INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WELKER® PORTABLE ODORIZER

WITH XLE CONTROLLER

OdorEyes by WELKER

MODEL
POC

DRAWING NUMBERS
OE143SYS.1
OE143SYS.3

MANUAL NUMBER
IOM-183

REVISION
Rev. A, 08/14/2024

TABLE OF CONTENTS

IMPORTANT SAFETY INFORMATION
READ ALL INSTRUCTIONS

Notes emphasize information and/or provide additional information to assist the user.

Caution messages appear before procedures that could result in damage to equipment if not observed.

Warning messages appear before procedures that could result in personal injury if not observed.

This manual is intended to be used as a basic installation and operation guide for the Welker OdorEyes Portable Odorizer, POC. For comprehensive instructions, please refer to the IOM Manuals for each individual component. A list of relevant component IOM Manuals is provided in Appendix A of this manual.

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker OdorEyes equipment described in this manual. Correct installation and operation, however, are the responsibility of the end user. Welker reserves the right to make changes to this manual and all products in order to improve performance and reliability.

BEFORE YOU BEGIN

Read these instructions completely and carefully.

IMPORTANT – Save these instructions for local inspector's use.

IMPORTANT – Observe all governing codes and ordinances.

Note to Installer – Leave these instructions with the end user.

Note to End User – Keep these instructions for future reference.

Installation of this Portable Odorizer is of a mechanical and electrical nature.

Proper installation is the responsibility of the installer. Product failure due to improper installation is not covered under the warranty.

If you received a damaged Portable Odorizer, please contact a Welker representative immediately.

Phone: 281.491.2331
Address: 13839 West Bellfort Street
Sugar Land, TX 77498

SECTION 1: PRODUCT INFORMATION

1.1 Introduction

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this equipment becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, and Maintenance* (IOM) *Manuals* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use.*

If you have any questions, please call Welker at 1.281.491.2331.

**The following procedures have been written for use with standard Welker OdorEyes parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual.*

1.2 Product Description

The Welker OdorEyes *POC* Portable Odorizer is a portable odorant injection system designed to inject liquid odorant proportional to time into a natural gas pipeline.

The pump cabinet contains one (1) Welker OdorEyes BIP Bellows Injection Pump, which injects the liquid odorant into the pipeline. To prolong the operational life of the injection pump, an inline filter removes particles from the liquid odorant and the Welker F-19 Filter Dryer conditions the pneumatic supply.

The POC is designed for pneumatic operation. The pneumatic timer strokes the pump, and the optional pneumatic counter tallies each stroke. For added automation and to enable proportional to flow injection, the POC can be equipped with the optional touch screen controller. The touch screen controller serves as the system's brain. It continuously receives feedback from the customer's gas flow meter and the odorant flow meter in the pump cabinet, allowing the system to respond to changing flow conditions. As pipeline conditions change, the controller increases or decreases the injection rate so that the POC continues injection proportional to flow. On-site and remote troubleshooting are made easier by time- and date-stamped audit data detailing system performance, alarm history, and odorant tank level. For automated POCs used in remote locations, a solar panel with battery can be added to limit interruptions to operation.

Welker may custom design the POC to suit the particular application and specifications of each customer.

1.3 Safety Warning

Wherever hazardous gases or vapor-producing liquids are used, transported, or stored, the potential for an accidental leak exists. Continuous monitoring of these hazards is essential to ensure personnel safety.

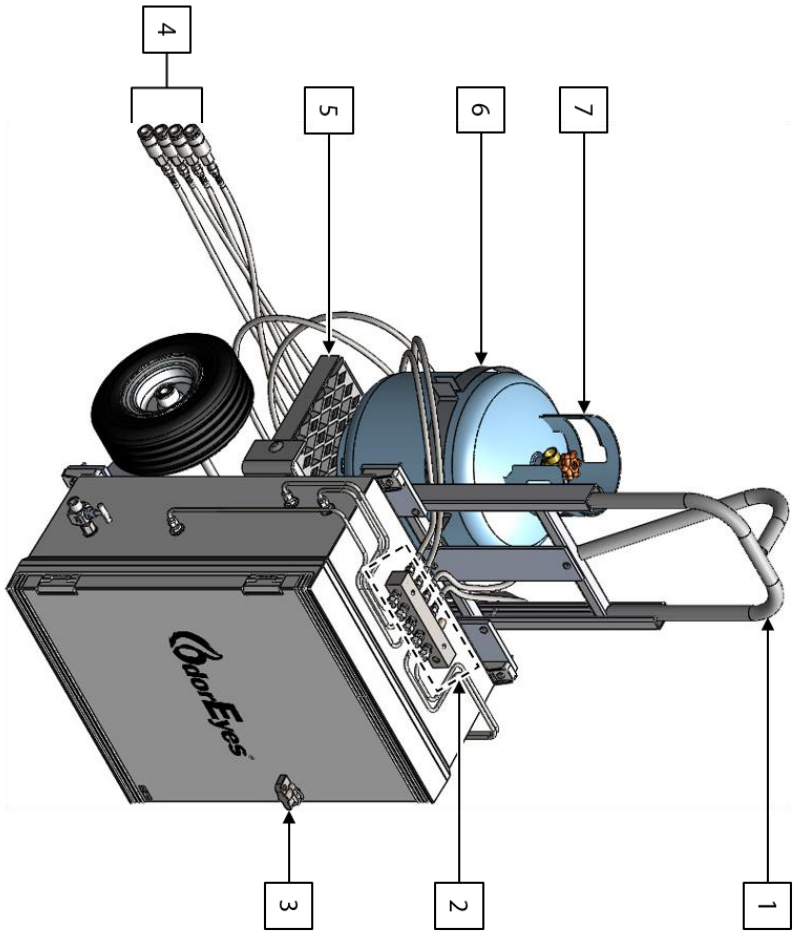
1.4 Specifications

The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

Table 1: POC Specifications	
Application	Liquid Odorant Injection
Maximum Allowable Operating Pressure	1500 psig @ -20 °F to 120 °F (*103 barg @ -28 °C to 48 °C*)
Utility Requirements	**Pneumatic Supply:** For Pump Operation **Pneumatic Supply:** For Blanket Pressure
Electrical Connections	**Controller (Optional):** DC 12 V **Solar Panel (Optional):** DC 12 V **Solenoid (Optional):** DC12 V
Injection Volume	**BIP-1:** 0.5–3 cc **BIP-2:** 0.1–0.75 cc **BIP-3:** 1–9 cc
Operation	**BIP:** Piston-Operated
Mounting	On 2-Wheel Hand Truck
Features	Flexlines With Quick-Connects Inline Odorant Filter Mounting Bracket for Customer-Supplied 5-Gallon Odorant Supply Tank NEMA 4 Enclosure Outlet Check Valve Pneumatic Timer Regulator for Blanket Pressure Regulator for Pneumatic Supply Welker OdorEyes BIP-1, BIP-2, or BIP-3 Bellows Injection Pump Welker F-19 Filter Dryer
Electrical Area Classification	NEC Class I, Div. 1
Options	3-Way Solenoid Valve Flow Meter With Bypass Pneumatic Counter Purge Valve Solar Panel Mounted on Second 2-Wheel Hand Truck Touch Screen Controller With NEMA 4X Enclosure Welker SG-4 Sight Glass

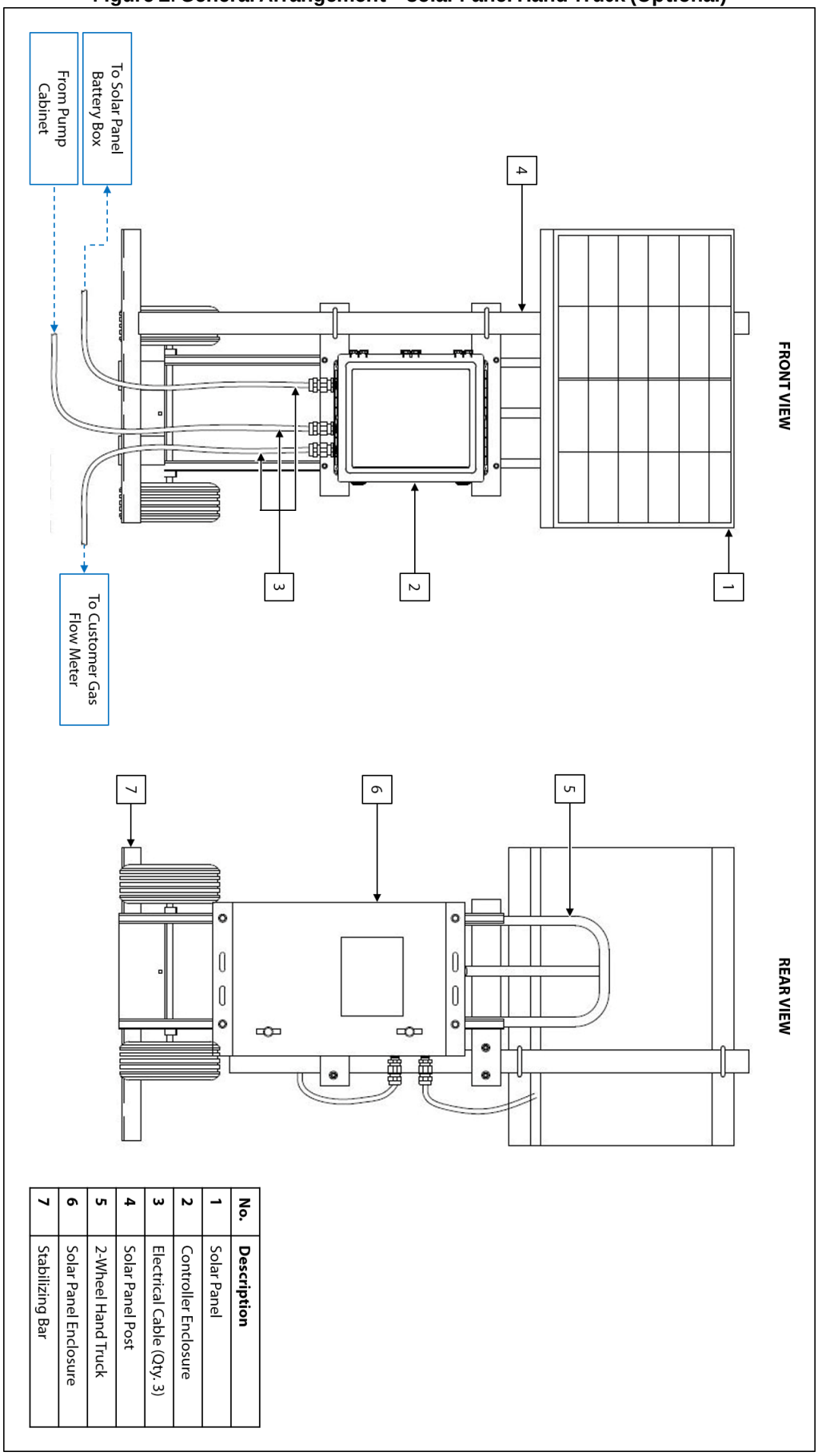
1.5 Equipment Diagrams

Figure 1: General Arrangement – POC Hand Truck



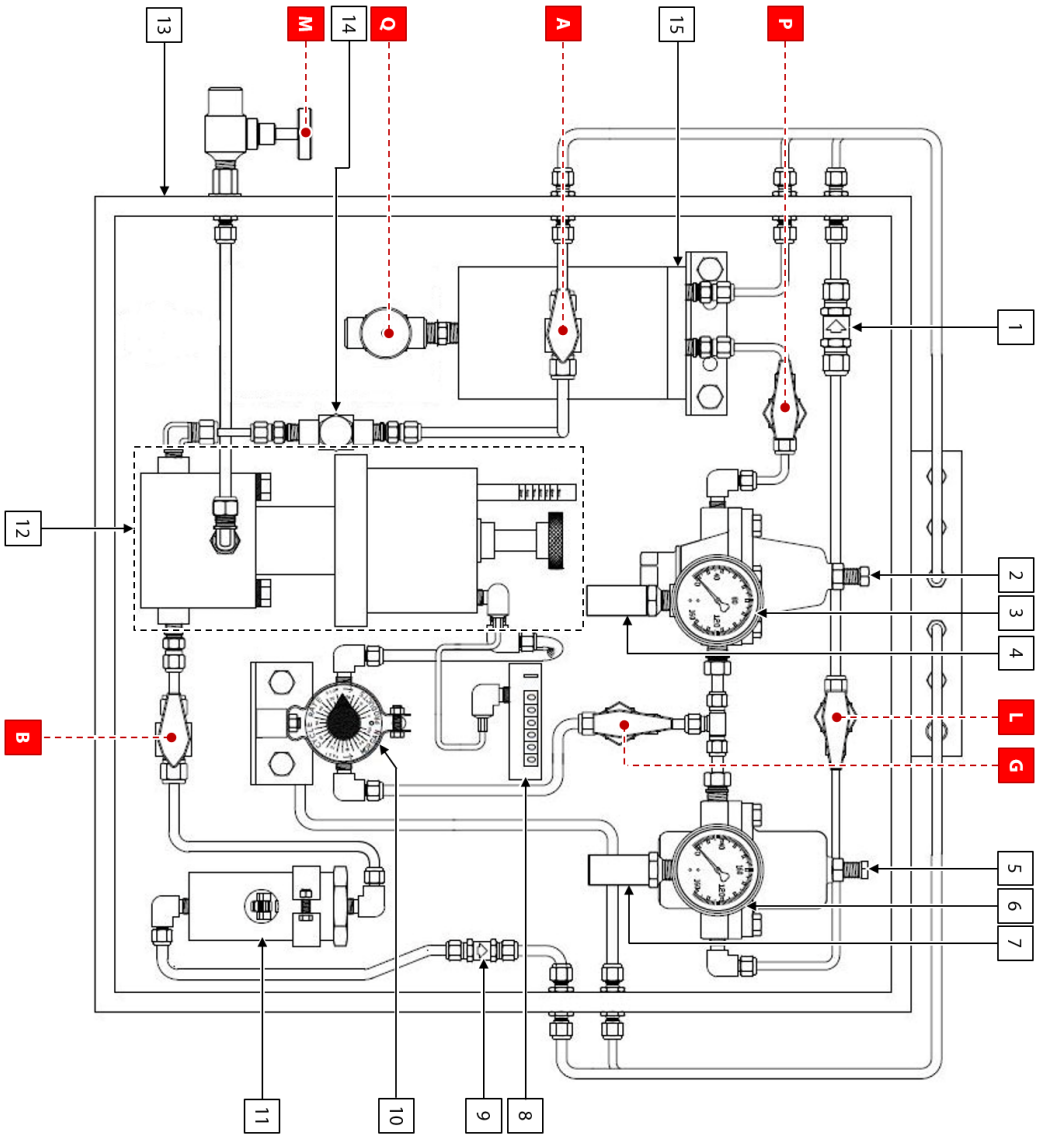
No.	Description
1	2-Wheel Hand Truck
2	Connections Manifold
3	Pump Cabinet
4	Flexlines With Quick-Connects
5	Fold-Up Step (for Odorant Supply Tank)
6	Mounting Bracket (for Odorant Supply Tank)
7	Customer-Supplied 5-Gallon Odorant Supply Tank (Shown for Reference)

Figure 2: General Arrangement – Solar Panel Hand Truck (Optional)



No.	Description
1	Solar Panel
2	Controller Enclosure
3	Electrical Cable (Qty. 3)
4	Solar Panel Post
5	2-Wheel Hand Truck
6	Solar Panel Enclosure
7	Stabilizing Bar

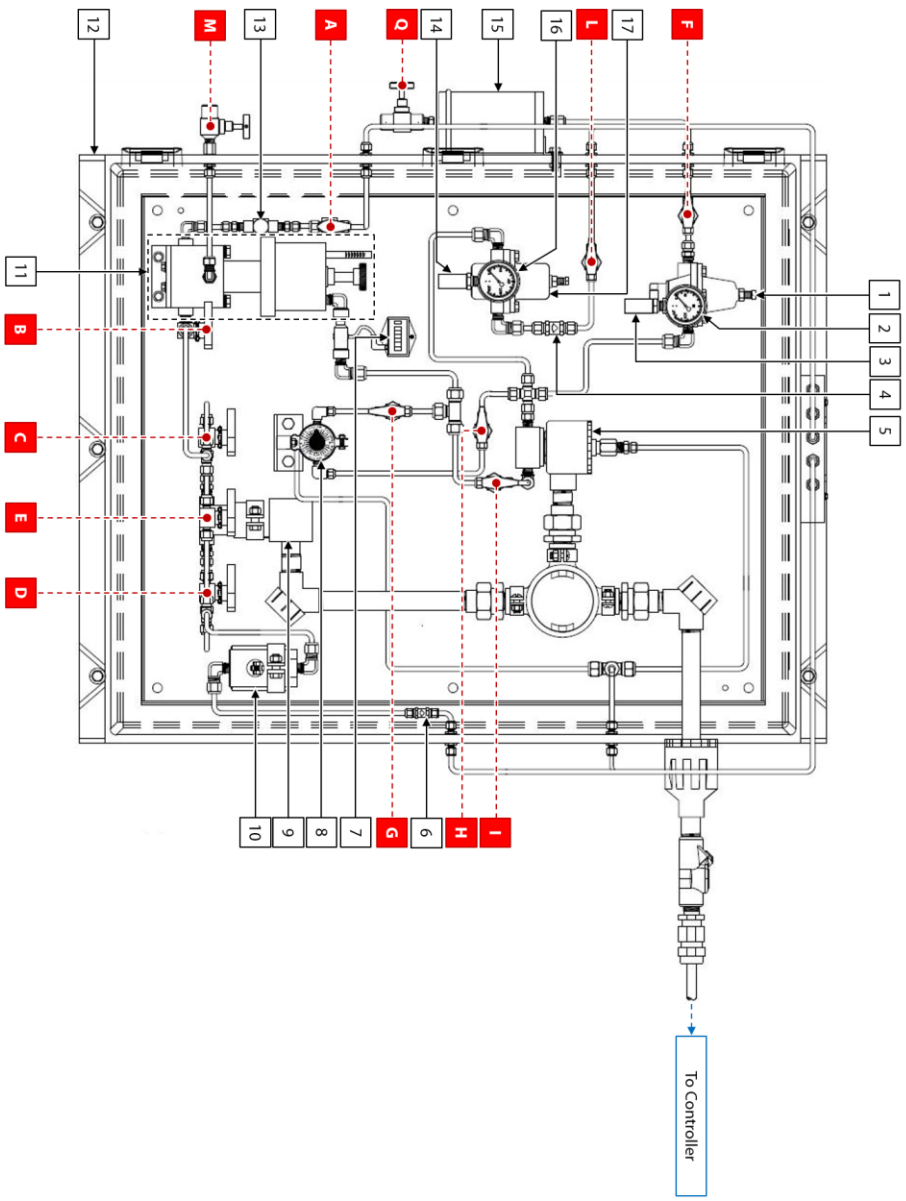
Figure 3: Standard POC Pump Cabinet



No.	Description
1	Check Valve, Blanket Pressure
2	Pneumatic Supply Regulator
3	Pressure Gauge, Pneumatic Supply Regulator
4	Welker RV-1 Relief Valve, Pneumatic Supply Regulator
5	Blanket Pressure Regulator
6	Pressure Gauge, Blanket Pressure Regulator
7	Welker RV-1 Relief Valve, Blanket Pressure Regulator
8	Pneumatic Counter (Optional)
9	Check Valve, Odorant Outlet
10	Pneumatic Timer
11	Welker SG-4 Sight Glass (Optional)
12	Welker BIP Bellows Injection Pump (See *Figure 8*)
13	Pump Cabinet
14	Inline Filter
15	Welker F-19 Filter Dryer
A	Injection Pump Inlet Valve
B	Injection Pump Outlet Valve
G	Injection Pump Actuation Valve (Pneumatic Timer)
L	Blanket Pressure Outlet Valve
M	Injection Pump Purge Outlet Valve
P	F-19 Outlet Valve
Q	F-19 Drain Valve

Shown Without Enclosure Door for Clarity

Figure 4: POC Pump Cabinet With Optional Solenoid and Flow Meter



No.	Description
1	Pneumatic Supply Regulator
2	Pressure Gauge, Pneumatic Supply Regulator
3	Welker RV-1 Relief Valve, Pneumatic Supply Regulator
4	Check Valve, Blanket Pressure
5	Solenoid (Optional)
6	Check Valve, Odorant Outlet
7	Pneumatic Counter (Optional)
8	Pneumatic Timer
9	Flow Meter (Optional)
10	Welker SG-4 Sight Glass (Optional)
11	Welker BIP Bellows Injection Pump (See *Figure 8*)
12	Pump Cabinet
13	Inline Filter
14	Welker RV-1 Relief Valve, Blanket Pressure Regulator
15	Welker F-19 Filter Dryer
16	Pressure Gauge, Blanket Pressure Regulator
17	Blanket Pressure Regulator
A	Injection Pump Inlet Valve
B	Injection Pump Outlet Valve
C	Odorant Flow Meter Inlet Valve
D	Odorant Flow Meter Outlet Valve
E	Odorant Flow Meter Bypass Valve
F	Pneumatic Supply Inlet Valve
G	Injection Pump Actuation Valve (Pneumatic Timer)
H	Pneumatic Timer Isolation Valve
I	Injection Pump Actuation Valve (Normal Operation)
L	Blanket Pressure Outlet Valve
M	Injection Pump Purge Outlet Valve
Q	F-19 Drain Valve

Shown Without Enclosure Door for Clarity

2.1 Before You Begin

After unpacking the unit, check the equipment for compliance and any damage that may have occurred during shipment. Immediately contact a Welker representative if you received damaged equipment.

When sealing fittings with PTFE tape, refer to the proper sealing instructions for the brand used.

The POC Portable Odorizer will ship mounted on a two-wheel hand truck and "hard-tube" connected with manufacturer-supplied fittings and hardware. However, the customer may need to supply some tubing and fittings in order to complete the installation of the system.

2.2 Installation

Hand Trucks

1. Locate the POC hand truck as close to the injection point as possible.
2. If the POC is equipped with the optional solar panel and touch screen controller on a second hand truck, locate this hand truck as close to the POC hand truck as possible, taking shading and direction of the sun into account.

Ensure that the solar panel battery has been removed from the solar panel enclosure prior to moving the hand truck.

The distance between the two (2) hand trucks is limited by the length of the provided electrical cables.

The solar panel must face the direction of the sun and cannot be shaded during daylight hours. Any shading of the solar panel could greatly reduce the output of the solar panel and inhibit the battery from charging.

Odorant Supply Tank

Odorant must be transported in a DOT certified container.

3. Fill the customer-supplied odorant supply tank in accordance with company policy and procedure, taking care not to exceed 80% of the total volume of the supply tank.

Never fill the odorant supply tank above 80% of its capacity. Allow at least 20% for product expansion, should the tank be exposed to increased temperatures.

4. With the fold-up step on the POC hand truck in the down position, install the filled odorant supply tank to the hand truck (*Figure 1*).
5. Using the mounting bracket, secure the filled odorant supply tank to the POC hand truck (*Figure 1*).

System Connections

For ease of mobility, the POC is equipped with flexlines with quick-connects for system connections. However, stainless steel tubing may be used in more permanent applications.

Welker recommends using stainless steel tubing for all natural gas process lines, as plastic tubing can absorb odorant from the gas.

