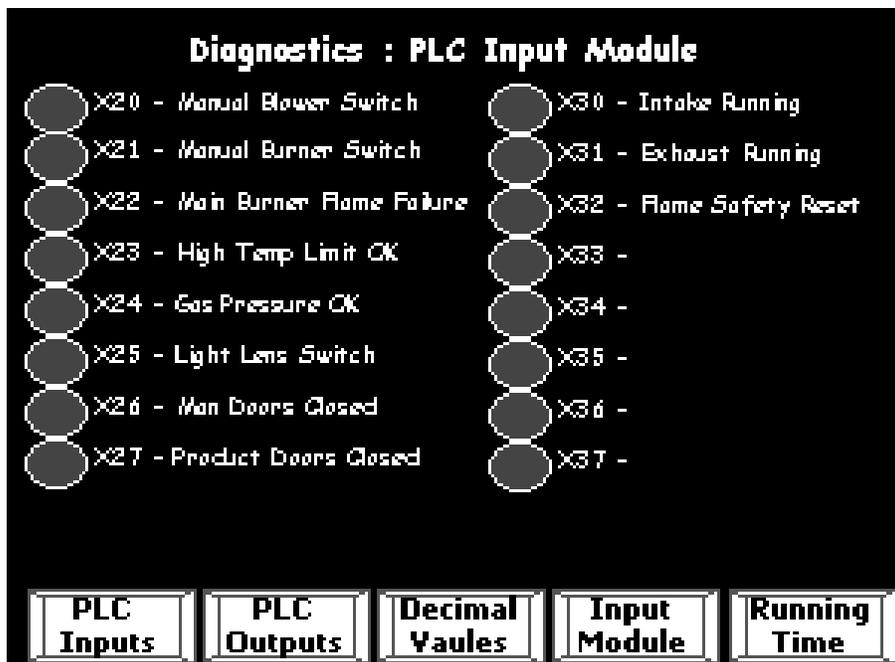
Figure 23. Decimals screen

Figure 24. PLC Input Module screen

Figure 25. Running Time screen

If applicable: Manual balance

If your booth includes Auto Balance, the exhaust motor speed will automatically adjust to maintain the desired pressure. The Advanced Setup screen indicates whether or not the system includes Auto Balance. For booths without Auto Balance, the pressure must be balanced manually.

NOTE
Ultra CTOF booths with frontal curtains must be configured to use manual balance.
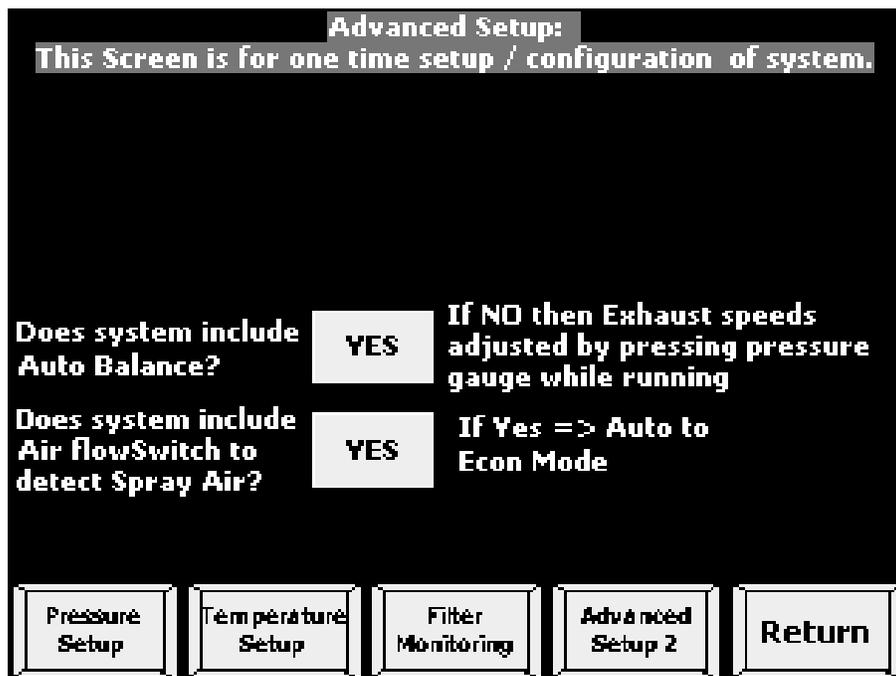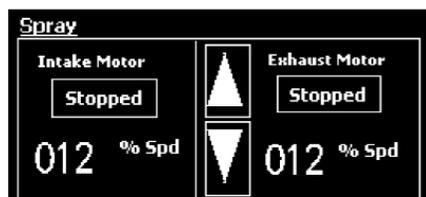

Figure 26. LOGIC 3 Advanced Setup with manual balance

For manual balance systems, the exhaust motor's speed must be adjusted manually. To configure manual balance:

1. Tap the **Booth Pressure Indicator** on the home screen.

    The Manual Balance Configuration screen appears.

