INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

# WELKER® ECOSYSTEM™ PULSE BYPASS SYSTEM WITH XL4 CONTROLLER

**DRAWING NUMBERS**
OE181VS.10E
OE181VS.14E
OE220VS.5E
OE220VS.7E

**MANUAL NUMBER**
IOM-229

**REVISION**
Rev. A, 08/14/2024

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# 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® ECOsystem™ Pulse Bypass System With XL4 Controller. 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 ECOsystem™ Pulse Bypass System 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 ECOsystem™ Pulse Bypass System, 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® *ECOsystem™ Pulse Bypass System With XL4 Controller* is designed to infuse the customer pipeline proportional to flow with natural gas that has been supersaturated with vaporized odorant. This skid-mounted automatic bypass system has three (3) primary components: the touch screen controller, the valve section, and the odorant supply tank. Each primary component plays an integral role in the operation of the ECOsystem™ and can be customized to better suit each application.

The touch screen controller serves as the system's brain. It continuously receives feedback from the customer's gas flow meter and the differential pressure (DP) transmitter in the valve section, allowing the system to respond to changing flow conditions. As pipeline conditions change, the controller increases or decreases the injection rate so that the ECOsystem™ continues infusing proportional to flow. On-site and remote troubleshooting and monitoring are made easier by time- and date-stamped audit data detailing system performance, alarm history, and odorant tank level. An optional solar panel generates renewable energy to power the system when an electrical source is unavailable.

The valve section contains two (2) or three (3) solenoids, which control the flow of gas through the odorant supply tank and into the pipeline. Having two (2) or three (3) solenoids allows the ECOsystem™ to better respond to and accommodate varying flow rates and limits interruption to operation in the event of solenoid maintenance. To prolong the operational life of the regulator and solenoids, the Welker® F-5 Filter Dryer conditions the natural gas supply. The DP transmitter communicates the solenoid operation to the controller to ensure proper odorization. For pulse bypass systems used in cold climates, a heater with thermostat can be added to replenish heat lost during regulation.

Each odorant supply tank is equipped with a tank fill inlet, vent port, blanket pressure inlet, level gauge, and outlet to the pipeline. The temperature transmitter communicates odorant temperature to the controller so the system can compensate for temperature changes within the odorant tank. For added automation, an electronic level transmitter can be installed to communicate tank level to the controller. Regardless of volume or orientation, the odorant supply tank comes with 110% containment that is sloped to the drain for easy draining.

*Welker® may custom design the ECOsystem™ Pulse Bypass System With XL4 Controller 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

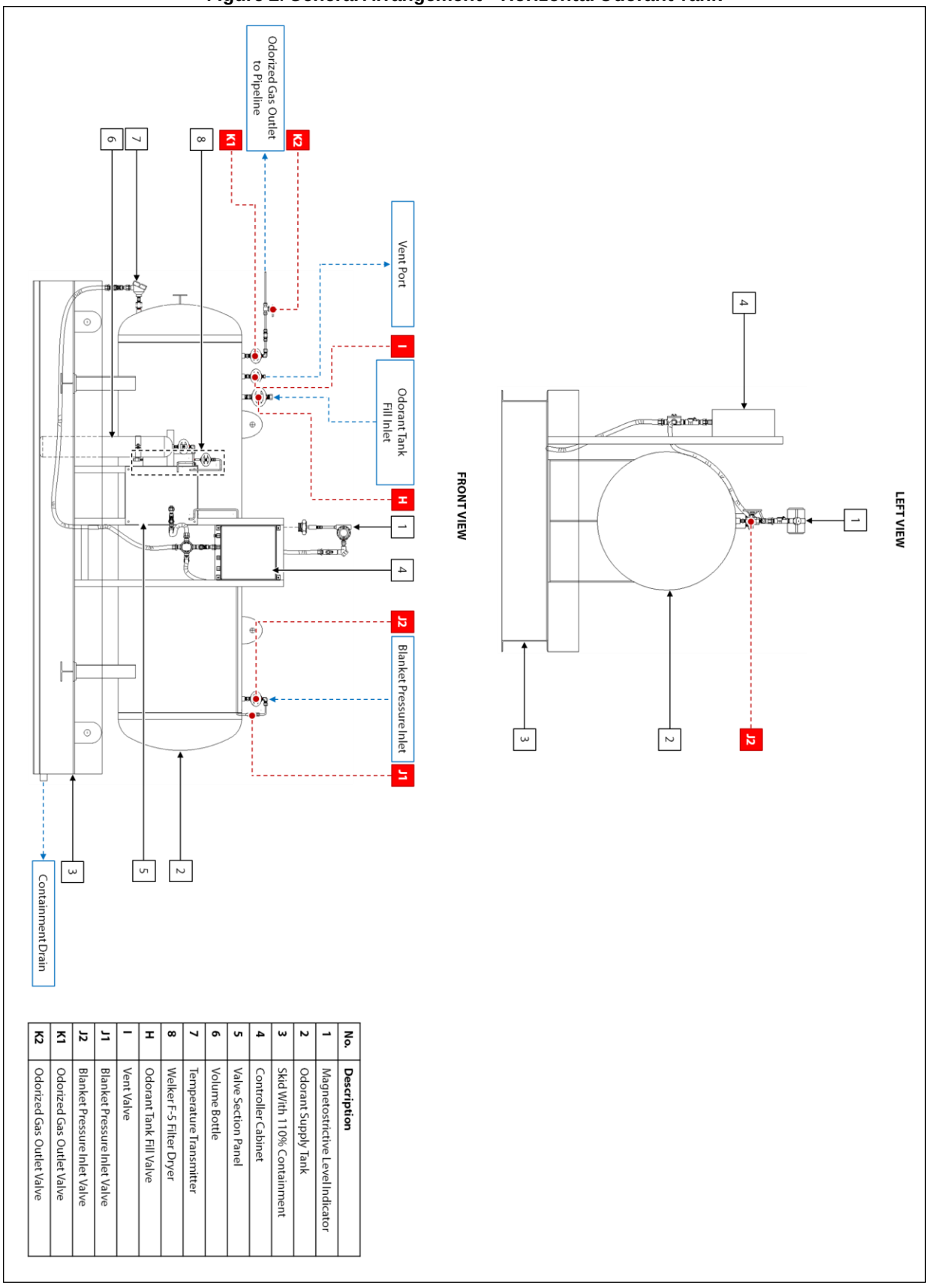
The specifications listed in this section are generalized for this equipment. Welker® can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

| Table 1: ECOsystem™ Specifications | |
|---|---|
| **Application** | Vaporized Odorant Infusion |
| **Electrical Connection** | AC 120 V<br>DC 24 V |
| **Odorant Tank Volume** | 20 US Gallons (*75 L*)<br>50 US Gallons (*189 L*)<br>60 US Gallons (*227 L*)<br>100 US Gallons (*378 L*)<br>120 US Gallons (*454 L*)<br>250 US Gallons (*946 L*)<br>500 US Gallons (*1892 L*)<br>Others Available |
| **Features** | Odorant Tank Level Gauge<br>Skid With 110% Containment<br>Temperature Transmitter<br>Touch Screen Controller<br>Valve Section (See *Table 2*) |
| **Options** | Flag Tracker Level Indicator<br>Heater for Controller Enclosure<br>NEMA 4 or NEMA 7 Enclosure for Controller<br>Solar Panel<br>Steel Building |

| Table 2: Valve Section Specifications | |
|---|---|
| **Tubing Size** | **Low Flow:** ¼" (*0.6 cm*)<br>**High Flow:** ⅜" (*0.9 cm*)<br>**Variable Flow:** ¼" and ⅜" (*0.6* and *0.9 cm*) |
| **Electrical Classification** | NEC Class I, Div 1, Group D, T3<br>NEC Class I, Div 1, Group D, T6 |
| **Features** | 2-Way Solenoid Valve (Qty = 2 or 3)<br>Differential Pressure (DP) Transmitter<br>Regulator for Natural Gas Supply<br>Welker® F-5 Filter Dryer for Natural Gas Supply |
| **Options** | Backup Solenoid<br>Enclosure<br>Heater With Thermostat<br>Low Flow Solenoid<br>Volume Bottle [for Systems With ⅜" (*0.9 cm*) Tubing] |

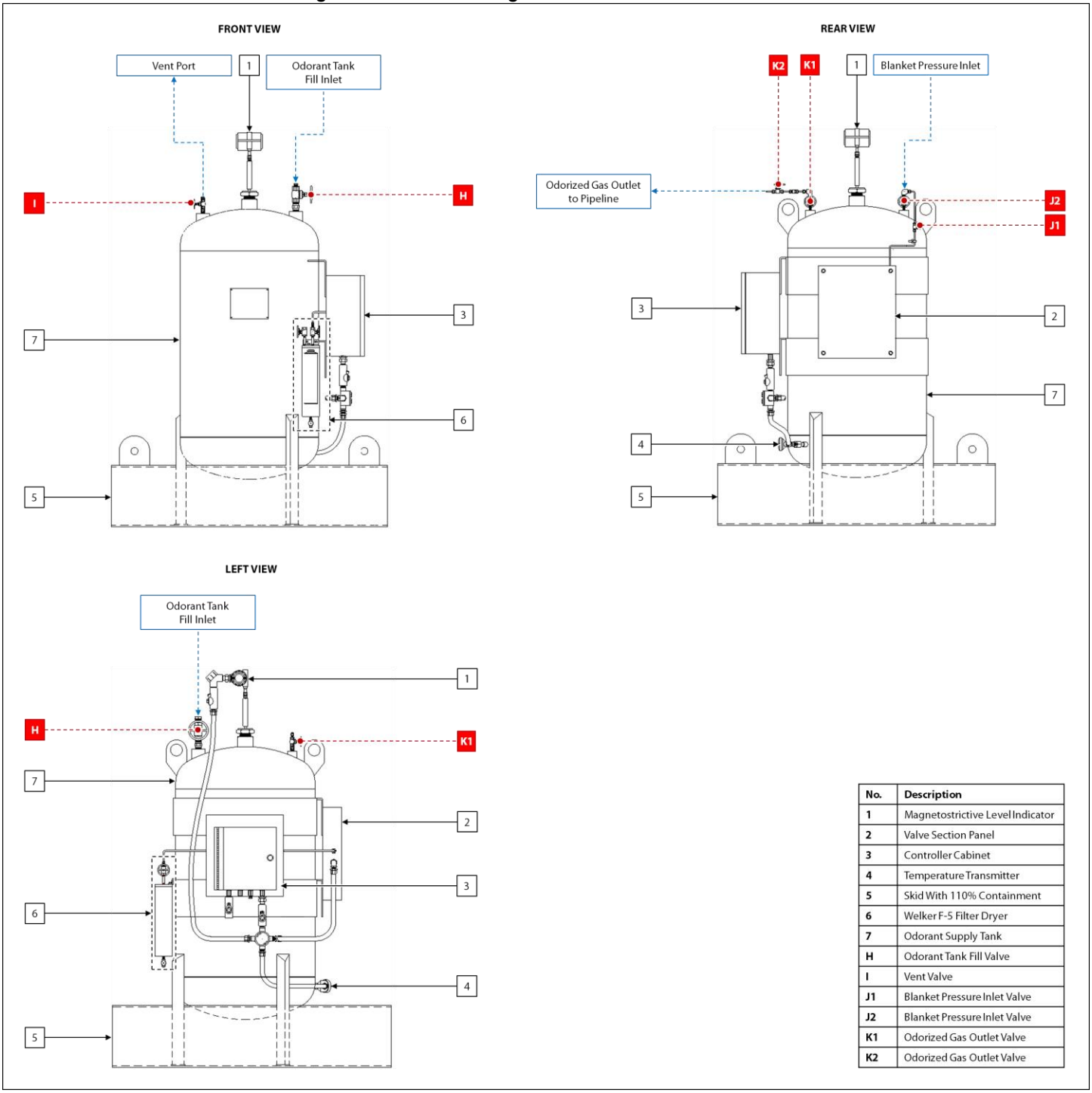
## 1.5 Equipment Diagrams

**Figure 1: General Arrangement – Horizontal Odorant Tank**



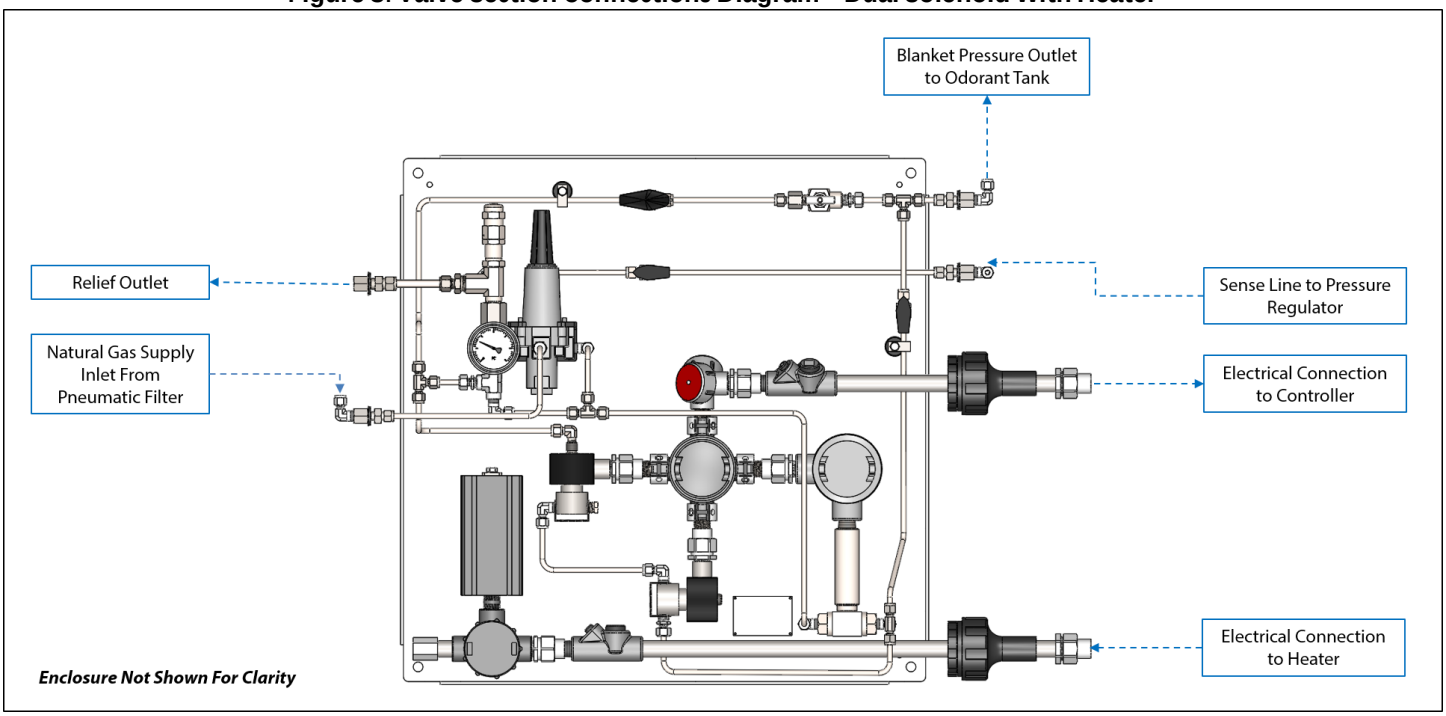

| No. | Description |
|---|---|
| 1 | Magnetostrictive Level Indicator |
| 2 | Odorant Supply Tank |
| 3 | Skid With 110% Containment |
| 4 | Controller Cabinet |
| 5 | Valve Section Panel |
| 6 | Volume Bottle |
| 7 | Temperature Transmitter |
| 8 | Welker F-5 Filter Dryer |
| H | Odorant Tank Fill Valve |
| I | Vent Valve |
| J1 | Blanket Pressure Inlet Valve |
| J2 | Blanket Pressure Inlet Valve |
| K1 | Odorized Gas Outlet Valve |
| K2 | Odorized Gas Outlet Valve |

## Figure 2: General Arrangement – Vertical Odorant Tank

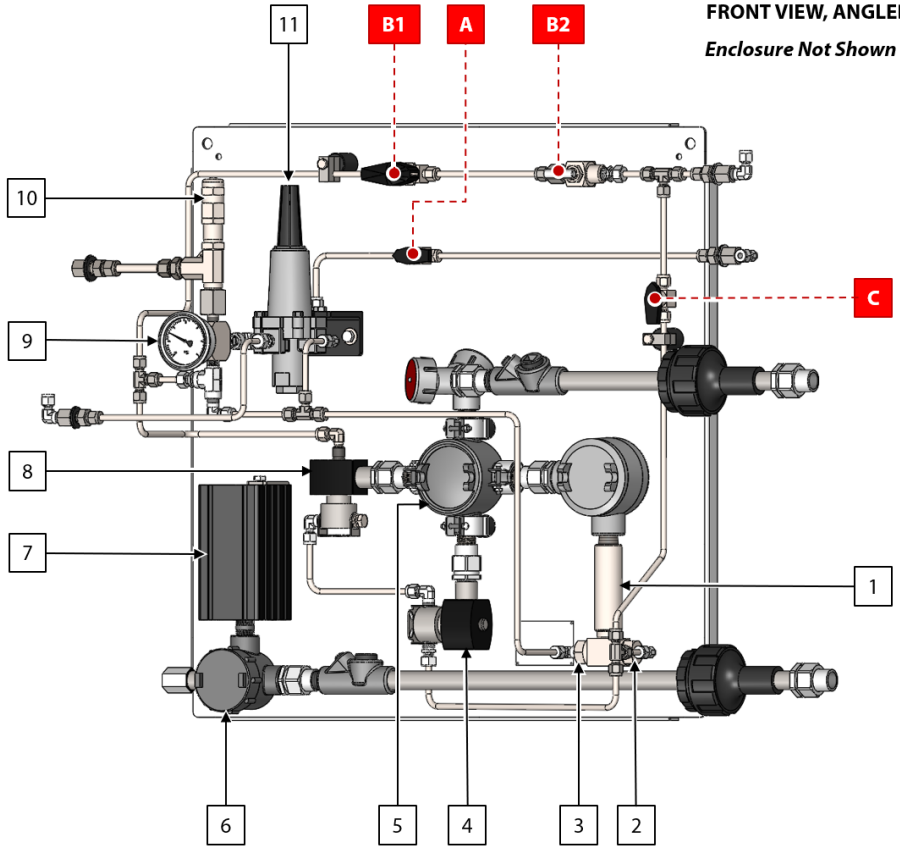



| No. | Description |
|---|---|
| 1 | Magnetostrictive Level Indicator |
| 2 | Valve Section Panel |
| 3 | Controller Cabinet |
| 4 | Temperature Transmitter |
| 5 | Skid With 110% Containment |
| 6 | Welker F-5 Filter Dryer |
| 7 | Odorant Supply Tank |
| H | Odorant Tank Fill Valve |
| I | Vent Valve |
| J1 | Blanket Pressure Inlet Valve |
| J2 | Blanket Pressure Inlet Valve |
| K1 | Odorized Gas Outlet Valve |
| K2 | Odorized Gas Outlet Valve |