Figure 5: Pump Cabinet Connections Diagram

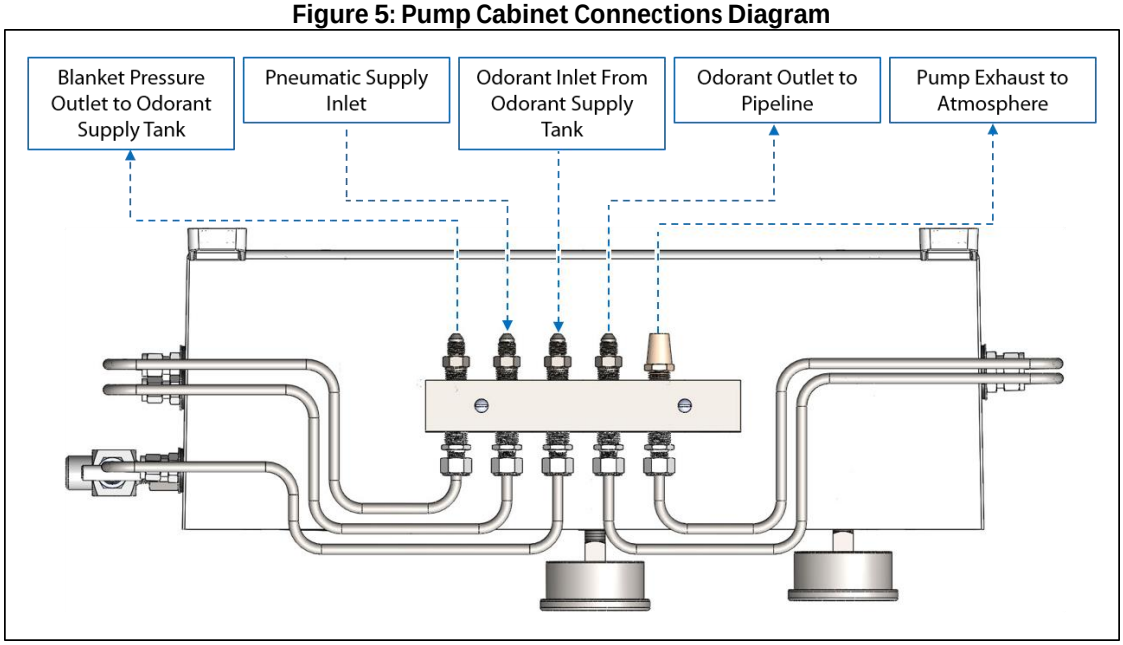
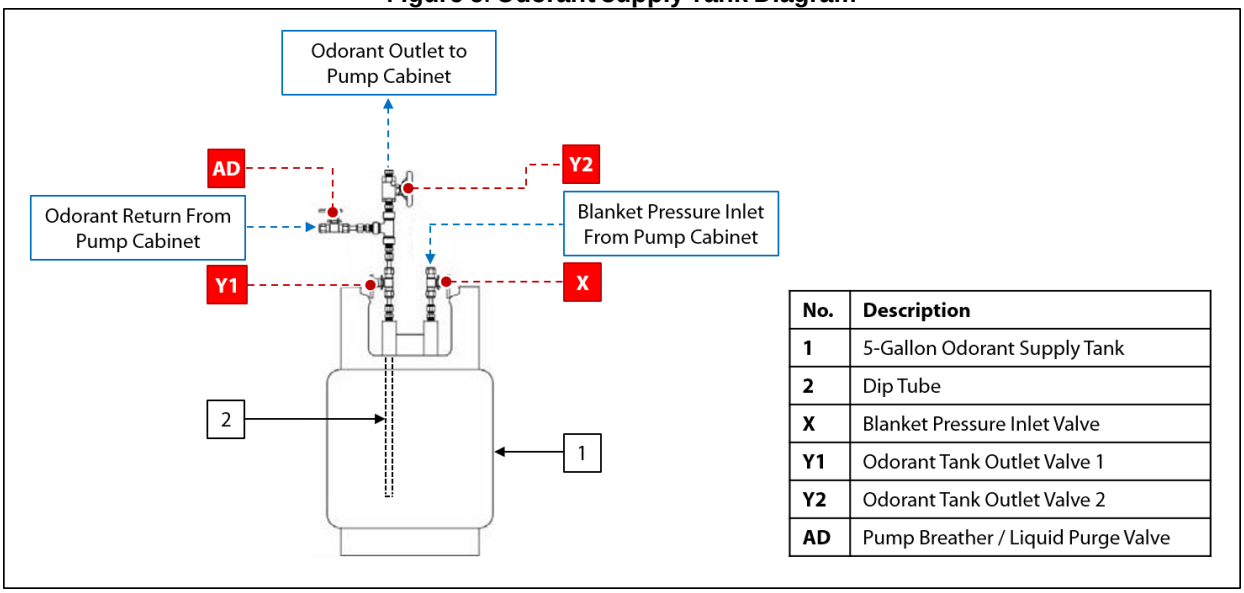


Figure 6: Odorant Supply Tank Diagram



No.	Description
1	5-Gallon Odorant Supply Tank
2	Dip Tube
X	Blanket Pressure Inlet Valve
Y1	Odorant Tank Outlet Valve 1
Y2	Odorant Tank Outlet Valve 2
AD	Pump Breather / Liquid Purge Valve

6. Using a provided flexline with quick-connects, connect from the blanket pressure outlet on the pump cabinet to the blanket pressure inlet on the odorant supply tank. The quick-connects will click audibly into place.
7. Using a provided flexline with quick-connects, connect from the odorant outlet on odorant supply tank to the odorant inlet on the pump cabinet. The quick-connects will click audibly into place.
8. Using a provided flexline with quick-connects, connect from the customer-supplied unodorized natural gas or inert gas supply to the pneumatic supply inlet on the pump cabinet. The quick-connects will click audibly into place.
9. Using the longest provided flexline with quick-connects, connect from the odorant outlet on the pump cabinet to the customer pipeline injection point.

Welker recommends installing a valve between the system odorant outlet and the injection point.

10. Ensure that all valves on the system are closed.
11. Ensure that all fittings and connections are tightened.
12. If the POC is equipped with the optional solar panel, continue to step 13. If the POC is not equipped with the optional solar panel, proceed to *Section 2.3, Start-Up Procedures*.

Solar Panel Connections

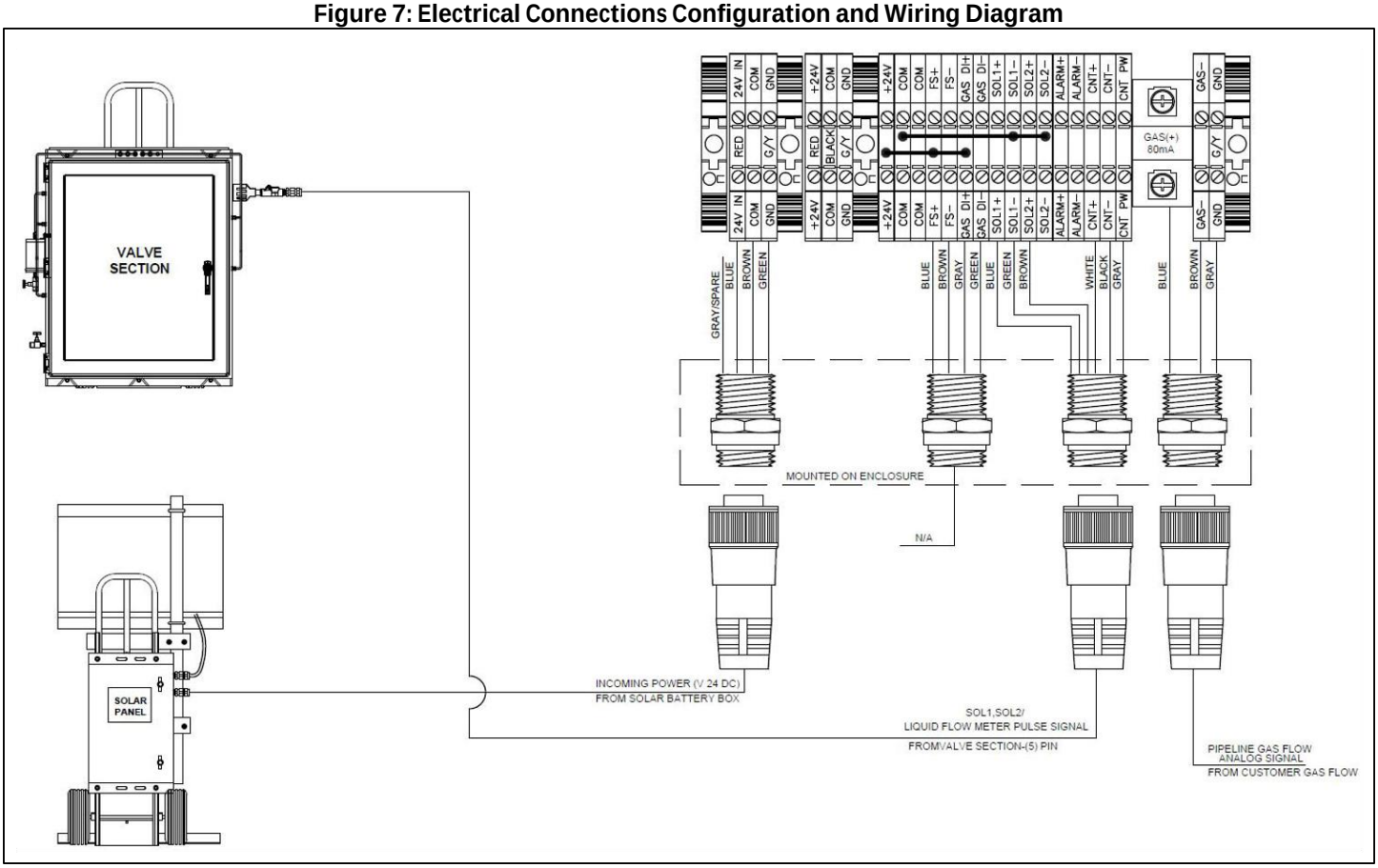
Follow the appropriate electrical zone regulations and guidelines. DO NOT place NEC Class I, Div. 2 electrical components in NEC Class I, Div. 1 zones.

For systems used in hazardous locations, sealing compound is required to seal all fittings to restrict the passage or gases, vapors, or flames.

13. Install the optional solar panel to the top of the solar panel post on the controller hand truck (*Figure 2*).

The solar panel must face the direction of the sun and cannot be shaded during daylight hours. Any shading of the solar panel could greatly reduce the output of the solar panel and inhibit the battery from charging.

Figure 7: Electrical Connections Configuration and Wiring Diagram



14. Install the solar panel battery to the solar panel enclosure on the second hand truck, and then connect the solar panel to the battery.
15. Using a provided electrical cable, connect from the pump cabinet to the controller enclosure (*Figure 2*).
16. Using a provided electrical cable, connect from the controller enclosure to the customer gas flow meter (*Figure 2*).

The controller can accept analog input.

2.3 Start-Up Procedures

Pneumatic Supply Regulator

1. If the POC is equipped with the standard pump cabinet, open F-19 outlet valve P (*Figure 3*).
2. If the POC is equipped with the pump cabinet with optional solenoid and flow meter, open pneumatic supply inlet valve F (*Figure 4*).
3. Apply pneumatic supply pressure to the pump cabinet. The pneumatic supply regulator will be pressurized.
4. Set the pneumatic supply regulator according to the recommended settings in Table 2 to the pressure required to stroke the pump located inside the pump cabinet.

Table 2: Injection Pump Pressure Regulator Settings

Injection Pressure	Approximate Regulator Set Point
0–400 psig	30 psig
401–800 psig	50 psig
801–1200 psig	80 psig
1201–2000 psig	100 psig

Blanket Pressure

5. Open blanket pressure inlet valve X (*Figure 6*).
6. Open blanket pressure outlet valve L (*Figure 3* or *Figure 4*).
7. Check the blanket pressure connections for leaks and repair as necessary.

Valve Configuration

8. Slowly open the valves indicated in Table 3.

Table 3: Start-Up Valve Orientation

Valve Letter	Valve Description	Reference Figure(s)
Y (Y1 and Y2)	Odorant Outlet	6
A	Injection Pump Inlet	3, 4
B	Injection Pump Outlet	3, 4
E	Odorant Flow Meter Bypass	4

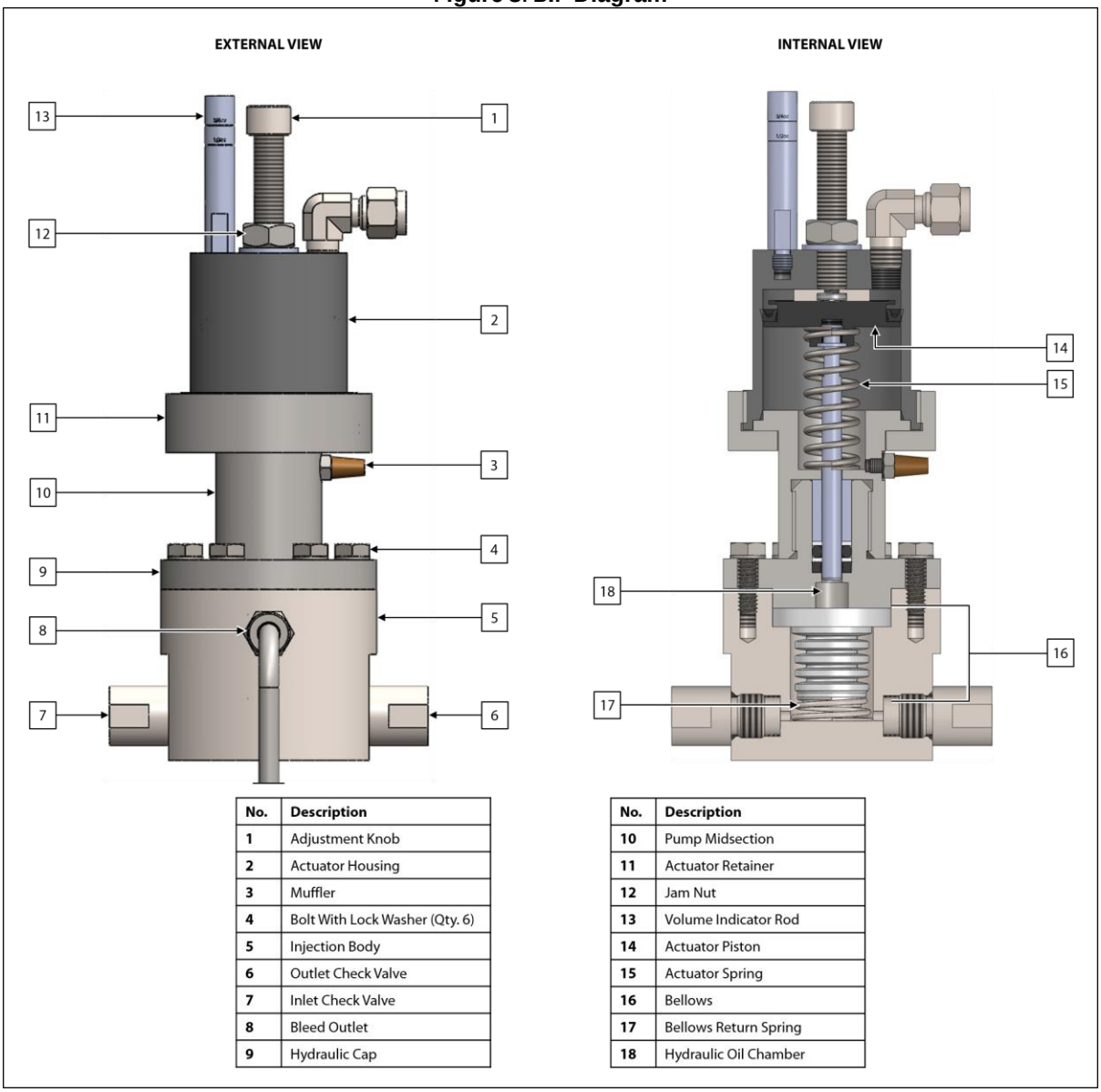
9. Slowly open any valves between the odorant outlet on the pump cabinet and the pipeline.
10. Check for leaks and repair as necessary.

Purging the Injection Pump

11. Open injection pump purge outlet valve M to purge the injection chamber of any trapped air (*Figure 3* or *Figure 4*).
12. Once all air has been purged from the injection chamber, close injection pump purge outlet valve M (*Figure 3* or *Figure 4*).
13. As necessary, adjust the injection volume of the injection pump.

Loosen the jam nut on the adjustment screw.
To increase the injection volume, turn the adjustment knob counterclockwise.
To decrease the injection volume, turn the adjustment knob clockwise.
Tighten the jam nut on the adjusting screw to secure the adjusting screw at the desired volume.

Figure 8: BIP Diagram



No.	Description
1	Adjustment Knob
2	Actuator Housing
3	Muffler
4	Bolt With Lock Washer (Qty. 6)
5	Injection Body
6	Outlet Check Valve
7	Inlet Check Valve
8	Bleed Outlet
9	Hydraulic Cap

No.	Description
10	Pump Midsection
11	Actuator Retainer
12	Jam Nut
13	Volume Indicator Rod
14	Actuator Piston
15	Actuator Spring
16	Bellows
17	Bellows Return Spring
18	Hydraulic Oil Chamber

14. If applicable, **slowly** open flow meter outlet valve D and flow meter inlet valve C, and then close flow meter bypass valve E (*Figure 4*).
15. Open any valve(s) restricting the flow of odorant from the POC to the pipeline.

Verifying Pump Operation

If the POC is equipped with the optional controller, Welker recommends turning OFF the controller prior to verifying pump operation using the pneumatic timer.

16. Open injection pump actuation valve G (*Figure 3* or *Figure 4*).
17. If applicable, open injection pump isolation valve H (*Figure 4*).
18. If applicable, close injection pump actuation valve I (*Figure 4*).
19. Turn the dial on the front of the pneumatic timer to set the stroke frequency of the injection pump.

To get a full stroke of the injection pump, do not set the stroke frequency faster than every six (6) seconds.

20. As the injection pump strokes, verify liquid odorant is being injection into the pipeline by referring to the Welker SG-4 Sight Glass. The Visual Flow Indicator (a.k.a. Spinner Wheel) inside the SG-4 should spin.

Welker recommends a minimum of ten (10) actuations to verify injection.

21. If the POC is not equipped with the optional controller, the POC is operational once the injection of liquid odorant has been verified. If the POC is equipped with the optional controller, continue to step 22.

Controller Configuration

22. Close injection pump actuation valve G and injection pump isolation valve H, and then open injection pump isolation valve I (*Figure 4*). This stops the flow of the pneumatic supply to the pneumatic timer, allowing the controller and solenoid to stroke the injection pump.
23. Verify that the customer set points have been correctly set by the manufacturer.
24. The POC is now operational.

2.4 Decommissioning Procedures

The system should be decommissioned prior to transport to another location.

Welker recommends having OdorXice Plus™ during decommissioning to control the odorant smell.

1. If the pneumatic timer is being used to stroke the injection pump, close injection pump actuation valve G (*Figure 3* or *Figure 4*).

DO NOT close injection pump actuation valve G during a pump stroke. Wait until the pump completes the stroke before closing the valve.

2. If the optional controller is being used to stroke the injection pump, close injection pump actuation valve I (*Figure 4*).

DO NOT close injection pump actuation valve G during a pump stroke. Wait until the pump completes the stroke before closing the valve.

3. Close any valves between the odorant outlet on the pump cabinet and the pipeline.
4. Close blanket pressure inlet valve X and odorant tank outlet valve Y2 on the customer-supplied odorant supply tank (*Figure 6*).
5. Disconnect the flexline with quick-connects from the pipeline injection point, and then connect the flexline to pump breather / liquid purge valve AD on the customer-supplied odorant supply tank (*Figure 6*).
6. If a valve was installed to the outlet of the flexline with quick-connects, open this valve.
7. Open pump breather / liquid purge valve AD.
8. Once the pump cabinet has been purged, close pump breather / liquid purge valve AD and the valve on the outlet of the flexline with quick-connects, if applicable.
9. Disconnect the flexline with quick-connects from pump breather / liquid purge valve AD.
10. Disconnect the blanket pressure flexline with quick-connects from blanket pressure inlet valve X on the customer-supplied odorant supply tank (*Figure 5*).
11. Disconnect the pneumatic supply flexline with quick-connects from the customer-supplied unodorized natural gas or inert gas supply (*Figure 5*).
12. Disconnect the odorant supply flexline with quick-connects from odorant tank outlet valve Y2 on the customer-supplied odorant supply tank (*Figure 5*).
13. If the POC is equipped with the optional solar panel, disconnect the battery from the solar panel, and then remove the solar panel battery from the solar panel enclosure on the second hand truck.

The solar panel battery must be removed from the solar panel enclosure prior to moving the hand truck.

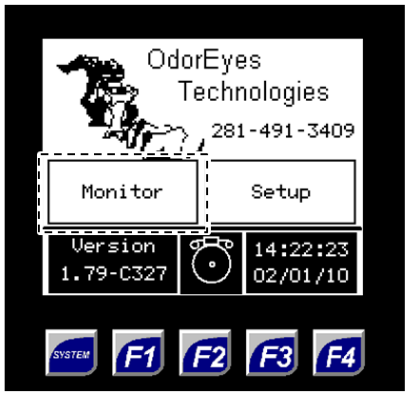
14. The POC may now be cleaned and prepared for transport to another location.

3.1 Understanding the Display

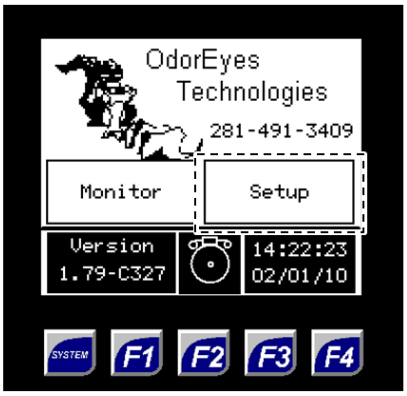
The touch screen controller is used to modify system parameters and view current system information and current alarm status.

The touch screen controller is a menu-driven system. The Home screen is the top screen in the menu tree (*Figure 9*).

Figure 9: Home Screen



Monitor
Takes you to the monitoring screens where you can view current information about the operation of the odorizer.



Setup
Takes you to the setup screens where you can change any set point values in the odorizer and view the version of software the odorizer is running.

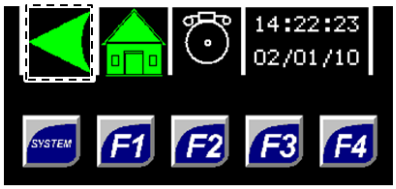
From the Home screen, the user can access three (3) types of screens:

- **Menu**-from this type of screen, the user can access submenus.
- **Informational**-from this type of screen, the user can monitor the odorizer and view current operating conditions.
- **Setup**-from this type of screen, numeric and/or text values that affect the setup of the odorizer can be changed.

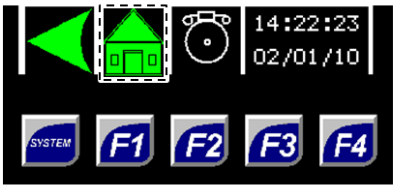
Navigating the Display

Figure 10: Toolbar and Function Keys

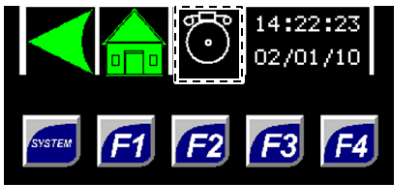
TOOLBAR



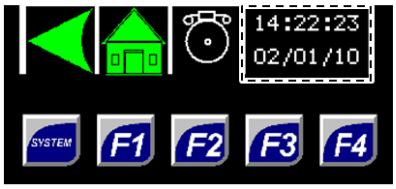
Back Button
Takes you back one (1) level in the menu tree to the previous screen.



Home Button
Takes you to the **Home** screen.

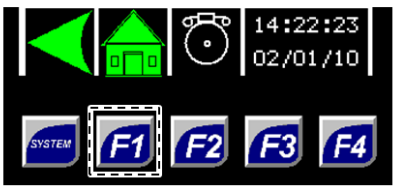


Alarms Button
Takes you to the **Current Alarms** screen.

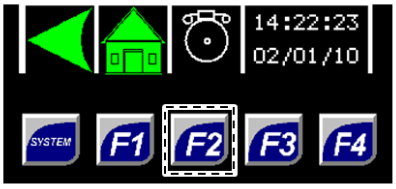


Current Date and Time
This is the current date and time in the odorizer. It can be changed from any screen.

