INSTALLATION, OPERATION, AND MAINTENANCE MANUAL

WELKER® ACCU/LINE™ INJECTION SYSTEM

WITH XLT CONTROLLER

DRAWING NUMBERS
OE160VS
OE161VS
OE162VS.124
OE162VS.624
OE163VS
OE163VS.624
OE164VS
OE165VS
OE166VS.124
OE170VS.224
OE172VS.124
OE173VS.624

MANUAL NUMBER
IOM-179

REVISION
Rev. D, 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 Accu/Line™ Injection System With XLt 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 Accu/Line™ Injection 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 Accu/Line™ Injection 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 *Accu/Line™ Injection System With XLt Controller* is designed to inject liquid odorant proportional to flow into a natural gas pipeline. This skid-mounted automatic injection system has three (3) primary components: the touch screen controller, the pump cabinet, and the odorant supply tank. Each primary component plays an integral role in the operation of the Accu/Line™ 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 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 Accu/Line™ continues injecting 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.

The pump cabinet contains one (1) or two (2) Welker® OdorEyes BIP Bellows Injection Pumps or Welker® SSO-9 Sample/Injection Pumps, which inject the liquid odorant into the pipeline. Having two (2) pumps allows the Accu/Line™ to better respond to and accommodate varying flow rates and limits interruption to operation for pump maintenance. To prolong the operational life of the injection pumps, the Welker® F-9 Filter removes particles from the liquid odorant and the Welker® F-5 Filter Dryer conditions the pneumatic supply. The odorant flow meter communicates the injection volume to the controller, which in turn actuates the solenoid(s) for proportional to flow odorization.

Each odorant supply tank is equipped with a tank fill inlet, vent port, blanket pressure inlet, and level gauge. For added automation, an electronic level transmitter can be installed to communicate tank level to the controller. Regardless of volume and orientation, every odorant supply tank comes with 110% containment that is sloped to the drain port for easy draining.

Welker® may custom design the Accu/Line™ Injection System With XLt 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

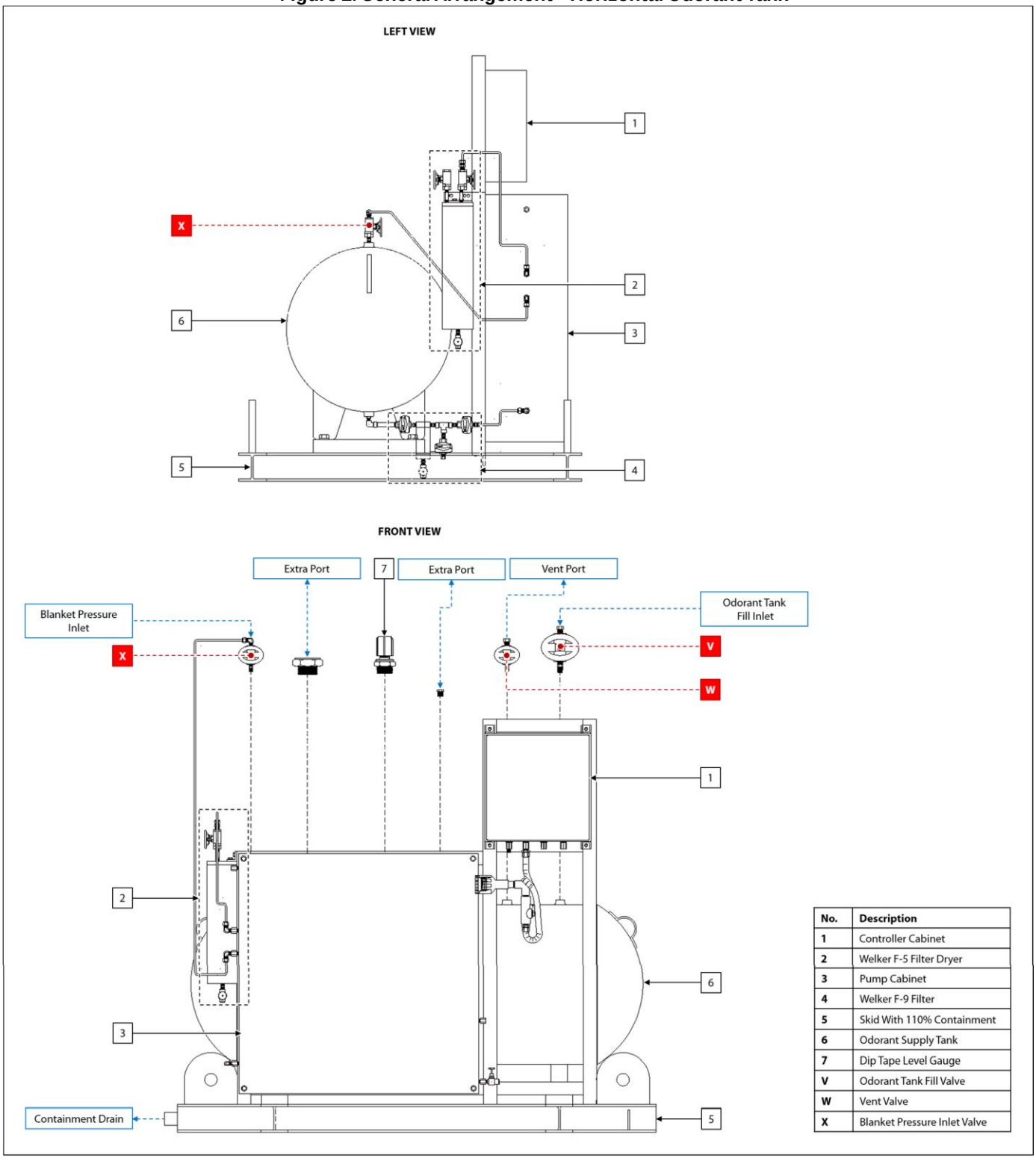
The specifications listed in this section are generalized for this equipment. Welker® can modify the equipment according to your company's needs. **Please note that the specifications may vary depending on the customization of your equipment.**