## Figure 3: Valve Section Connections Diagram – Dual Solenoid With Heater




## Figure 4: Valve Section Diagram – Dual Solenoid With Heater

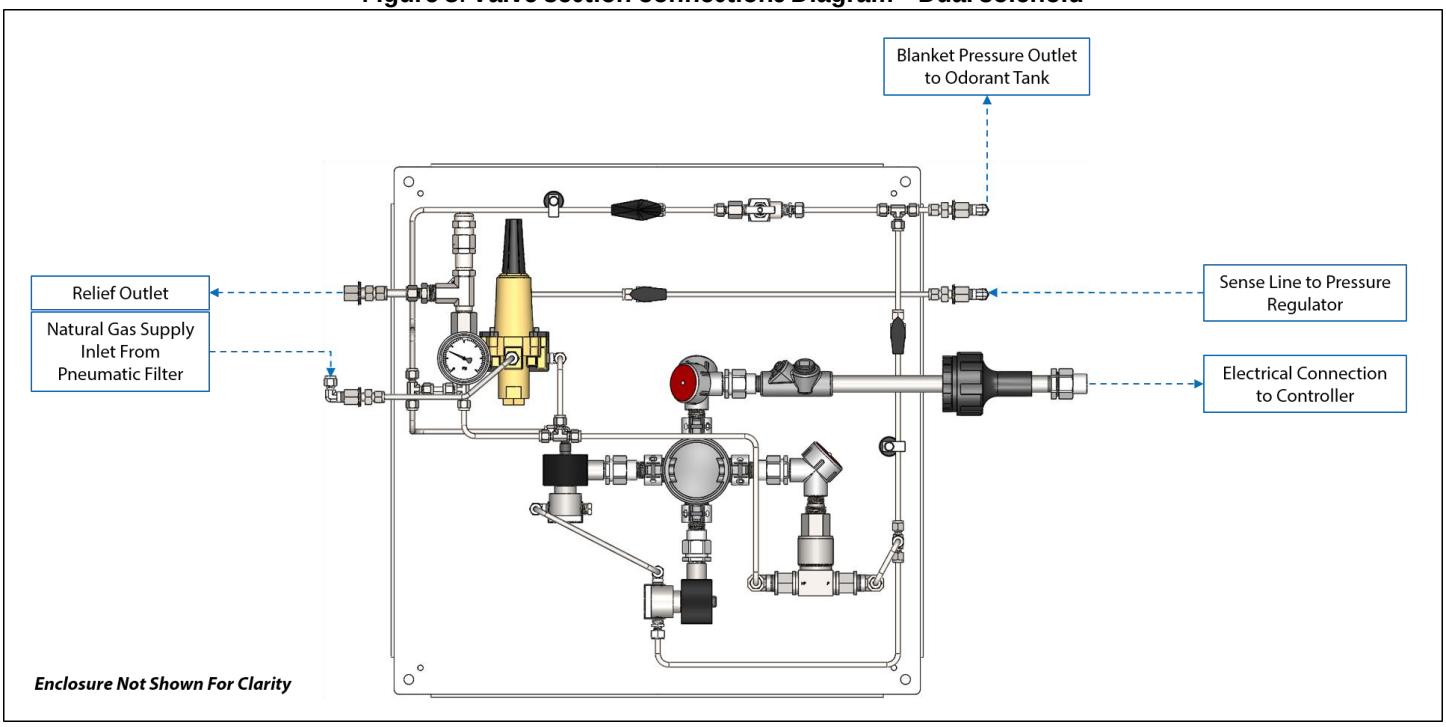



**FRONT VIEW, ANGLED**

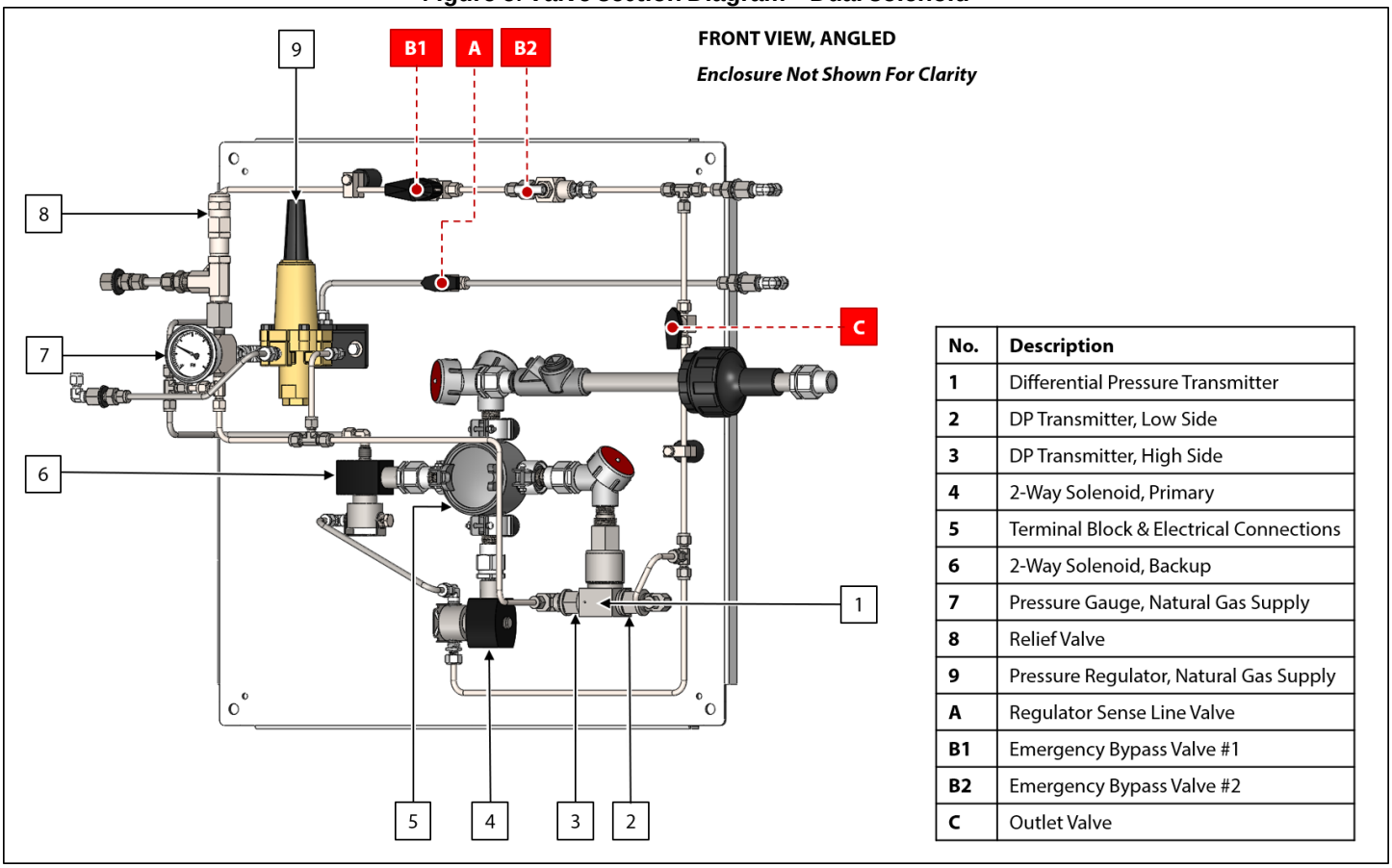
***Enclosure Not Shown For Clarity***

| No. | Description |
|---|---|
| 1 | Differential Pressure Transmitter |
| 2 | DP Transmitter, Low Side |
| 3 | DP Transmitter, High Side |
| 4 | 2-Way Solenoid, Primary |
| 5 | Terminal Block & Electrical Connections |
| 6 | Thermostat |
| 7 | Heater |
| 8 | 2-Way Solenoid, Backup |
| 9 | Pressure Gauge, Natural Gas Supply |
| 10 | Relief Valve |
| 11 | Pressure Regulator, Natural Gas Supply |
| A | Regulator Sense Line Valve |
| B1 | Emergency Bypass Valve #1 |
| B2 | Emergency Bypass Valve #2 |
| C | Outlet Valve |

## Figure 5: Valve Section Connections Diagram – Dual Solenoid

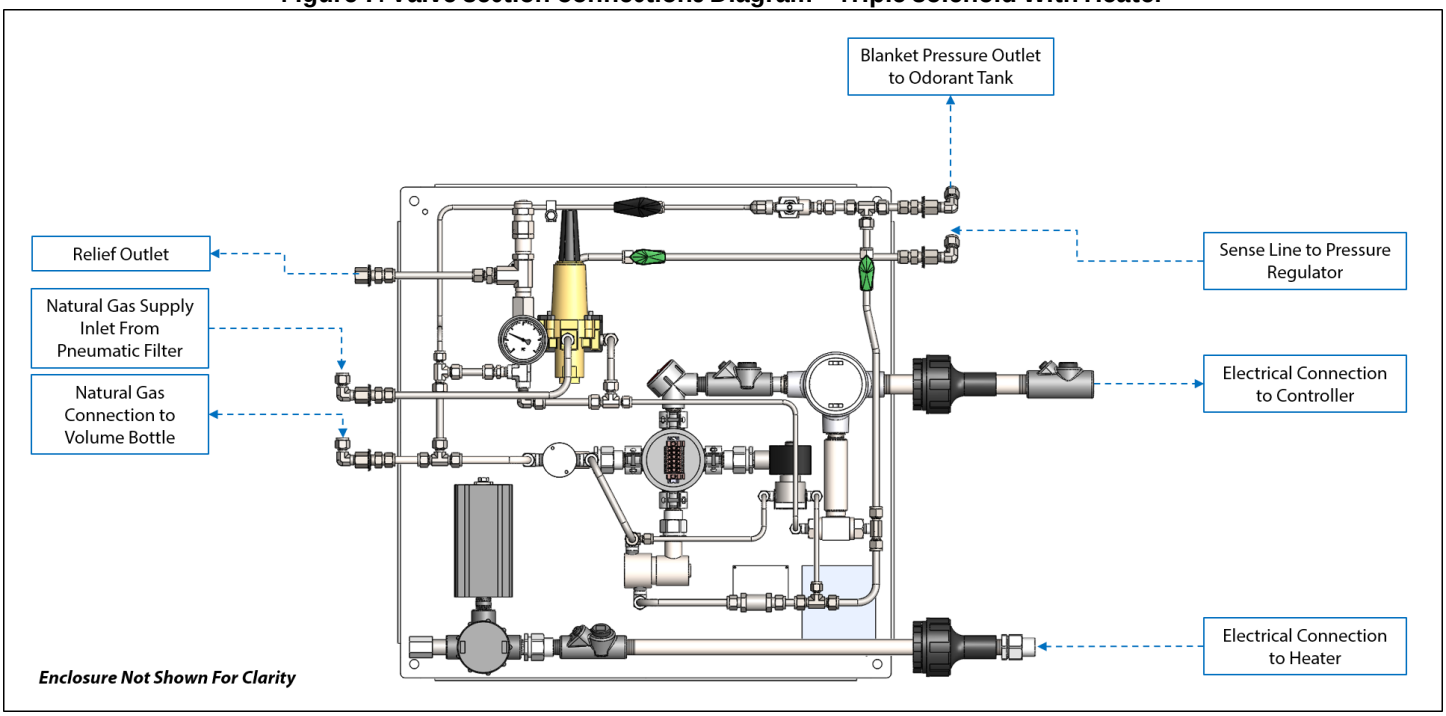



## Figure 6: Valve Section Diagram – Dual Solenoid

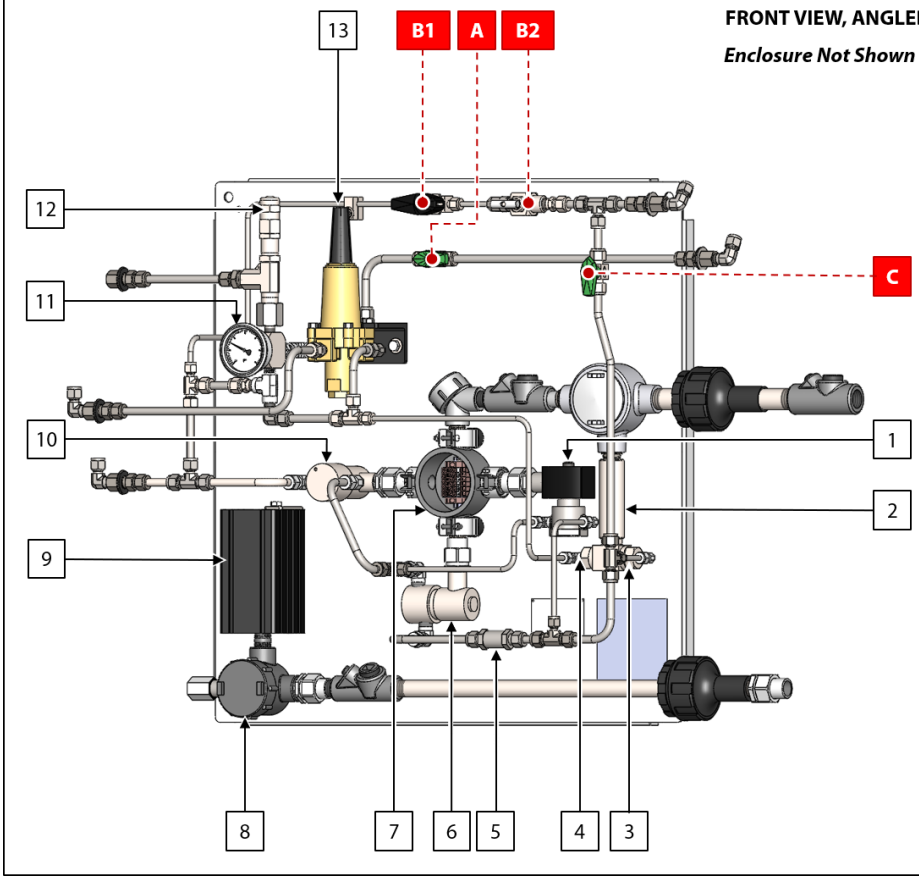



| No. | Description |
|---|---|
| 1 | Differential Pressure Transmitter |
| 2 | DP Transmitter, Low Side |
| 3 | DP Transmitter, High Side |
| 4 | 2-Way Solenoid, Primary |
| 5 | Terminal Block & Electrical Connections |
| 6 | 2-Way Solenoid, Backup |
| 7 | Pressure Gauge, Natural Gas Supply |
| 8 | Relief Valve |
| 9 | Pressure Regulator, Natural Gas Supply |
| A | Regulator Sense Line Valve |
| B1 | Emergency Bypass Valve #1 |
| B2 | Emergency Bypass Valve #2 |
| C | Outlet Valve |

## Figure 7: Valve Section Connections Diagram – Triple Solenoid With Heater




## Figure 8: Valve Section Diagram – Triple Solenoid With Heater

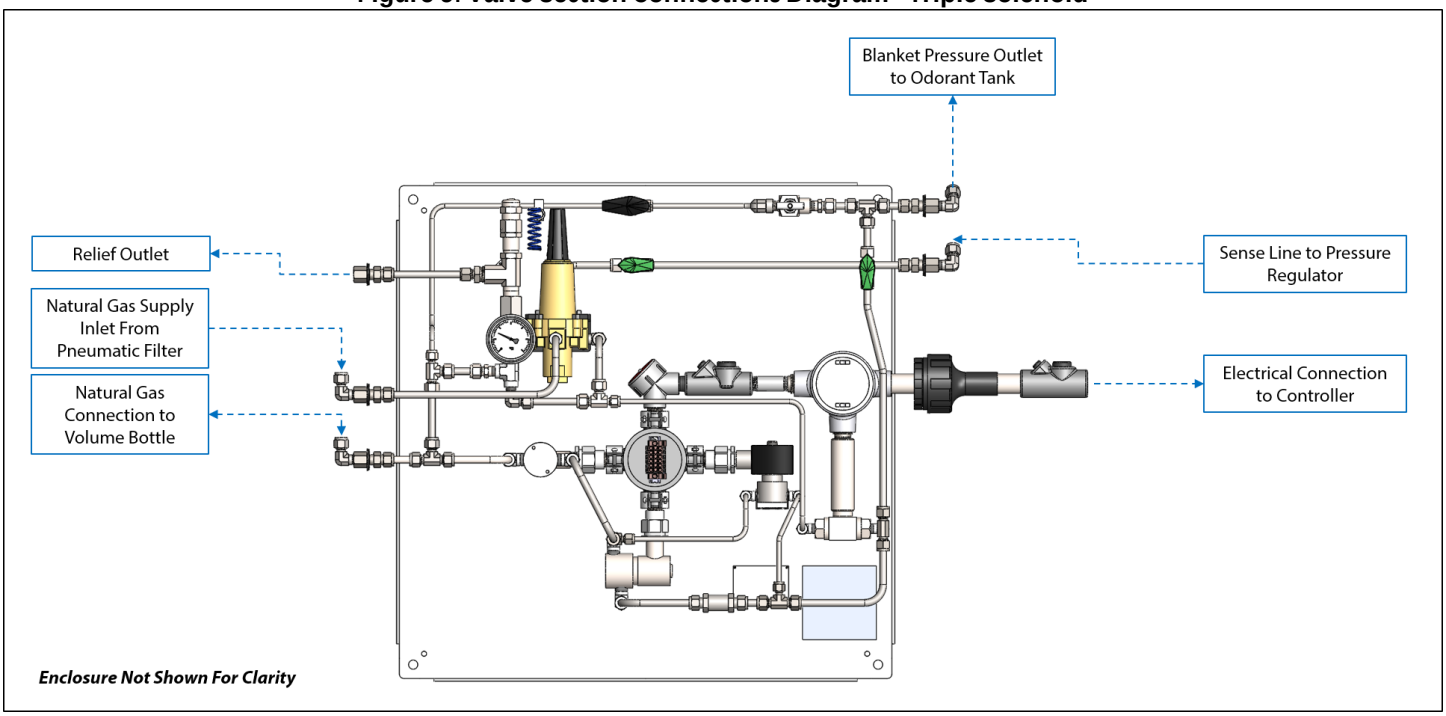



**FRONT VIEW, ANGLED**

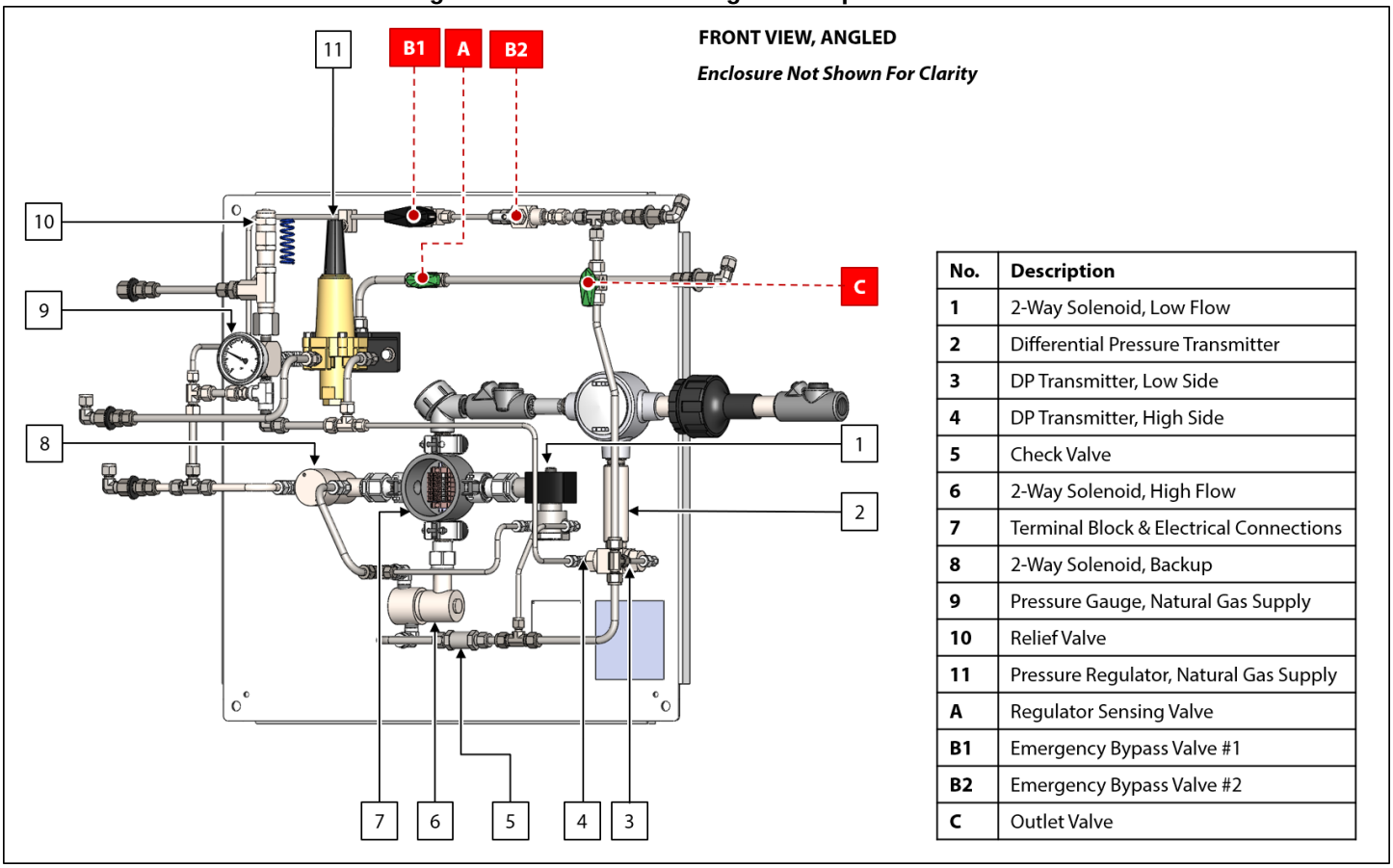
***Enclosure Not Shown For Clarity***

| No. | Description |
|---|---|
| 1 | 2-Way Solenoid, Low Flow |
| 2 | Differential Pressure Transmitter |
| 3 | DP Transmitter, Low Side |
| 4 | DP Transmitter, High Side |
| 5 | Check Valve |
| 6 | 2-Way Solenoid, High Flow |
| 7 | Terminal Block & Electrical Connections |
| 8 | Thermostat |
| 9 | Heater |
| 10 | 2-Way Solenoid, Backup |
| 11 | Pressure Gauge, Natural Gas Supply |
| 12 | Relief Valve |
| 13 | Pressure Regulator, Natural Gas Supply |
| A | Regulator Sensing Valve |
| B1 | Emergency Bypass Valve #1 |
| B2 | Emergency Bypass Valve #2 |
| C | Outlet Valve |