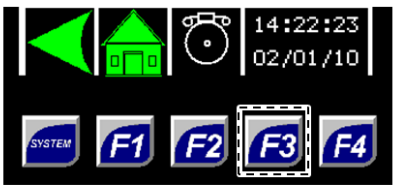
FUNCTION KEYS



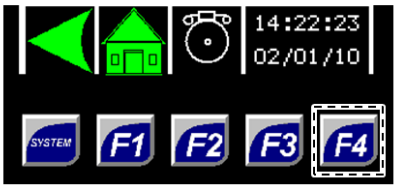
F1 Key
Takes you to the **Home** screen.



F2 Key
Takes you to the **Current Alarms** screen.



F3 Key
Takes you to the **SDcard Data Logging** screen.



F4 Key
Starts and stops the auto scroll function.

The toolbar appears on every screen except the Home screen.

If nothing on the screen is pressed for a certain amount of time, the sleep function will cause the backlight on the screen to turn off. To wake up the controller, press anywhere on the screen or press one of the function keys.

Viewing the Current Alarms

From any screen, press the Alarms button to go to the Current Alarms screen (*Figure 11*).

Figure 11: Current Alarms Screen

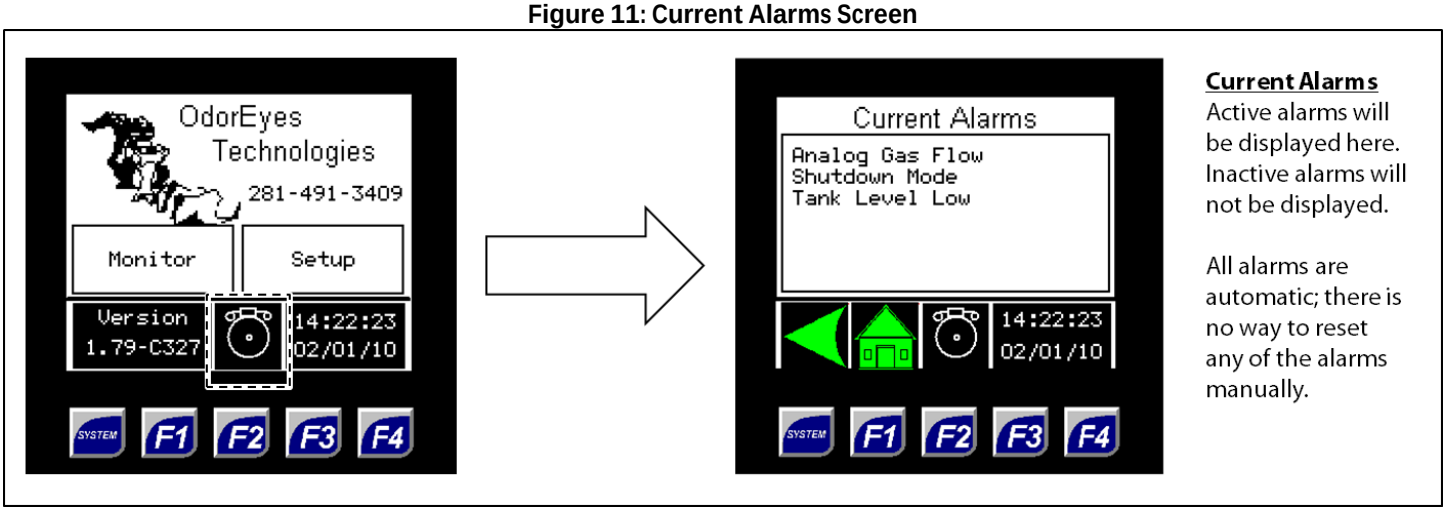


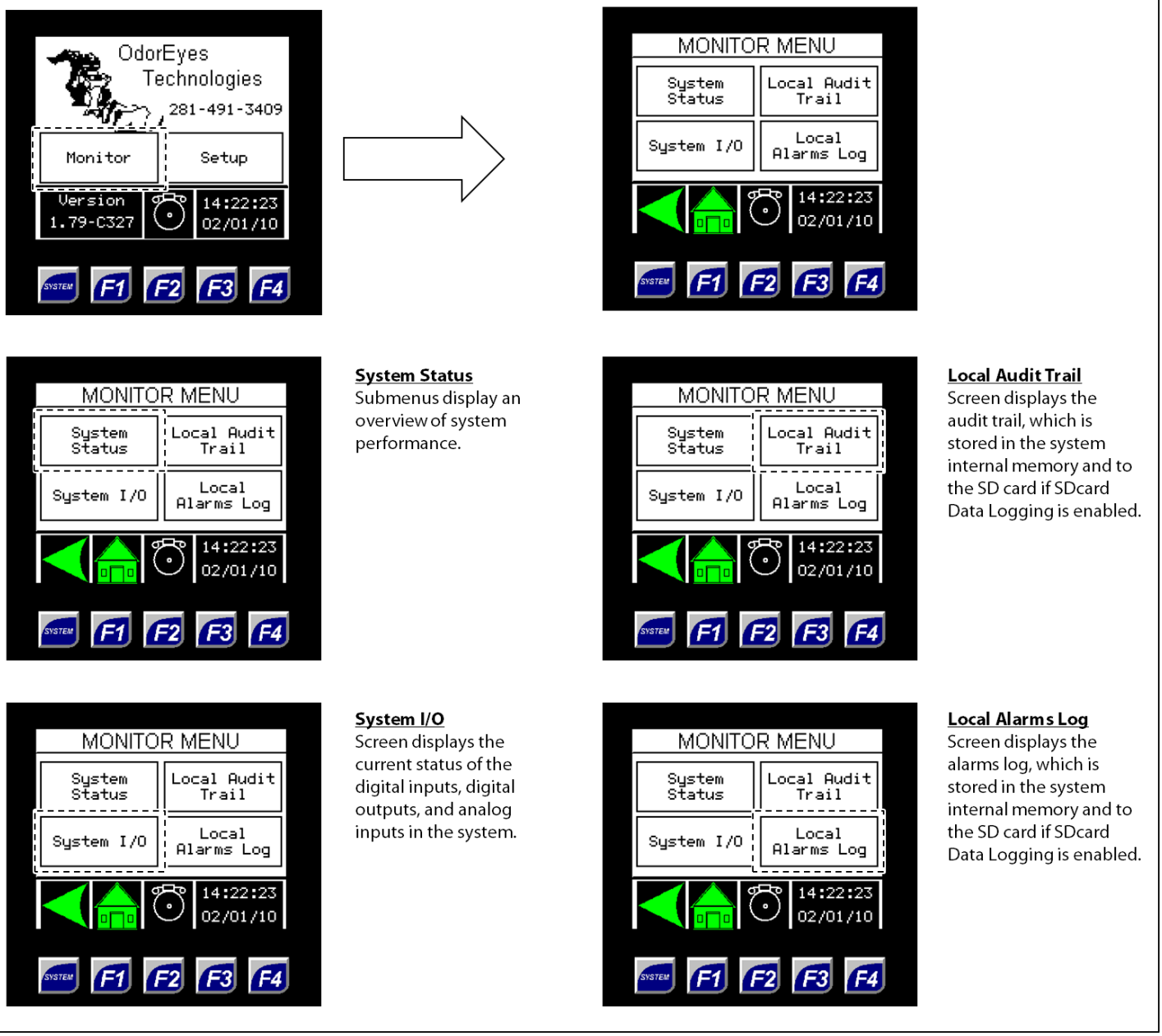
Table 4: Current Alarms	
Analog Flow	Can only be active if Analog Input method is selected.
Pulse Flow	Can only be active if Pulse Input method is selected.
Constant Rate	Can only be active if Constant Rate mode is specified as the desired fail mode. The controller will enter this gas flow fail mode when there is a gas flow signal loss.
Shutdown Mode	Can only be active if Shutdown Mode is specified as the desired fail mode. The controller will enter this gas flow fail mode when there is a gas flow signal loss.
Fixed Rate	Can only be active if Fixed mode is enabled.
Tank Level	Can only be active if an electronic level transmitter is used to track the odorant tank level and the controller loses the 4–20 mA signal from the transmitter. **NOTE:** If this alarm is active, the controller will automatically switch to the odorant flow method to track the odorant tank level. The controller will use the value of odorant in the tank and subtract the appropriate volume with each stroke.
Tank Low Level	Active if the odorant tank level has dropped below the specified value.
P1 Overflow	Active if the pump output for the last ten (10) strokes exceeds the allowable average deviation.
P1 Low Flow	Active if the pump output for the last ten (10) strokes is below the allowable average deviation.
P1 No Flow	Active if after ten (10) strokes there is no output from the pump.
Dual Pump Mode	Indicates the odorizer is currently actuating both pumps.
SD Card Error	Active if SDcard Data Logging is enabled but no micro SD card is installed.

3.2 Navigating the Monitor Menus

Through the Monitor menu, the user can access the System Status, System I/O, Local Audit Trail, and Local Alarms Log to view current information for the odorizer.

Monitor screens are information screens: no values can be changed from these screens.

Figure 12: Monitor Menu Submenus



System Status
Submenus display an overview of system performance.

Local Audit Trail
Screen displays the audit trail, which is stored in the system internal memory and to the SD card if SDcard Data Logging is enabled.

System I/O
Screen displays the current status of the digital inputs, digital outputs, and analog inputs in the system.

Local Alarms Log
Screen displays the alarms log, which is stored in the system internal memory and to the SD card if SDcard Data Logging is enabled.

SYSTEM STATUS

The System Status submenus provide the user with an overview of system performance.

Figure 13: System Status Submenus

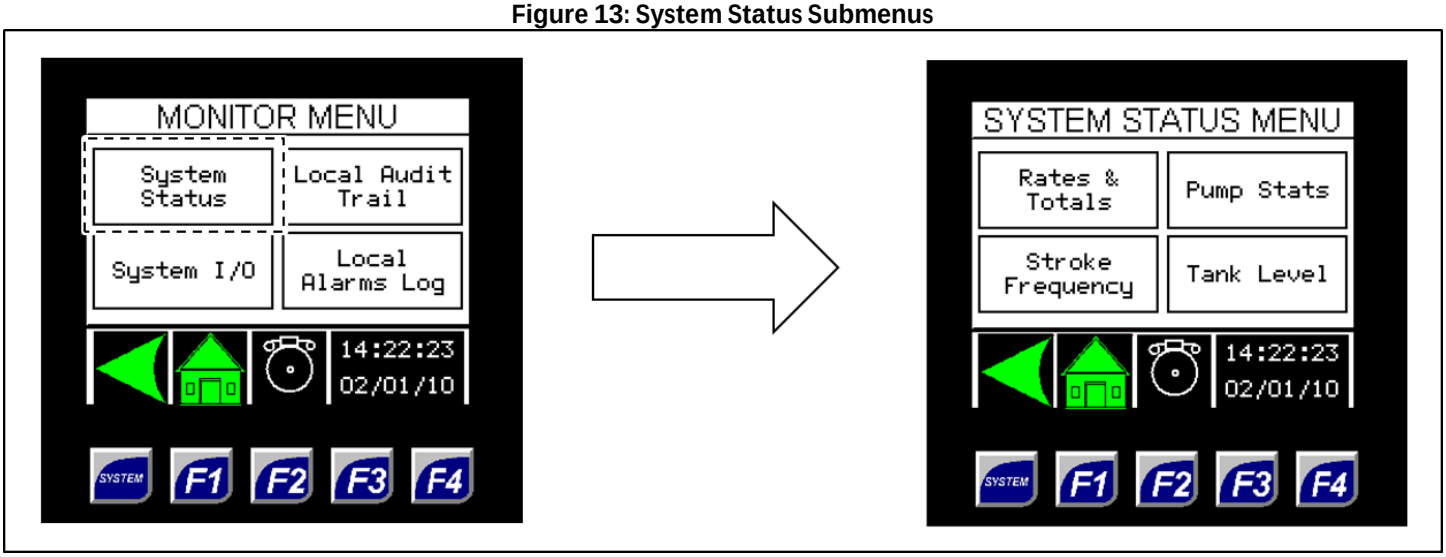


Figure 14: System Status – Rates & Totals

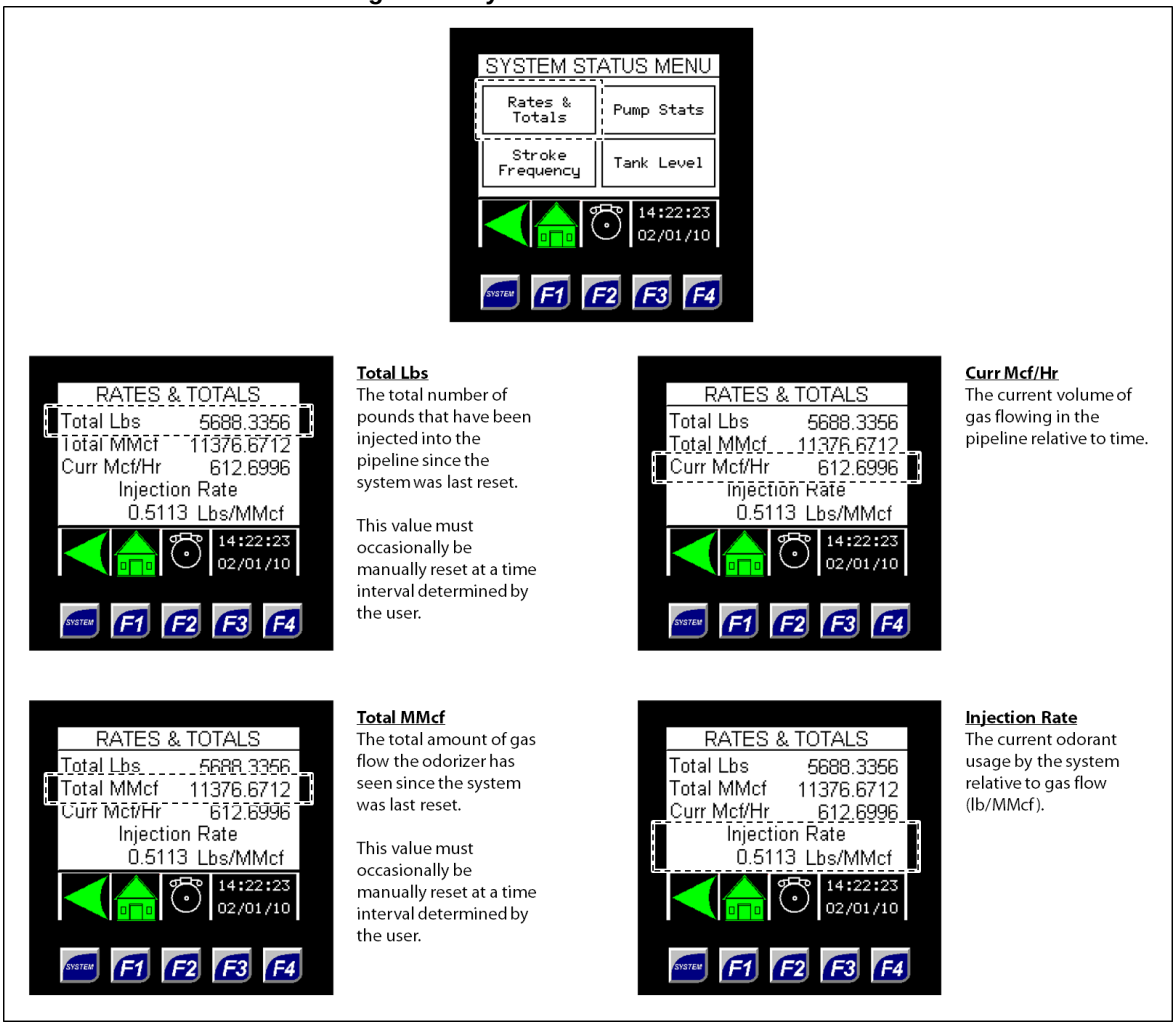
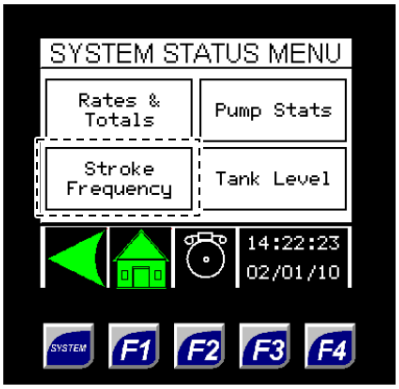
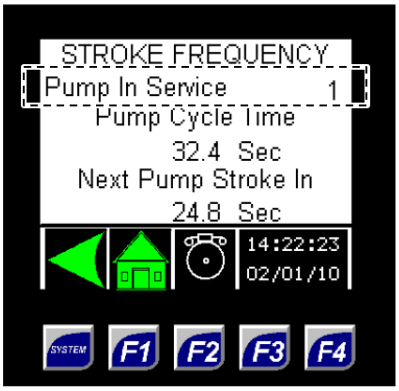


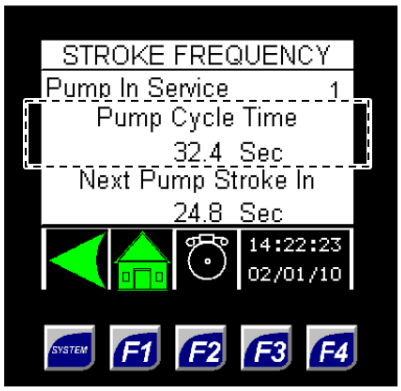
Figure 15: System Status – Stroke Frequency



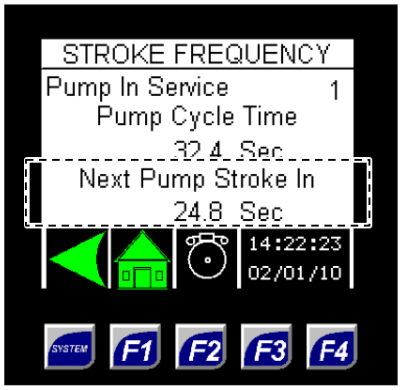


Pump In Service
This indicates which pump is currently injecting odorant into the pipeline.

Note this system has one (1) pump.

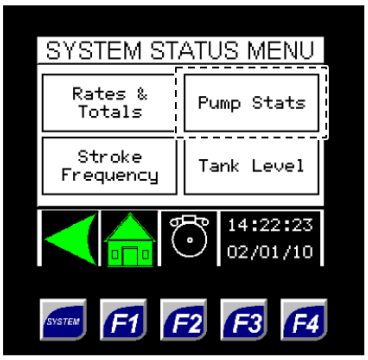


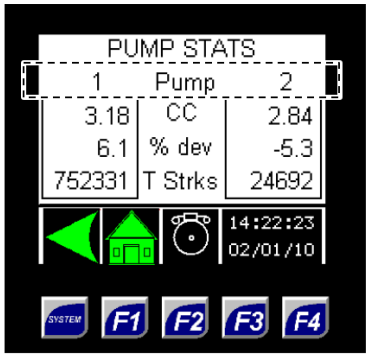
Pump Cycle Time
This indicates the current cycle time (in seconds) of the currently operating pump.



Next Pump Stroke In
This is a countdown timer until the next stroke of the currently operating pump. The countdown time is given in seconds.

Figure 16: System Status – Pump Stats

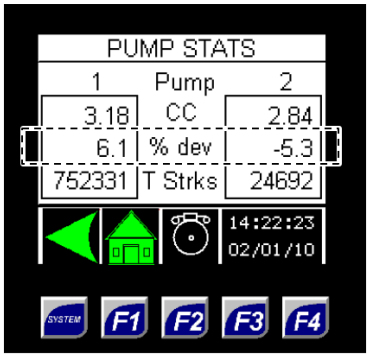




Pump
The (1) column displays statistics for the first pump.

The (2) column displays statistics for the second pump, if applicable.

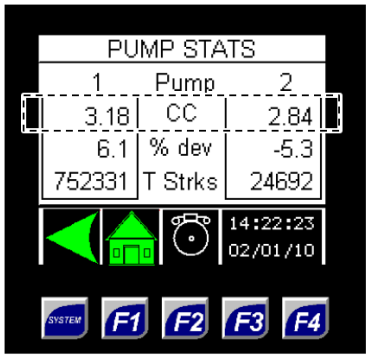
Note this system has one (1) pump.



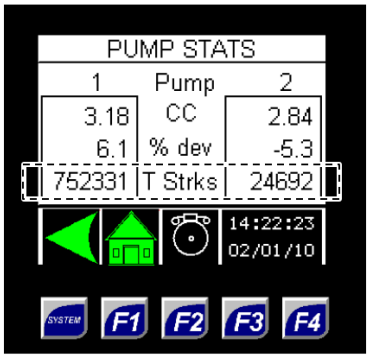
% dev
The 10-stroke average deviation of the pump from the user's set point.

If the pump is below its set point, it will show a negative percentage.

If the pump is above its set point, it will show a positive percentage.



CC
The volume of odorant the pump injected on its last stroke. The volume is given in cubic centimeters (cc).

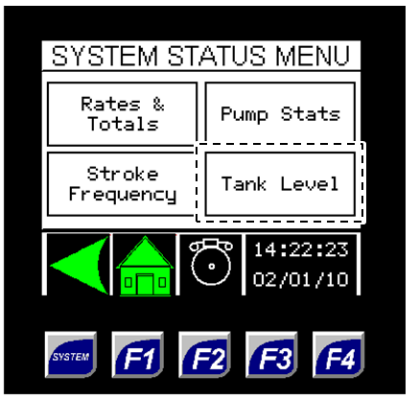


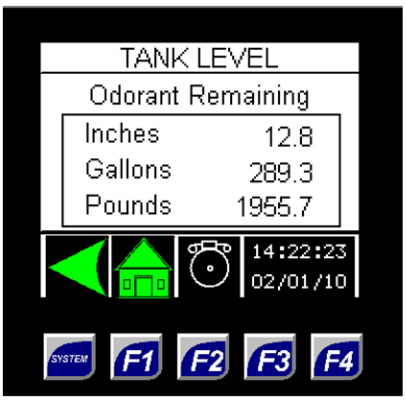
T Strks
The total number of strokes for the pump since the system was last reset by the user.

This should be reset after performing pump maintenance.

The Tank Level submenu is not applicable for this system.

Figure 17: System Status – Tank Level





This screen displays the amount of odorant remaining in the odorant supply tank in inches, US gallons, and pounds.

These values will either be from a level transmitter or a calculation based on odorant usage.

SYSTEM I/O

The System I/O submenu provides the user with an overview of the current status of digital inputs, digital outputs, and analog inputs in the system.