Table 1: Accu/Line™ Specifications	
Application	Liquid Odorant Injection
Utility Requirements	Pneumatic Supply to Operate Injection Pump(s)
Electrical Connections	**Controller:** AC 120 V **Flow Meter and Solenoid:** DC 12 V or DC 24 V
Odorant Tank Volume	20 US Gallons (*75 L*) 100 US Gallons (*378 L*) 250 US Gallons (*946 L*) 500 US Gallons (*1892 L*) Others Available
Features	Odorant Tank Level Gauge Pump Cabinet (See *Table 2*) Skid With 110% Containment Touch Screen Controller

Table 2: Pump Cabinet Specifications	
Materials of Construction	**BIP-1, -2, and -3:** 303 Stainless Steel, 316/316L Stainless Steel, Anodized Aluminum, Buna, Kalrez®, Polyurethane, PTFE, and Teflon® **SSO-9:** 316/316L Stainless Steel, Anodized Aluminum, Kalrez®, and PTFE
Maximum Allowable Operating Pressure	**BIP-1 and -3:** 2160 psig @ -20 °F to 100 °F (*148 barg @ -28 °C to 37 °C*) **BIP-2:** 2000 psig @ -20 °F to 100 °F (*137 barg @ -28 °C to 37 °C*) **SSO-9:** 1800 psig @ -20 °F to 120 °F (*124 barg @ -28 °C to 48 °C*)
Injection Volume	**BIP-1:** 0.5–3.00 cc **BIP-2:** 0.1–0.75 cc **BIP-3:** 1.0–9.0 cc **SSO-9:** 0–10 cc or 0–50 cc
Operation	**BIP-1, -2, and -3:** Bellows-Operated **SSO-9:** Piston-Operated
Features	Regulator for Pneumatic Supply Welker® F-5 Filter Dryer for Pneumatic Supply: Nominal Filter Rating: 3 Micron Welker® F-9 Filter for Odorant Supply
Options	Flow Meter Heater and Insulation NEMA 4 or NEMA 4X Enclosure Pneumatic Timer Purge System Regulator for Blanket Pressure Welker® OdorEyes AEF-1 Atmospheric Exhaust Filter