## Figure 9: Valve Section Connections Diagram– Triple Solenoid

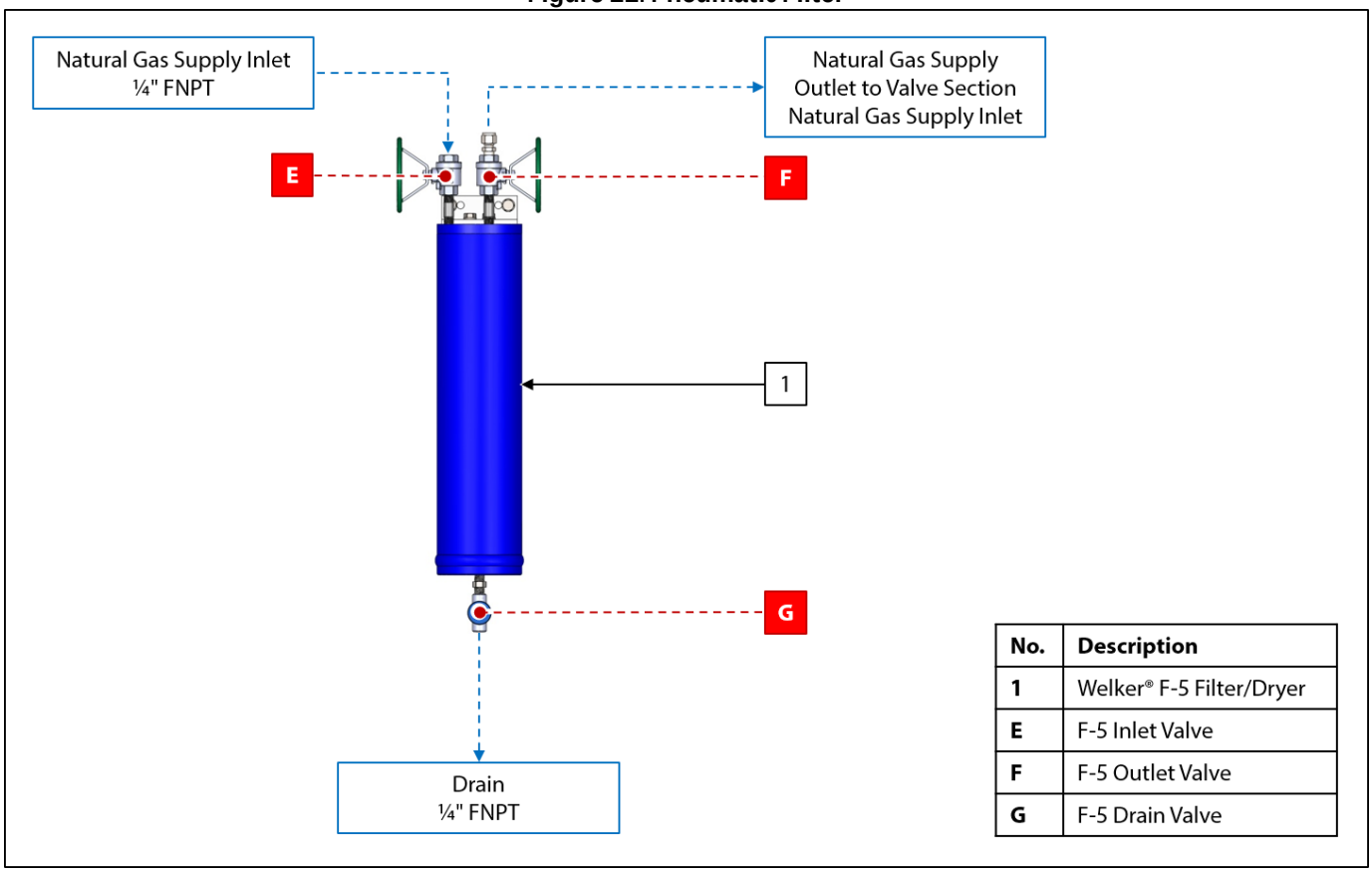



## Figure 10: Valve Section Diagram – Triple Solenoid



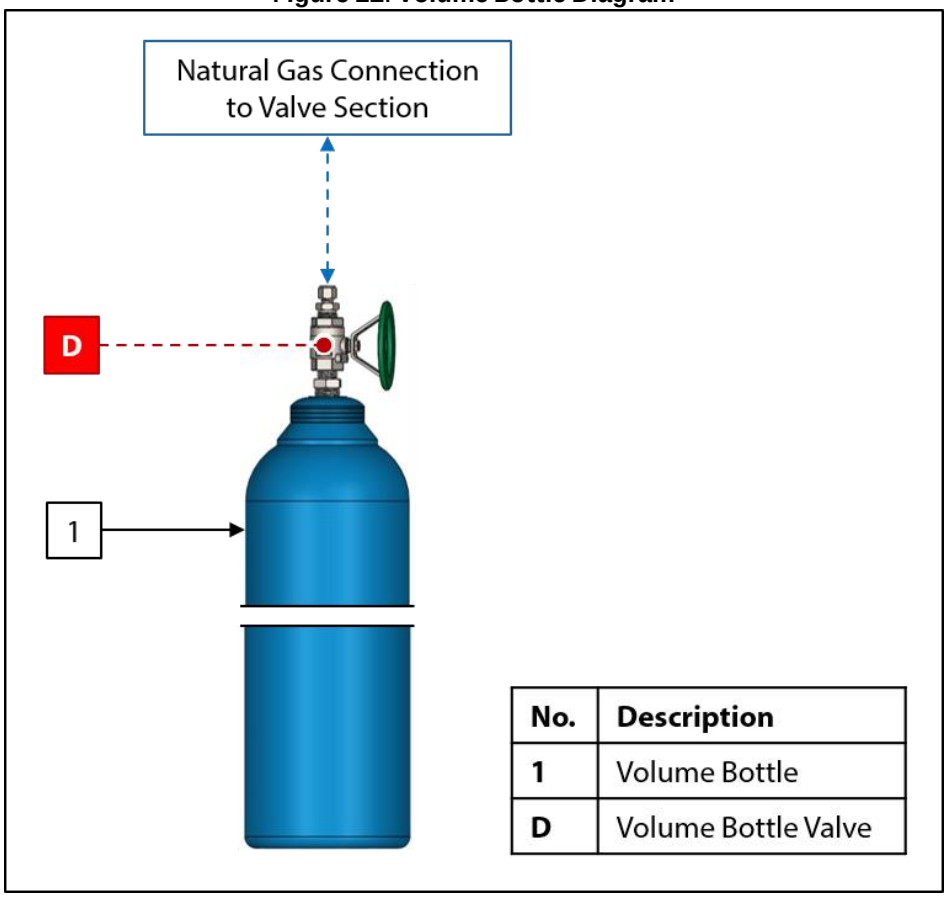

| No. | Description |
|---|---|
| 1 | 2-Way Solenoid, Low Flow |
| 2 | Differential Pressure Transmitter |
| 3 | DP Transmitter, Low Side |
| 4 | DP Transmitter, High Side |
| 5 | Check Valve |
| 6 | 2-Way Solenoid, High Flow |
| 7 | Terminal Block & Electrical Connections |
| 8 | 2-Way Solenoid, Backup |
| 9 | Pressure Gauge, Natural Gas Supply |
| 10 | Relief Valve |
| 11 | Pressure Regulator, Natural Gas Supply |
| A | Regulator Sensing Valve |
| B1 | Emergency Bypass Valve #1 |
| B2 | Emergency Bypass Valve #2 |
| C | Outlet Valve |

**Figure 11: Pneumatic Filter**




| No. | Description |
|---|---|
| 1 | Welker® F-5 Filter/Dryer |
| E | F-5 Inlet Valve |
| F | F-5 Outlet Valve |
| G | F-5 Drain Valve |

**Figure 12: Volume Bottle Diagram**




| No. | Description |
|---|---|
| 1 | Volume Bottle |
| D | Volume Bottle Valve |

## SECTION 2: INSTALLATION & OPERATION

### 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 ECOsystem™ will ship skid-mounted and "hard-tube" connected with manufacturer-supplied fittings and hardware. However, the customer will need to supply some tubing and fittings in order to complete the installation of the system.

The ECOsystem™ must be installed in a section of the natural gas pipeline with a regulated pressure drop, such as a regulator station or gate station.

All electrical connections must meet local and national electric codes, and excessive weight added to the conduit run must be supported.

### 2.2 Installation

**System Skid**

1. Mount the skid to a flat, level surface, such as a concrete slab.
2. Connect a grounding wire to each grounding lug on the skid to safely ground the system.
3. Connect the skid drain port(s) to an appropriate draining location.

**System Connections**

4. Using appropriately sized customer-supplied tubing, connect from the outlet of the pipeline upstream of the regulated pressure drop to the inlet of the Welker® F-5 Filter Dryer (*Figure 11*).

Tubing must have a minimum diameter of $\frac{3}{8}$".

5. Connect from odorized gas outlet valve K2 to an unused valve on the natural gas pipeline downstream of the regulated pressure drop (*Figure 1* or *Figure 2*).

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

6. Ensure that all valves on the system are closed.
7. Ensure that all fittings, connections, and bolts are tightened.

## Electrical Connections


Turn OFF the electrical supply prior to making electrical connections.

8. Connect an appropriate electrical supply to the controller. Refer to industry standards for appropriate electrical connections to interface with the PLC.


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

9. Connect the customer gas flow signal device to the termination block.

The controller can accept analog or pulse input.

10. If the ECOsystem™ is not equipped with the optional flag tracker level indicator, installation is now complete; proceed to *Section 2.3, Start-Up Procedures*. If the ECOsystem™ is equipped with the optional flag tracker level indicator, continue to step 11.

## Flag Tracker Level Indicator (Optional)

The float and gasket must be installed to the flag tracker level indicator prior to filling the odorant supply tank.

The float and gasket are packaged separately for shipment.

11. Remove the bottom drain flange from the base of the level indicator.
12. Install the float to the spring on the bottom drain flange. The top of the float should point up.

The top of the float is marked to ensure proper orientation.

The spring attached to the bottom drain flange cushions the float when the odorant supply tank is empty.

13. Replace the shipping gasket with the provided gasket.
14. Install the bottom drain flange with float to the level indicator.

## 2.3 Start-Up Procedures

**Before Commissioning Day:**
**Odorant Supply Tank**

1. Fill the 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.

2. Check the odorant supply tank for leaks and repair as necessary.

**On Commissioning Day:**
**Gas Flow**

1. Ensure the site is ready to flow gas. Determining that the odorizer is operating correctly can only be verified with gas flow.
2. Enter the Controller Setup menu and ensure that the Odor Rate Required odorization rate is set to 0.0 Lbs/MMcf (*Figure 25*).
3. Initiate gas flow.
4. Enter the Monitor menu's Rates & Totals submenu (*Figure 17*) and verify that the odorizer is reporting a gas flow rate substantially similar to the gas flow rate reported by the flow meter.

> While the gas flow rate is increasing or decreasing, the rate reported by the odorizer will lag the rate reported by the flow meter.

5. Should the odorizer rate not substantially match the flow meter flow rate, check the Minimum and Maximum flow rates on the Gas Flow Signal setup page (*Figure 37*) and adjust if necessary.
6. Do not commission the odorizer until steps 1–5 are verifiably completed.

**Natural Gas Supply Regulator**

> Open and shut valves slowly.

7. As necessary, open any valves between the outlet on the natural gas pipeline and the F-5 inlet.
8. Open F-5 inlet valve E and F-5 outlet valve F (*Figure 11*).
9. Apply natural gas to the valve section to pressurize the natural gas supply regulator (*Figure 3*, *Figure 4*, *Figure 5*, *Figure 6*, *Figure 7*, *Figure 8*, *Figure 9*, or *Figure 10*).

> The pneumatic supply regulator comes factory-set to the setting required to operate the solenoids.

## Valve Configuration

10. Slowly open the valves indicated in Table 3.

**Table 3: Start-Up Valve Orientation**

| Valve Letter | Valve Description | Reference Figures |
|---|---|---|
| C | Outlet Valve | 3–10 |
| J1 & J2 | Blanket Pressure Inlet | 1 & 2 |
| K1 & K2 | Odorized Gas Outlet | 1 & 2 |

Once odorized gas outlet valves K1 and K2 are open, gas may free flow from the odorant supply tank to the pipeline until pressure in the system equalizes. Note that free flow will last only for a short time and over-odorization will not occur.

11. If applicable, slowly open any valves between the odorized gas outlet on the odorant supply tank and the pipeline.
12. Check for leaks and repair as necessary.

## Odorant Supply Tank

13. Verify pipeline pressure at the point of injection.
14. Check the differential pressure that the regulator in the odorizer is set to. This will be stamped on a tag affixed to the regulator.
15. Open regulator sense line valve A (*Figure 4*, *Figure 6*, *Figure 8*, or *Figure 10*).
16. Open emergency bypass valves B1 and B2 (*Figure 4*, *Figure 6*, *Figure 8*, or *Figure 10*).
17. Observe the gauge on the regulator as pressure increases. The gauge will show tank pressure plus the differential pressure setpoint shown on the tag.
18. In order to allow pressure to stabilize, periodically shut emergency bypass valve B1.
19. If the pressure displayed on the gauge is within 1 or 2 psig of the pipeline pressure plus the differential, continue to step 20. If not, then reopen emergency bypass valve B1 and repeat steps 17 and 18.
20. Close emergency bypass valves B1 and B2 (*Figure 4*, *Figure 6*, *Figure 8*, or *Figure 10*).
21. If applicable, open regulator sense line valve A (*Figure 4*, *Figure 6*, *Figure 8*, or *Figure 10*).
22. If applicable, open volume bottle valve D (*Figure 12*). The volume bottle will fill with the conditioned natural gas.

## Touch Screen Controller Configuration

23. Verify that the customer set points have been correctly set by the manufacturer.
24. Enter the Controller Setup menu and set the Odor Rate Required to the target odorization rate (in Lbs/MMcf) (*Figure 25*).

## Verifying Solenoid and Differential Pressure (DP) Transmitter Operation

25. From the controller, verify the correct operation of the solenoid and DP transmitter. From the Home screen, select Monitor (*Figure 16*). From the Monitor menu, select System I/O (*Figure 20* and *Figure 21*).
26. Backup Sol should **always** be green.
27. As the controller opens the solenoid, verify that DP transmitter raw data drops at the same time as Main Sol turns green.
28. As the controller closes the solenoid, verify that DP transmitter raw data rises again after Main Sol clears.
29. Once the correct operation of the solenoid and DP transmitter has been confirmed, the ECOsystem™ is operational.

No alarms should be showing on the Current Alarms screen (*Figure 15*) or the alarm display area (to the left and just above the function buttons) (*Figure 14*).

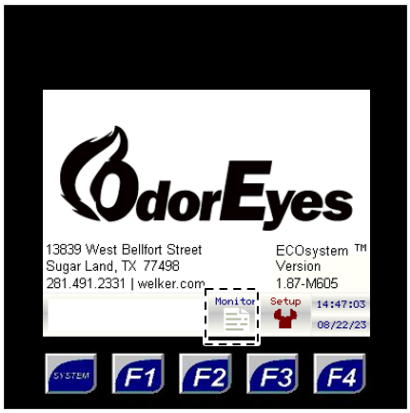
Welker® recommends remaining onsite for at least one-half (½) hour to ensure no alarms develop.

## 3.1 Understanding the Display

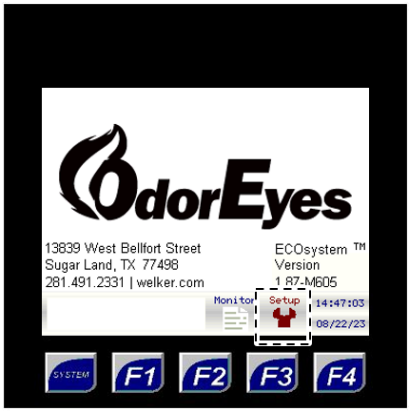
The touch screen controller is used to modify system parameters and view current system information and current alarm status.

The touch screen controller is a menu-driven system. The Home screen is the top screen in the menu tree (*Figure 13*).

**Figure 13: Home Screen**




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



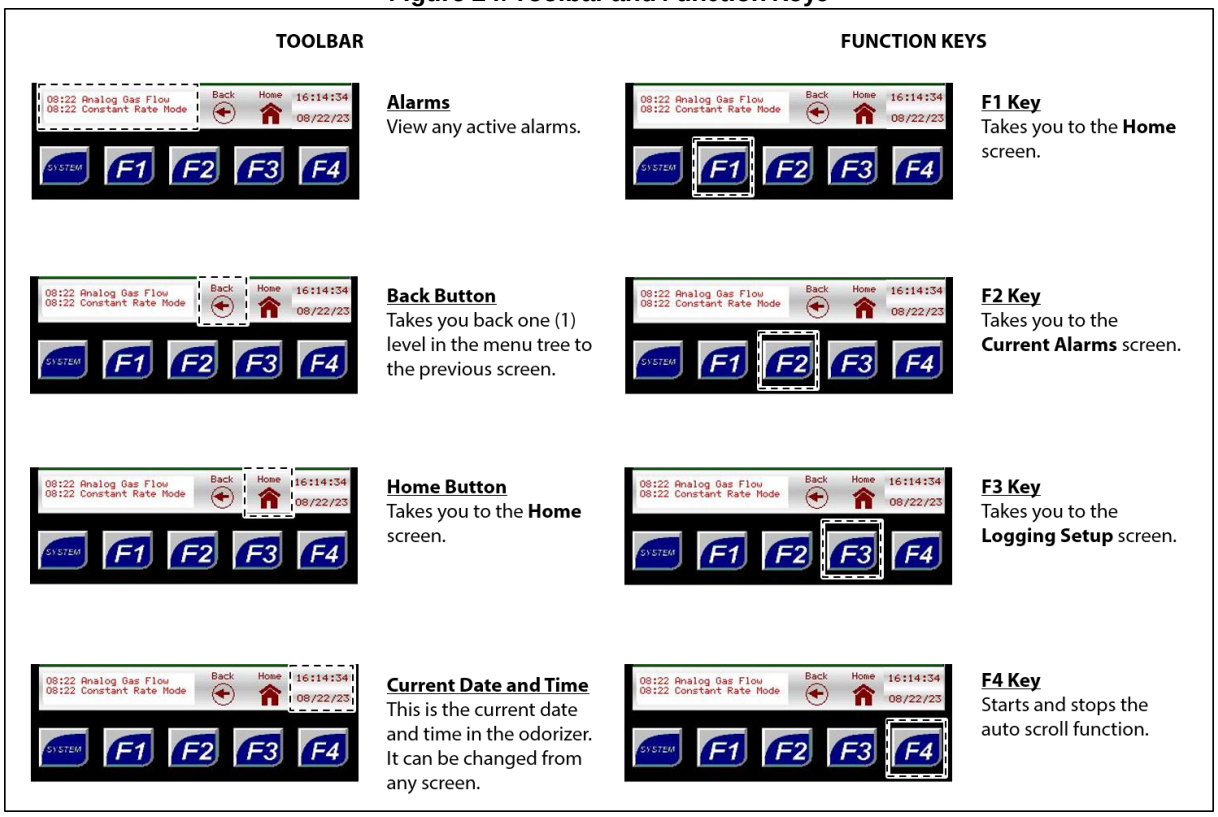

**Setup**
Takes you to the setup screens where you can change any set point values in the odorizer.

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. These screens have a **blue** background.
- **Setup-**from this type of screen, numeric and/or text values that affect the setup of the odorizer can be changed. These screens have a **red** background.

## Navigating the Display

**Figure 14: Toolbar and Function Keys**



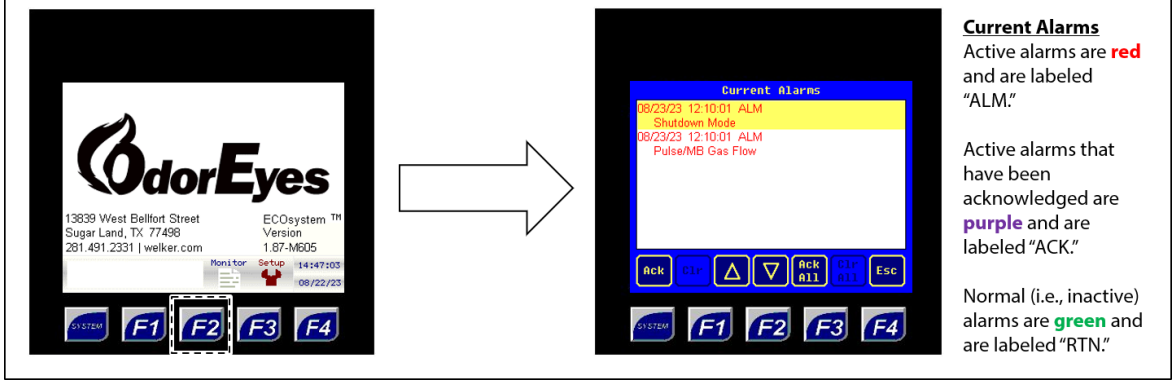

The toolbar appears on every screen.

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 F2 key to go to the Current Alarms screen (*Figure 15*).

**Figure 15: Current Alarms Screen**



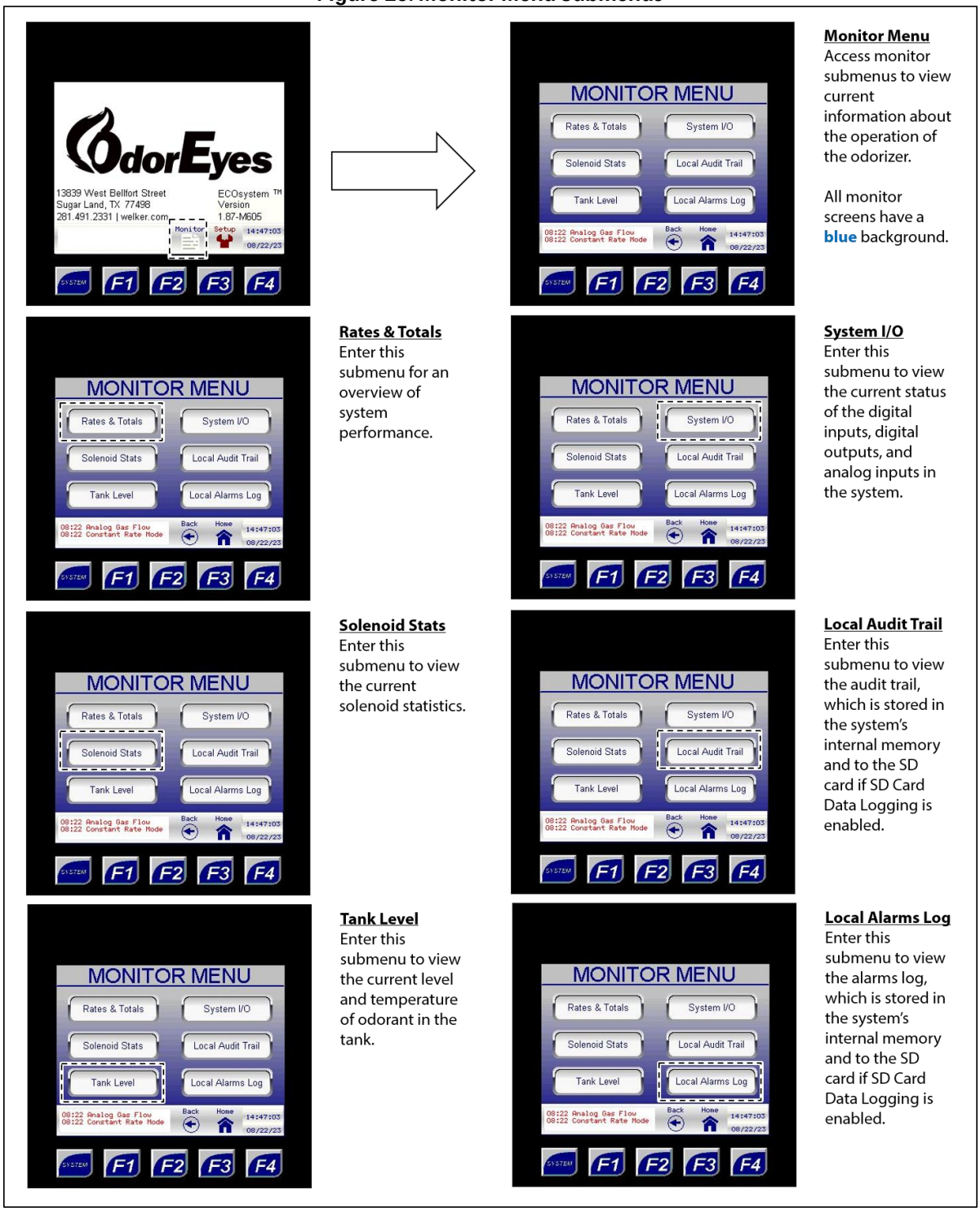
| Table 4: Current Alarms | |
|---|---|
| **Analog Gas Flow** | Can only be active if Analog mode is selected.<br>The controller will go into the selected fail mode when this alarm is active.<br>**NOTE:** If this alarm is active, verify that a 4–20 mA signal is being received from the flow meter. |
| **Pulse Gas Flow** | Can only be active if Pulse mode is selected.<br>The controller will go into the selected fail mode when this alarm is active.<br>**NOTE:** If this alarm is active, the pulse input cutoff time has expired. Verify that a pulse input is being received from the flow meter. If this alarm is active when the controller is receiving pulse input from the flow meter, Welker® recommends increasing the pulse input cutoff time to prevent the alarm from becoming active prematurely. |
| **Constant Rate Mode** | Can only be active if Constant Rate Mode is specified as the desired fail mode.<br>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.<br>The controller will enter this gas flow fail mode when there is a gas flow signal loss. |
| **Fixed Mode** | Can only be active if Fixed Mode is enabled and the Fixed Alarm Rate is set.<br>**NOTE:** If this alarm is active, the Fixed Alarm Rate will be the assumed gas flow in the system and will override any other input parameters. The Fixed Rate Alarm will not clear until Fixed Mode is disabled. |
| **Analog Temperature** | Can only be active if Transmitter is set as the RTD setup method.<br>**NOTE:** If this alarm is active, verify that a 4–20 mA signal is being received from the temperature transmitter. If this alarm is active, the system will use the manually entered temperature; therefore, Welker® recommends regularly updating the manual temperature value. |
| **Analog 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.<br>**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 each time the solenoid opens. |
| **Tank Low Level** | Active if the odorant tank level has dropped below the specified value.<br>**NOTE:** This alarm will clear once the tank is filled with odorant or the alarm set point is lowered. |
| **Odorant Overflow** | Active if the differential pressure (DP) transmitter signals the controller indicating gas is passing through it even though the solenoids should not be open.<br>**NOTE:** If this alarm is active, it could be an indication that a solenoid is stuck open and that the system is over-odorizing or that the DP transmitter configuration needs to be adjusted. |
| **Odorant No Flow** | Active if the controller signals the solenoid to open but does not receive a signal from the DP transmitter confirming the solenoid has opened.<br>**NOTE:** If this alarm is active, it could be an indication that the solenoid has failed closed or that the pressure differential across the system is not great enough to odorize. |

## 3.2 Navigating the Monitor Menus

Through the Monitor menus, the user can access the Rates & Totals, Solenoid Stats, Tank Level, System I/O, Local Audit Trail, and Local Alarms Log to view current information for the odorizer.