Figure 18: System I/O, 1 of 2

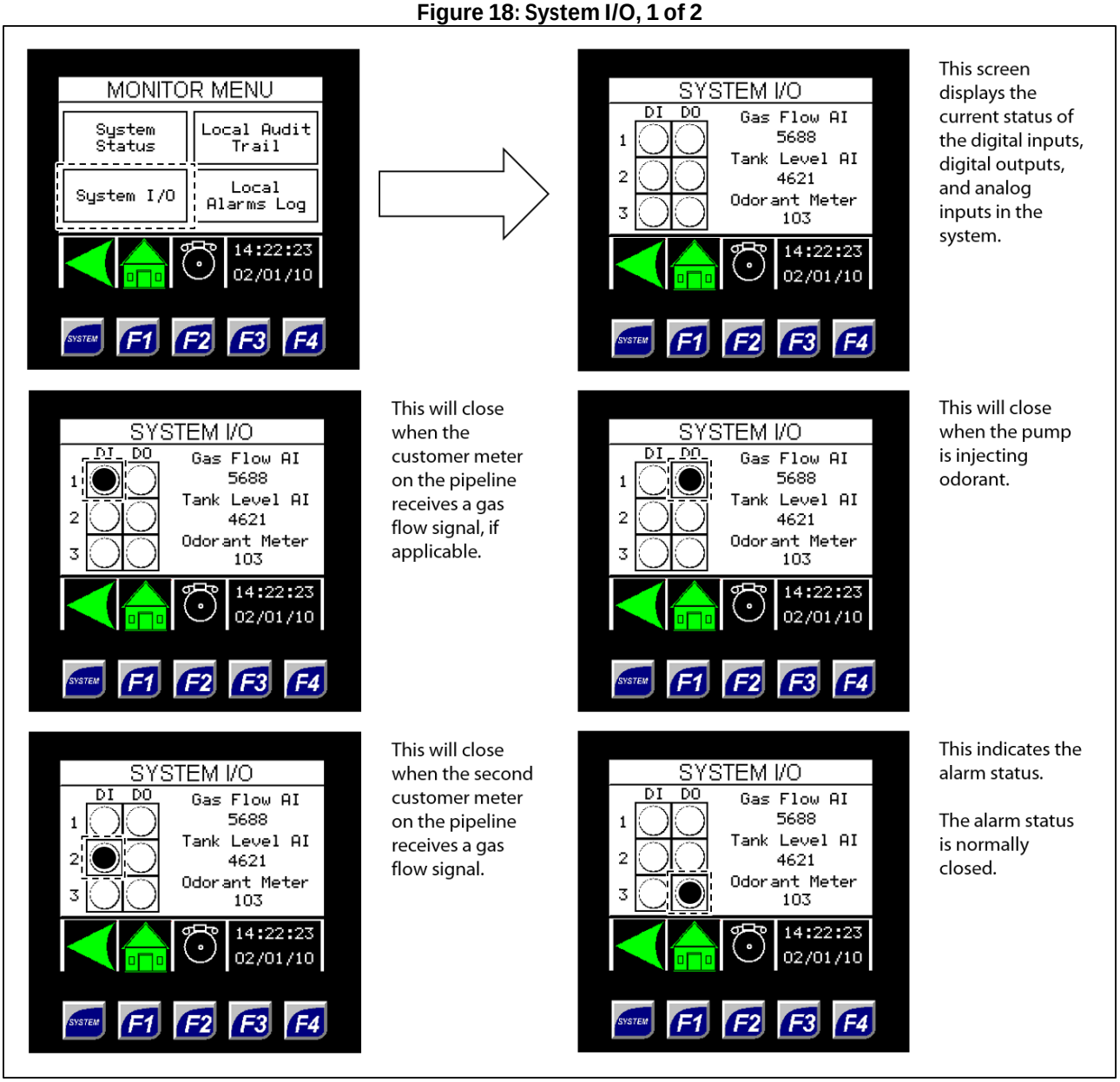
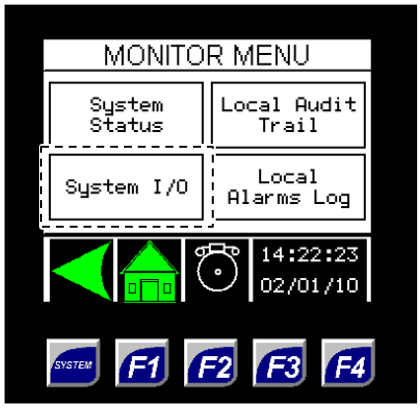
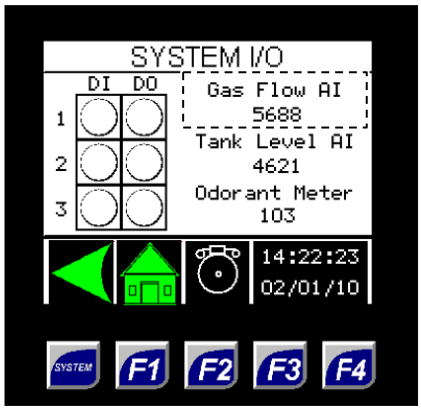


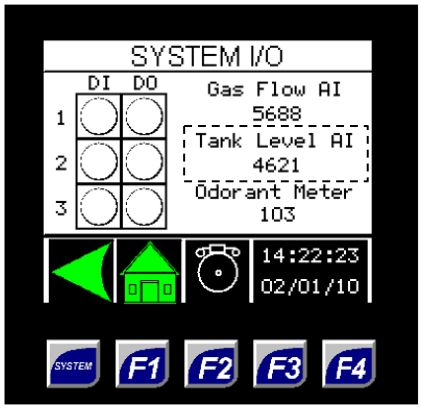
Figure 19: System I/O, 2 of 2





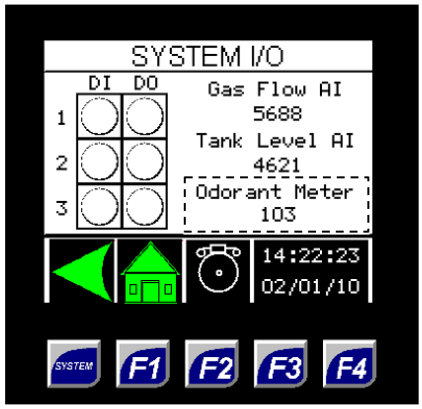
This analog signal is the raw count coming into the odorizer after the signal has been converted from milliamps. This value will vary according to the output from the customer gas flow meter.

Analog Input Conversion	
Signal (mA)	**Raw Count**
4	6400
20	32000



This analog signal is the raw count coming into the odorizer after the signal has been converted from milliamps. This value will vary according to customer specifications.

This is not applicable for this system.



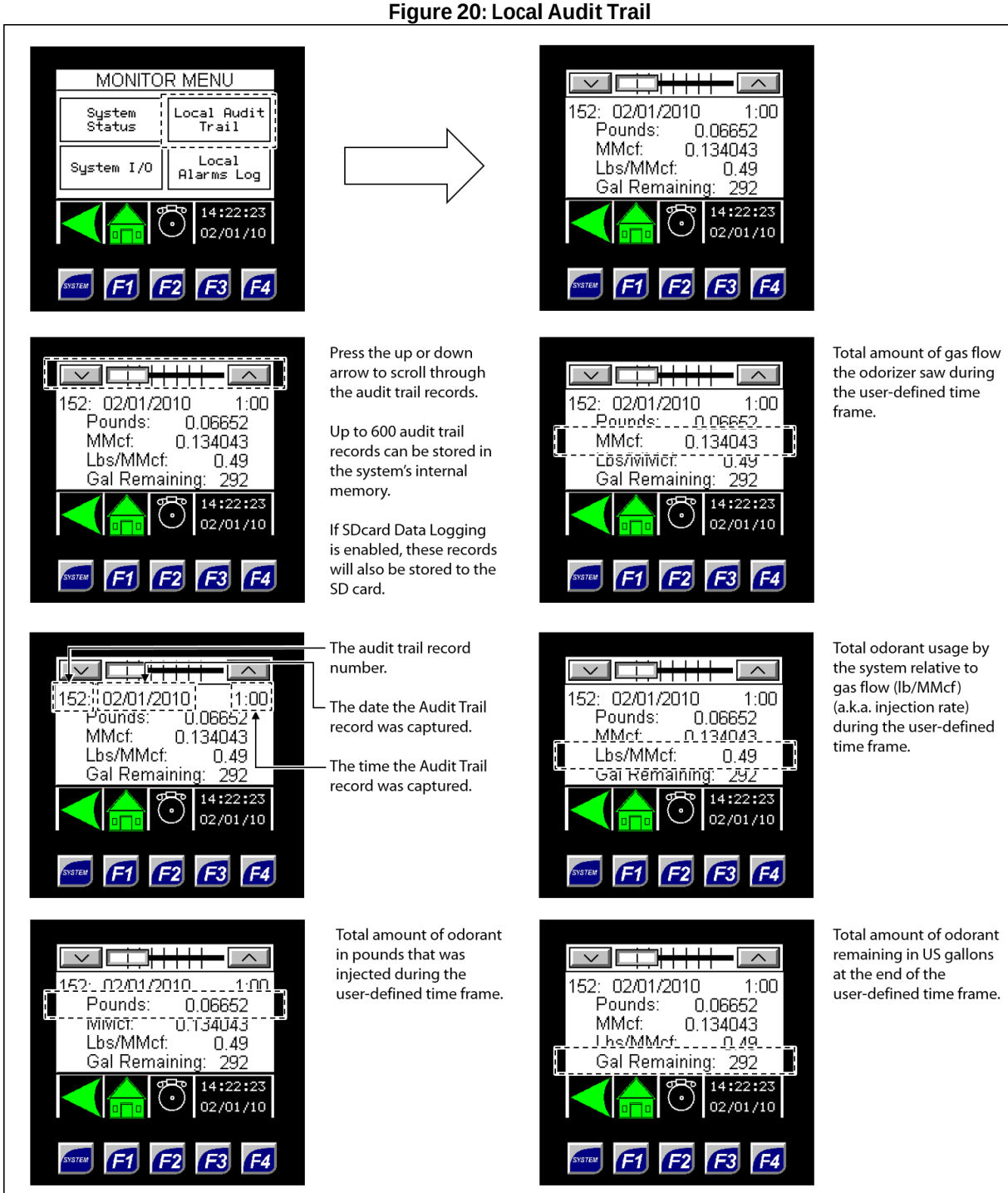
This value indicates how many high-speed pulses were received from the odorant flow meter.
This value appears after each pump stoke and reverts to zero (0) after two (2) seconds.

Local Audit Trail

From the Local Audit Trail submenu, the user can access the audit tail records stored in internal memory. Up to 600 audit trail records can be stored and viewed.

If SDcard Data Logging is enabled, the audit trail records will also be stored to the installed micro SD card. The micro SD card is equipped with 2 GB of storage.

Figure 20: Local Audit Trail

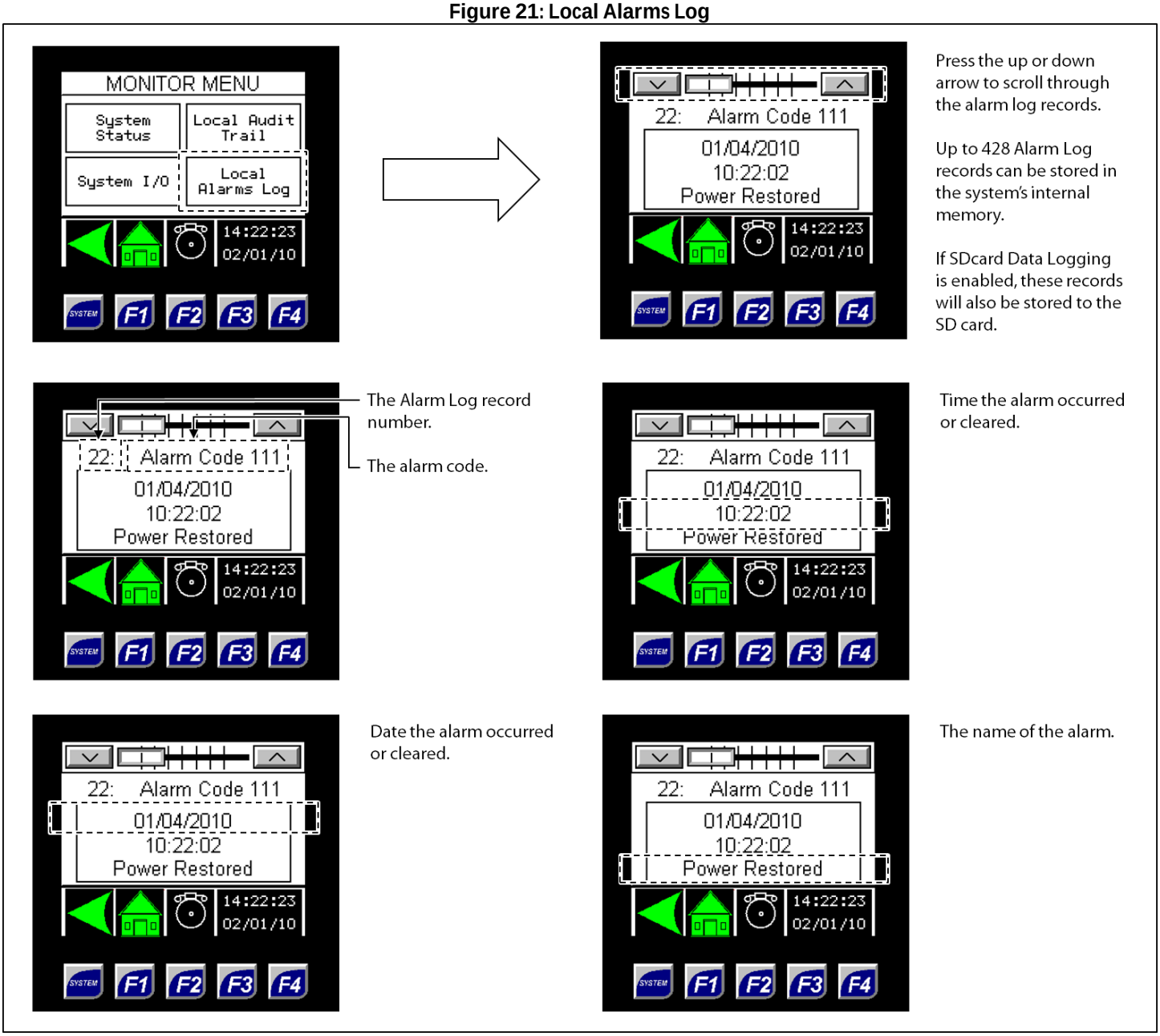


Local Alarms Log

From the Local Alarms Log submenu, the user can access the alarm logs stored in internal memory. Up to 428 alarm logs can be stored and viewed.

If SDcard Data Logging is enabled, the alarm logs will also be stored to the installed micro SD card. The micro SD card is equipped with 2 GB of storage.

Figure 21: Local Alarms Log

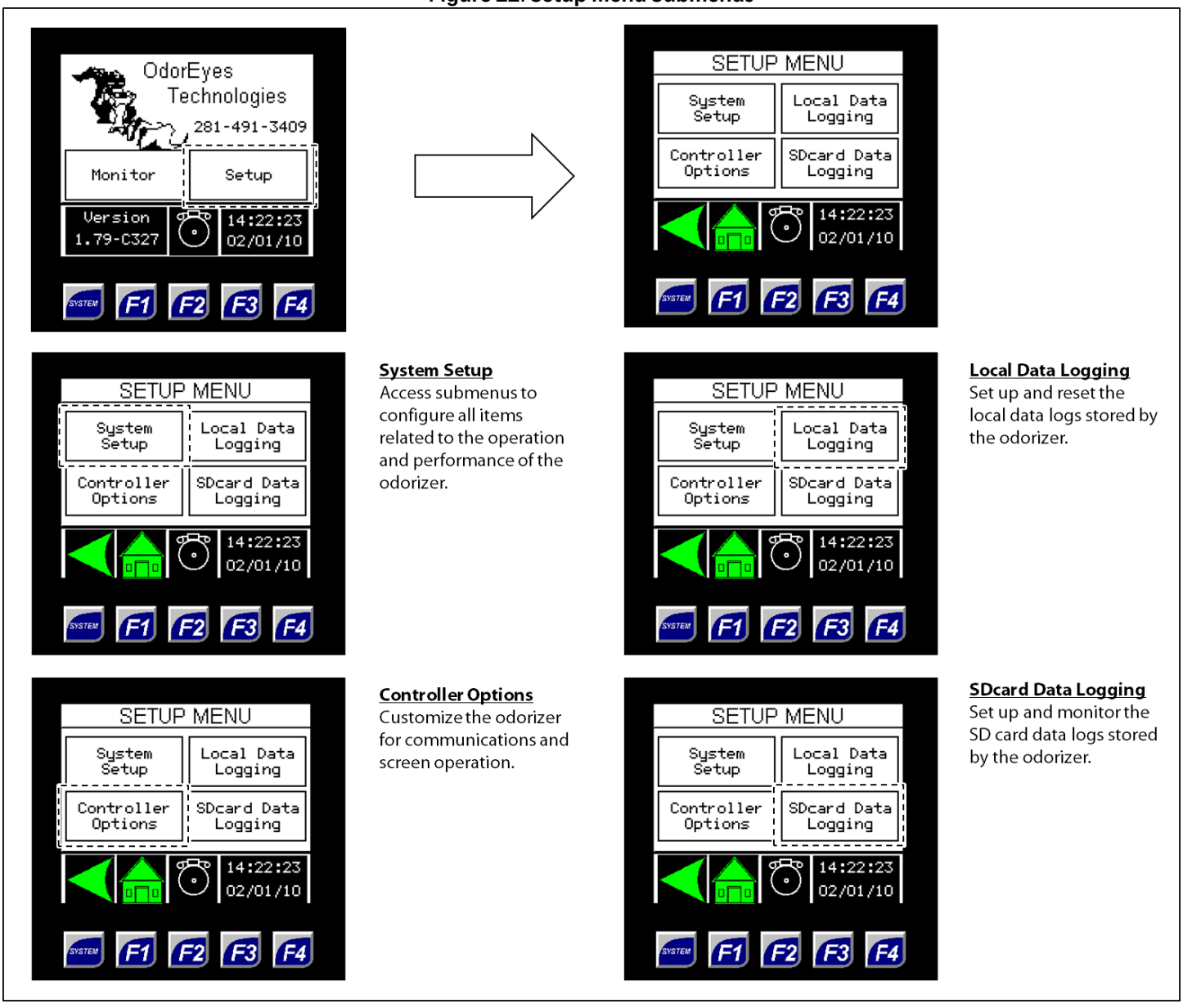


3.3 Navigating the Setup Menus

Through the Setup menu, the user can access the System Setup, Controller Options, Local Data Logging, and SDcard Data Logging submenus and change numeric and/or text values that alter the parameters and features of the odorizer.

Changing numeric and/or text values in the Setup submenus will alter how the system operates.

Figure 22: Setup Menu Submenus



Changing Values on Setup Screens

Numeric Values

1. To change a numeric value, press on the value to be changed. A keypad will appear on the screen.
2. Type the new value using the keypad.
3. Once the new numeric value has been entered, press ENTER to save the changes.

> If the new value entered is outside the range of allowable values, the value will revert to the previous value once ENTER is pressed. The keypad will stay active, allowing another value to be entered.

Text Values

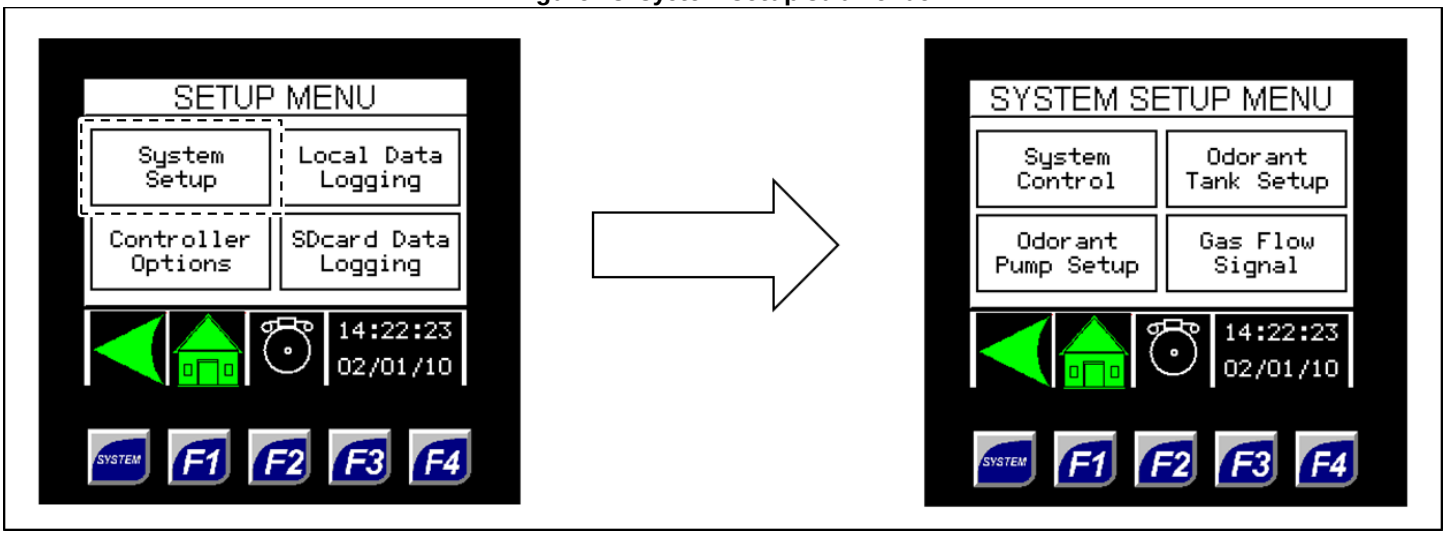
4. To change a text value, press on the value to be changed. A dropdown menu will appear on the screen.
5. Scroll through the value's options using the arrow keys in the dropdown menu.
6. Highlight the desired text value, and then press ENTER to save the changes.

> If a mistake is made while entering the new value or if the value does not need to be changed, press the home button to discard the changes and return to the Home screen.

System Setup

> Through the Setup menu, the user can configure all items related to the operation and performance of the odorizer.

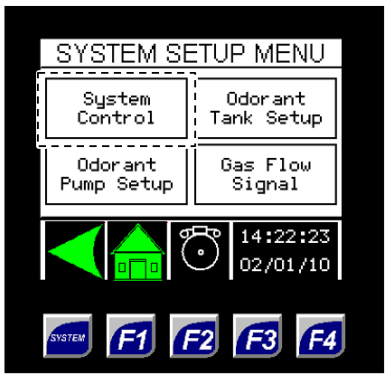
Figure 23: System Setup Submenus

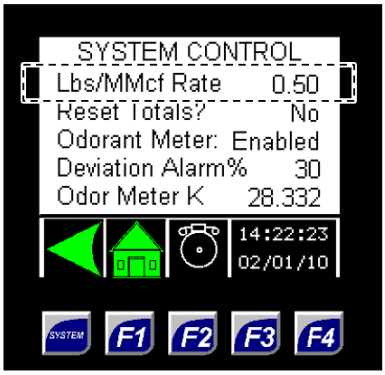


System Control

Through the System Control submenu, the user can set the general parameters for the odorizer.

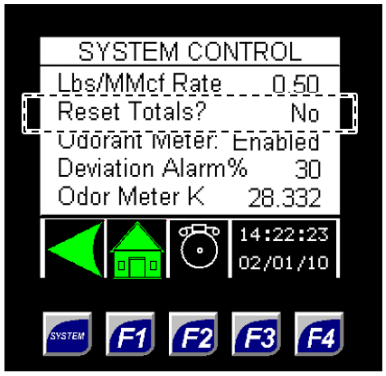
Figure 24: System Setup – System Control





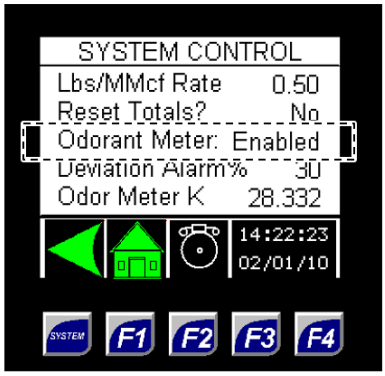
Lbs/MMcf Rate
This is the injection rate the user would like the system to maintain.

The system will stroke the pump faster or slower in order to odorize proportional to flow and to maintain this injection rate.



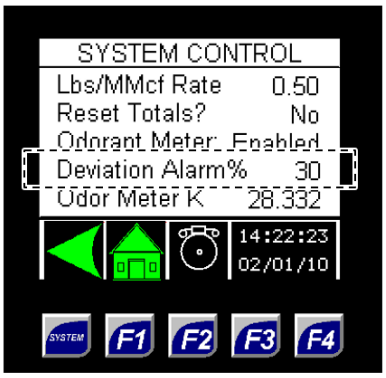
Reset Totals
Toggling this field to "Yes" causes the gas flow and odorant flow totals to be reset.

Once reset, this field will automatically revert back to "No."



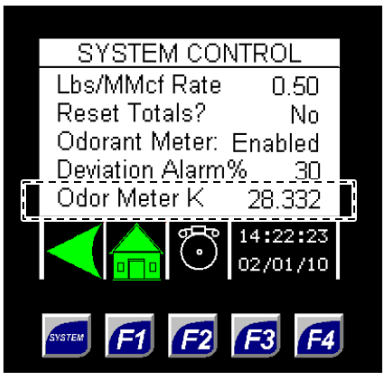
Odorant Meter
When enabled, each stroke of the pump is measured, monitored, and recorded, and the pump stroke frequency will adjust based on this value.