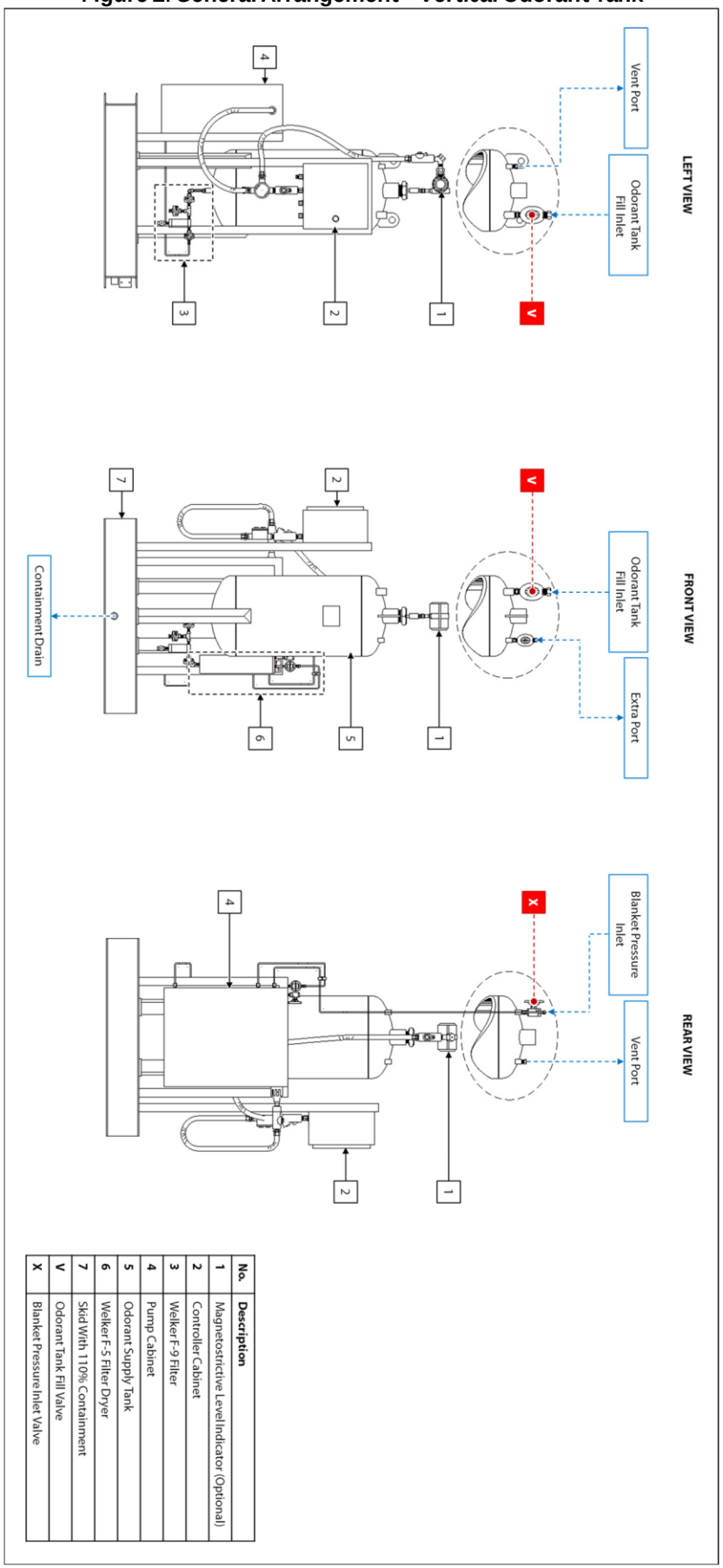
1.5 Equipment Diagrams

Figure 1: General Arrangement – Horizontal Odorant Tank



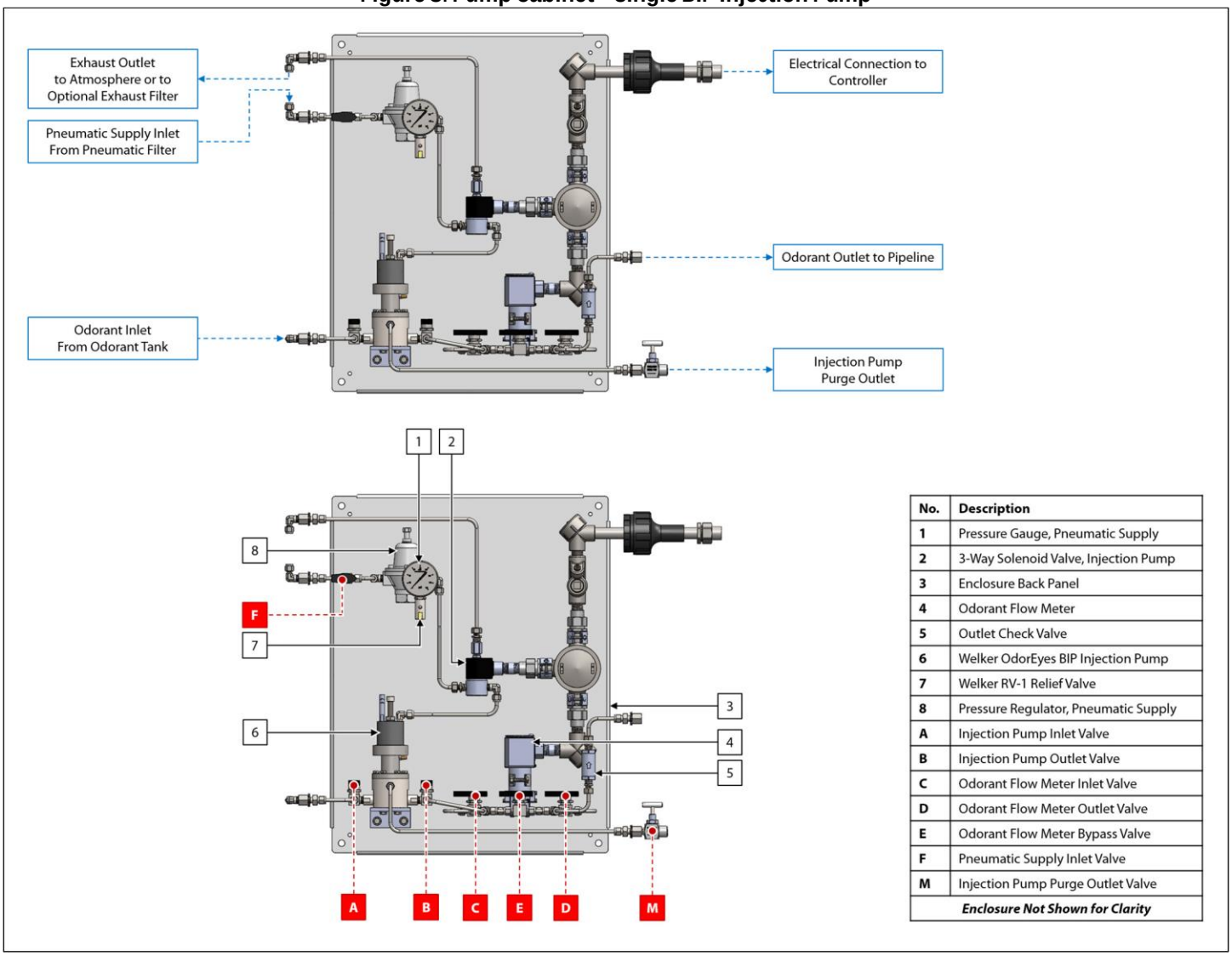
No.	Description
1	Controller Cabinet
2	Welker F-5 Filter Dryer
3	Pump Cabinet
4	Welker F-9 Filter
5	Skid With 110% Containment
6	Odorant Supply Tank
7	Dip Tape Level Gauge
V	Odorant Tank Fill Valve
W	Vent Valve
X	Blanket Pressure Inlet Valve