Monitor screens, which have a **blue** background, are informational screens: no values can be changed from these screens.

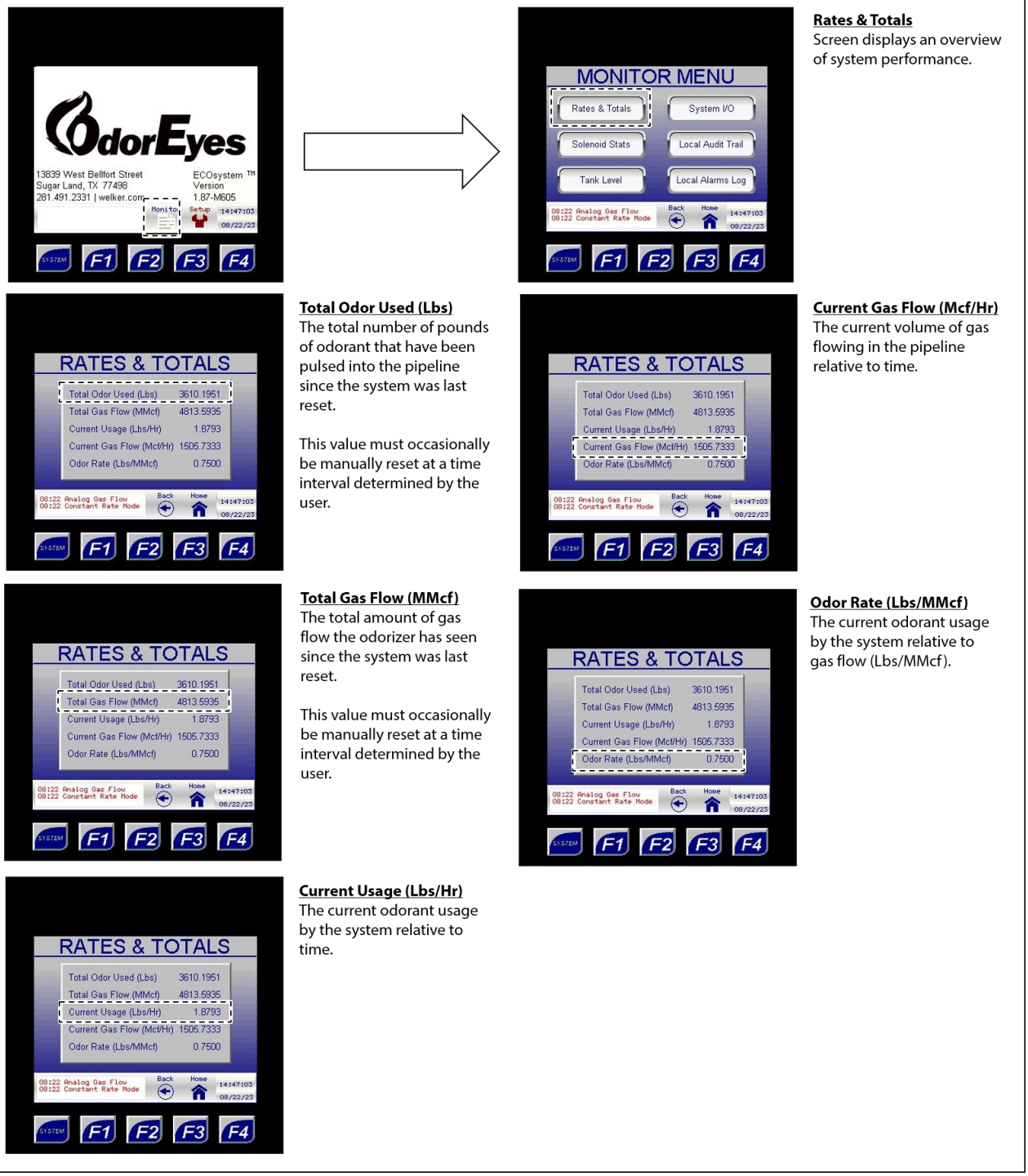
**Figure 16: Monitor Menu Submenus**



## Rates & Totals

The Rates & Totals submenu provides the user with an overview of system performance.

**Figure 17: Monitor Menu – Rates & Totals**




**Rates & Totals**
Screen displays an overview of system performance.

**Total Odor Used (Lbs)**
The total number of pounds of odorant that have been pulsed into the pipeline since the system was last reset.

This value must occasionally be manually reset at a time interval determined by the user.

**Current Gas Flow (Mcf/Hr)**
The current volume of gas flowing in the pipeline relative to time.

**Total Gas Flow (MMcf)**
The total amount of gas flow the odorizer has seen since the system was last reset.

This value must occasionally be manually reset at a time interval determined by the user.

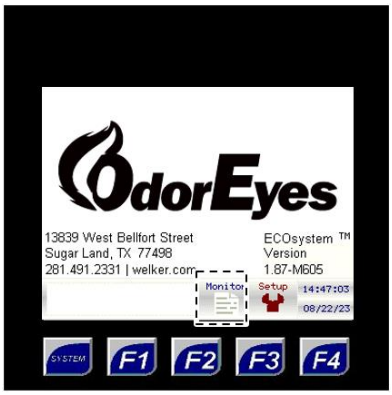
**Odor Rate (Lbs/MMcf)**
The current odorant usage by the system relative to gas flow (Lbs/MMcf).

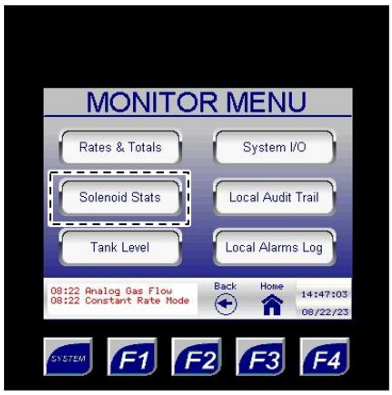
**Current Usage (Lbs/Hr)**
The current odorant usage by the system relative to time.

If the system status totals are used to track system performance, they should be periodically reset through the Controller Setup submenu (*Figure 25*). As the total values increase, they will begin to lose accuracy and will eventually stop accumulating.

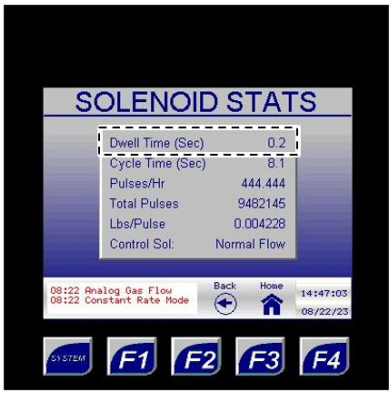
## Solenoid Stats

**Figure 18: Monitor Menu – Solenoid Stats**

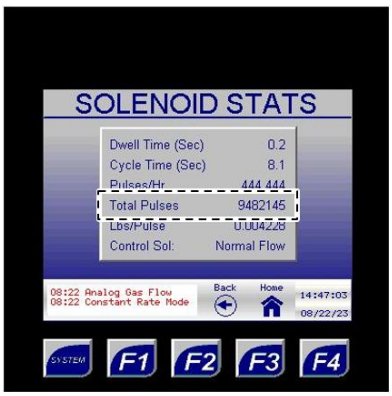


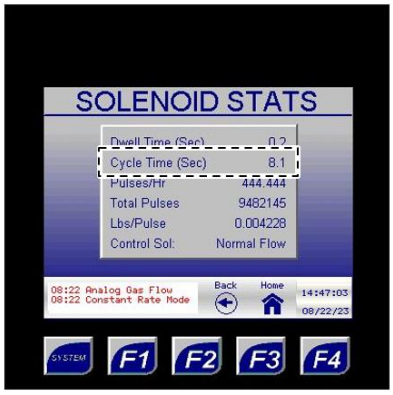

**Solenoid Stats**
Screen displays the current solenoid statistics.



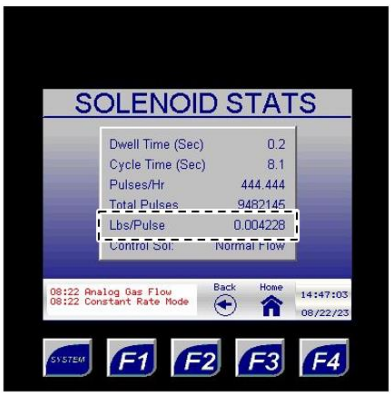

**Dwell Time (Sec)**
The dwell time is the length of time (in seconds) the solenoid remains open each time it opens.



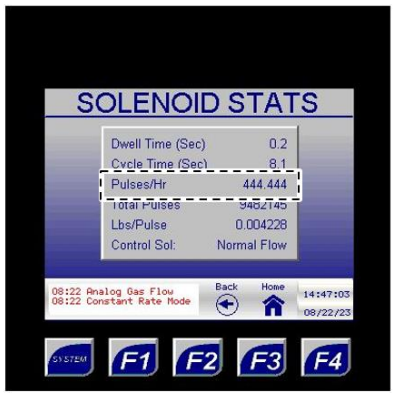

**Total Pulses**
The total number of times the solenoid has pulsed odorant into the pipeline.



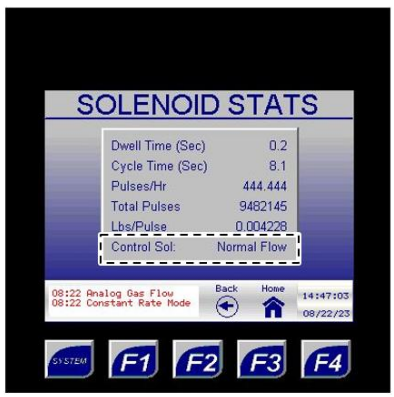

**Cycle Time (Sec)**
The cycle time is how frequently (in seconds) the solenoid is opening.




**Lbs/Pulse**
Pounds per pulse is the volume of odorant pulsed into the pipeline every time the solenoid opens.



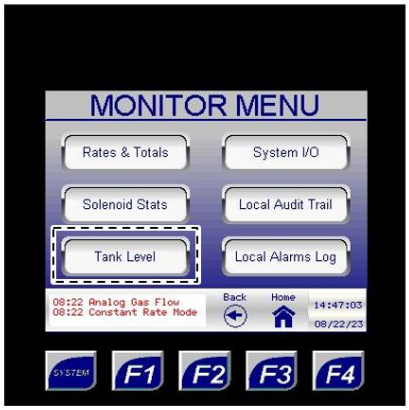

**Pulses/Hr**
Pulses per hour is the number of times the solenoid will open per hour given the current dwell and cycle times.




**Control Sol:**
This indicates which solenoid is currently operating.

## Odorant Tank Level

**Figure 19: Monitor Menu – Tank Level**





This screen displays the amount of odorant remaining in the odorant supply tank in inches, US gallons, and pounds, as well as the temperature of the odorant in degrees Fahrenheit.

These values will either be from a transmitter or manually entered.

## 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 20: Monitor Menu – System I/O, 1 of 2**

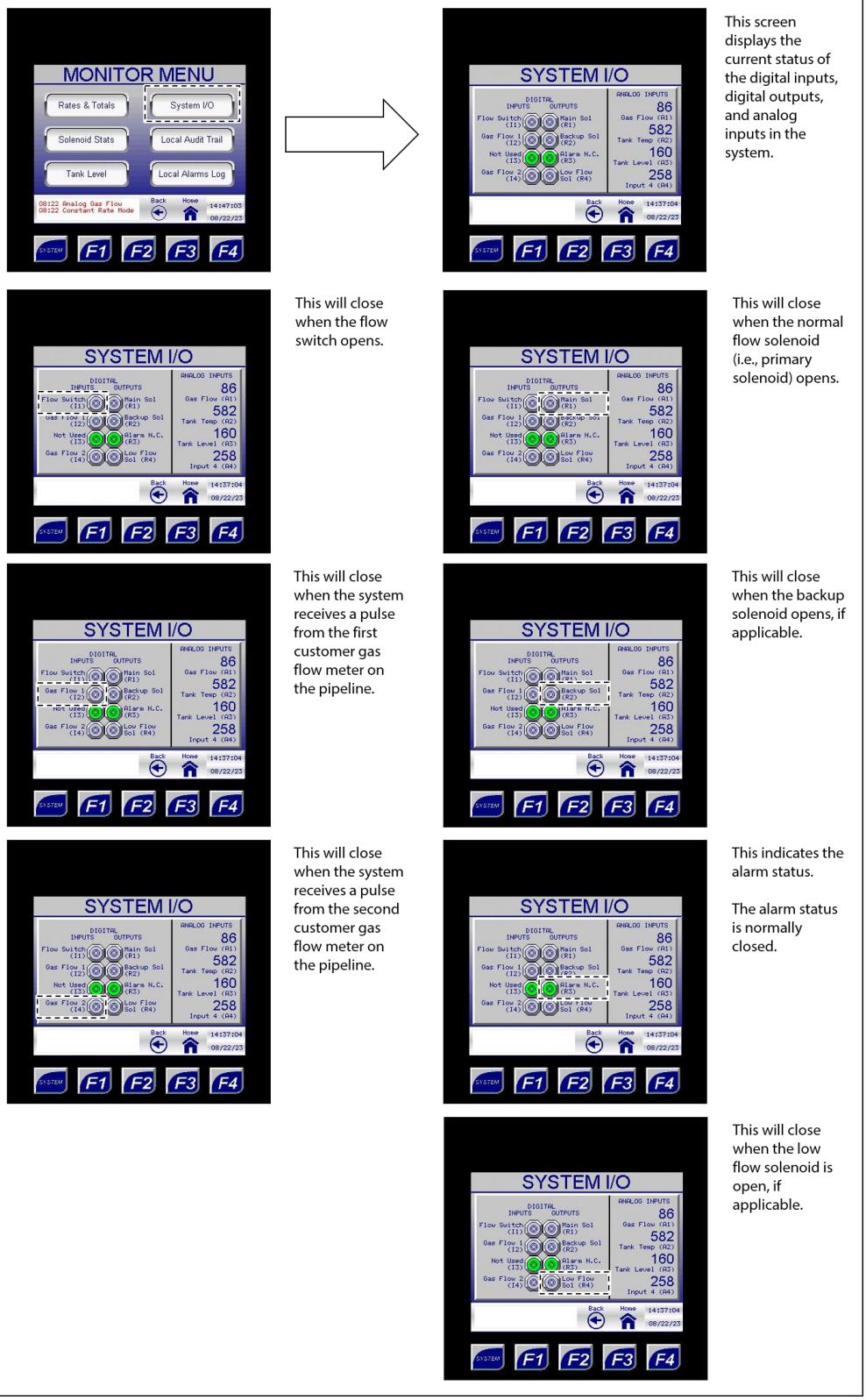
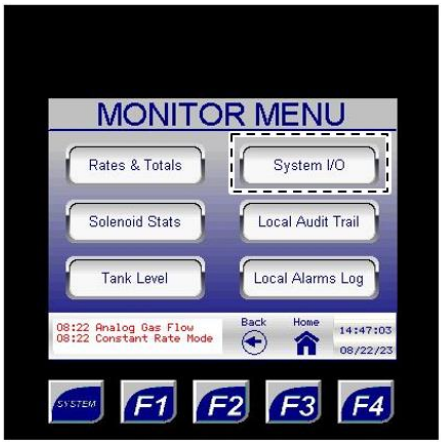
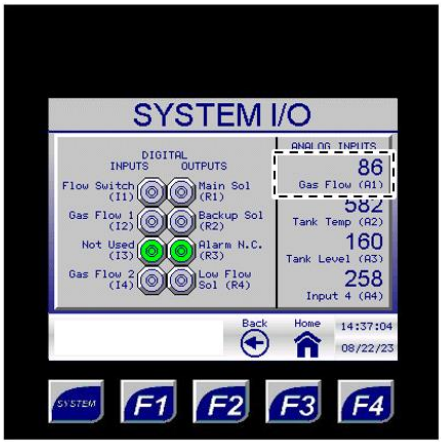


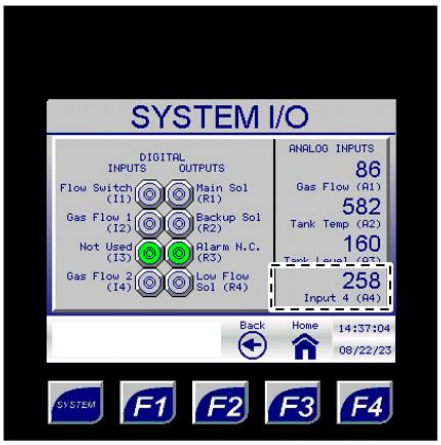
**Figure 21: Monitor Menu – System I/O, 2 of 2**



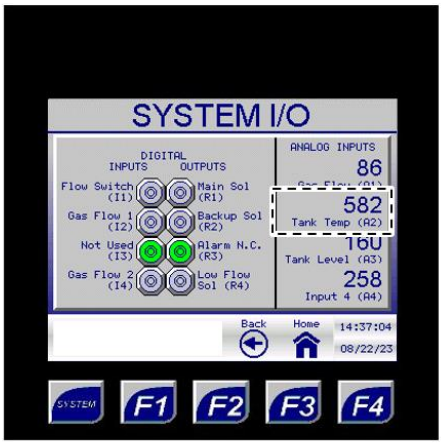

| Analog Input Conversion | |
|---|---|
| **Signal (mA)** | **Raw Count** |
| 4 | 6400 |
| 20 | 32000 |



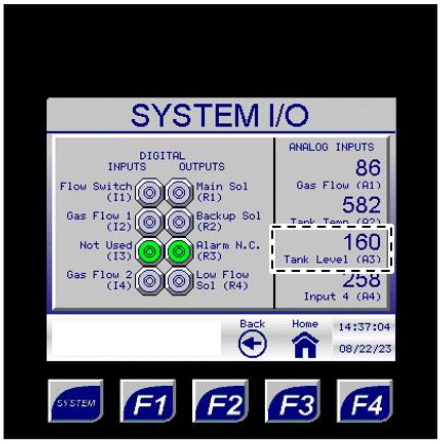

This analog signal is the raw count coming into the odorizer after the signal has been converted from milliamps. This value will vary according to the output from the customer gas flow meter.




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 differential pressure (DP) transmitter.




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 RTD, if one is used.



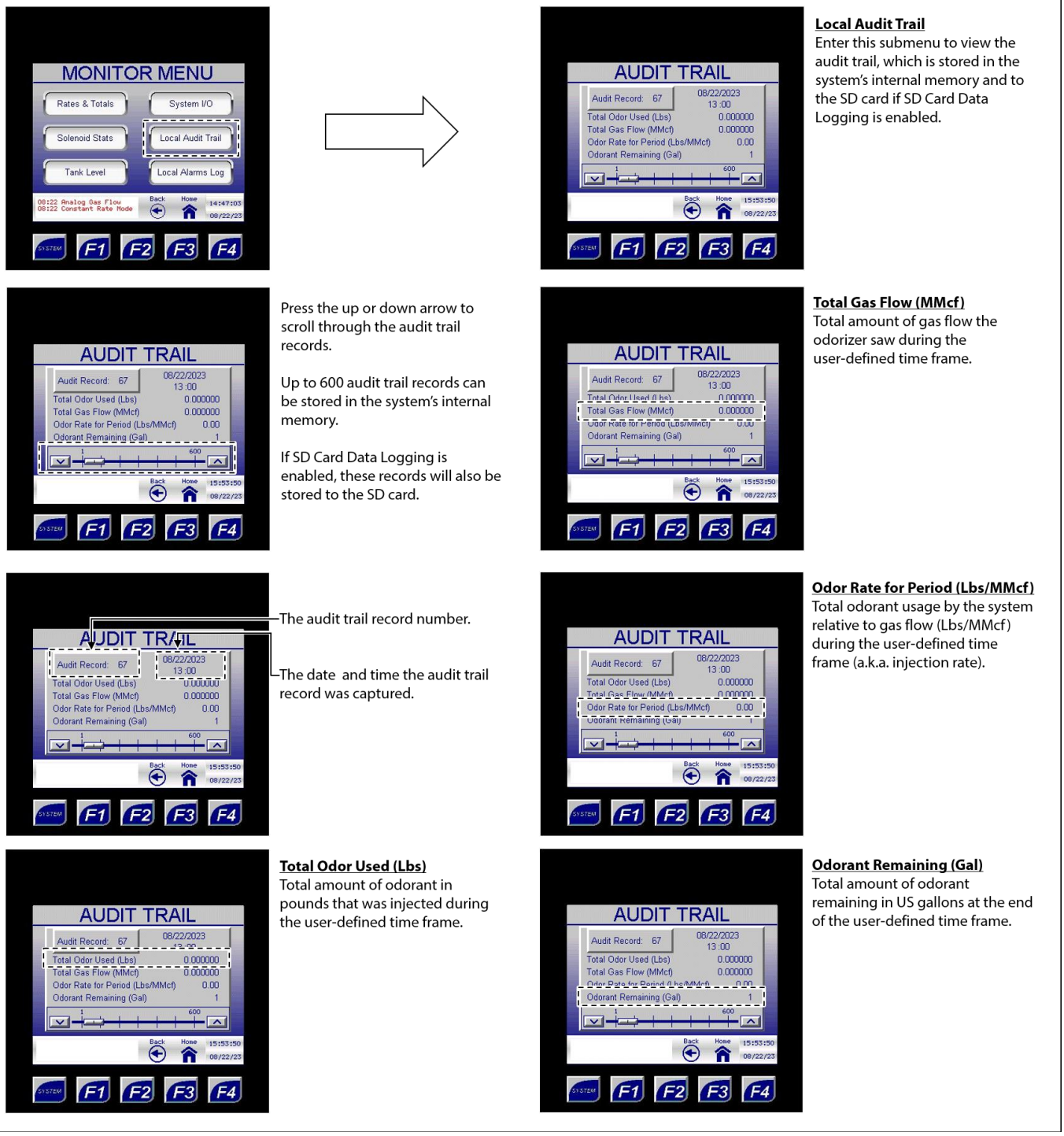

This analog signal is the raw count coming into the odorizer after the RTD signal has been converted from milliamps. This value will vary according to the output from the level transmitter.