When disabled, each stroke of the pump is assumed to be at its set value.



Deviation Alarm%
This is the allowable deviation the pump can work in before it will alarm for low flow or pump overflow.

The smaller this value, the more closely the user must monitor the pump and the less tolerant the system will be of pump output variations.

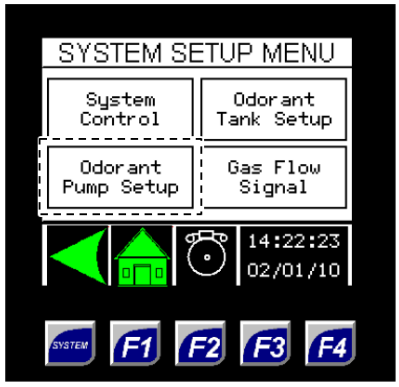


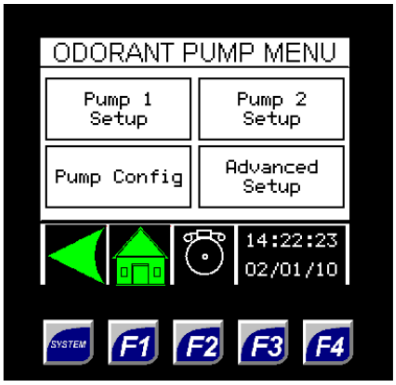
Odor Meter K
This value is factory-set for the odorant flow meter. This value represents how many revolutions of the meter it takes to equal 1 cc of liquid.

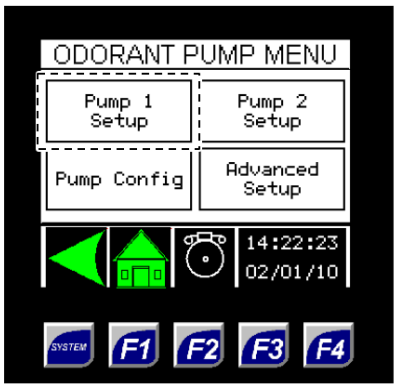
Odorant Pump Setup

Through the Odorant Pump Setup submenus, the user can input information for the injection pump.

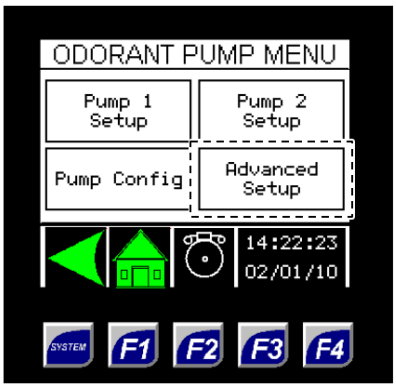
Figure 25: System Setup – Odorant Pump Setup Submenus



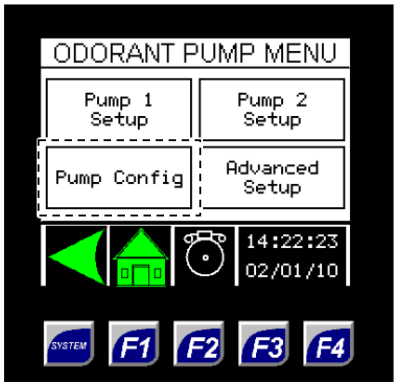




Pump 1 Setup
Set the known output of the pump, manually stroke the pump, reset the total number of pump strokes, and reset the pump alarms.

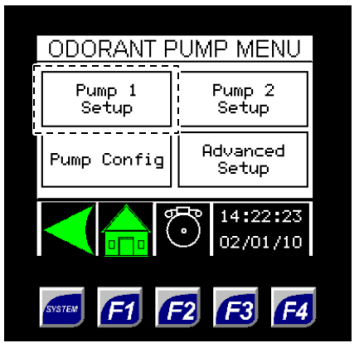


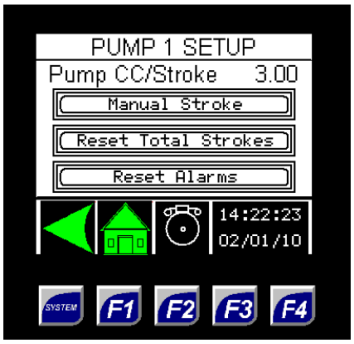
Advanced Setup
Set the minimum cycle time of the pump.

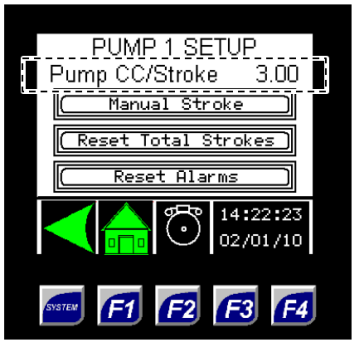


Pump Config
View and change the current operation of the pumps.

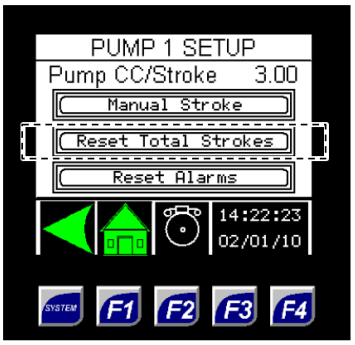
Figure 26: Odorant Pump Setup



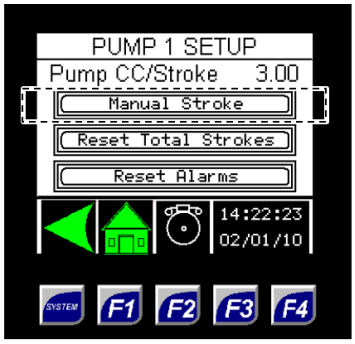




Pump CC/Stroke
Set the known output of the pump in cubic centimeters (cc).

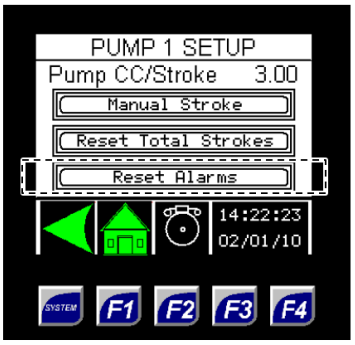


Reset Total Strokes
Pressing this button will reset the total number of strokes for the pump. This option is to assist in the tracking and scheduling of pump maintenance. After being reset, this field will revert to its normal state.



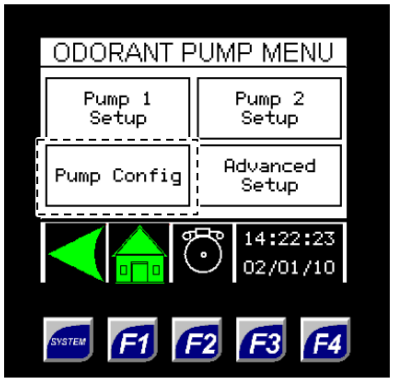
Manual Stroke
Manually stroke the pump.

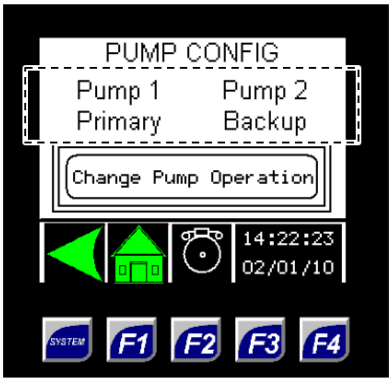
When the pump is set to stroke it will be highlighted until the first available opportunity, at which time it will stroke the pump. After a manual pump stroke, this field will revert to its normal state.



Reset Alarms
Pressing this button will reset the pump alarms, which also resets the average deviation to 0%. Alarms are typically reset after maintenance has been performed on the pump and it is put back into service. After being reset, this field will revert to its normal state.

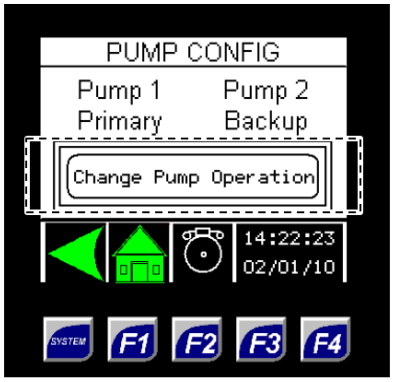
Figure 27: Odorant Pump Setup – Pump Configuration





Pump 1 / Pump 2
View the current operation of the pump.

Note this system has one (1) pump.



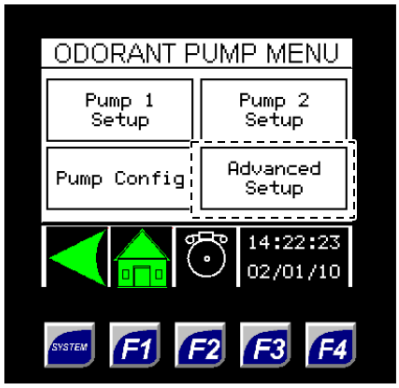
Change Pump Operation
Change the current operation of the pump as displayed above this button.

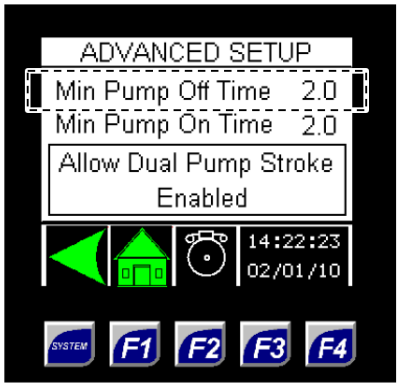
The pumps can be set up according to the Pump Operation Configurations table.

Note this system has one (1) pump.

Pump Operation Configurations	
Pump 1	**Pump 2**
None	None
Primary	None
None	Primary
Primary	Backup
Backup	Primary

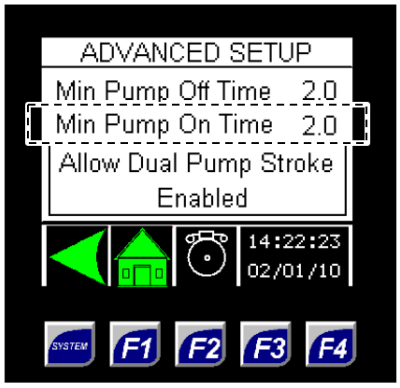
Figure 28: Odorant Pump Setup – Advanced Setup





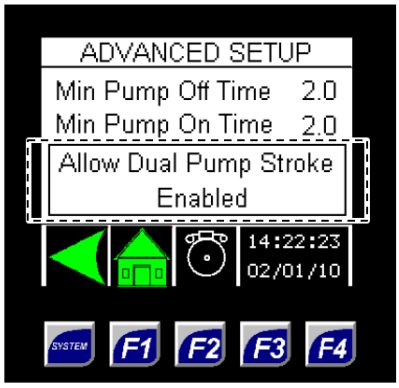
Min Pump Off Time
The minimum amount of time required to reset the pump before the next stroke.

This value is factory-set.



Min Pump On Time
The minimum amount of time required to stroke the pump.

This value is factory-set.

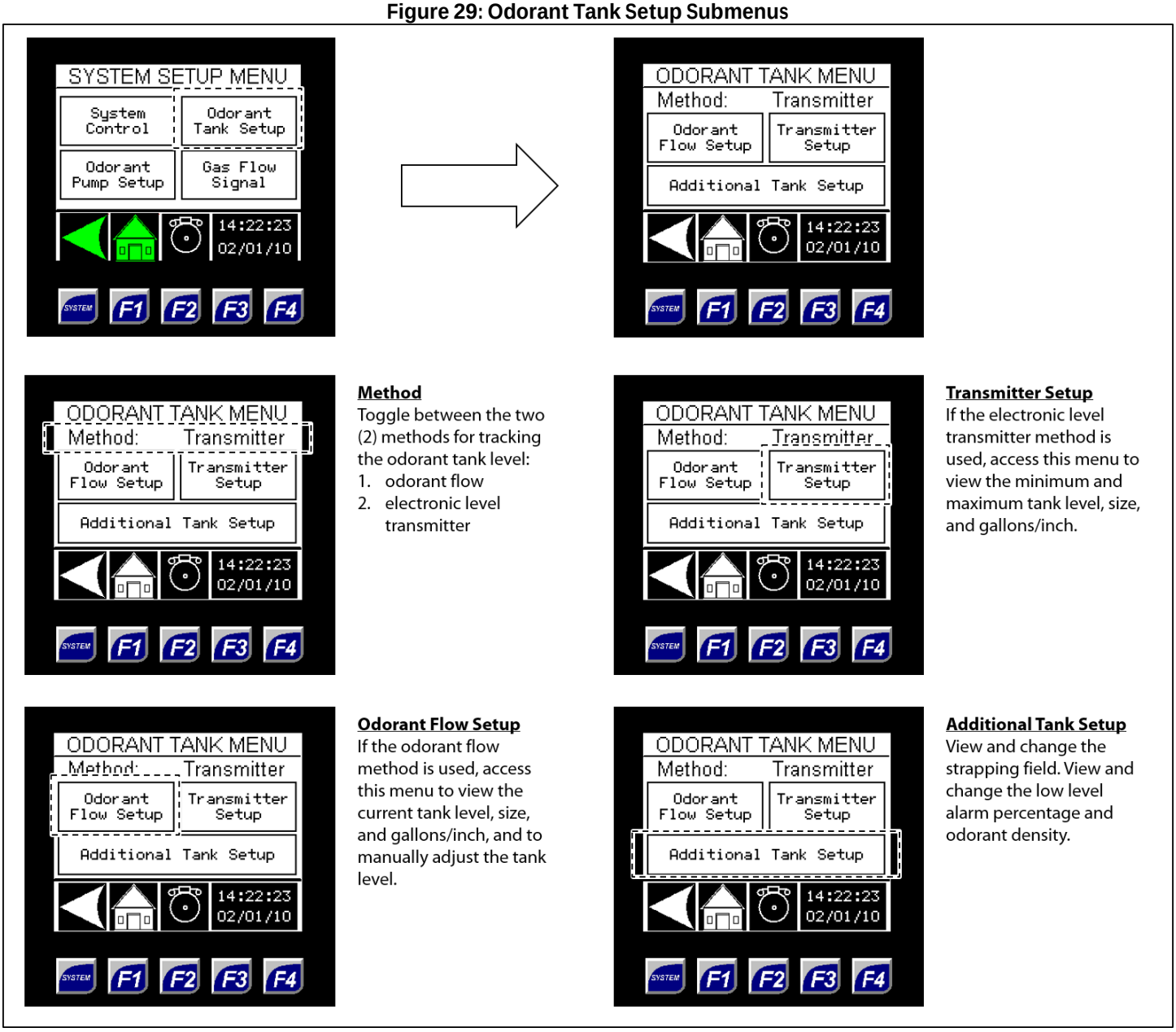


Allow Dual Pump Stroke
This option is factory-set to disabled, as the system has one (1) pump.

Odorant Tank Setup

Through the Odorant Tank Setup submenus, the user can input information for the odorant tank.

Figure 29: Odorant Tank Setup Submenus



Method
Toggle between the two (2) methods for tracking the odorant tank level:
1. odorant flow
2. electronic level transmitter

Transmitter Setup
If the electronic level transmitter method is used, access this menu to view the minimum and maximum tank level, size, and gallons/inch.

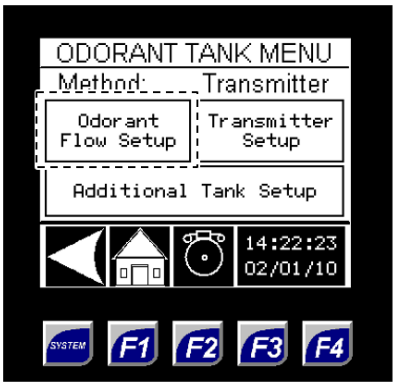
Odorant Flow Setup
If the odorant flow method is used, access this menu to view the current tank level, size, and gallons/inch, and to manually adjust the tank level.

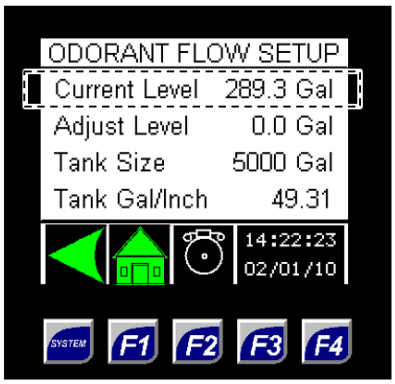
Additional Tank Setup
View and change the strapping field. View and change the low level alarm percentage and odorant density.

When using an electronic level transmitter to track the odorant tank level, the Method should be set to Transmitter. When estimating the odorant tank level based on odorant usage, the Method should be set to Odorant Flow.

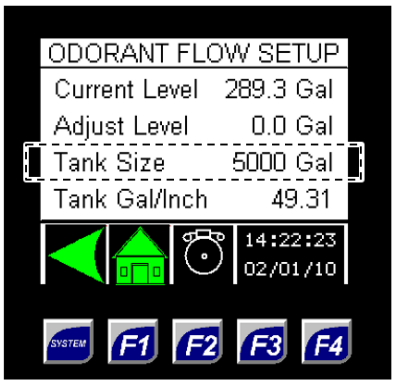
Odorant Flow Setup

Figure 30: Odorant Tank Setup – Odorant Flow Setup

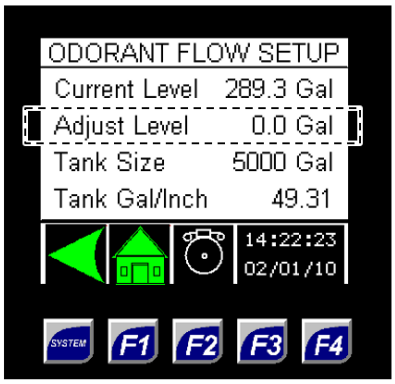




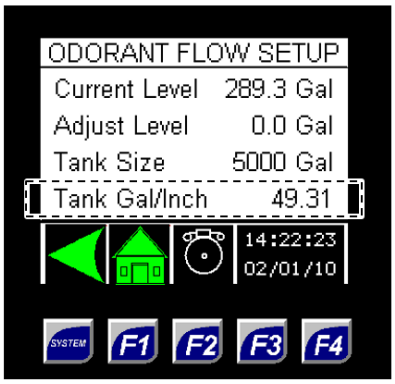
Current Level
View the current level of the tank in US gallons.



Tank Size
This is the volume of the tank in US gallons.



Adjust Level
If the odorant flow method is used, the current tank level can be manually adjusted.



Tank Gal/Inch
This value is used to convert between US gallons and inches.

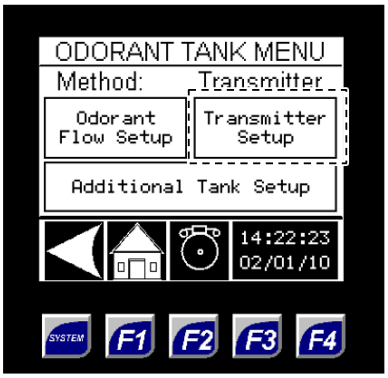
For vertical tanks, this value is based on the average US gallons/inch for the entire tank.

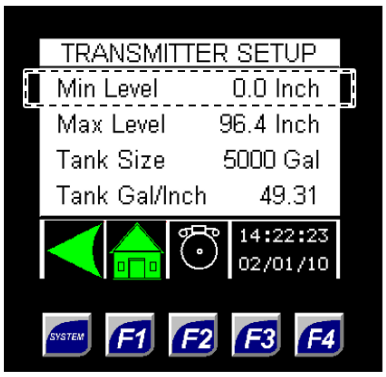
The Current Level numeric value cannot be directly changed. Instead, the user must enter a value in the Adjust Level field to increase or decrease the Current Level by the specified amount.

- To decrease the Current Level, enter the volume to be subtracted from the current level as a negative number in the Adjust Level field, and then press ENTER to save the changes. The Current Level should have decreased by the amount entered, and the Adjust Level should have reverted to 0.0 Gal.
- To increase the Current Level, enter the volume to be added to the current level in the Adjust Level field, and then press ENTER to save the changes. The Current Level should have increased by the amount entered, and the Adjust Level should have reverted to 0.0 Gal.

Note this system is not equipped with a level transmitter.

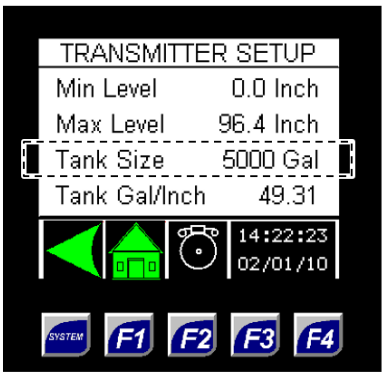
Figure 31: Odorant Tank Setup – Transmitter Setup



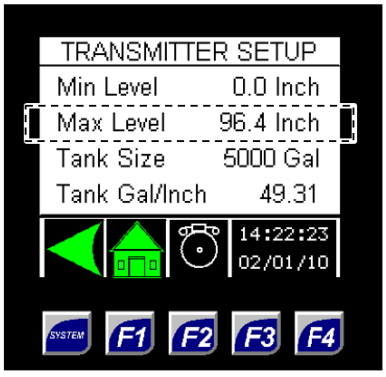


Min Level
If the electronic level transmitter method is used, this value is the 4 mA signal.

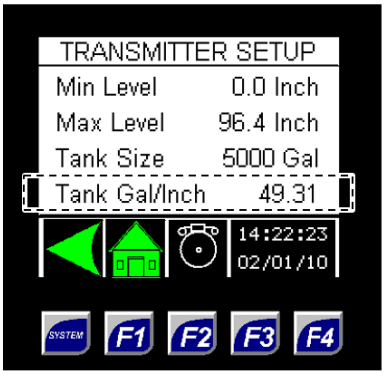
This value is typically factory-set at 0.0 inches.



Tank Size
This is the volume of the tank in US gallons.



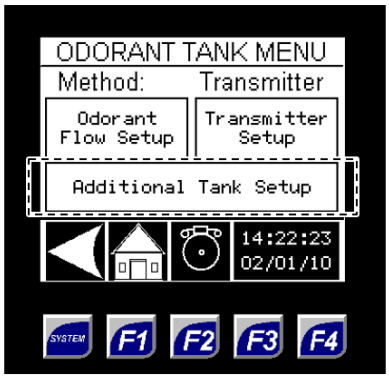
Max Level
If the electronic level transmitter method is used, this value is the 20 mA signal.



Tank Gal/Inch
This value is used to convert between US gallons and inches.

For vertical tanks, this value is based on the average US gallons/inch for the entire tank.

Figure 32: Odorant Tank Setup – Additional Tank Setup



Strapping
Toggle this field to enable or disable the tank strapping table.

For horizontal odorant tanks, this field should be **enabled**.

For vertical odorant tanks, this field should be **disabled**.