Figure 2: General Arrangement – Vertical Odorant Tank



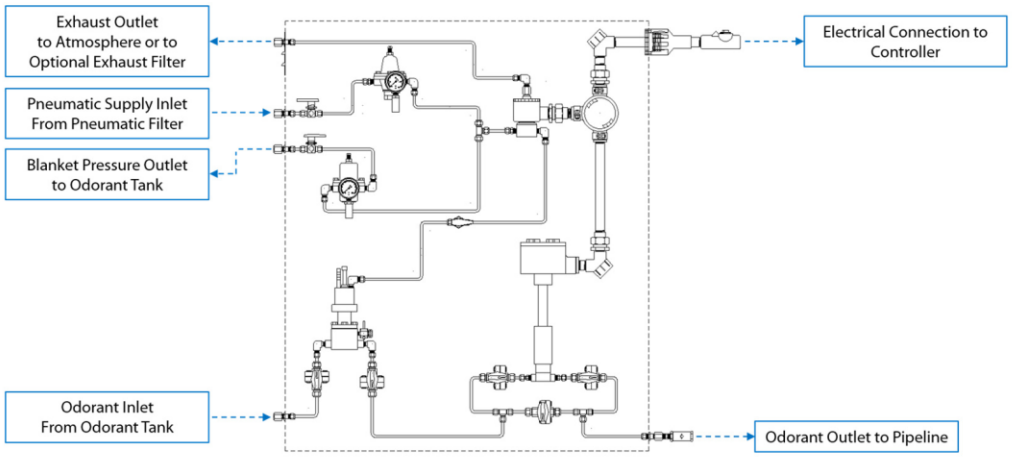
No.	Description
1	Magnetostrictive Level Indicator (Optional)
2	Controller Cabinet
3	Welker F-9 Filter
4	Pump Cabinet
5	Odorant Supply Tank
6	Welker F-5 Filter Dryer
7	Skid With 110% Containment
V	Odorant Tank Fill Valve
X	Blanket Pressure Inlet Valve

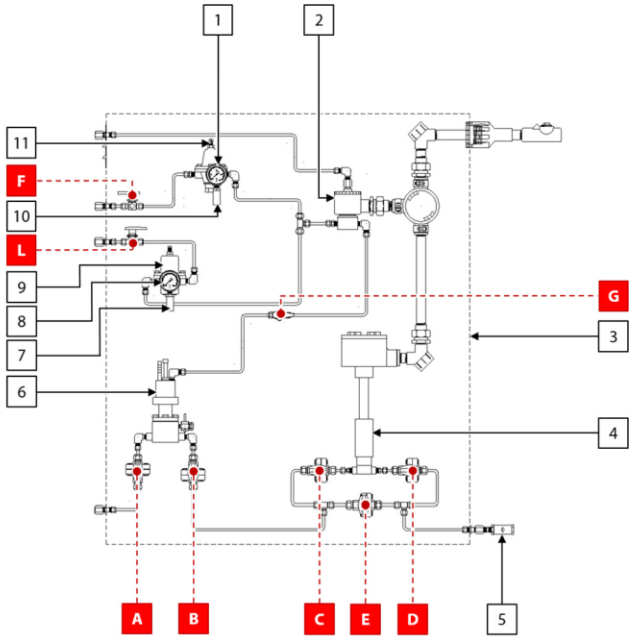
Figure 3: Pump Cabinet – Single BIP Injection Pump



No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Injection Pump
3	Enclosure Back Panel
4	Odorant Flow Meter
5	Outlet Check Valve
6	Welker OdorEyes BIP Injection Pump
7	Welker RV-1 Relief Valve
8	Pressure Regulator, Pneumatic Supply
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
M	Injection Pump Purge Outlet Valve
Enclosure Not Shown for Clarity	

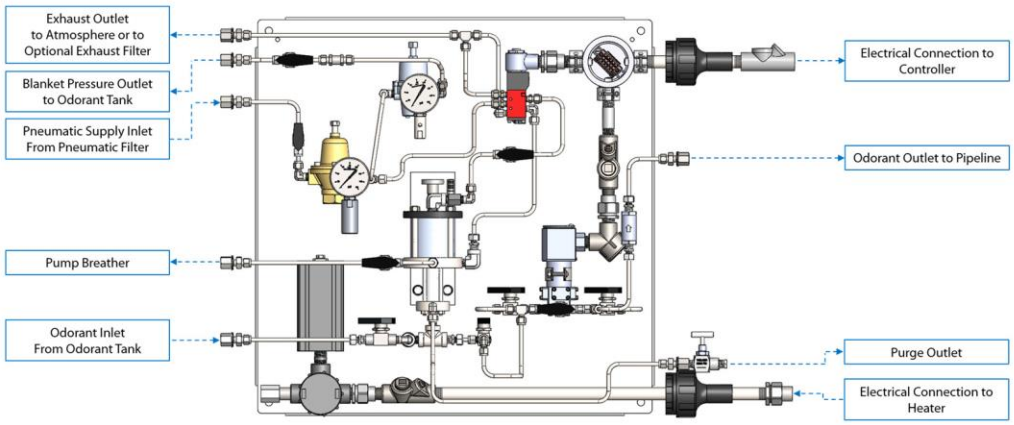
Figure 4: Pump Cabinet – Single BIP Injection Pump With Blanket Pressure Regulator