## Local Audit Trail

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

If SD Card Data Logging is enabled, the audit trail records will also be stored on the installed micro SD card. The micro SD card is equipped with 8 GB of storage.

**Figure 22: Monitor Menu – Local Audit Trail**

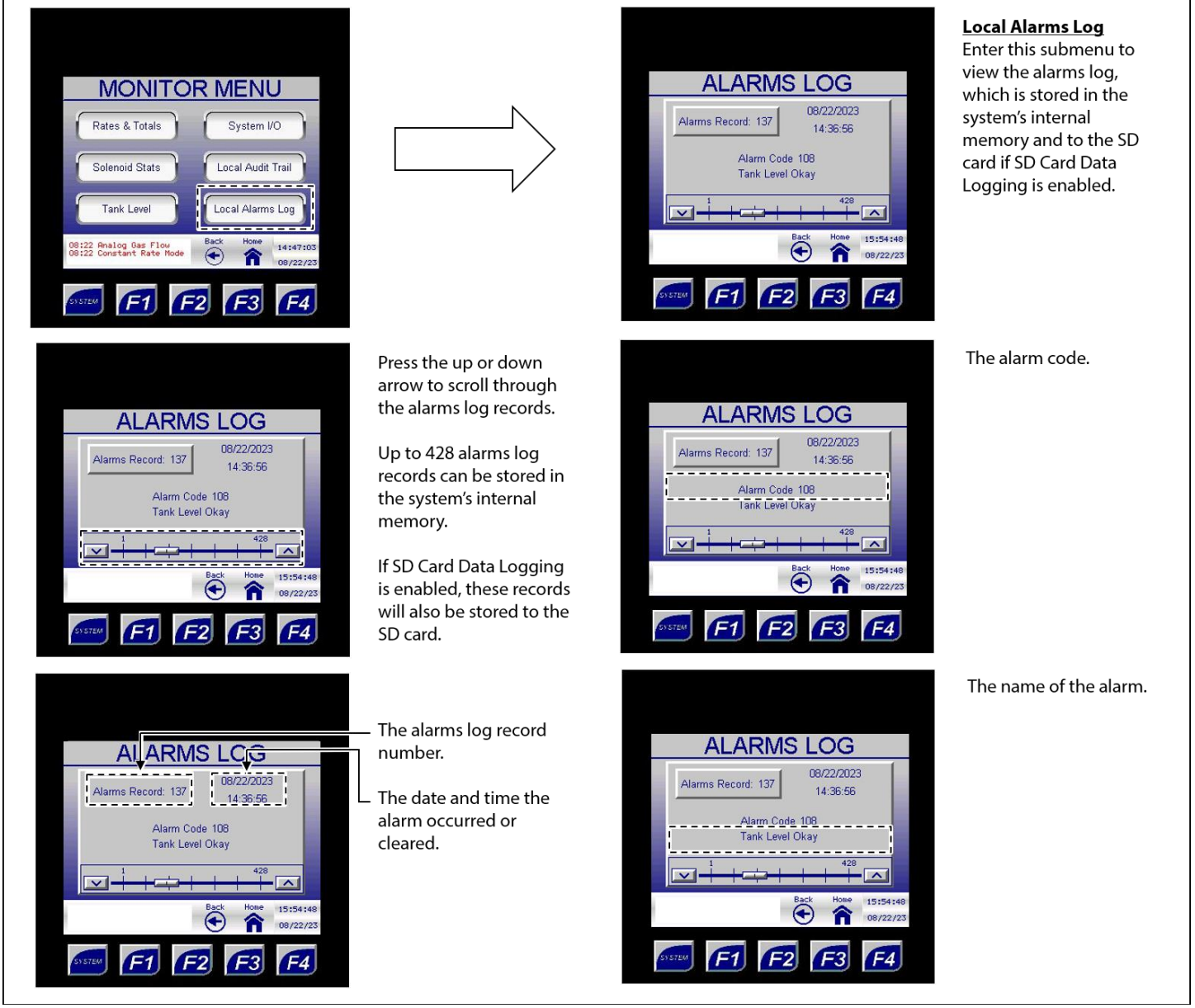


## Local Alarms Log

From the Local Alarms Log submenu, the user can access the alarms log stored on internal memory. Up to 428 logged alarms can be stored and viewed.

If SD Card Data Logging is enabled, the logged alarms will also be stored on the installed micro SD card. The micro SD card is equipped with 8 GB of storage.

**Figure 23: Monitor Menu – Local Alarms Log**

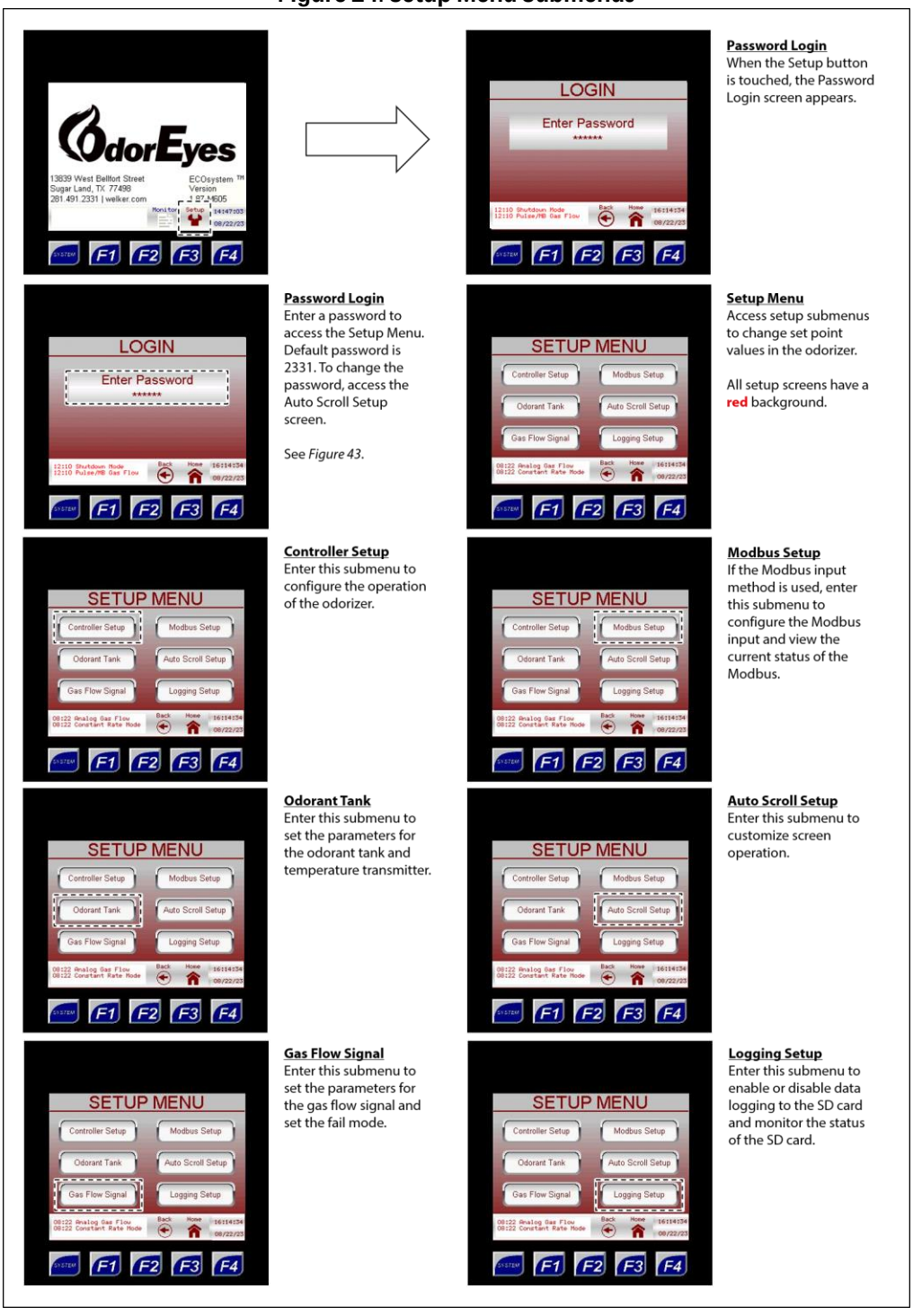


## 3.3 Navigating the Setup Menus

Through the Setup menu, the user can access the Controller Setup, Odorant Tank, Gas Flow Signal, Modbus Setup, Auto Scroll Setup, and Logging Setup 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 24: Setup Menu Submenus**




**Password Login**
When the Setup button is touched, the Password Login screen appears.

**Password Login**
Enter a password to access the Setup Menu. Default password is 2331. To change the password, access the Auto Scroll Setup screen.

See *Figure 43*.

**Setup Menu**
Access setup submenus to change set point values in the odorizer.

All setup screens have a **red** background.

**Controller Setup**
Enter this submenu to configure the operation of the odorizer.

**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.

**Odorant Tank**
Enter this submenu to set the parameters for the odorant tank and temperature transmitter.

**Auto Scroll Setup**
Enter this submenu to customize screen operation.

**Gas Flow Signal**
Enter this submenu to set the parameters for the gas flow signal and set the fail mode.

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

## 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

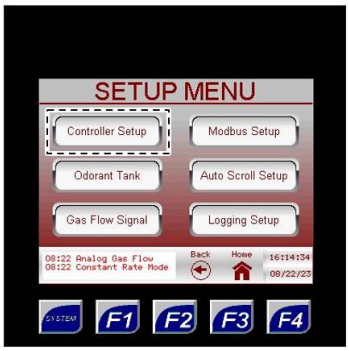
4. To change a text value, press on the value to be changed. A dropdown menu will appear on the screen.
5. Scroll through the value's options using the arrow keys in the dropdown menu.
6. Highlight the desired text value, and then press ENTER to save the changes.

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.

## Controller Setup

Through the Controller Setup submenu, the user can set the general parameters for the odorizer.

**Figure 25: Setup Menu – Controller Setup**

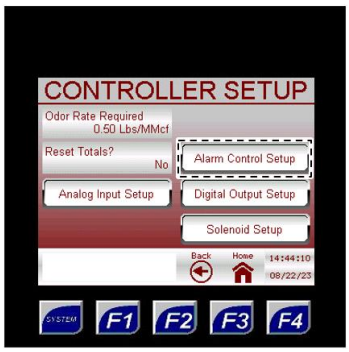




**Odor Rate Required**
Set the number of pounds of odorant to pulse per million standard cubic feet (MMcf) of gas passed.

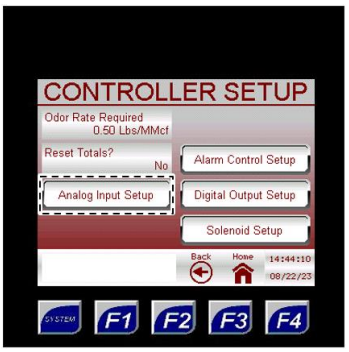

**Reset Totals**
Toggling this field to "Yes" causes the gas flow and odorant usage totals to be reset.

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




**Alarm Control Setup**
Enter this submenu to configure odorant flow alarms and the differential pressure (DP) transmitter.

See *Figure 29* and *Figure 30*.

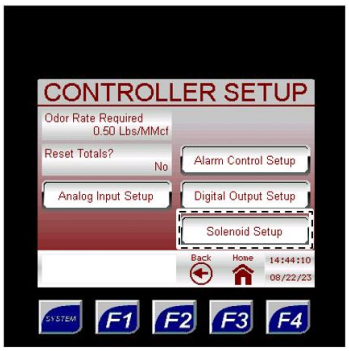



**Analog Input Setup**
Enter this submenu to configure the analog inputs.

See *Figure 26*.


**Digital Output Setup**
Enter this submenu to configure the digital outputs.

See *Figure 28*.



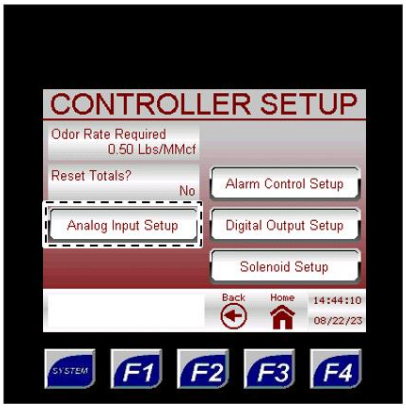

**Solenoid Setup**
Enter this submenu to configure the solenoid operations.

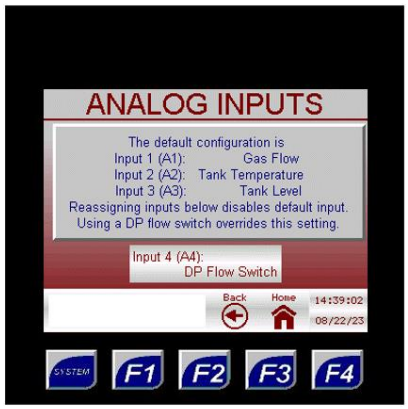
See *Figure 27*.

If the system status totals are used to track system performance, they should be periodically reset through the Controller Setup submenu (*Figure 25*). As the total values increase, they will begin to lose accuracy and will eventually stop accumulating.

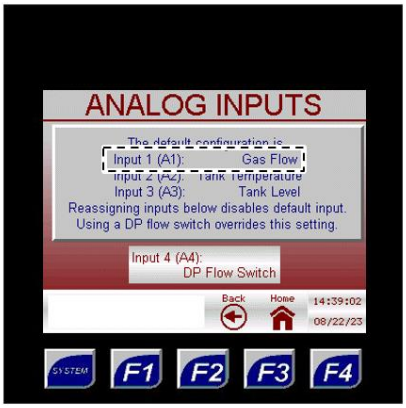
## Analog Output Setup

**Figure 26: Controller Setup – Analog Inputs Setup**

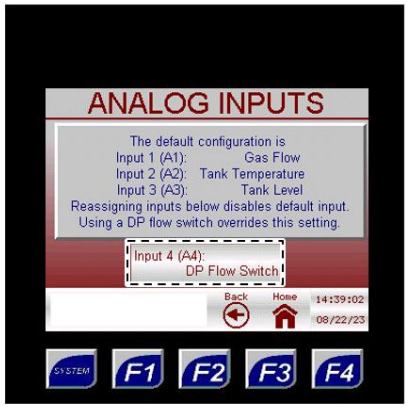


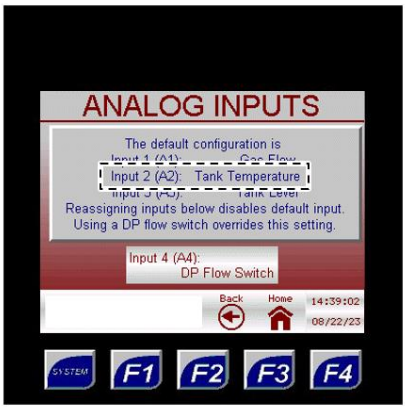

**Analog Inputs Setup**
Enter this submenu to configure the analog inputs if the customer desires to receive the odorization rate in the form of an analog signal.



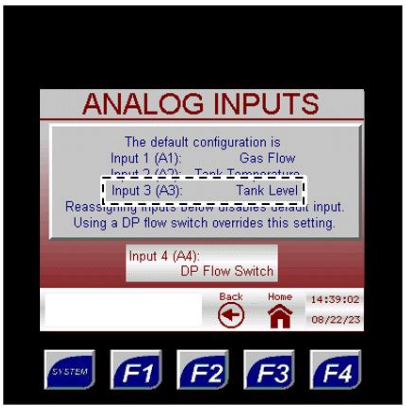

**Input 1: Gas Flow**
This remains fixed. However, reassigning inputs under Input 4 disables the default input.




**Input 4**
Touch this to change the function of Input 4. **Only change under guidance from Welker® OdorEyes® personnel.** It can be changed to one of the following:
- Disabled
- Gas Flow
- Tank Temperature
- Tank Level
- DP Flow Switch




**Input 2: Tank Temperature**
This remains fixed. However, reassigning inputs under Input 4 disables the default input.



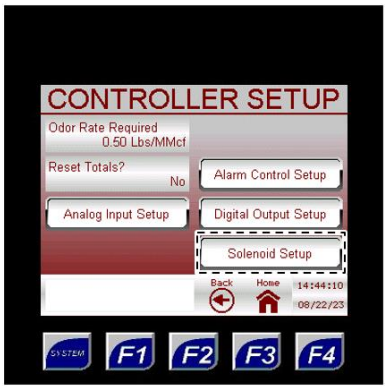

**Input 3: Tank Level**
This remains fixed. However, reassigning inputs under Input 4 disables the default input.

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


Only change Analog Input 4 under guidance from Welker® OdorEyes® personnel.

## Solenoid Setup

**Figure 27: Controller Setup – Solenoid Setup**





**Solenoid Setup**
Enter this submenu to configure the solenoid setup if the system is equipped with two (2) or three (3) solenoids.

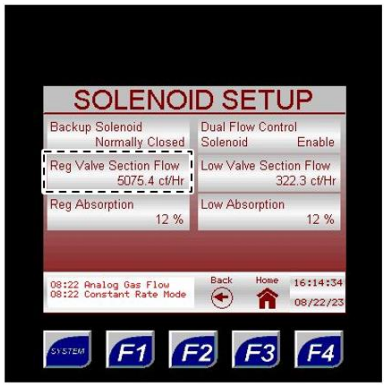

**Backup Solenoid**
For systems that use a backup solenoid in series with the primary solenoid, the backup solenoid can be normally open or normally closed.

This must be set correctly so that the system will operate properly in the event of primary solenoid failure.


**Dual Flow Control Solenoid**
For dual solenoid systems, this should be **disabled**.

For triple solenoid systems, this should be **enabled**.

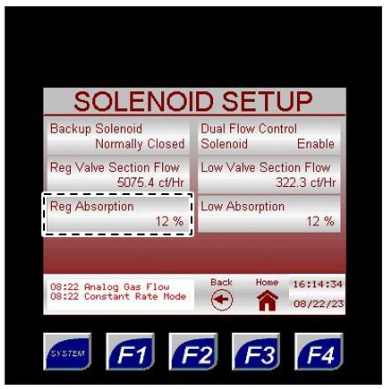
This is set at the factory.




**Reg Valve Section Flow**
This constant, which is based on the inlet pressure and the pressure drop across the solenoid, is the volume of gas (cf/Hr) used by the control logic for calculations.

This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.


**Low Valve Section Flow**
This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.

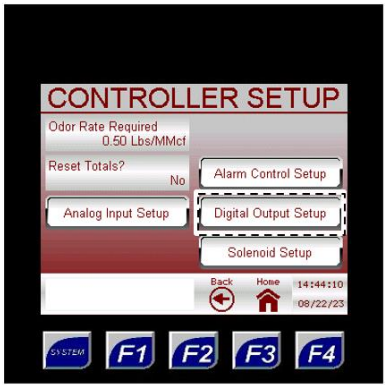


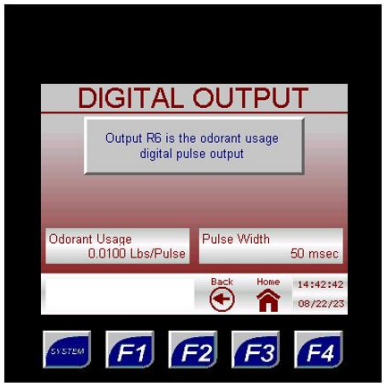

**Reg Absorption**
This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.


**Low Absorption**
This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.

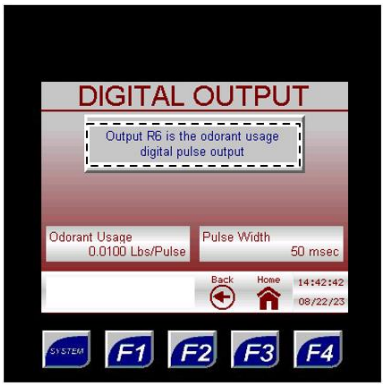
## Digital Output Setup

**Figure 28: Controller Setup – Digital Output Setup**

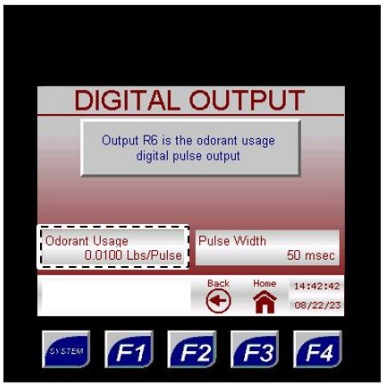


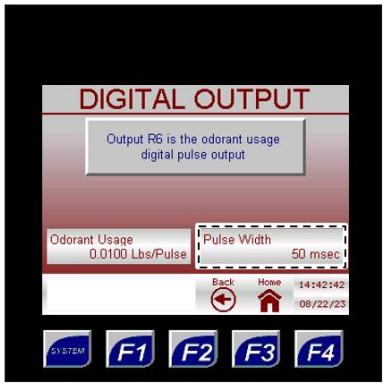

**Digital Output**
Enter this submenu to configure the odorant usage digital pulse output.




**Output R6**
Output R6 is the odorant usage digital pulse output.



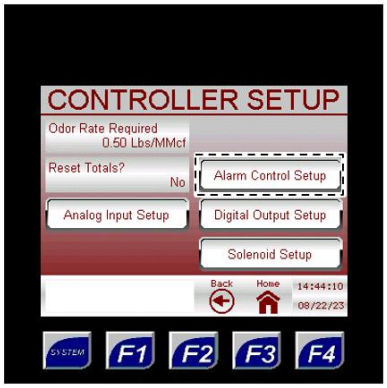

**Odorant Usage**
This indicates odorant usage in Lbs/Pulse.

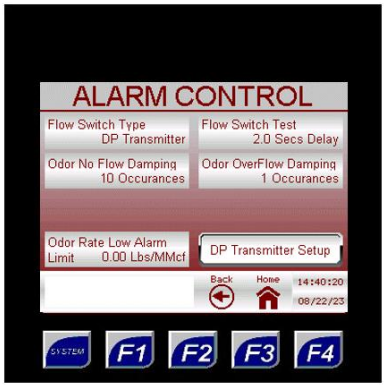



**Pulse Width**
This indicates the odorant pulse width in terms of milliseconds.

## Alarm Control Setup

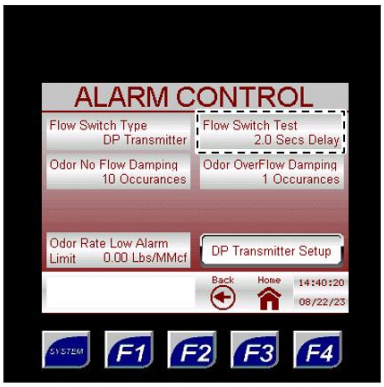
**Figure 29: Controller Setup – Alarm Control Setup**



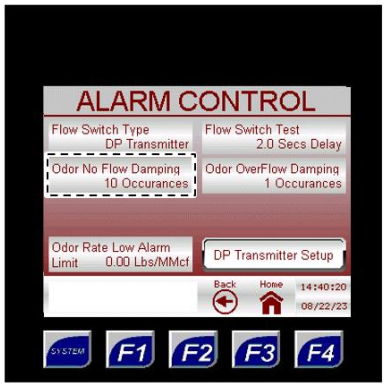




**Alarm Control Setup**
Enter this submenu to configure the odorant flow alarms and to enter the differential pressure (DP) transmitter setup submenu.