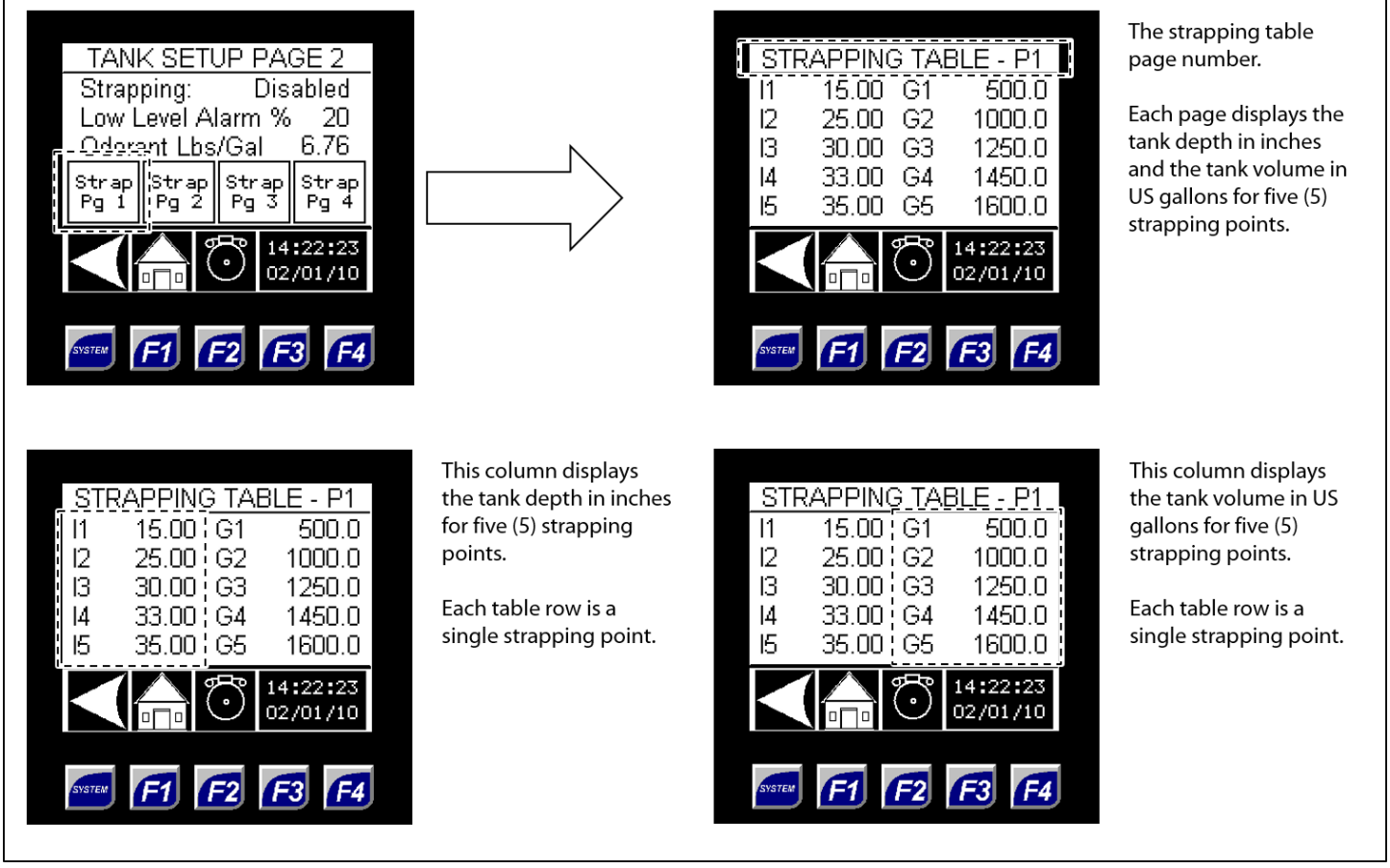
Odorant Lbs/Gal
The odorant density will vary according to the odorant used.

The odorant density should be published by the odorant manufacturer in pounds/US gallon at 60 °F.

Low Level Alarm %
The low level alarm set point is a percent value at which the system will trigger an alarm for low odorant level in the tank.

Strap Pg 1, 2, 3, and 4
If strapping is enabled, view the tank depth and tank volume for each strapping point.

Figure 33: Odorant Tank Setup – Additional Tank Setup, Strapping Tables



If the odorant tank is horizontal, the strapping points will be calculated and entered at the factory.

Gas Flow Signal

Through the Gas Flow Signal submenus, the user can set up the parameters of the odorant gas flow input signal.

Figure 34: System Setup – Gas Flow Signal Submenus

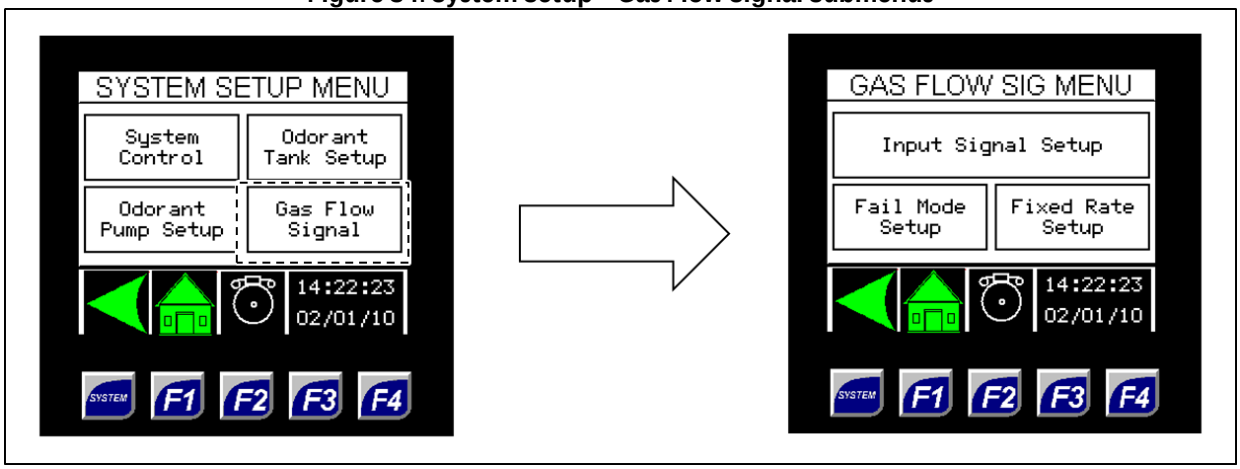
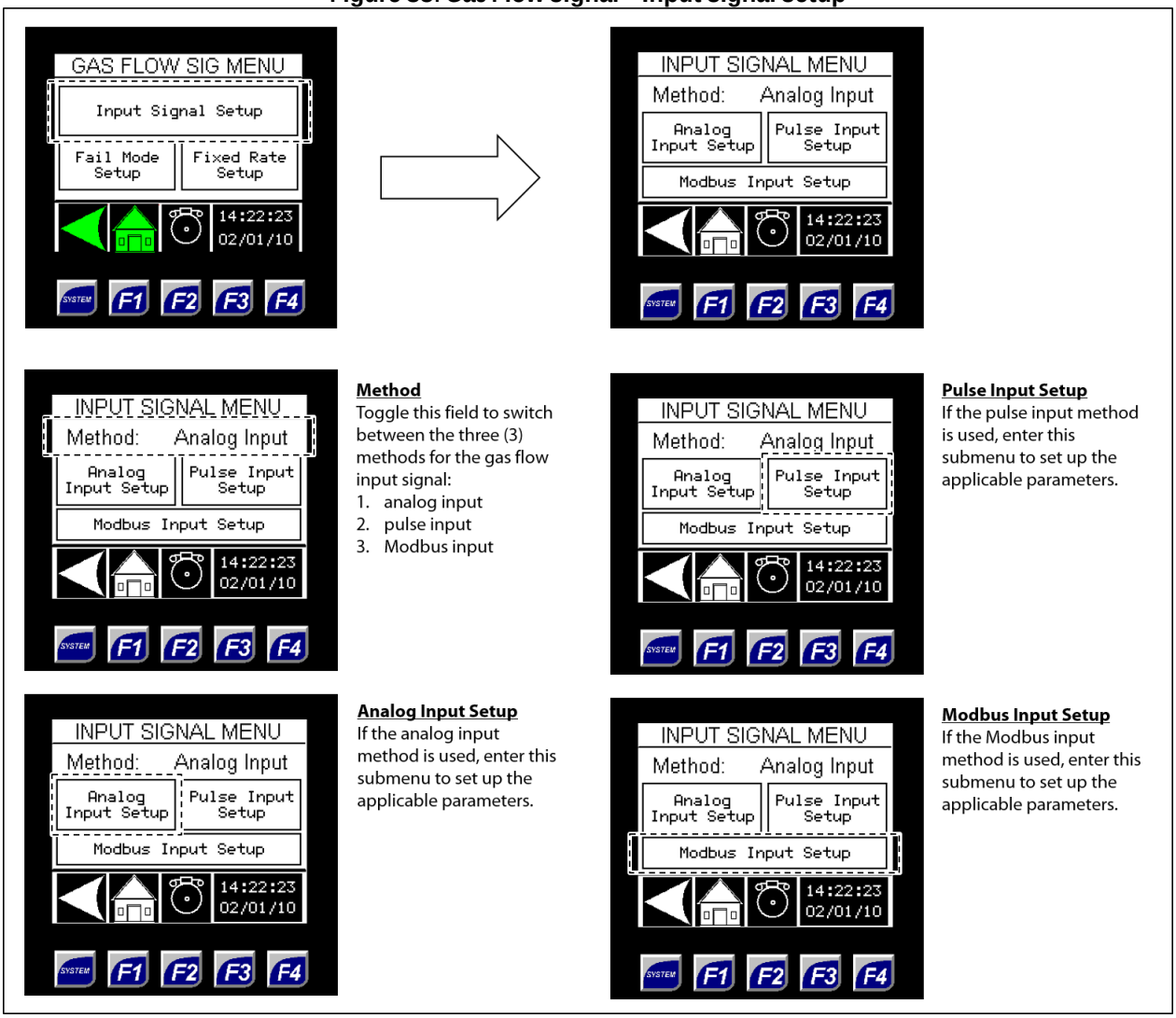


Figure 35: Gas Flow Signal – Input Signal Setup



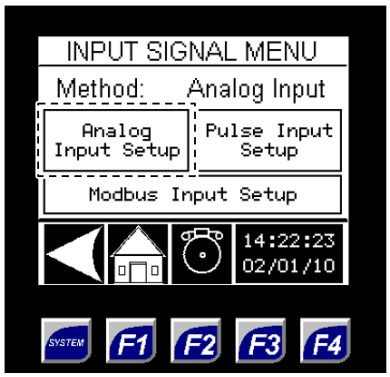
Method
Toggle this field to switch between the three (3) methods for the gas flow input signal:
1. analog input
2. pulse input
3. Modbus input

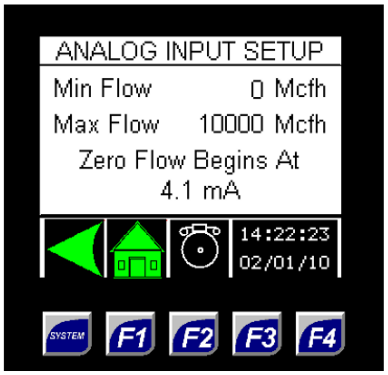
Pulse Input Setup
If the pulse input method is used, enter this submenu to set up the applicable parameters.

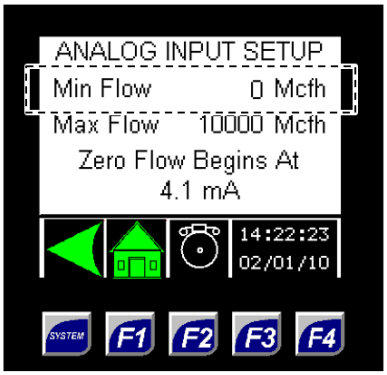
Analog Input Setup
If the analog input method is used, enter this submenu to set up the applicable parameters.

Modbus Input Setup
If the Modbus input method is used, enter this submenu to set up the applicable parameters.

Figure 36: Gas Flow Signal – Analog Input Setup

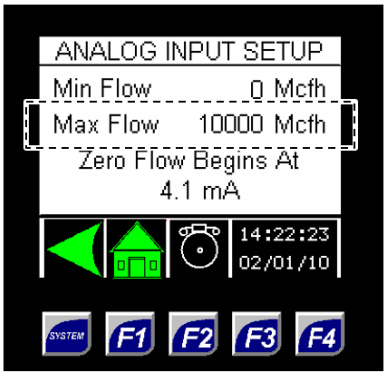




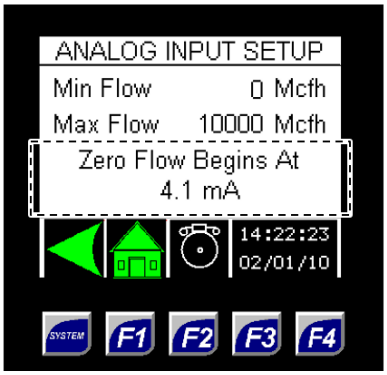


Min Flow
If the analog input method is used, this value is the 4 mA signal.

In most cases, this value comes factory-set to zero (0) Mcf/h.



Max Flow
If the analog input method is used, this value is the 20 mA signal.

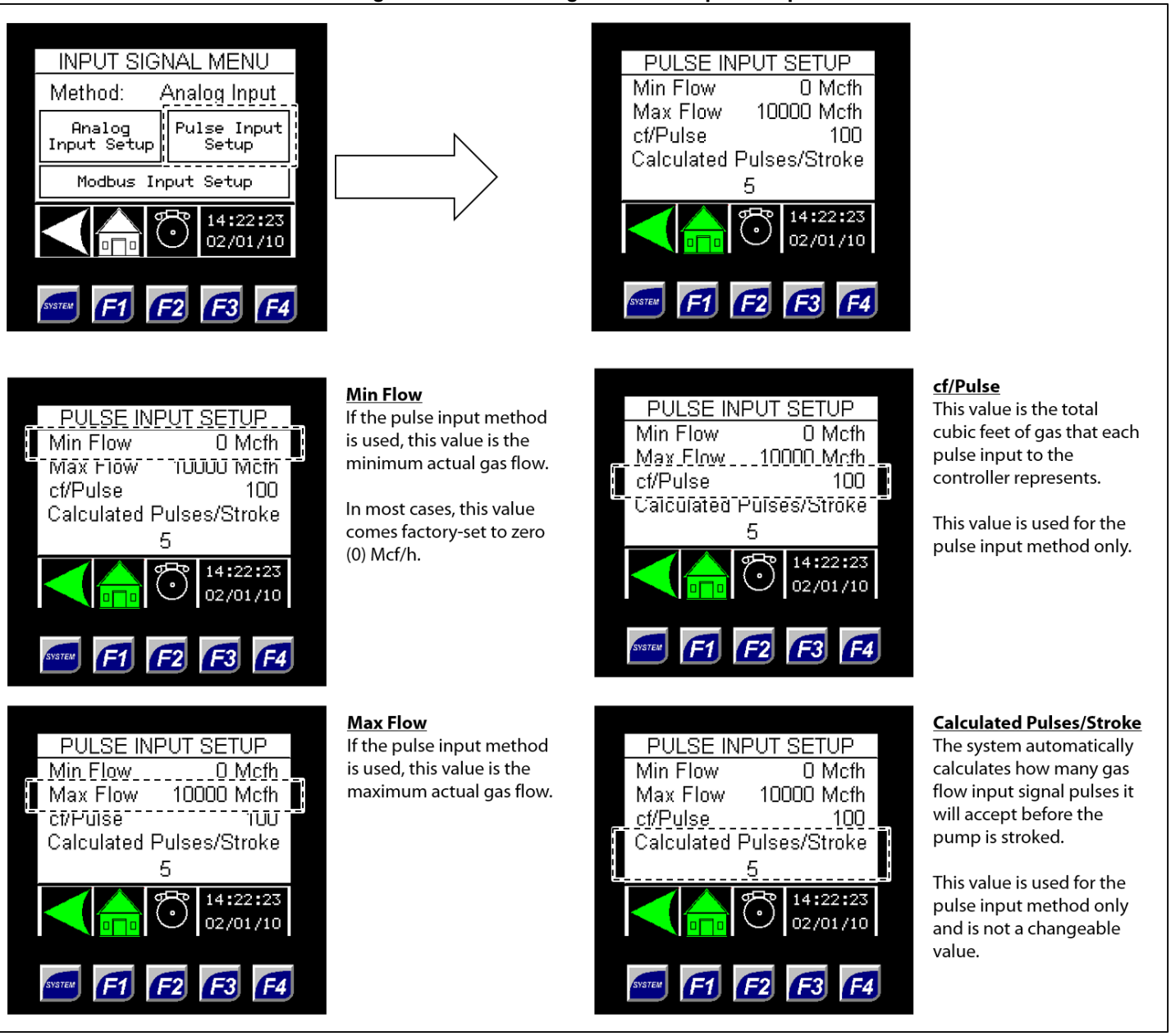


Zero Flow Begins At
This value is only active if the analog input method is used.

Any value below this gas flow low cutoff value (in milliamps) will be treated as zero gas flow (0 Mcf/h).

If the gas flow signal will be analog, the analog signal must be 4–20 mA powered by the user.

Figure 37: Gas Flow Signal – Pulse Input Setup



Min Flow
If the pulse input method is used, this value is the minimum actual gas flow.

In most cases, this value comes factory-set to zero (0) Mcf/h.

Max Flow
If the pulse input method is used, this value is the maximum actual gas flow.

cf/Pulse
This value is the total cubic feet of gas that each pulse input to the controller represents.

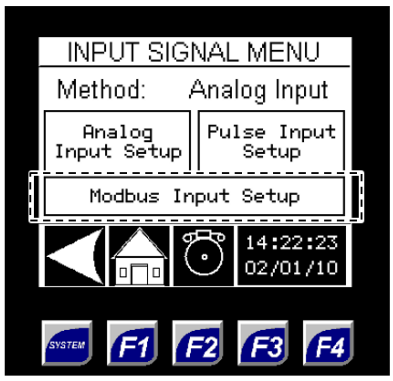
This value is used for the pulse input method only.

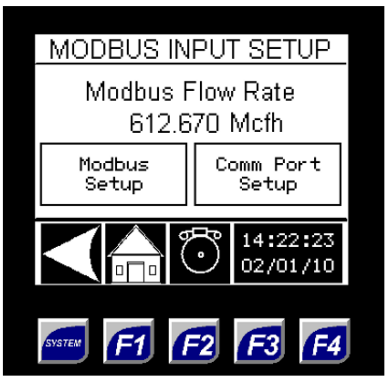
Calculated Pulses/Stroke
The system automatically calculates how many gas flow input signal pulses it will accept before the pump is stroked.

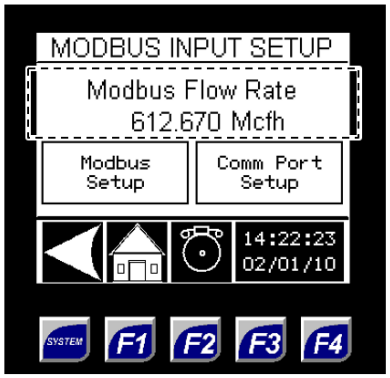
This value is used for the pulse input method only and is not a changeable value.

If the gas flow signal will be a pulse, the pulse will be a digital pulse powered by the controller.

Figure 38: Gas Flow Signal – Modbus Input Setup Submenus

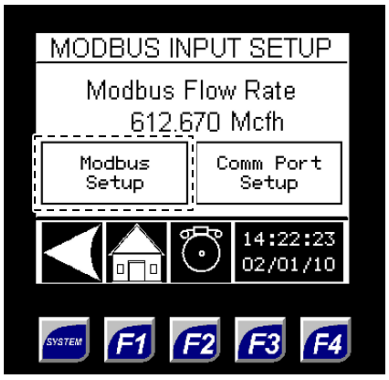






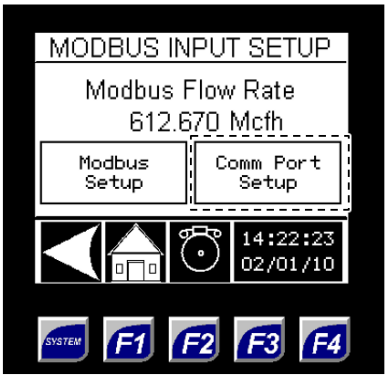
Modbus Flow Rate
If the Modbus input method is used, this is the value the Modbus is downloading for the flow rate (Mcf/h)

This value can be changed here for testing purposes.



Modbus Setup
If the Modbus input method is used, enter this submenu to configure the Modbus input and view the current status of the Modbus.

See *Figures 39* and *40*.

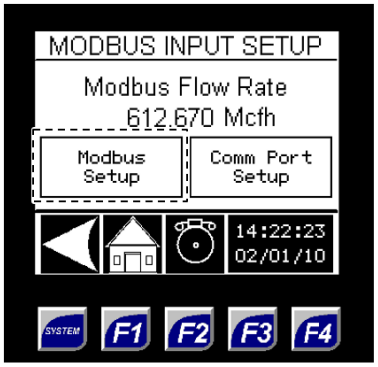


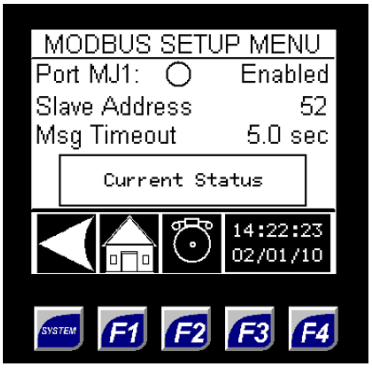
Comm Port Setup
If the Modbus input method is used, enter this submenu to configure the communication settings for the Modbus.

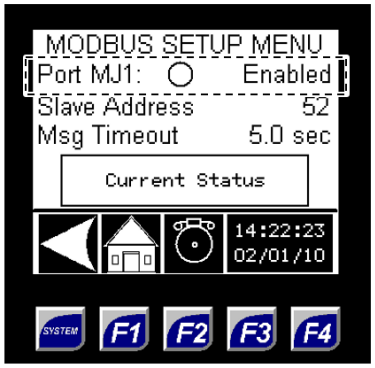
See *Figure 41*.

If the gas flow signal will be Modbus, the Modbus input will be a value downloaded from the Modbus master device in Mcf/h. The Modbus Register is 43275, and the input value should be downloaded as a 32-bit float.

Figure 39: Modbus Input – Modbus Setup

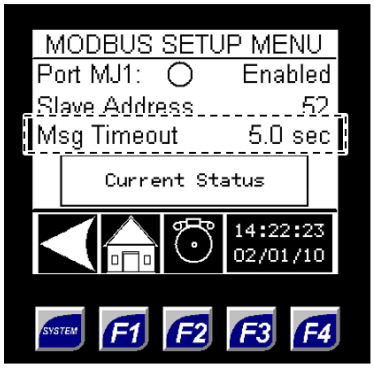




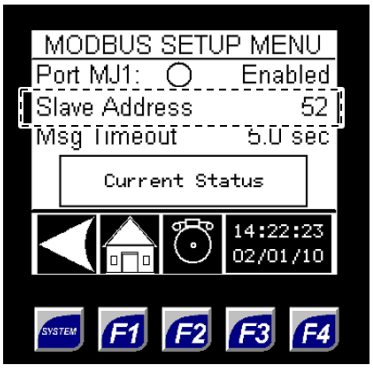


Port MJ1
When enabled, the mode of port MJ1 switches to the mode set in the Comm Port Setup menu.

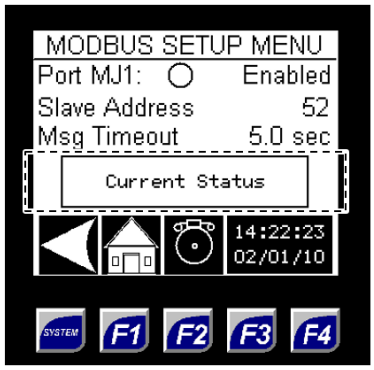
If the system is able to switch the mode of port MJ1 according to the setting, the round switch light will illuminate.



Msg Timeout
This value is the timeout between Modbus messages.



Slave Address
This value is the Modbus slave address of the odorizer.

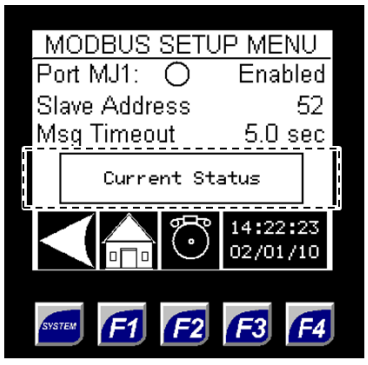


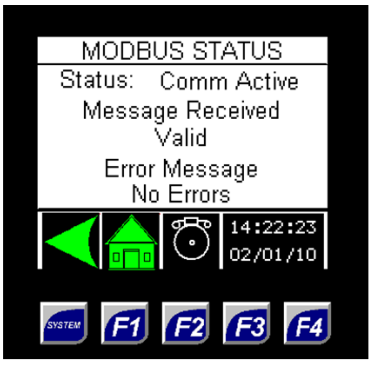
Current Status
Access this submenu to view the current status of the Modbus.