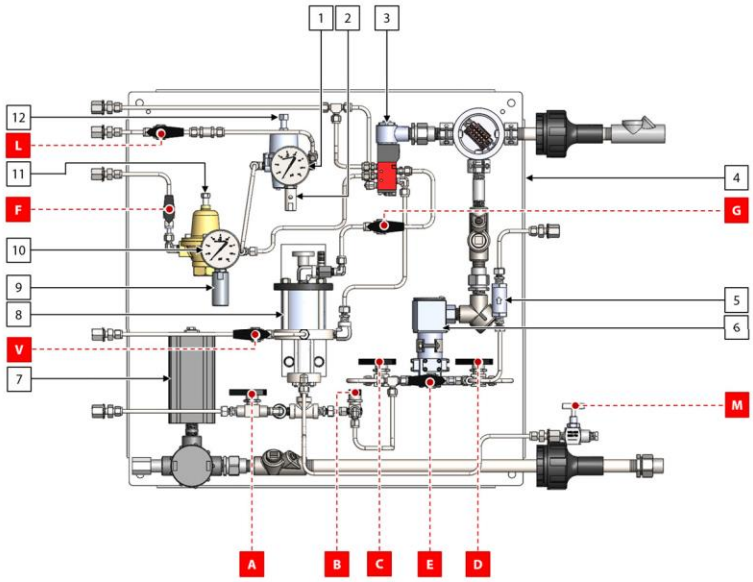




No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Injection Pump
3	Enclosure Back Panel
4	Odorant Flow Meter
5	Outlet Check Valve
6	Welker OdorEyes BIP Injection Pump
7	Welker RV-1 Relief Valve
8	Pressure Gauge, Blanket Pressure
9	Pressure Regulator, Blanket Pressure
10	Welker RV-1 Relief Valve
11	Pressure Regulator, Pneumatic Supply
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
L	Blanket Pressure Outlet Valve
Enclosure Not Shown for Clarity	

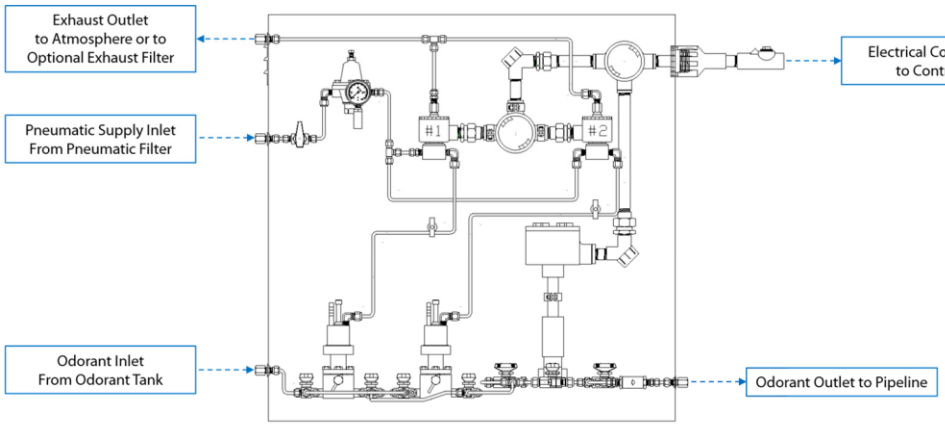
Figure 5: Pump Cabinet – Single SSO-9 Injection Pump With Blanket Pressure Regulator and Heater

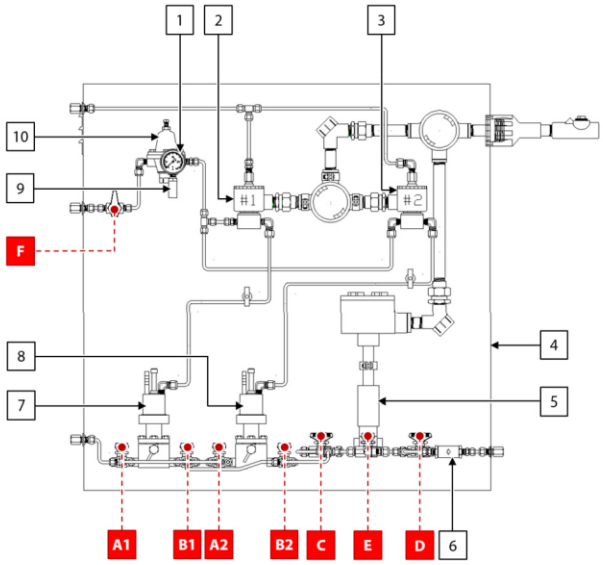




No.	Description
1	Pressure Gauge, Pneumatic Supply
2	Welker RV-1 Relief Valve
3	3-Way Solenoid Valve, Injection Pump
4	Enclosure Back Panel
5	Outlet Check Valve
6	Odorant Flow Meter
7	Heater
8	Welker SSO-9 Injection Pump With Check Valves
9	Welker RV-1 Relief Valve
10	Pressure Gauge, Blanket Pressure
11	Pressure Regulator, Blanket Pressure
12	Pressure Regulator, Pneumatic Supply
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
L	Blanket Pressure Outlet Valve
M	Injection Pump Purge Outlet Valve
V	Injection Pump Breather Valve
Enclosure Not Shown for Clarity	