**Flow Switch Type**
This indicates that the odorant flow switch type is a differential pressure (DP) transmitter.

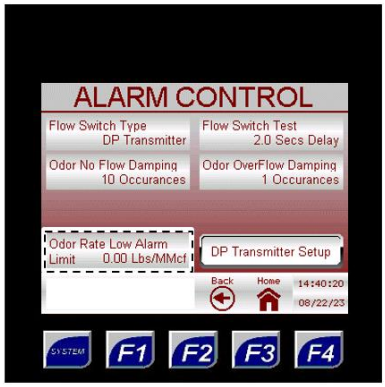



**Flow Switch Test**
This indicates the delay, in seconds, of the flow switch test.

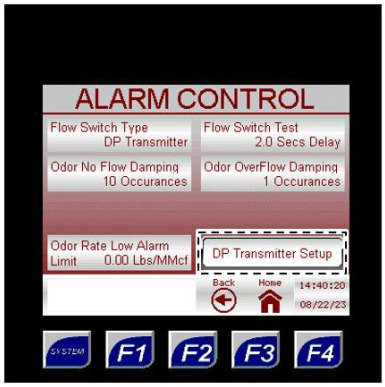



**Odor No Flow Damping**
This indicates the number of times odorant flow is not detected before an alarm occurs.


**Odor OverFlow Damping**
This indicates the number of times when odorant overflow occurs before an alarm occurs.



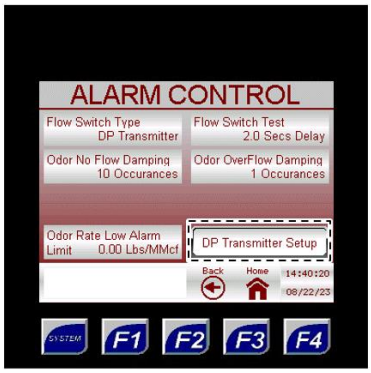

**Odor Rate Low Alarm Limit**
This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.

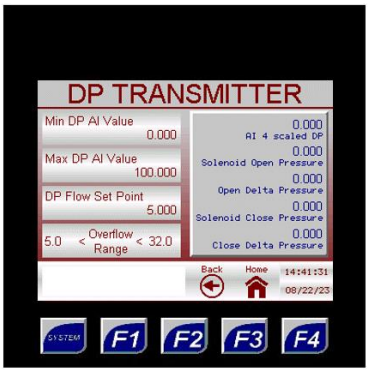



**DP Transmitter Setup**
Enter this submenu to set up the differential pressure transmitter.

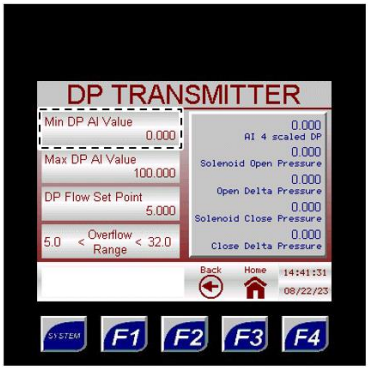
## DP Transmitter Setup

**Figure 30: Alarm Control Setup – Differential Pressure (DP) Transmitter Setup**



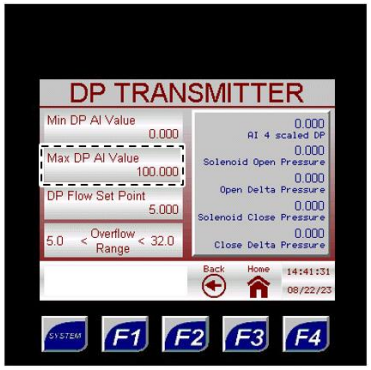




**DP Transmitter Setup**
Enter this submenu to configure the differential pressure transmitter setup.



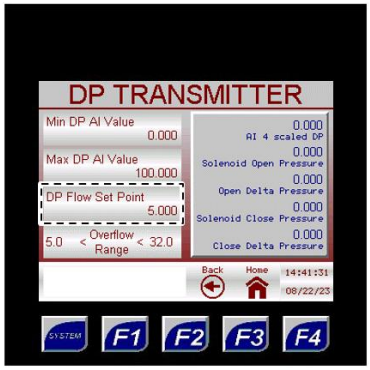

**Min DP AI Value**
This is the value that is represented by 4 mA from the DP transmitter.

This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.

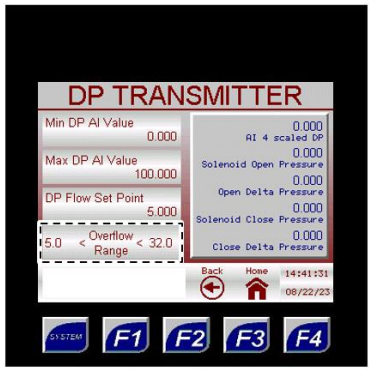



**Max DP AI Value**
This is the value that is represented by 20 mA from the DP transmitter.

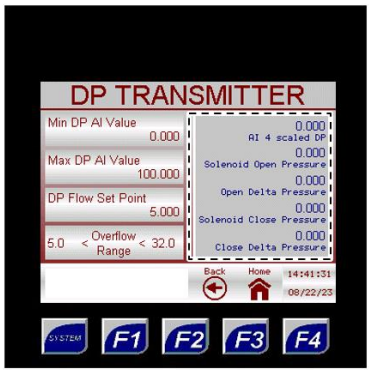
This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.




**DP Flow Set Point**
This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.




**Overflow Range**
This value is factory-set according to customer specifications and should not be changed unless instructed by Welker® OdorEyes® personnel.




**DP Transmitter Data**
This displays live data from the differential pressure transmitter.

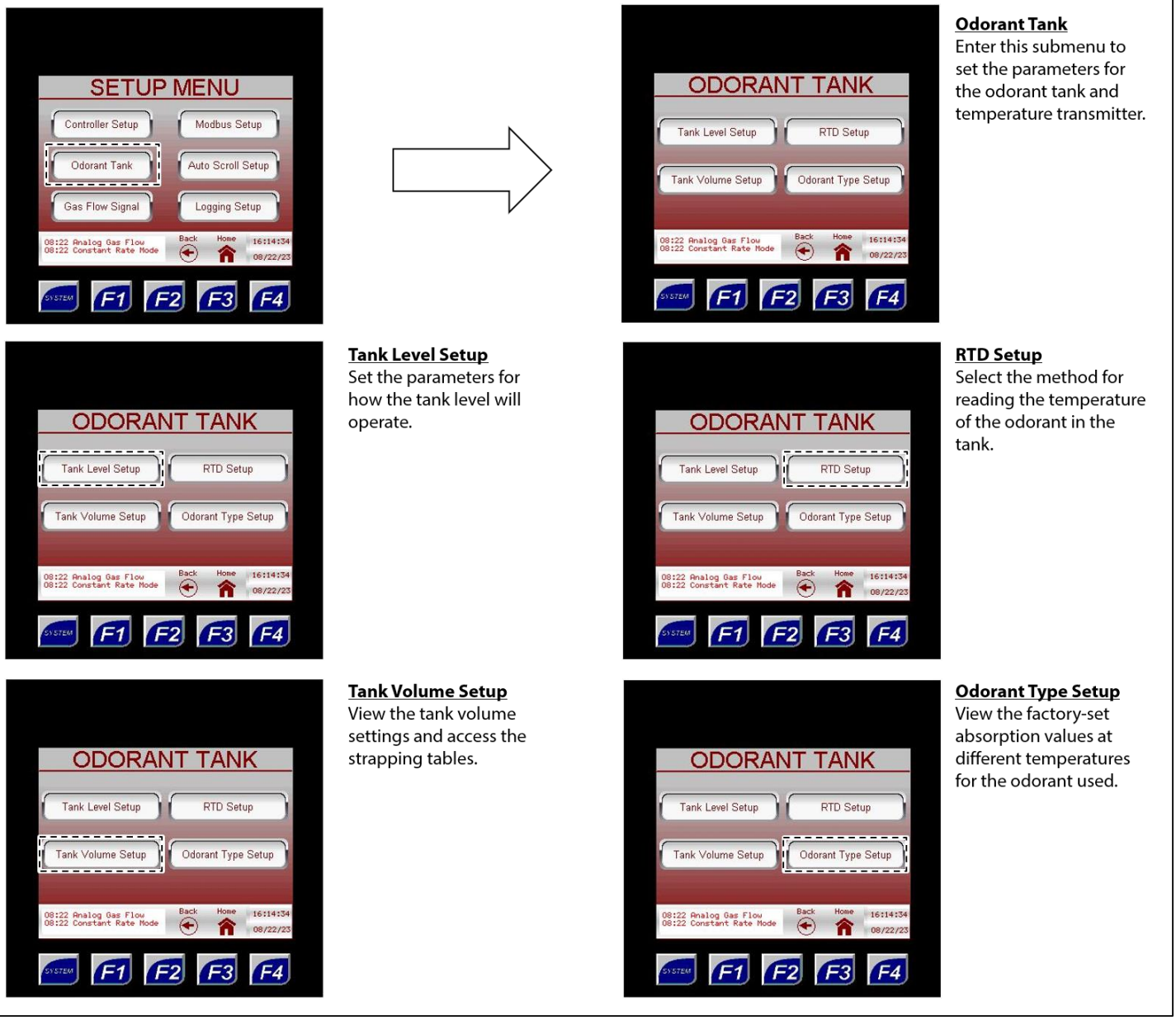
STOP

Only change differential pressure (DP) values under guidance from Welker® OdorEyes® personnel.

## Odorant Tank Setup

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

**Figure 31: Setup Menu – Odorant Tank**




**Odorant Tank**
Enter this submenu to set the parameters for the odorant tank and temperature transmitter.

**Tank Level Setup**
Set the parameters for how the tank level will operate.

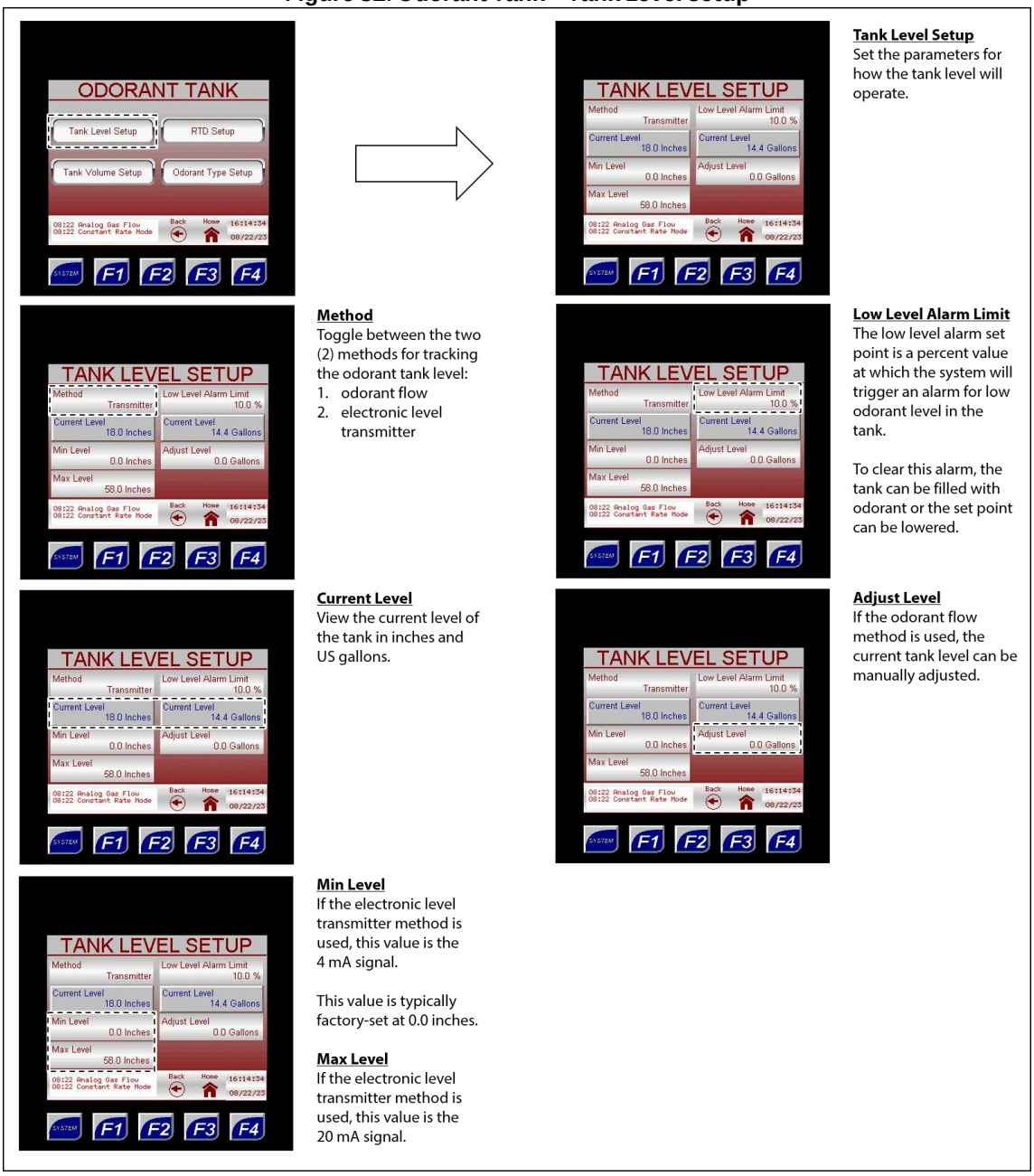
**RTD Setup**
Select the method for reading the temperature of the odorant in the tank.

**Tank Volume Setup**
View the tank volume settings and access the strapping tables.

**Odorant Type Setup**
View the factory-set absorption values at different temperatures for the odorant used.

## Tank Level Setup

**Figure 32: Odorant Tank – Tank Level Setup**




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.

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.
- 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.

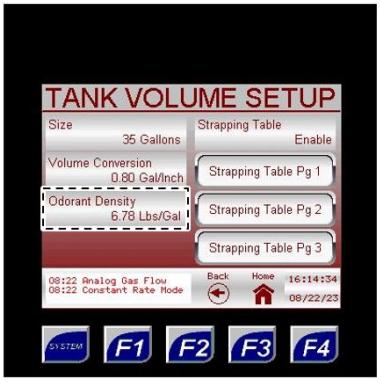
## Tank Volume Setup

**Figure 33: Odorant Tank – Tank Volume Setup**



**Tank Volume Setup**
Set the parameters for the tank volume.


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




**Odorant Density**
The odorant density will vary according to the odorant used.

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


**Volume Conversion**
This value is the volume of liquid odorant per inch. This is used only with vertical odorant tanks.


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

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

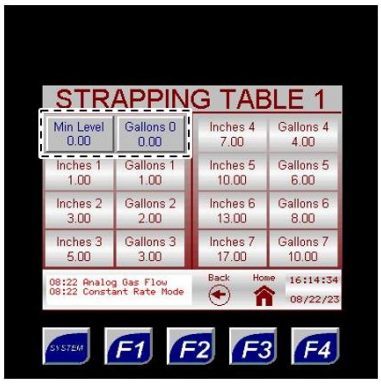
**Strapping Table Pg 1, 2, 3**
If strapping is enabled, view the tank depth and tank volume for each strapping point. See *Figure 34*.

**Figure 34: Tank Volume Setup – Strapping Tables**



The strapping table page number.

Each page displays the tank depth in inches and the tank volume in US gallons for multiple strapping points.

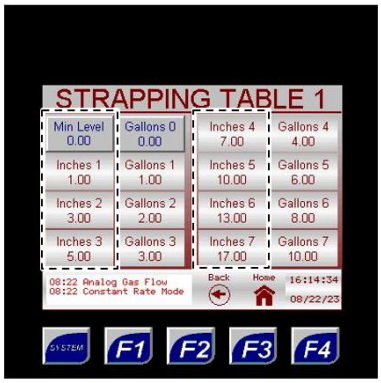



The minimum strapping point for the tank is displayed on page 1.

It is zero (0) inches and zero (0) US gallons.


The right column of each table displays the tank volume in US gallons per inch.

Each table row is a single strapping point.




The left column of each table displays the tank depth in inches.

Each table row is a single strapping point.

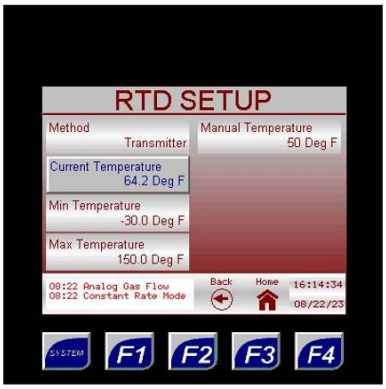

The maximum strapping point for the tank is displayed on the last page.

The maximum strapping point will depend on the tank size and volume.

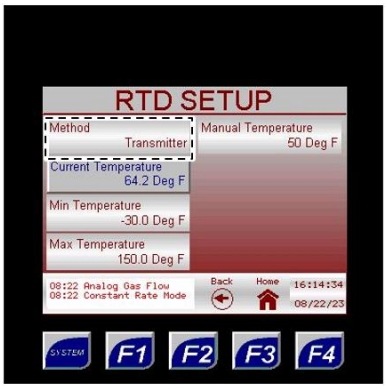
If the odorant tank is horizontal, the strapping points will be calculated and entered at the factory.

## RTD Setup

**Figure 35: Odorant Tank – RTD Setup**

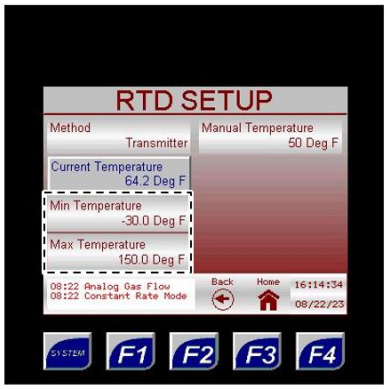




**RTD Setup**
Select the method for reading the temperature of the odorant in the tank.



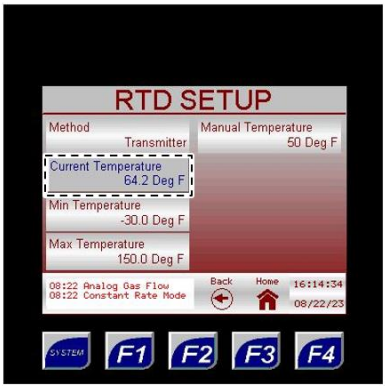

**Method**
Toggle between the two (2) methods for reading the temperature of the odorant in the tank:

1. manual entry
2. temperature transmitter

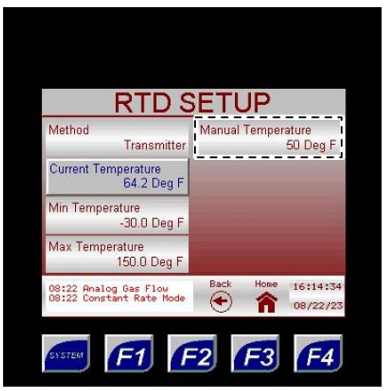



**Min Temperature**
If the temperature transmitter method is used, this value is the 4 mA signal.

**Max Temperature**
If the temperature transmitter method is used, this value is the 20 mA signal.




**Current Temperature**
If the temperature transmitter method is used, this is the current temperature of the odorant tank.




**Manual Temperature**
Manually enter the temperature of the odorant in the tank in degrees Fahrenheit.

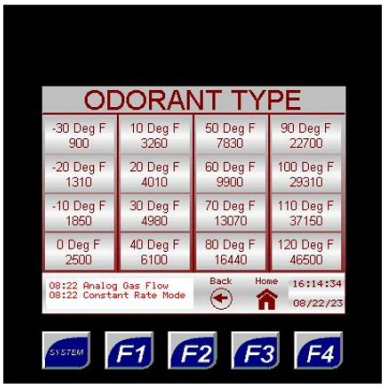
The temperature should be manually entered even if the temperature transmitter method is used, as the system will automatically switch over to manual entry in the event of signal loss from the transmitter.

When using a temperature transmitter to track the temperature in the odorant tank, the Method should be set to Transmitter. When there is no device tracking the temperature in the odorant tank, the Method should be set to Manual Entry.

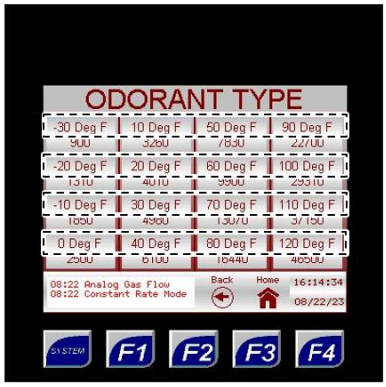
Setting an accurate manual temperature is necessary even when using a temperature transmitter. The temperature of the odorant supply tank is key to system operation; correct odorization is not possible without this value.

## Odorant Type Setup

**Figure 36: Odorant Tank – Odorant Type Setup**

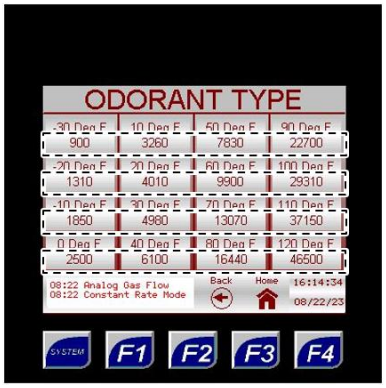




**Odorant Type Setup**
View the factory-set absorption values at different temperatures for the odorant used.




The first value in each cell is the temperature in degrees Fahrenheit.