    NOTE
    Different speeds must be set for Spray, Economy, Flash, and Cure modes.

2. Tap the **Up Arrow** to increase the intake or exhaust motor speed by 1 percent or tap the **Down Arrow** to decrease the intake or exhaust motor speed by 1 percent until you reach the desired fan speed.

   NOTE
   Motor speeds will vary based on airflow preferences and must be increased as filters load.

Troubleshooting

Table 4. LOGIC 3 Fault and Warning codes

Code	Fault & Warning	Basic Cause Categories	Troubleshooting Guide
1	FIRE PROTECTION TRIPPED	No Fire alarm signal for fire alarm system. The fire alarm input is indicating alarm conditions.	1. Verify fire alarm system is not tripped. 2. Check relay for fire alarm. 3. Check wiring is correct. 4. Verify fire suppression is normal.
2	E-STOP PRESSED	System Stop (previously E-Stop) pressed.	If the System Stop pushbutton was not pressed, check for faulty pushbutton or wiring.
3	EXHAUST VFD NOT RESPONDING	Indicates the VFD running feedback is different from the VFD run command for more than 10 seconds.	1. Verify that the VFD is not in an alarm state. 2. Verify that wiring is correct. 3. Verify the wiring on the motor is correct. 4. If applicable: verify that fuses between motor and VFD are good.
4	INTAKE VFD NOT RESPONDING	Indicates that the intake VFD running status is different from the VFD run command for more than 10 seconds.	1. Verify that the VFD is not in an alarm state. 2. Verify that wiring is correct. 3. Verify the wiring on the motor is correct. 4. If applicable: verify that fuses between motor and VFD are good.
6	BURNER AIR NOT FLOWING	Burner high/low air flow switch has not been proven for the set time or burner high/low air flow switch was proven, but has unexpectedly been lost.	1. Check inlet filters. 2. Check fan belts. 3. Check air flow switches wiring. 4. Verify pressure drop across burner. 5. Verify motor is operating correctly.
7	BURNER FAIL TO START	Burner failed to light.	Check main burner on relay wiring for burner request and burner air flow relay request circuit.
8	FLAME FAILURE	The flame safety relay has an alarm.	1. Reset flame safety relay if tripped. 2. Try to relight burner. 3. Verify gas pressure drop across burner. 4. Verify flame rod condition.
9	BURNER GAS PRESSURE FAULT	Low or high gas pressure	1. Reset high gas pressure switch. 2. Check for incoming gas pressure.
10	BURNER HIGH TEMP LIMIT FAULT	Burner temperature too hot	1. Push reset on high temp switch. 2. Check inlet filters. 3. Check wiring. 4. Check burner setting on HMI. 5. Verify burner set-up. 6. Check high fire.

Code	Fault & Warning	Basic Cause Categories	Troubleshooting Guide
11	BOOTH NEGATIVE PRESSURE	Booth has negative pressure.	1. Check pressure transducer. 2. Check negative pressure switch. 3. Check wiring. 4. Check intake fan operation: belts, motors, etc.
14	AMU IN TEST	Service switches are on.	Check that service switches on air heater are in down position.
15	EXHAUST AIR FLOW FAULT	Exhaust fan not running. Faulty hardware or wiring.	1. Check exhaust airflow switch. 2. Check belt condition. 3. Check airlines. 4. Check wiring.
16	FAIL TO REACH TEMP IN CURE MODE	Booth temperature was not reached.	1. Check damper's position. 2. Check if VFD in force dry. 3. Check gas supply. 4. Check gas pressure high switch; reset if needed. 5. Check gas pressure at high fire.
17	TEMPERATURE PROBE FAULT	Temperature probe not reading.	1. Check wiring. 2. Check condition on temperature probe.