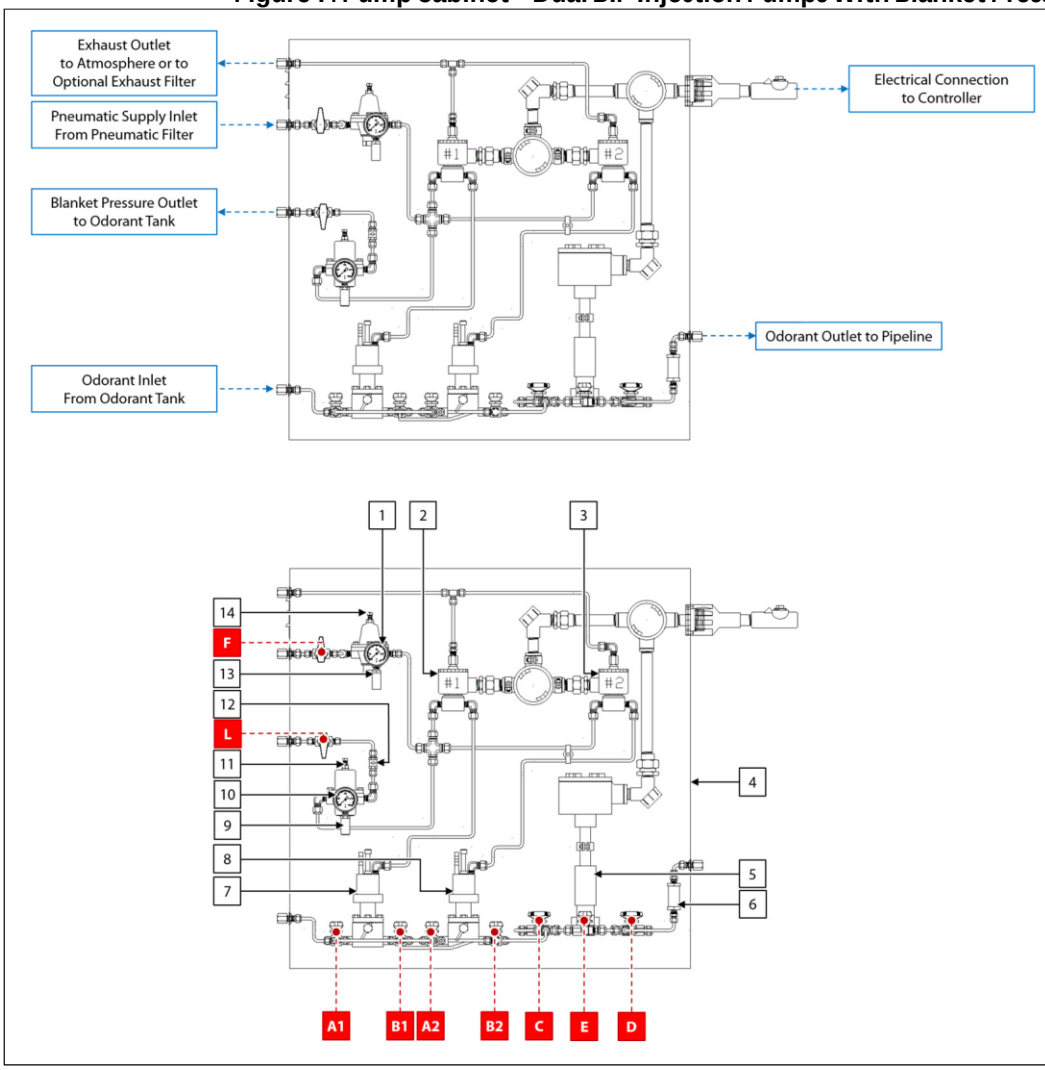
Figure 6: Pump Cabinet – Dual BIP Injection Pumps





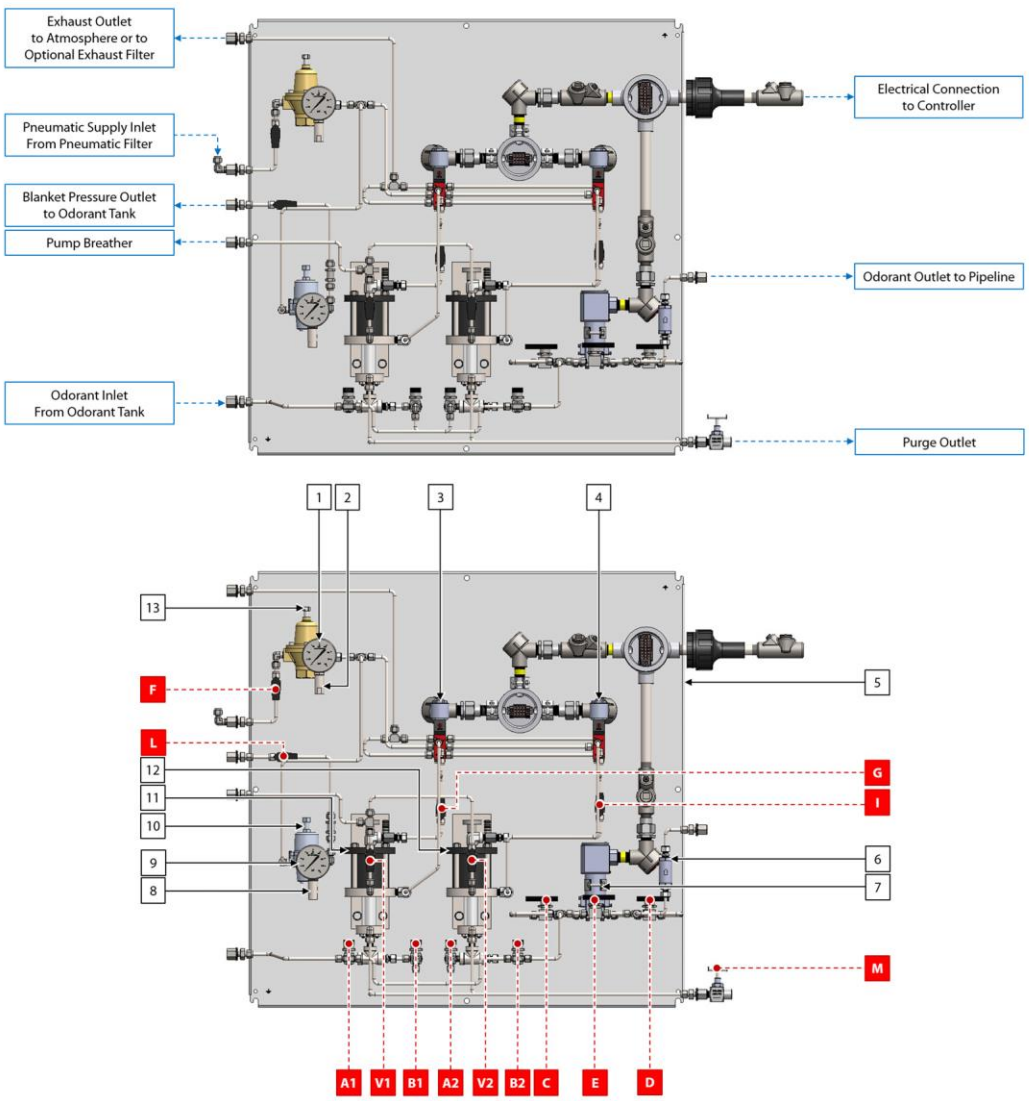
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Primary Injection Pump
3	3-Way Solenoid Valve, Backup Injection Pump
4	Enclosure Back Panel
5	Odorant Flow Meter
6	Outlet Check Valve
7	Welker OdorEyes BIP Injection Pump, Primary
8	Welker OdorEyes BIP Injection Pump, Backup
9	Welker RV-1 Relief Valve
10	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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
Enclosure Not Shown for Clarity	