See *Figure 40*.

Modbus Setup can also be accessed through the Controller Options submenu (*Figure 44*).

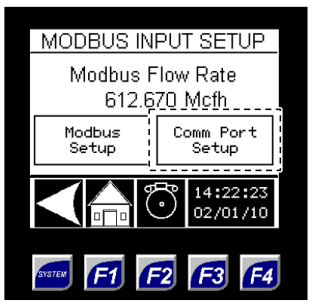
Figure 40: Modbus Setup – Current Status

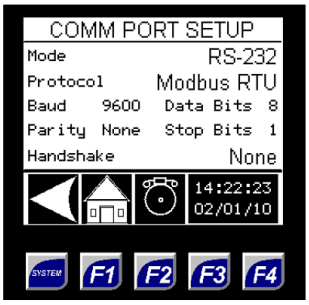


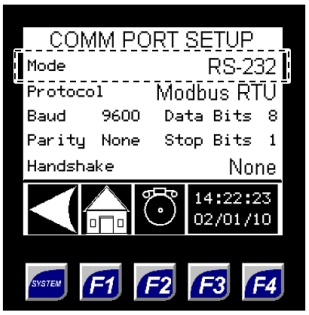


This submenu displays the current status of the Modbus for troubleshooting purposes.

Figure 41: Modbus Input – Comm Port Setup

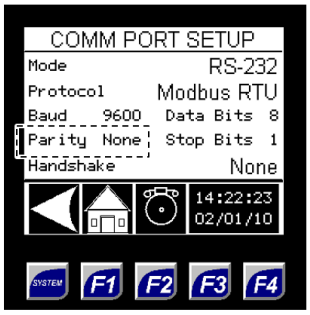




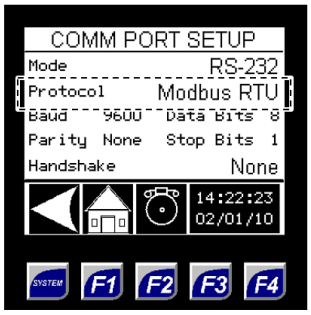


Mode
The mode setting applies to port MJ1 only.

The mode can be set to:
- RS232
- RS485
- Modem
- Ethernet
- Fiber A
- Fiber B
- GSM Dual
- GSM Quad
- Radio 900 MHz
- Radio Zigbee

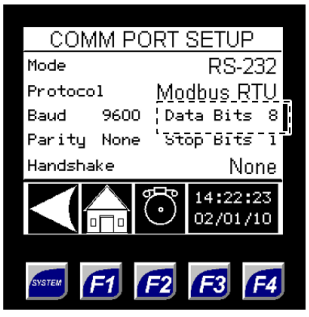


Parity
This value can be set to None, Odd, or Even.

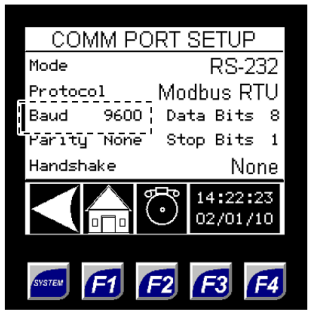


Protocol
The protocol setting applies to port MJ1 only.

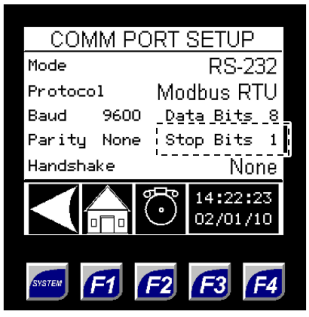
The protocol can be set to:
- CsCAN
- Generic
- Modbus RTU
- Modbus ASCII
- Modbus TCP



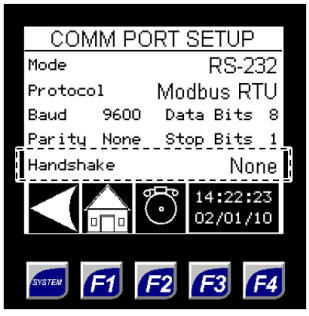
Data Bits
This value can be set to 7 or 8.



Baud
The available baud rate ranges from 300 to 115200.



Stop Bits
This value can be set to 1 or 2.

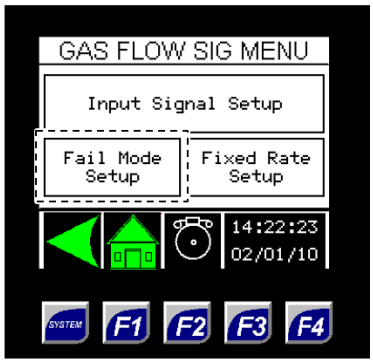


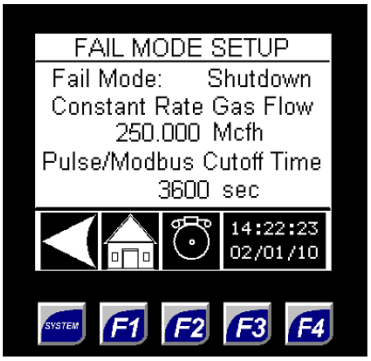
Handshake
The required handshake can depend on the Mode and/or Protocol used.

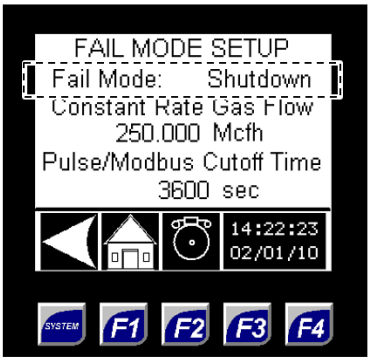
The handshake can be set to:
- None
- Xon/Xoff
- Hardware
- Multidrop Full
- Multidrop Half
- Radio Modem

Comm Port Setup can also be accessed through the Controller Options submenu (*Figure 49*).

Figure 42: Gas Flow Signal – Fail Mode Setup

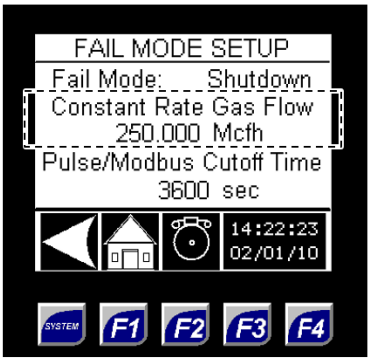






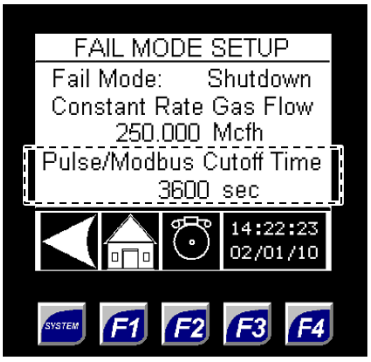
Fail Mode
This value tells the controller how you want the system to react in the event of a gas flow signal loss.

The system can fail in shutdown or constant rate mode.



Constant Rate Gas Flow
This value is only active if the fail mode is set to constant rate mode.

In the event of a gas flow signal loss, the system will continue to odorize at the constant rate set here (Mcf/h).



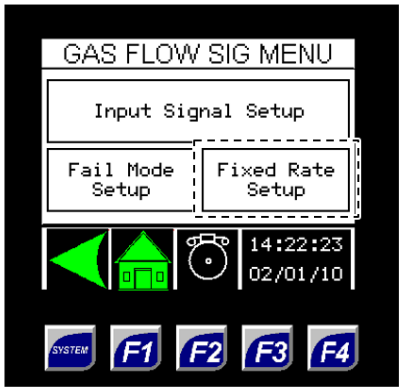
Pulse/Modbus Cutoff Time
If the pulse input method is used, this value is the amount of time (in seconds) the system will wait between pulse inputs before it will determine there is a gas flow signal loss.

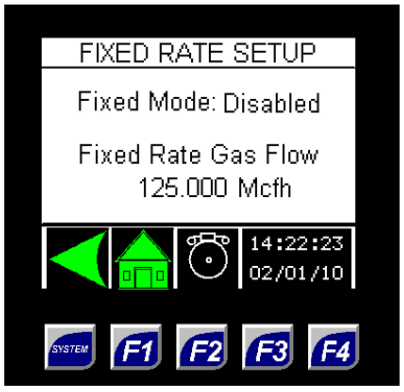
If the Modbus input method is used, this value is the amount of time (in seconds) the system will wait between changes of the downloaded Modbus value.

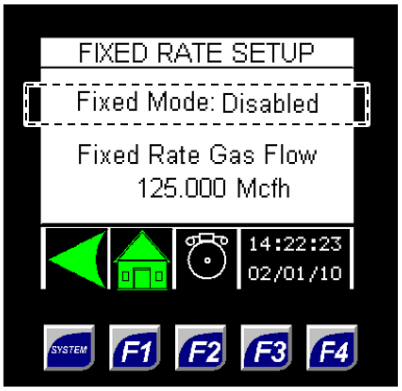
Setting the Fail Mode to Shutdown will halt odorization until the alarm is cleared.
Setting the Fail Mode to Constant Rate will allow odorization to continue at the specified rate.

If the gas flow value does not change during the Pulse/Modbus Cutoff Time, the system will alarm for loss of flow and will enter the specified Fail Mode. The alarm will clear on the next pulse input or change in Modbus gas flow, and the system will resume normal operation.

Figure 43: Gas Flow Signal – Fixed Rate Setup

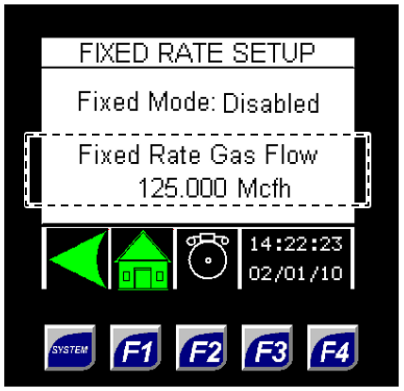






Fixed Mode
When disabled, the system will odorize proportional to flow.

When enabled, the rate entered will be the assumed gas flow in the system and will override any other input parameters. The Fixed Rate Alarm will be active on the Alarms screen.

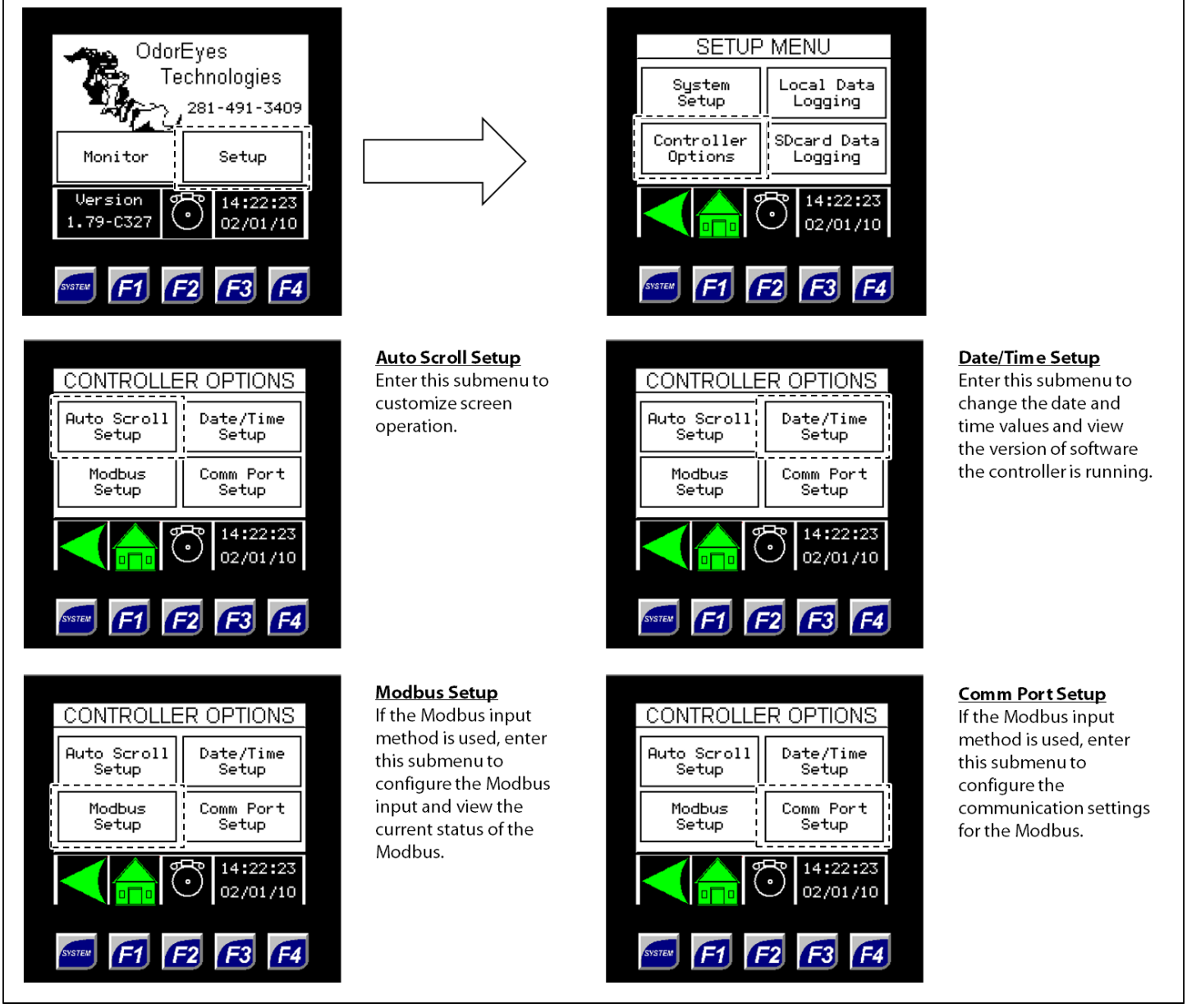


Fixed Rate Gas Flow
When Fixed Mode is enabled, the flow rate (Mcf/h) must be manually set. The system will odorize based on this rate until Fixed Mode is disabled.

Controller Options

Through the Controller Options submenus, the user can customize the screen operation and set up communication for the controller.

Figure 44: System Setup – Controller Options Submenu



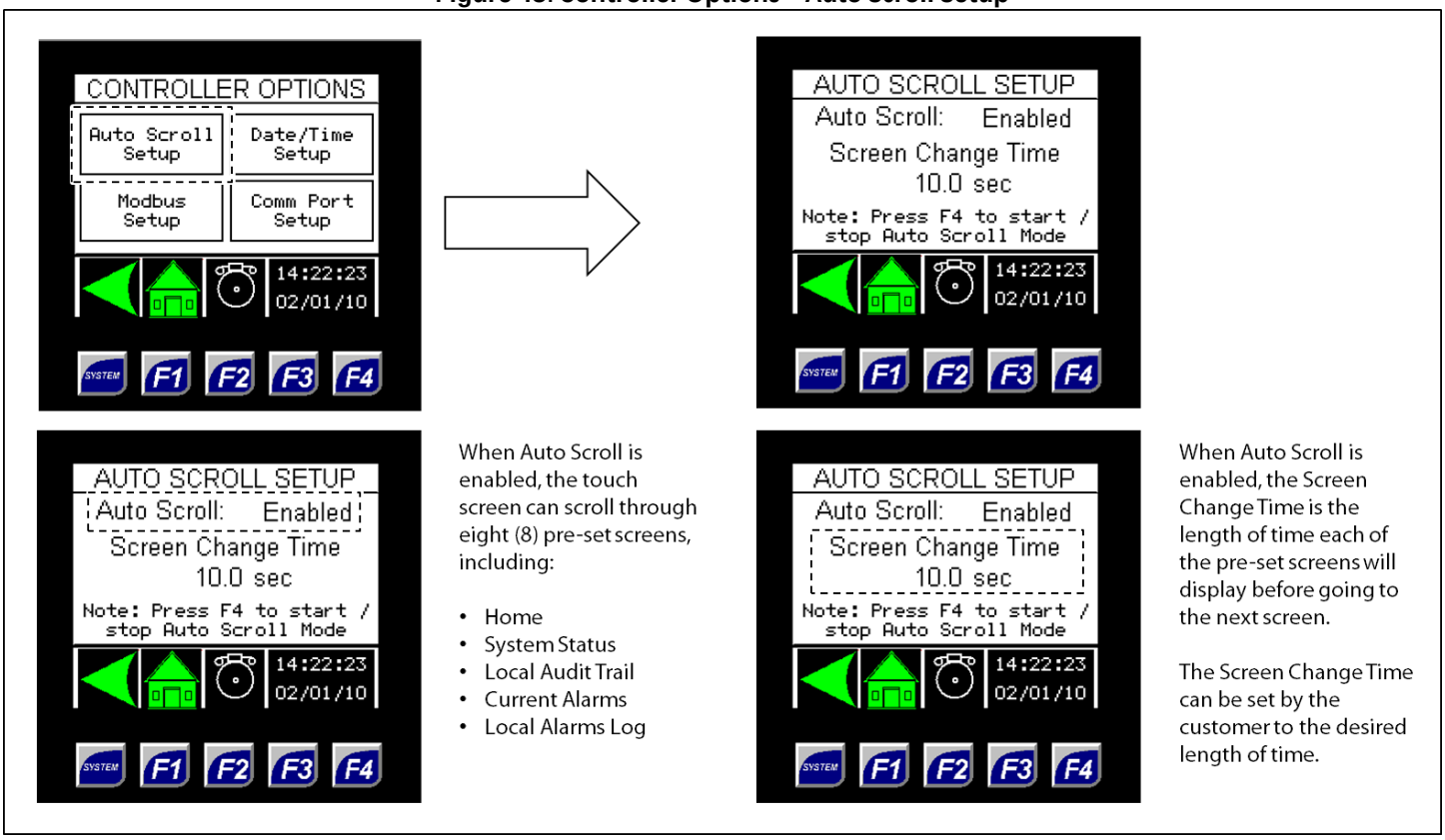
Auto Scroll Setup
Enter this submenu to customize screen operation.

Date/Time Setup
Enter this submenu to change the date and time values and view the version of software the controller is running.

Modbus Setup
If the Modbus input method is used, enter this submenu to configure the Modbus input and view the current status of the Modbus.

Comm Port Setup
If the Modbus input method is used, enter this submenu to configure the communication settings for the Modbus.

Figure 45: Controller Options – Auto Scroll Setup



When Auto Scroll is enabled, the touch screen can scroll through eight (8) pre-set screens, including:

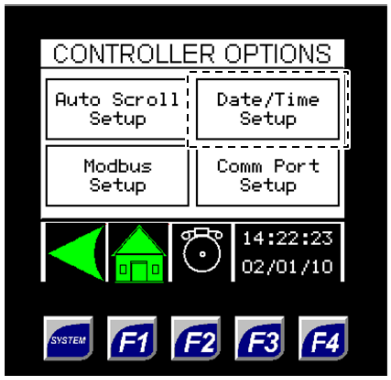
- Home
- System Status
- Local Audit Trail
- Current Alarms
- Local Alarms Log

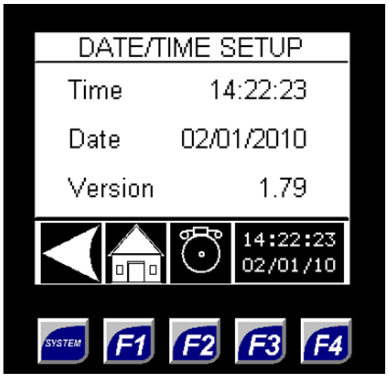
When Auto Scroll is enabled, the Screen Change Time is the length of time each of the pre-set screens will display before going to the next screen.

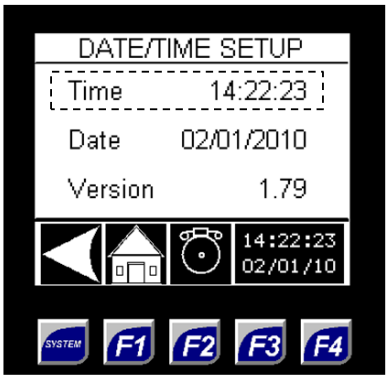
The Screen Change Time can be set by the customer to the desired length of time.

The auto scroll behavior can also be started and stopped by pressing the F4 function key (*Figure 10*).

Figure 46: Controller Options – Date/Time Setup



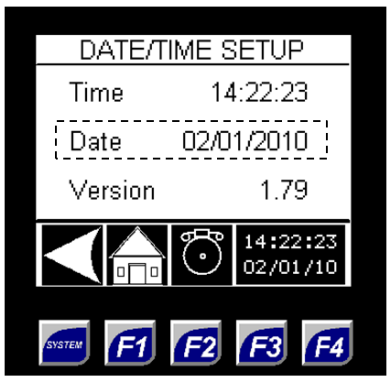




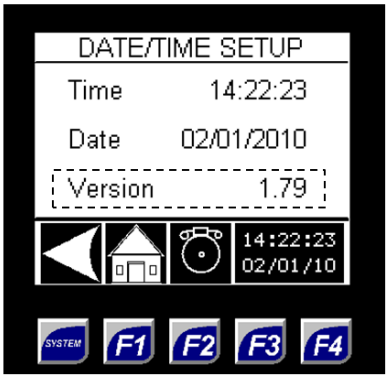
Change the current time here.

The backup battery ensures that the current date and time will not be lost.

Note that the clock does not account for daylight saving time.



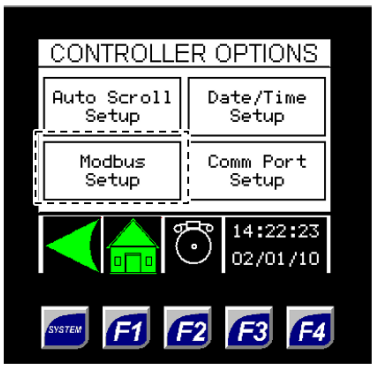
Change the current date here.

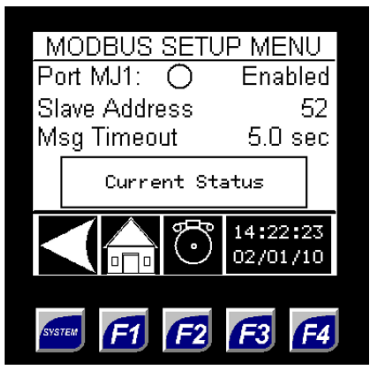


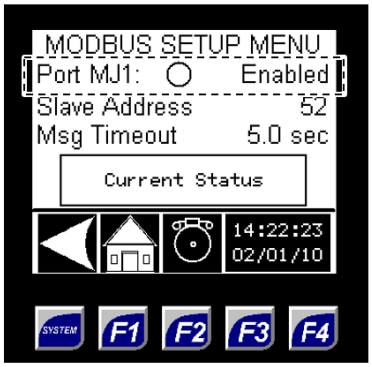
This is the version of software the controller is currently running.

The date and time can also be edited by selecting the current date and time on any screen (*Figure 10*).

Figure 47: Controller Options – Modbus Setup

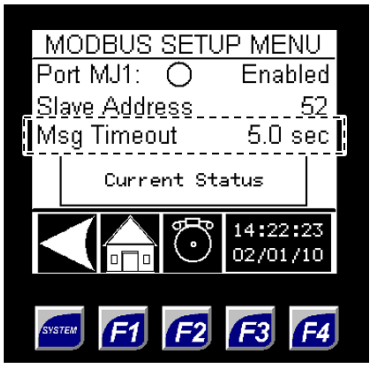




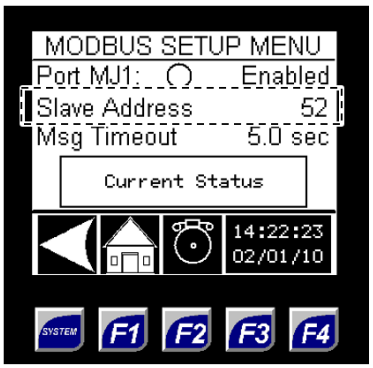


Port MJ1
When enabled, the mode of port MJ1 switches to the mode set in the Comm Port Setup menu.