The temperatures range from -30 °F to 120 °F and increase by increments of 10 °F.




The second value in each cell is the absorption value associated with the temperature in the cell.

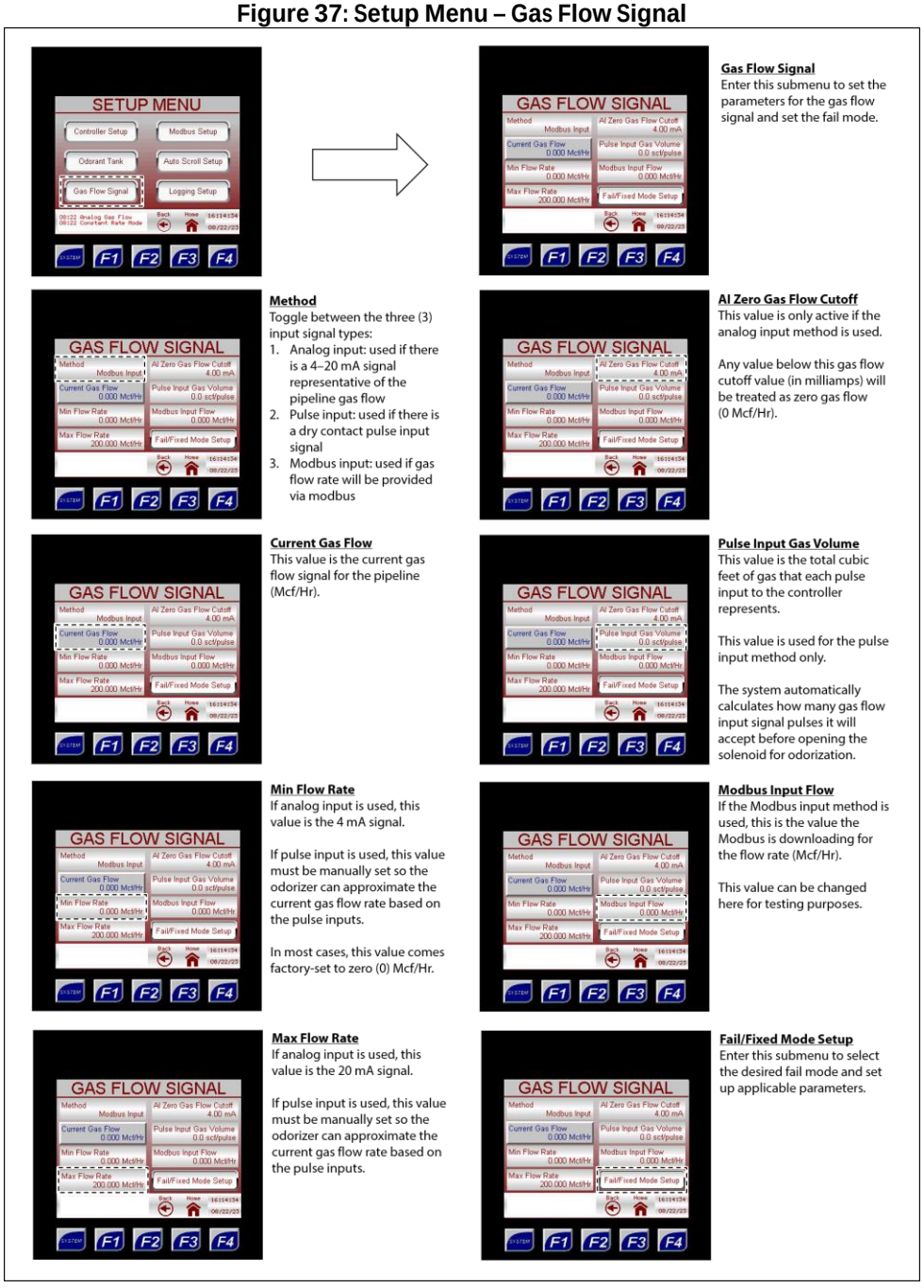
These values are factory-set based on customer specifications.

If the type of odorant used is changed, please contact Welker® OdorEyes® personnel for new absorption values and/or pressure regulator settings.

## Gas Flow Signal

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

**Figure 37: Setup Menu – Gas Flow Signal**




**Gas Flow Signal**
Enter this submenu to set the parameters for the gas flow signal and set the fail mode.

**Method**
Toggle between the three (3) input signal types:
1. Analog input: used if there is a 4–20 mA signal representative of the pipeline gas flow
2. Pulse input: used if there is a dry contact pulse input signal
3. Modbus input: used if gas flow rate will be provided via modbus

**Al Zero Gas Flow Cutoff**
This value is only active if the analog input method is used.

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

**Current Gas Flow**
This value is the current gas flow signal for the pipeline (Mcf/Hr).

**Pulse Input Gas Volume**
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.

The system automatically calculates how many gas flow input signal pulses it will accept before opening the solenoid for odorization.

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

If pulse input is used, this value must be manually set so the odorizer can approximate the current gas flow rate based on the pulse inputs.

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

**Modbus Input Flow**
If the Modbus input method is used, this is the value the Modbus is downloading for the flow rate (Mcf/Hr).

This value can be changed here for testing purposes.

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

If pulse input is used, this value must be manually set so the odorizer can approximate the current gas flow rate based on the pulse inputs.

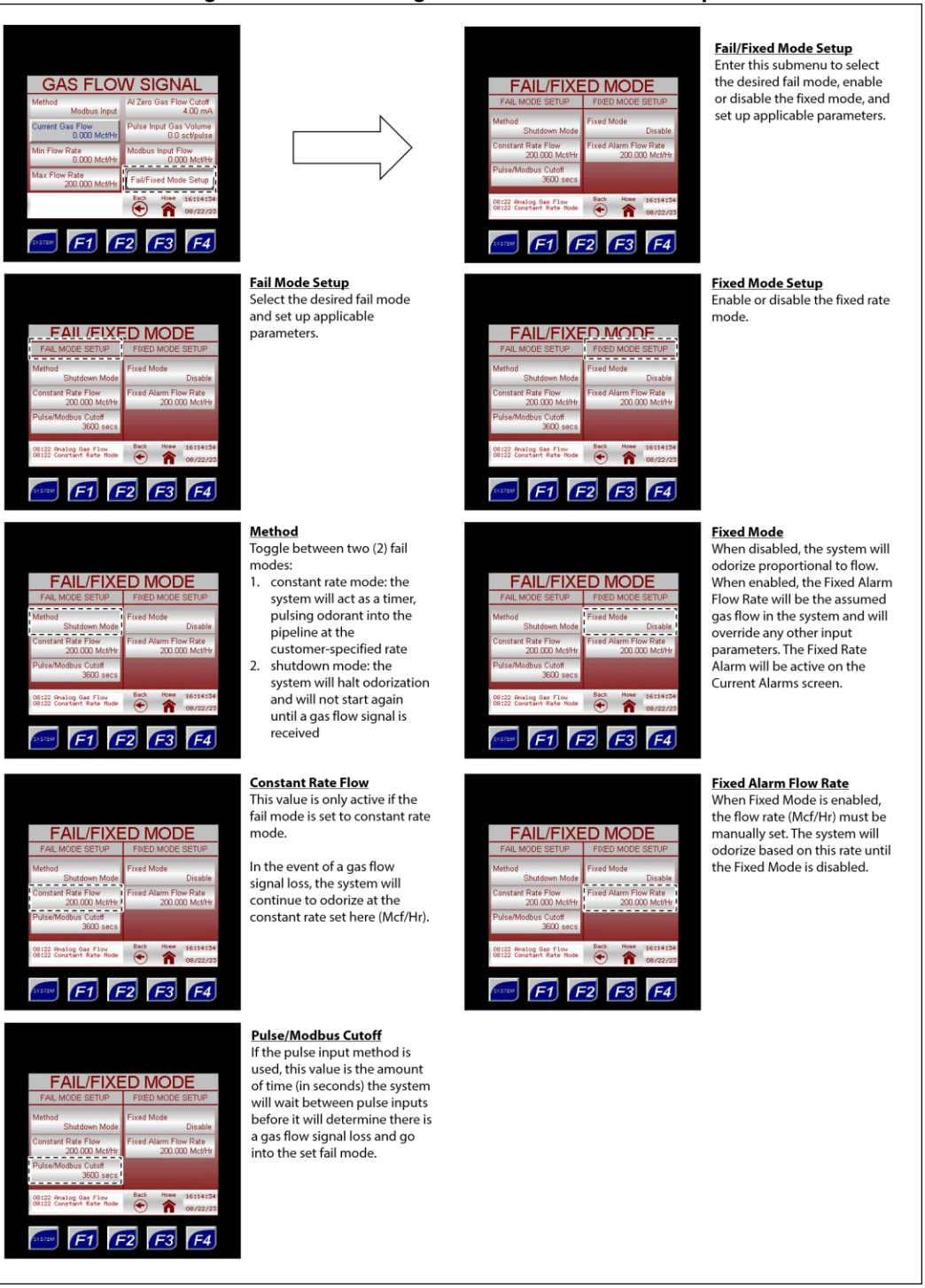
**Fail/Fixed Mode Setup**
Enter this submenu to select the desired fail mode and set up applicable parameters.

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

If the pulse input method is selected, the Pulse/Modbus Cutoff must also be set (*Figure 38*).

## Fail/Fixed Mode Setup

### Figure 38: Gas Flow Signal – Fail/Fixed Mode Setup




**Fail/Fixed Mode Setup**
Enter this submenu to select the desired fail mode, enable or disable the fixed mode, and set up applicable parameters.

**Fail Mode Setup**
Select the desired fail mode and set up applicable parameters.

**Fixed Mode Setup**
Enable or disable the fixed rate mode.

**Method**
Toggle between two (2) fail modes:

1. constant rate mode: the system will act as a timer, pulsing odorant into the pipeline at the customer-specified rate
2. shutdown mode: the system will halt odorization and will not start again until a gas flow signal is received

**Fixed Mode**
When disabled, the system will odorize proportional to flow. When enabled, the Fixed Alarm Flow Rate 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 Current Alarms screen.

**Constant Rate 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/Hr).

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

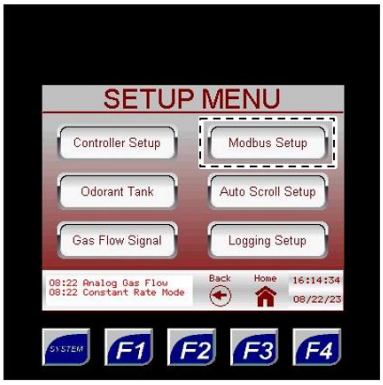
**Pulse/Modbus Cutoff**
If the pulse input method is used, this value is the amount of time (in seconds) the system will wait between pulse inputs before it will determine there is a gas flow signal loss and go into the set fail mode.

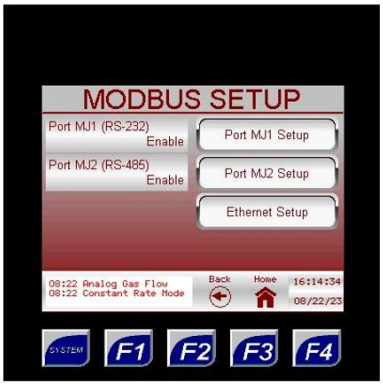
Setting the Fail Mode to Constant Rate will allow odorization to continue at the specified rate.
Setting the Fail Mode to Shutdown will halt odorization until the alarm is cleared.

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.

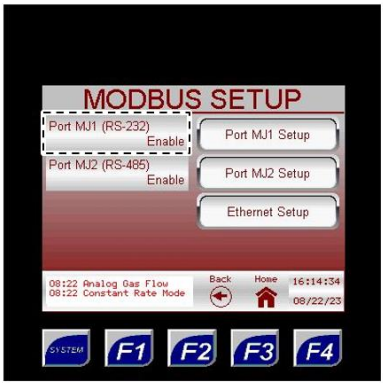
## Modbus Setup

**Figure 39: Setup Menu – Modbus Setup**

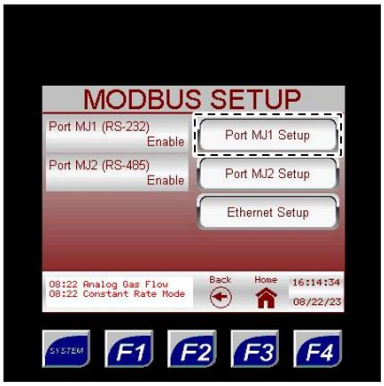


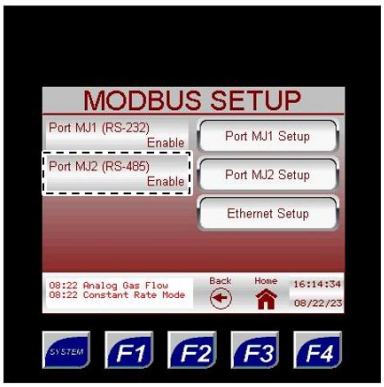

**Modbus Setup**
If the Modbus input method is used, enter this submenu to configure the Modbus input and view the current status of the Modbus.



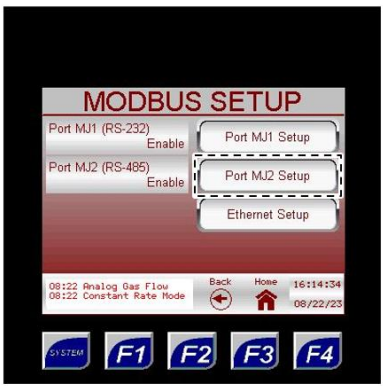

**Port MJ1**
When enabled, the mode of port MJ1 switches to Modbus.



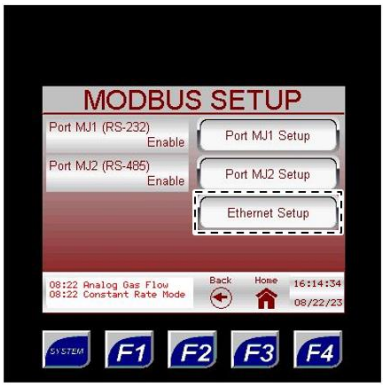

**Port MJ1 Setup**
Enter this submenu to configure port MJ1 and view its current status.




**Port MJ2**
When enabled, the mode of port MJ2 switches to Modbus.



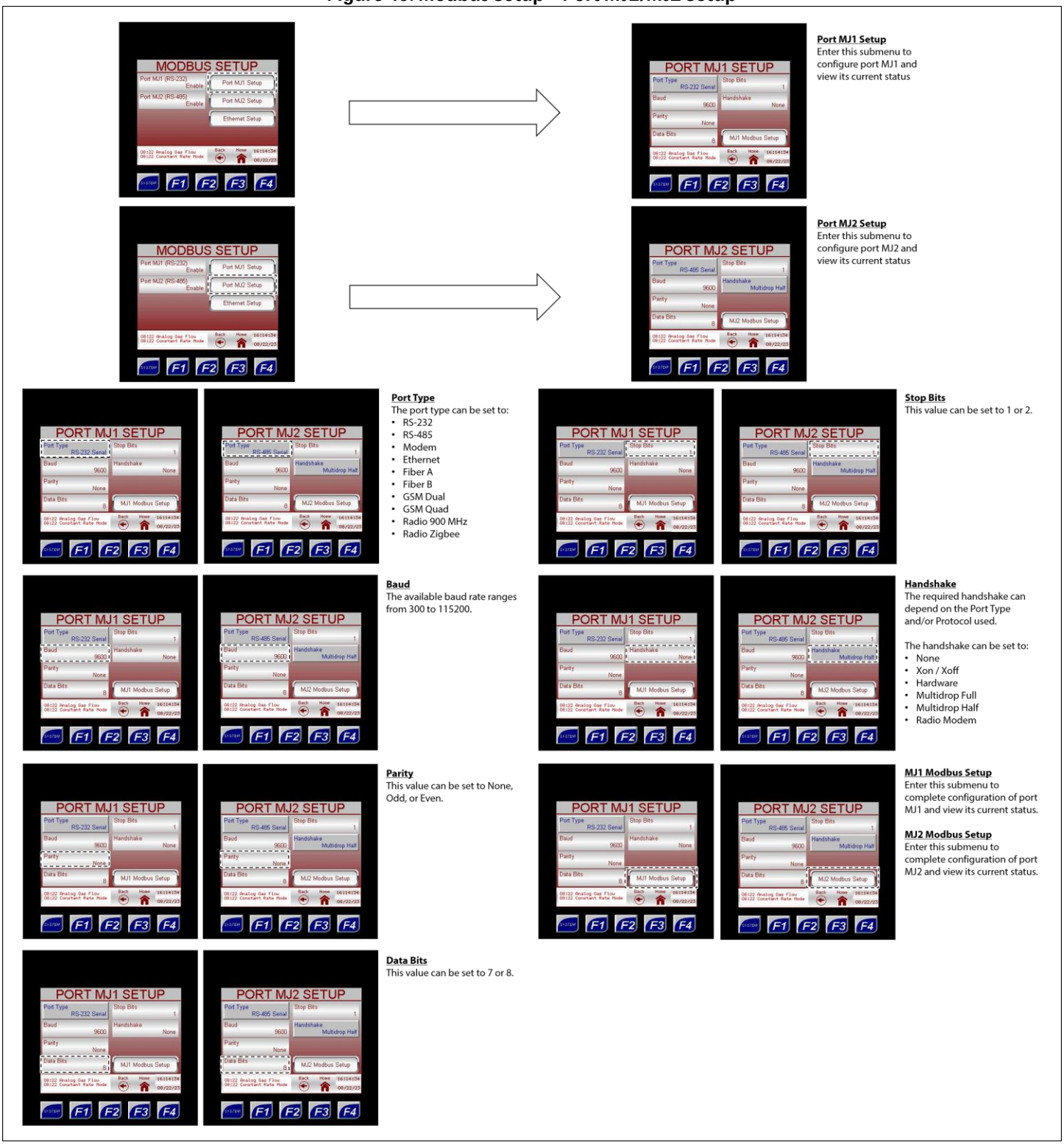

**Port MJ2 Setup**
Enter this submenu to configure port MJ2 and view its current status.




**Ethernet Setup**
Enter this submenu to configure the Ethernet connection and view its current status.

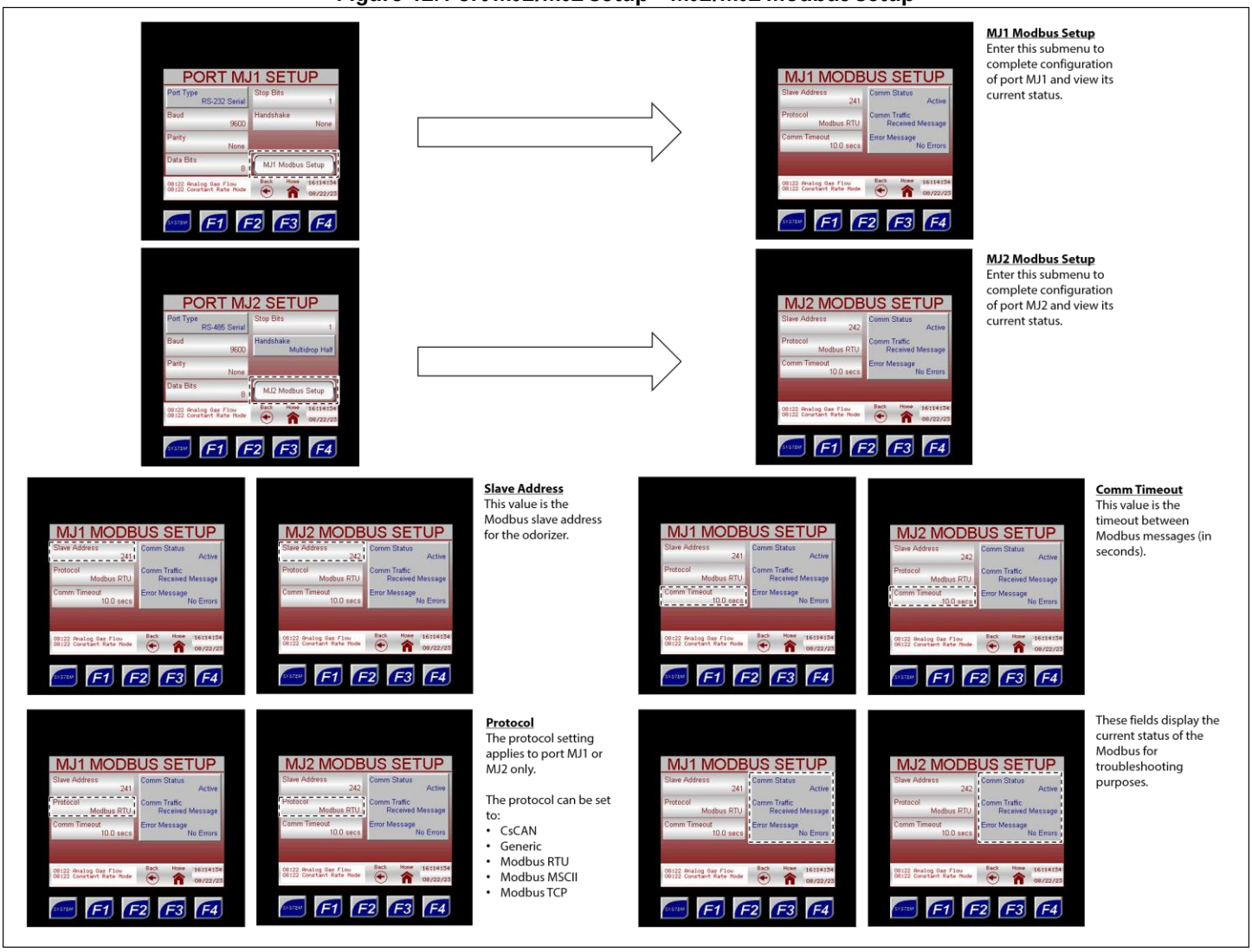
## Port MJ1/MJ2 Setup

### Figure 40: Modbus Setup – Port MJ1/MJ2 Setup

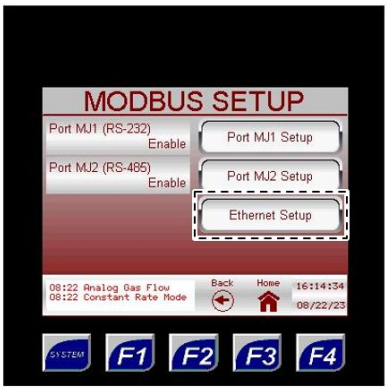


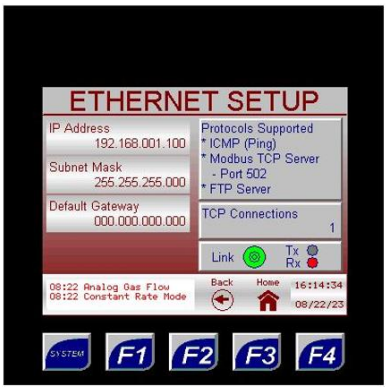
## MJ1/MJ2 Modbus Setup

**Figure 41: Port MJ1/MJ2 Setup – MJ1/MJ2 Modbus Setup**

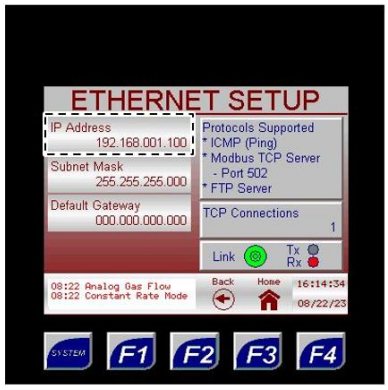


## Figure 42: Modbus Setup – Ethernet Setup



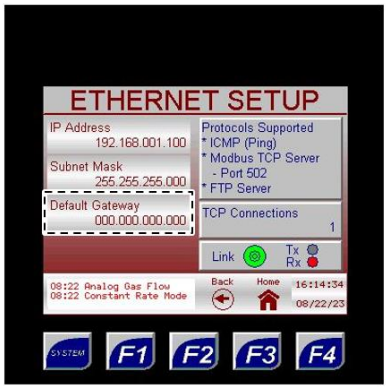




**Ethernet Setup**
Enter this submenu to configure the Ethernet connection and view its current status.



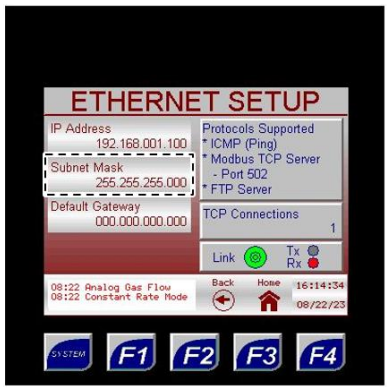

**IP Address**
Manually assign an IP address.

Pressing this field will bring up an on-screen keyboard for address entry.