Figure 7: Pump Cabinet – Dual BIP Injection Pumps With Blanket Pressure Regulator



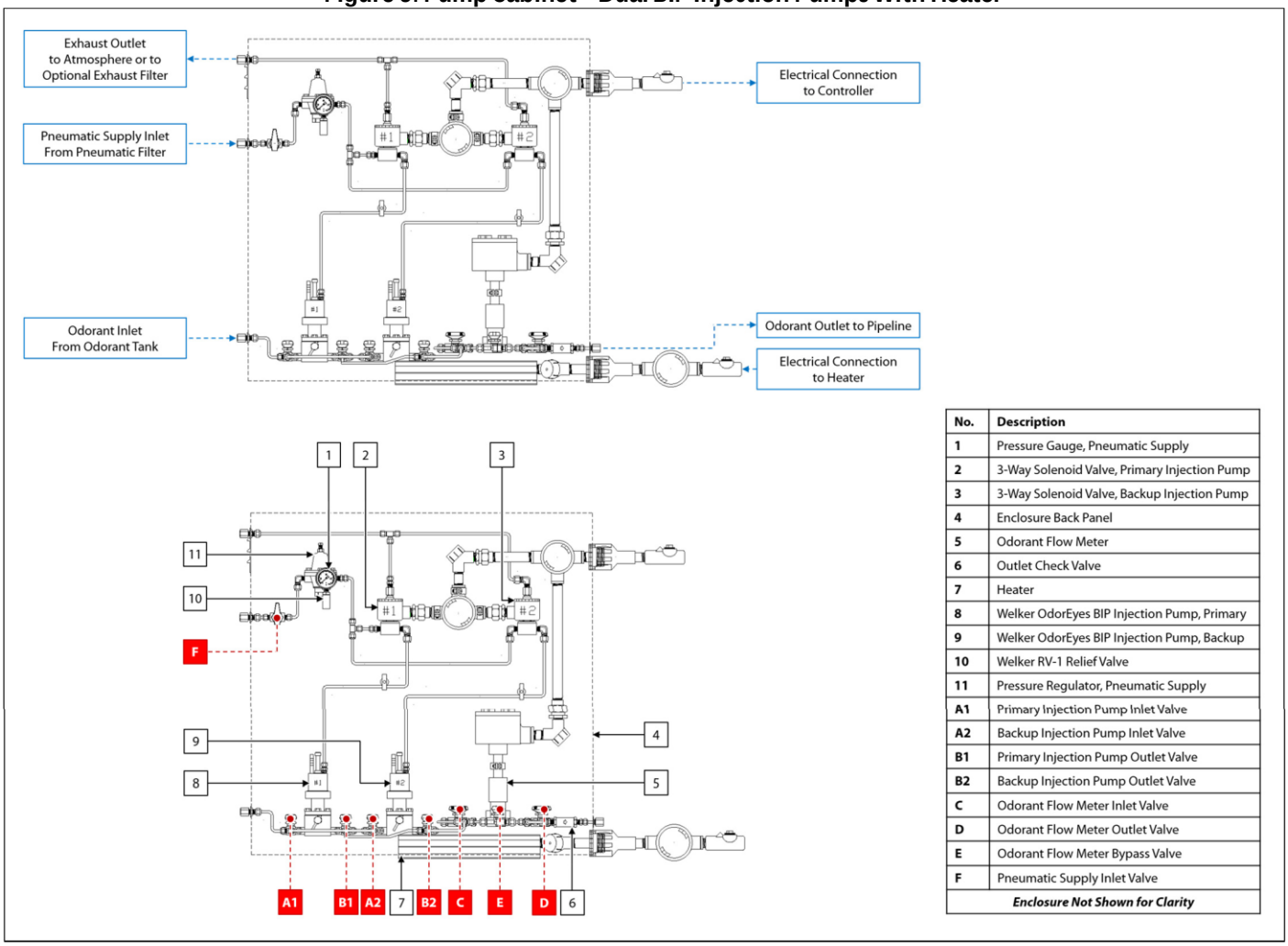
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Primary Injection Pump
3	3-Way Solenoid Valve, Backup Injection Pump
4	Enclosure Back Panel
5	Odorant Flow Meter
6	Outlet Check Valve
7	Welker OdorEyes BIP Injection Pump, Primary
8	Welker OdorEyes BIP Injection Pump, Backup
9	Welker RV-1 Relief Valve
10	Pressure Gauge, Blanket Pressure
11	Pressure Regulator, Blanket Pressure
12	Blanket Pressure Outlet Check Valve
13	Welker RV-1 Relief Valve
14	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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
L	Blanket Pressure Outlet Valve
Enclosure Not Shown for Clarity	