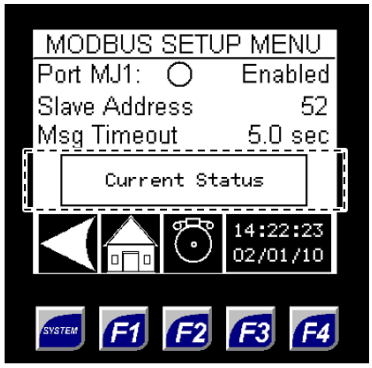
If the system is able to switch the mode of port MJ1 according to the setting, the round switch light will illuminate.



Msg Timeout
This value is the timeout between Modbus messages.



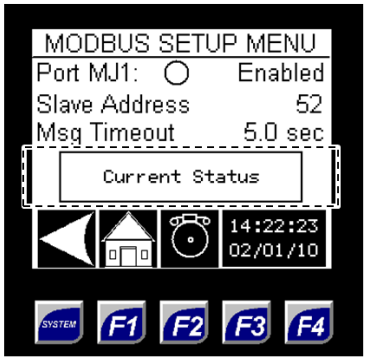
Slave Address
This value is the Modbus slave address of the odorizer.

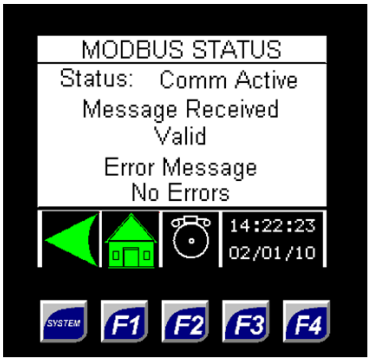


Current Status
Access this submenu to view the current status of the Modbus.

See *Figure 48*.

Figure 48: Modbus Setup – Current Status





This submenu displays the current status of the Modbus for troubleshooting purposes.

Modbus Setup can also be accessed through Gas Flow Signal submenus (*Figure 38*).

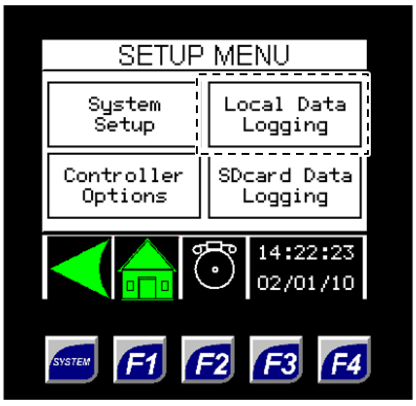
Figure 49: Controller Options – Comm Port Setup

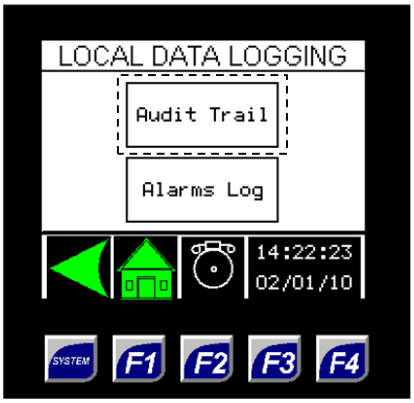
Comm Port Setup can also be accessed through Gas Flow Signal submenus (*Figure 41*).

Local Data Logging

Through the Local Data Logging submenus, the user can set up and reset the data logs stored locally.

Figure 50: System Setup – Local Data Logging Submenus

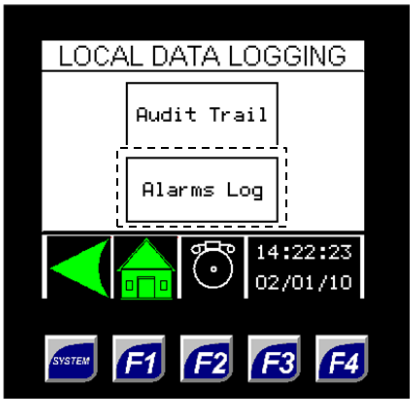




Audit Trail
Set the number of hours each audit trail record will store.

View the number of stored audit trail records and where the current record will be stored in memory.

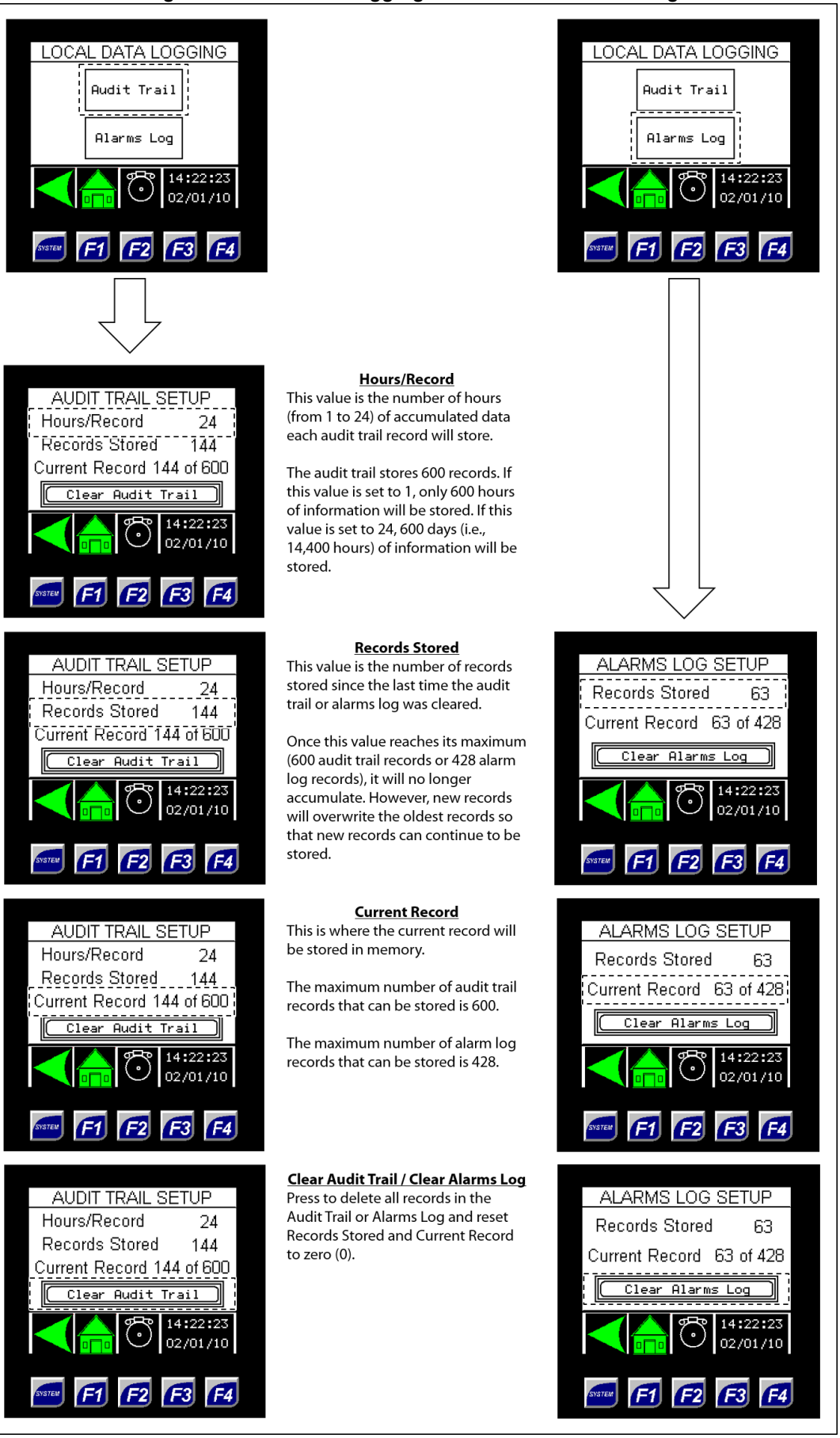
Clear the Audit Trail.



Alarms Log
View the number of stored alarm log records and where the current record will be stored in memory.

Clear the Alarms Log.

Figure 51: Local Data Logging – Audit Trail and Audit Log



Hours/Record
This value is the number of hours (from 1 to 24) of accumulated data each audit trail record will store.

The audit trail stores 600 records. If this value is set to 1, only 600 hours of information will be stored. If this value is set to 24, 600 days (i.e., 14,400 hours) of information will be stored.

Records Stored
This value is the number of records stored since the last time the audit trail or alarms log was cleared.

Once this value reaches its maximum (600 audit trail records or 428 alarm log records), it will no longer accumulate. However, new records will overwrite the oldest records so that new records can continue to be stored.

Current Record
This is where the current record will be stored in memory.

The maximum number of audit trail records that can be stored is 600.

The maximum number of alarm log records that can be stored is 428.

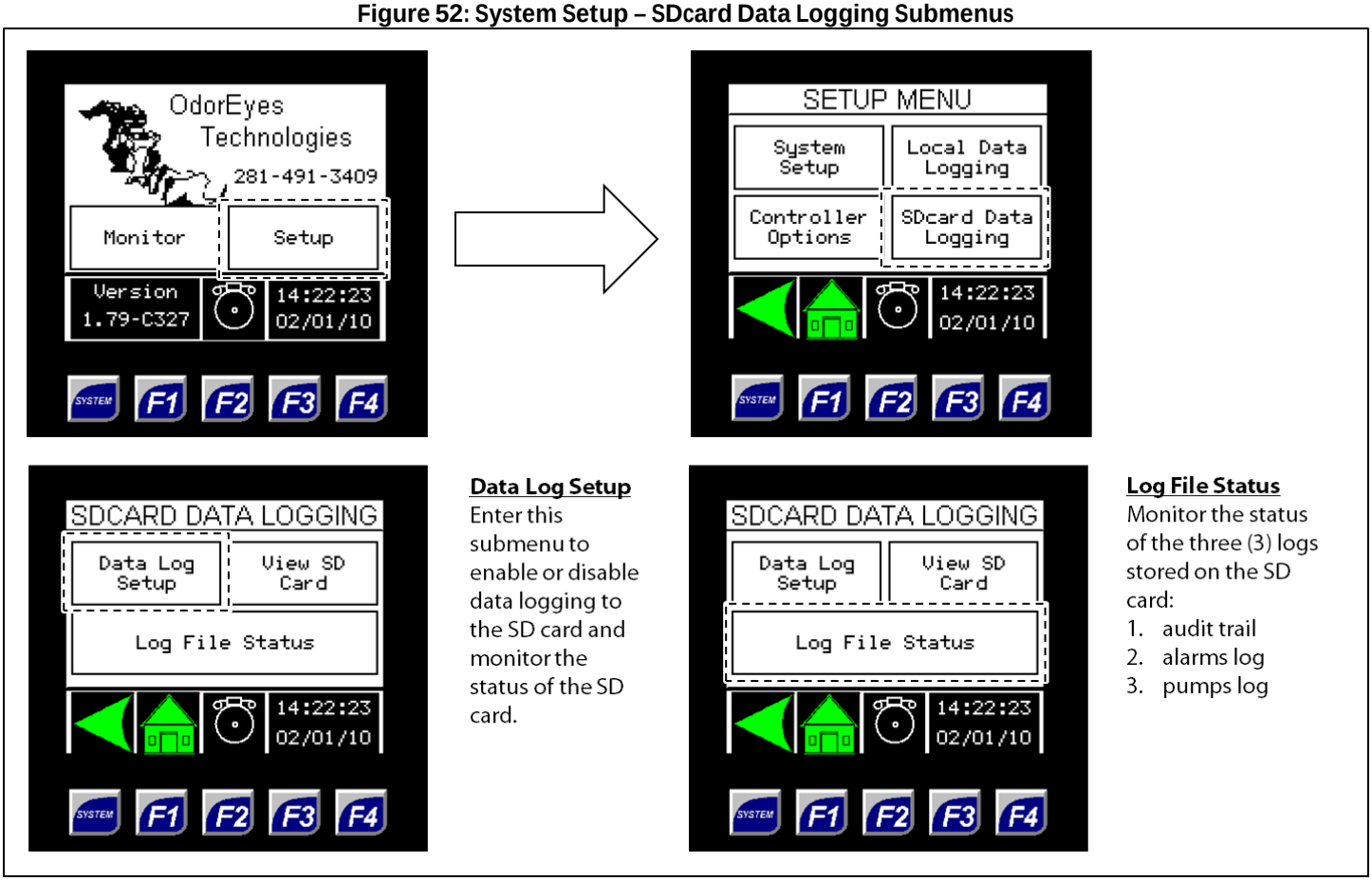
Clear Audit Trail / Clear Alarms Log
Press to delete all records in the Audit Trail or Alarms Log and reset Records Stored and Current Record to zero (0).

SDcard Data Logging

Through the SDcard Data Logging submenus, the user can set up and monitor the data logs stored on the installed micro SD card.

If a micro SD card is installed, data will automatically be logged to the installed card when Data Logging is enabled.

Figure 52: System Setup – SDcard Data Logging Submenus



Data Log Setup
Enter this submenu to enable or disable data logging to the SD card and monitor the status of the SD card.

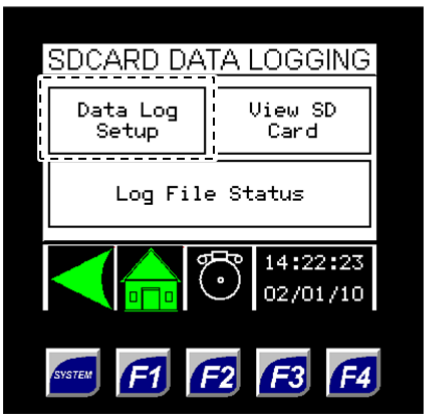
Log File Status
Monitor the status of the three (3) logs stored on the SD card:

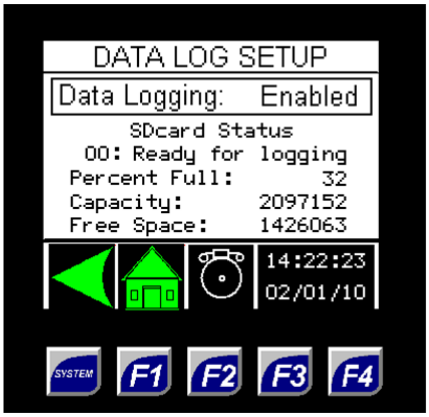
1. audit trail
2. alarms log
3. pumps log

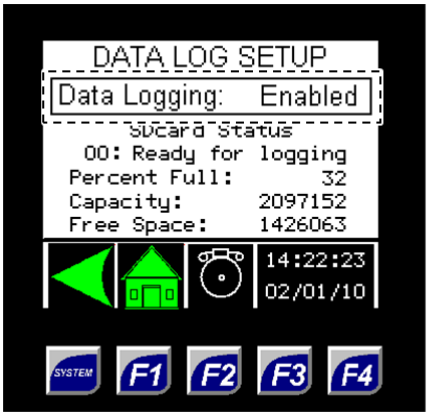
If the micro SD card needs to be removed, first enter Data Log Setup to disable Data Logging. Failure to disable Data Logging prior to removing the micro SD card will trigger the SD Card Error alarm.

To continue data logging, insert a new micro SD card, and then enable Data Logging through the Data Log Setup (*Figure 53*).

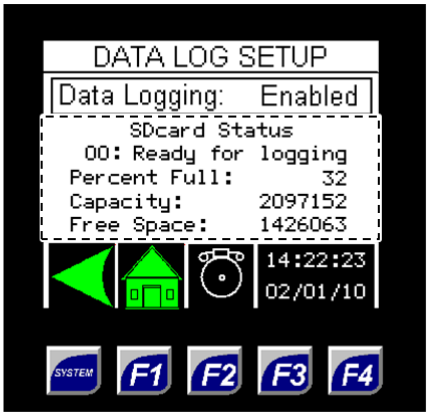
Figure 53: SDcard Data Logging – Data Log Setup





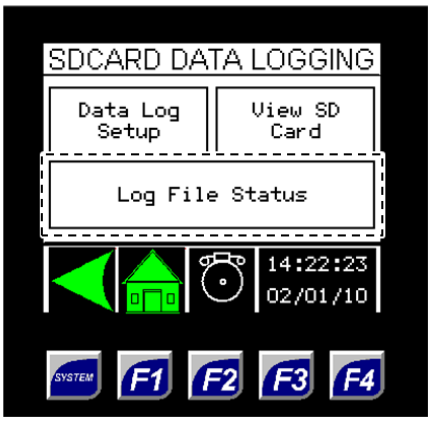


Data Logging
Must be enabled for the system to automatically log information to the installed SD card.



SDcard Status
Monitor the status and storage capacity of the installed SD card.

Figure 54: SDcard Data Logging – Log File Status



Audit Trail Status
Enter this submenu to view the status of the audit log.

A new audit log entry is created every 5 minutes.

Alarms Log Status
Enter this submenu to view the status of the Alarms Log.

A new Alarms Log entry is created when an alarm occurs or clears.

Pumps Log Status
Enter this submenu to view the status of the pumps log.

A new pumps log entry is created with each stroke of the odorizer.

SECTION 4: MAINTENANCE

4.1 Before You Begin

1. **Refer to *Appendix B, Maintenance Schedule,* for the itemized Welker recommended maintenance schedule for the POC.**
2. Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit available for repairs of the system in case of unexpected wear or faulty seals.

New seals supplied in spare parts kits should be lightly lubricated before being installed to ease the installation of the seals and reduce the risk of damage when positioning them on parts. Wipe excess lubricant from the seals, as it may adversely affect analytical instrument results.

For sample-exposed seals, Welker recommends non-hydrocarbon-based lubricants, such as Krytox®.
For non-sample-exposed seals, Welker recommends either non-hydrocarbon-based lubricants or silicone-based lubricants, such as Molykote® 111.

After the seals are installed, the outer diameter of shafts and inner diameter of cylinders may be lubricated to allow smooth transition of parts.

3. All maintenance and cleaning of the unit should be performed on a smooth, clean surface.

4.2 Maintenance

1. During injection, monitor the system for leaks. If leaks are present, halt operation and repair as necessary.
2. Occasionally, a system component may need to be repaired or replaced for manufacturer recommended maintenance. To perform maintenance on components:
    a. Turn OFF all electrical power to the system, if applicable.
    b. Depressurize the system and close all valves.
    c. Disconnect the tubing and remove individual system components for maintenance.
    d. For complete and proper maintenance on system components, refer to their *Installation, Operation, and Maintenance* (IOM) *Manual.* A list of component *Installation, Operation, and Maintenance* (IOM) *Manuals* is available in *Appendix A, Referenced or Attached Documents,* in this manual.
    e. After performing necessary maintenance on system components, reconnect all instrument tubing.
    f. Reinstall the system according to the instructions in *Section 2.2, Installation,* and *Section 2.3, Start-Up Procedures*.

4.3 Troubleshooting

Table 5: POC Troubleshooting		
Issues	**Possible Causes**	**Solutions**
Nothing is happening.	The battery is dead and not charging.	Ensure that the solar panel has been connected to the battery. As necessary, adjust the solar panel so that it faces the direction of the sun and is not shaded.
The BIP is not actuating properly.	The pneumatic supply may be too high, too low, or not operating.	Inspect the pneumatic supply. As necessary, regulate the pneumatic supply to ensure air is supplied at the appropriate pressure.
	The solenoid may not be actuating properly.	Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the solenoid. The solenoid may need to be replaced.
The BIP is not injecting the correct amount of odorant.	The BIP is not set to the desired injection volume.	Adjust the injection volume. See *Section 2.3, Start-Up Procedures,* for instructions on adjusting the injection volume.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

Welker *Installation, Operation, and Maintenance* (IOM) *Manuals* suggested for use with this unit:

- IOM-010: Welker OdorEyes BIP-1, BIP-2, BIP-3, and BIP-4 Bellows Injection Pumps
- IOM-033: Welker RV-1, RV-2, RV-2CP, and RV-3 Relief Valves
- IOM-094: Welker SG-4 Sight Glass
- IOM-105: Welker NV-1 and NV-2 Instrument Valves
- IOM-212: Welker F-19 Filter Dryer

Other *Installation, Operation, and Maintenance* (IOM) *Manuals* suggested for use with this unit:

- ASCO Valve, Inc. 1.4 W Low Power Solenoid Valves Low Power Series (Welker IOM-V266)
- Ellis/Kuhnke Controls PM Counters Panel or Base Mounted Pneumatic Counters (Welker IOM-V379)
- Emerson Process Management Regulator Technologies, Inc. Fisher™ 67C Series Instrument Supply Regulators (Welker IOM-V048)
- Emerson Process Management Regulator Technologies, Inc. Fisher™ 1301 Series High-Pressure Regulators Types 1301F and 1301G (Welker IOM-V107)
- Horner APG, LLC XLe/XLt OCS Modules (Welker IOM-V224)
- Max Machinery, Inc. Positive Displacement Flowmeters Models P001, P002, 213, 214, and 215 (Welker IOM-V106)
- MK Battery 8GUI-DEKA Valve-Regulated, Gelled-Electrolyte Battery (Welker IOM-V382)
- Morgan Products Inc. Model TR2 Air Actuated Timer (Welker IOM-V219)
- Morningstar Corporation SunSaver™ Solar Controller (Welker IOM-V346)
- Parker Hannifin Corporation Fluoropolymer Hose (Welker IOM-V174)
- Pentair plc Hoffman Hinge-Cover With 3-Point Latch or Quick-Release Latches, Type 4X Fiberglass Enclosures (Welker IOM-V381)
- Pentair plc Hoffman ULTRX, Type 4X Fiberglass Enclosures (Welker IOM-V380)
- Power-Sonic Corporation PS-1270 12 Volt 7.0 AH Rechargeable Sealed Lead Acid Battery (Welker IOM-V223)
- Swagelok Company Check Valves C, CA, CH, CP, and CPA Series (Welker IOM-V076)
- Swagelok Company Filters FW, F, and TF Series (Welker IOM-V092)
- Swagelok Company One-Piece Instrumentation Ball Valves 40G Series and 40 Series (Welker IOM-V085)
- Swagelok Company Plug Valves P4T and P6T Series (Welker IOM-V102)
- Swagelok Company Quick-Connects QC, QF, QM, and QTM Series (Welker IOM-V088)
- WIKA Instrument Corporation Bourdon Tube Pressure Gauges Type 232.53 and Type 233.53 (Welker IOM-V171)

Welker drawings and schematics suggested for use with this unit:

- System Drawing: OE143SYS.1 (Standard POC)
- System Drawing: OE143SYS.3 (POC With Optional Controller and Solar Panel)

APPENDIX B: MAINTENANCE SCHEDULE

Welker recommends keeping high-wear parts on hand and replacing these parts immediately when worn or damaged.

Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for each component for maintenance instructions.

Table B1: POC Maintenance Schedule

Action	Weekly	Every 12 Months	As Necessary
Open F-19 drain valve Q to allow moisture to drain from the filter.	X		
Verify the pneumatic supply pressure and blanket pressure, if applicable.		X	
Rebuild the BIP using a Welker repair kit. • Replace the seals and bearing. • Replace the check cartridges. • Inspect the bellows, actuator piston, actuator spring, and actuator housing for damage or wear.		X	
Rebuild the F-19 using a Welker repair kit. • Replace the O-rings and filter cartridge.		X	
View the controller's current alarms.			X
Inspect the injection pump, tubing, valves, and fittings on the system for leaks.			X
Rebuild the RV-1s using a Welker repair kit. • Replace the O-rings. • Inspect the spring and ball for damage or wear.			X
Replace the controller battery.			X
Maintain the flow meter.			X
Maintain the regulators.			X
Maintain the solenoid.			X
Maintain the pneumatic timer.			X

NOTES

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