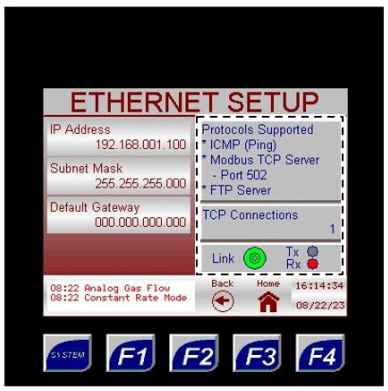

**Default Gateway**
Manually assign the default gateway.

Pressing this field will bring up an on-screen keyboard for gateway entry.




**Subnet Mask**
Manually assign the subnet mask.

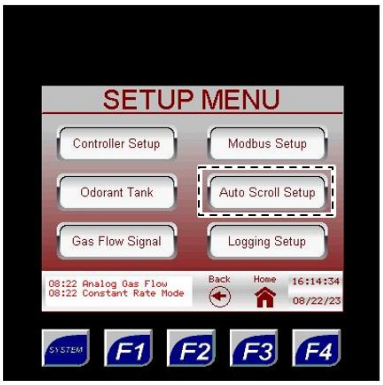
Pressing this field will bring up an on-screen keyboard for subnet mask entry.

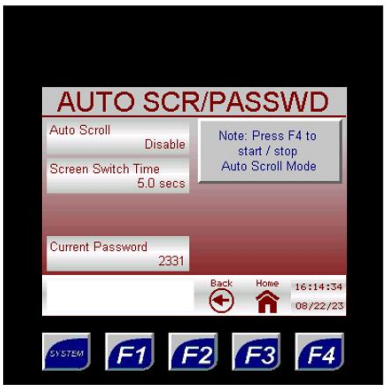



This column displays general and diagnostic information about the Ethernet connection.

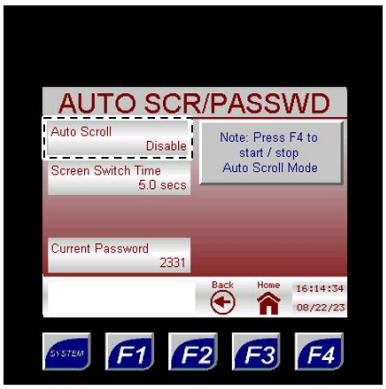
## Auto Scroll Setup

**Figure 43: Setup Menu – Auto Scroll Setup**



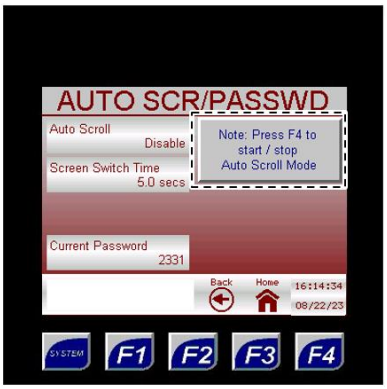




**Auto Scroll Setup**
Enter this submenu to customize screen operation.

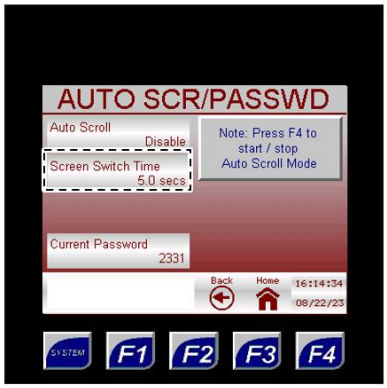



**Auto Scroll**
When Auto Scroll is enabled, the touch screen controller will automatically scroll through seven (7) pre-set screens.

See *Figure 44*.

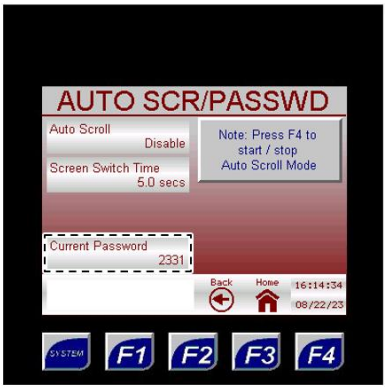



**Note**
Auto Scroll can be started or stopped at any time by pressing the F4 key.



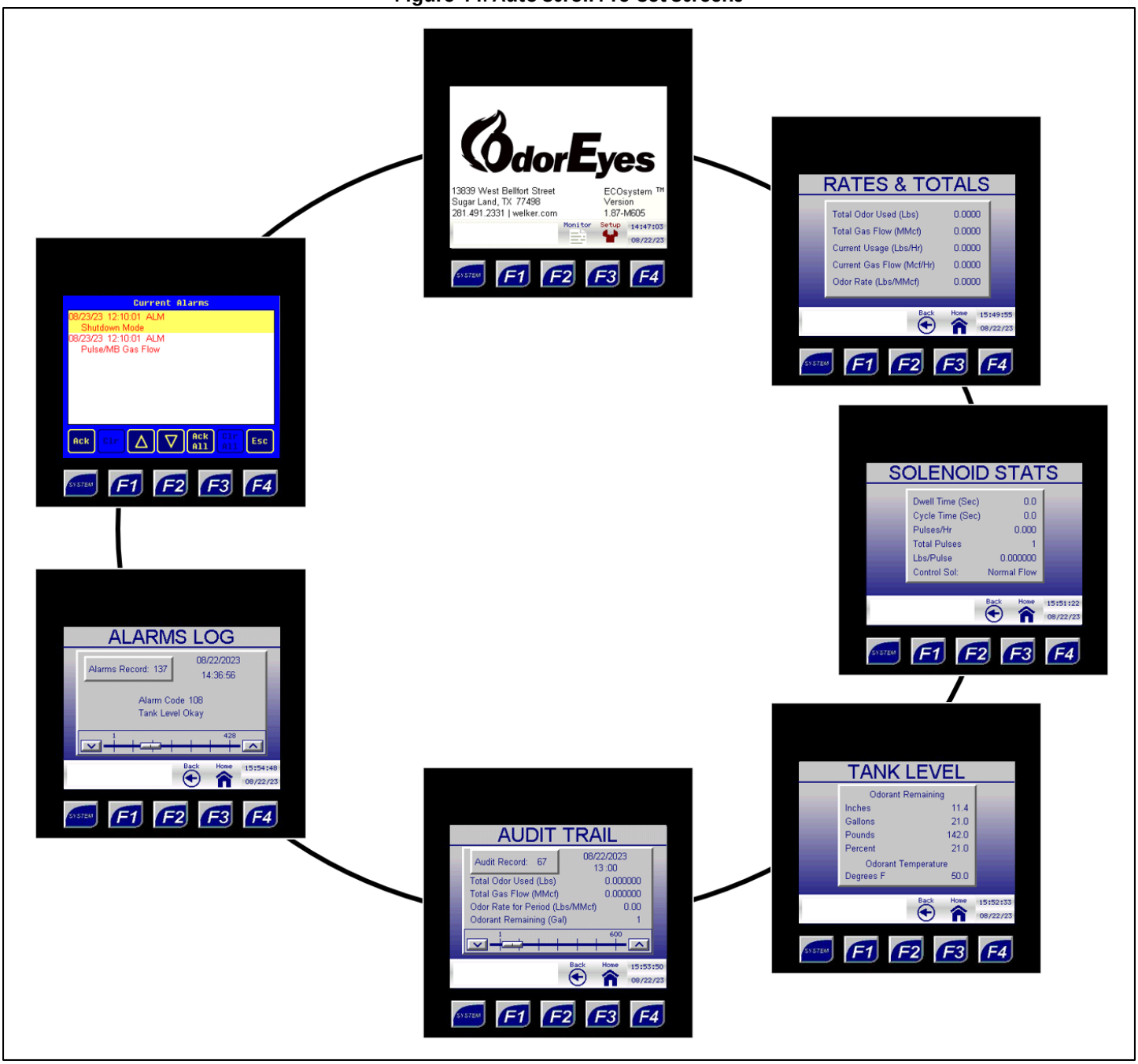

**Screen Switch Time**
When Auto Scroll is enabled, the Screen Switch Time is the length of time each of the pre-set screens will display before going to the next screen.

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




**Current Password**
Displays current password, which may be changed by touching the field and entering a new password.

**Figure 44: Auto Scroll Pre-Set Screens**

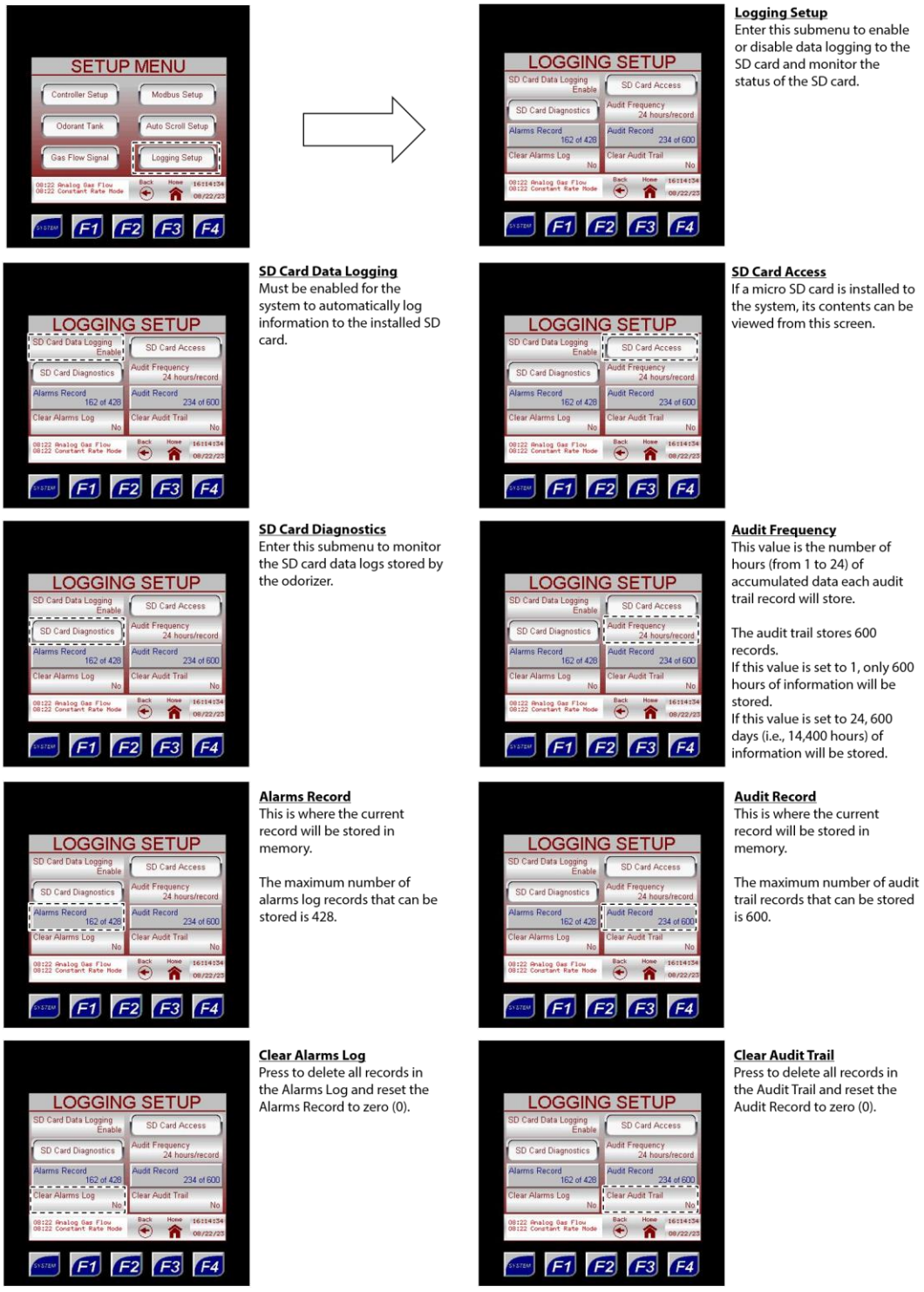



## Logging Setup

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

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

## Figure 45: Setup Menu – Logging Setup




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

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

**SD Card Access**
If a micro SD card is installed to the system, its contents can be viewed from this screen.

**SD Card Diagnostics**
Enter this submenu to monitor the SD card data logs stored by the odorizer.

**Audit Frequency**
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.

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

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

**Audit 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.

**Clear Alarms Log**
Press to delete all records in the Alarms Log and reset the Alarms Record to zero (0).

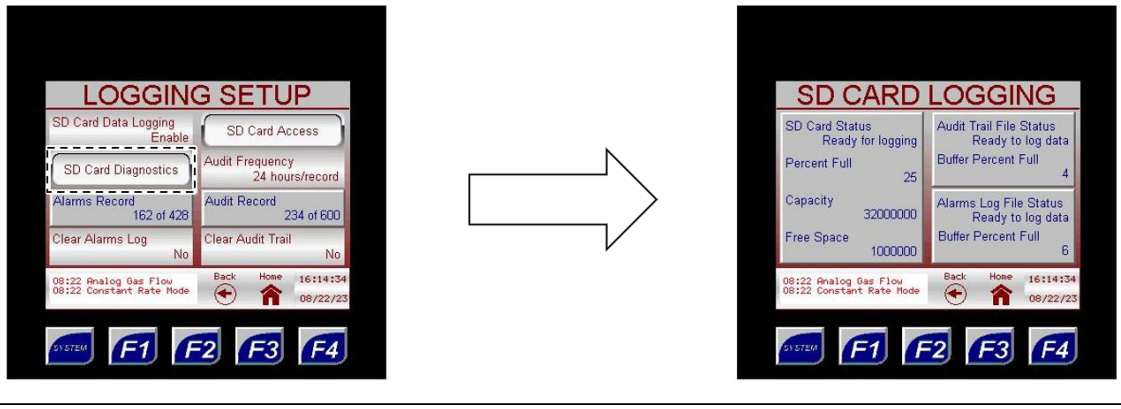
**Clear Audit Trail**
Press to delete all records in the Audit Trail and reset the Audit Record to zero (0).

If the micro SD card needs to be removed, first disable SD Card Data Logging. Failure to disable SD Card 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 SD Card Data Logging through the Logging Setup submenu (*Figure 45*).

## SD Card Diagnostics

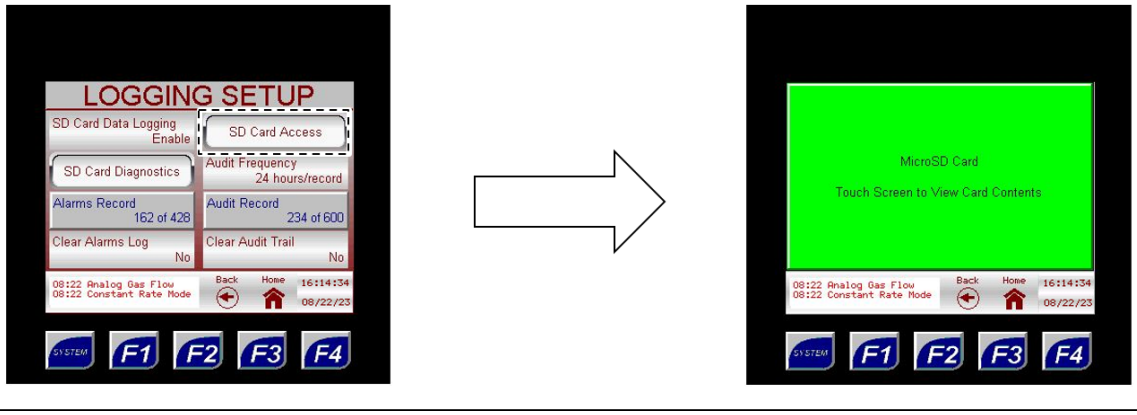
**Figure 46: Logging Setup – SD Card Diagnostics**




**SD Card Logging**
Monitor the status and storage capacity of the installed SD card.

## SD Card Access

**Figure 47: Logging Setup – SD Card Access**




If a micro SD Card is installed to the system, its contents can be viewed from this screen.

Contact Welker® OdorEyes® personnel for assistance installing software updates.

## SECTION 4: MAINTENANCE

### 4.1 Before You Begin

1. **Refer to *Appendix B, Maintenance Schedule*, for the itemized Welker® recommended maintenance schedule for the ECOsystem™.**
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 operation, 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.
    b. Depressurize the system and close all valves.

Prior to closing odorized gas outlet valves K1 and K2 and/or the pipeline isolation valve, the ECOsystem™ must be powered down. This is to prevent the odorant supply tank from building pressure.

    c. Disconnect the tubing and remove individual system components for maintenance.
    d. For complete and proper maintenance on individual system components, refer to their respective *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*.

## APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-025: Welker® IR-1, IR-2, IR-4, and IR-6 Instrument Regulators
- IOM-033: Welker® RV-1, RV-2, RV-2CP, and RV-3 Relief Valves
- IOM-105: Welker® NV-1 and NV-2 Instrument Valves
- IOM-169: Welker® F-5 Filter Dryer

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

- ABB Inc. K-TEK Products AT200 Magnetostrictive Level Transmitter (Welker® IOM-V011)
- ASCO, L.P. 0.55 W Low Power Solenoid Valves Low Power Series (Welker® IOM-V267)
- ASCO, L.P. 1.4 W Low Power Solenoid Valves Low Power Series (Welker® IOM-V266)
- ASCO, L.P. General Service Solenoid Valves Series 8314 (Welker® IOM-V121)
- ASCO, L.P. High Pressure Solenoid Valves Series 8223 (Welker® IOM-V103)
- CCI Thermal Technologies Inc. Cata-Dyne™ Explosion-Proof Gas Catalytic Heaters WX Series (Welker® IOM-V030)
- Emerson Process Management Regulator Technologies, Inc. Fisher™ 1301 Series High-Pressure Regulators Types 1301F and 1301G (Welker® IOM-V107)
- GE Oil & Gas Mooney Series 20/20S/20H/20HS Pilot Regulators (Welker® IOM-V101)
- Horner APG, LLC XL4 OCS Modules (Welker® IOM-V369)
- Inline Industries, Inc. 201F Ball Valve (Welker® IOM-V222)
- INTERTEC Instrumentation Ltd. CP MULTITHERM C Electric Heater (Welker® IOM-V104)
- INTERTEC Instrumentation Ltd. TS Thermostat (Welker® IOM-V105)
- MTS Systems Corporation Level Plus® Liquid-Level Sensors With Temposonics® Technology M-Series Model MR Analog Transmitter (Welker® IOM-V036)
- Power-Sonic Corporation PS-1270 12 Volt 7.0 AH Rechargeable Sealed Lead Acid Battery (Welker® IOM-V223)
- PR electronics 5333D 2-Wire Programmable Transmitter (Welker® IOM-V270)
- PR electronics PRetop 5331B 2-Wire Programmable Transmitter (Welker IOM-V269)
- Quest-Tec Solutions Magne-Trac™ Level Indicators (Welker® IOM-V367)
- Saginaw Control & Engineering EL Enclosure SCE-30EL3012LP (Welker® IOM-V265)
- Solutions With Innovation L505 Visual Level Indicator Dip-Tape Visual Level Indicator (Welker® IOM-V037)
- Swagelok Company Check Valves C, CA, CH, CP, and CPA Series (Welker® IOM-V076)
- 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 Proportional Relief Valves R Series (Welker® IOM-V086)
- 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: OE181VS.10E (Dual Solenoid Valve Section With Optional Heater, ¼" Tubing)
- System Drawing: OE181VS.14E (Dual Solenoid Valve Section, ¼" Tubing)
- System Drawing: OE220VS.5E (Triple Solenoid Valve Section With Optional Heater, ¼" and ⅜" Tubing)
- System Drawing: OE220VS.7E (Triple Solenoid Valve Section, ¼" and ⅜" Tubing)
- Additional drawings available.

## 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: ECOsystem™ Maintenance Schedule**

| Action | Weekly | Every 12 Months | As Necessary |
|---|---|---|---|
| If applicable, confirm proper functioning of the heater. | X | | |
| Open F-5 drain valve G to allow moisture to drain from the filter. | X | | |
| Verify the pneumatic supply pressure. | | X | |
| Rebuild the F-5 using a Welker® repair kit.<br>• Replace the O-rings and filter cartridge. | | X | |
| View the controller's current alarms. | | | X |
| Inspect the tubing, valves, and fittings on the system for leaks. | | | X |
| Replace the controller battery. | | | X |
| Maintain the regulator. | | | X |
| Maintain the relief valve. | | | X |
| Maintain the solenoid(s). | | | X |

## NOTES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