Figure 8: Pump Cabinet – Dual SSO-9 Injection Pumps With Blanket Pressure Regulator



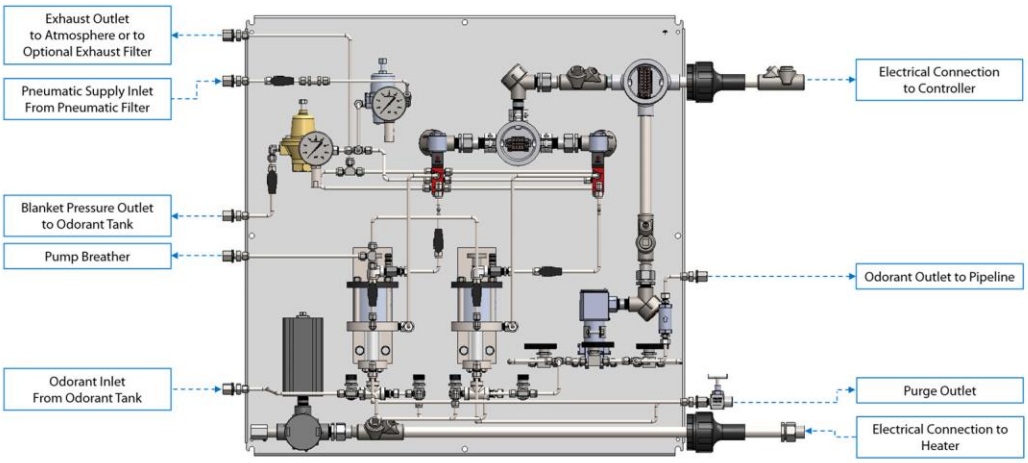
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	Welker RV-1 Relief Valve
3	3-Way Solenoid Valve, Primary Injection Pump
4	3-Way Solenoid Valve, Backup Injection Pump
5	Enclosure Back Panel
6	Outlet Check Valve
7	Odorant Flow Meter
8	Welker RV-1 Relief Valve
9	Pressure Gauge, Blanket Pressure
10	Pressure Regulator, Blanket Pressure
11	Welker SSO-9 Injection Pump, Primary
12	Welker SSO-9 Injection Pump, Backup
13	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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	Primary Injection Pump Actuation Valve
I	Backup Injection Pump Actuation Valve
L	Blanket Pressure Outlet Valve
M	Injection Pump Purge Outlet Valve
V1	Primary Injection Pump Breather Valve
V2	Backup Injection Pump Breather Valve
Enclosure Not Shown for Clarity	

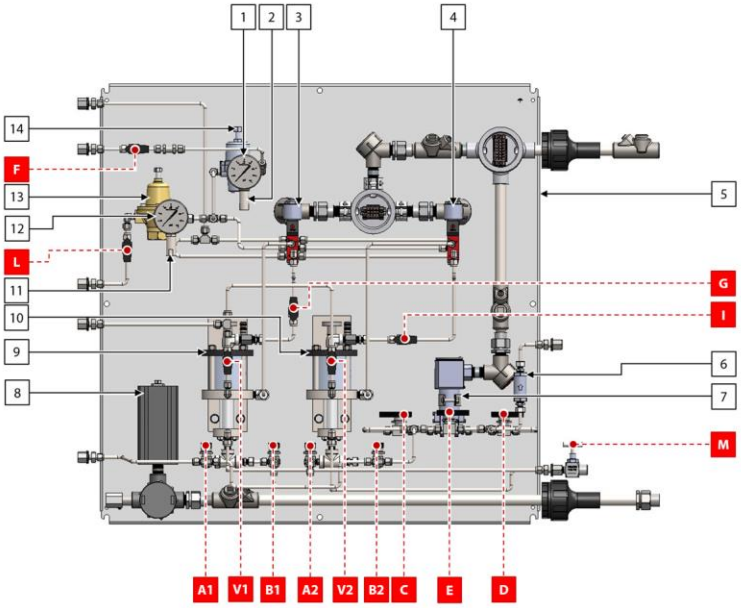
Figure 9: Pump Cabinet – Dual BIP Injection Pumps With Heater



No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Primary Injection Pump
3	3-Way Solenoid Valve, Backup Injection Pump
4	Enclosure Back Panel
5	Odorant Flow Meter
6	Outlet Check Valve
7	Heater
8	Welker OdorEyes BIP Injection Pump, Primary
9	Welker OdorEyes BIP Injection Pump, Backup
10	Welker RV-1 Relief Valve
11	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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
Enclosure Not Shown for Clarity	

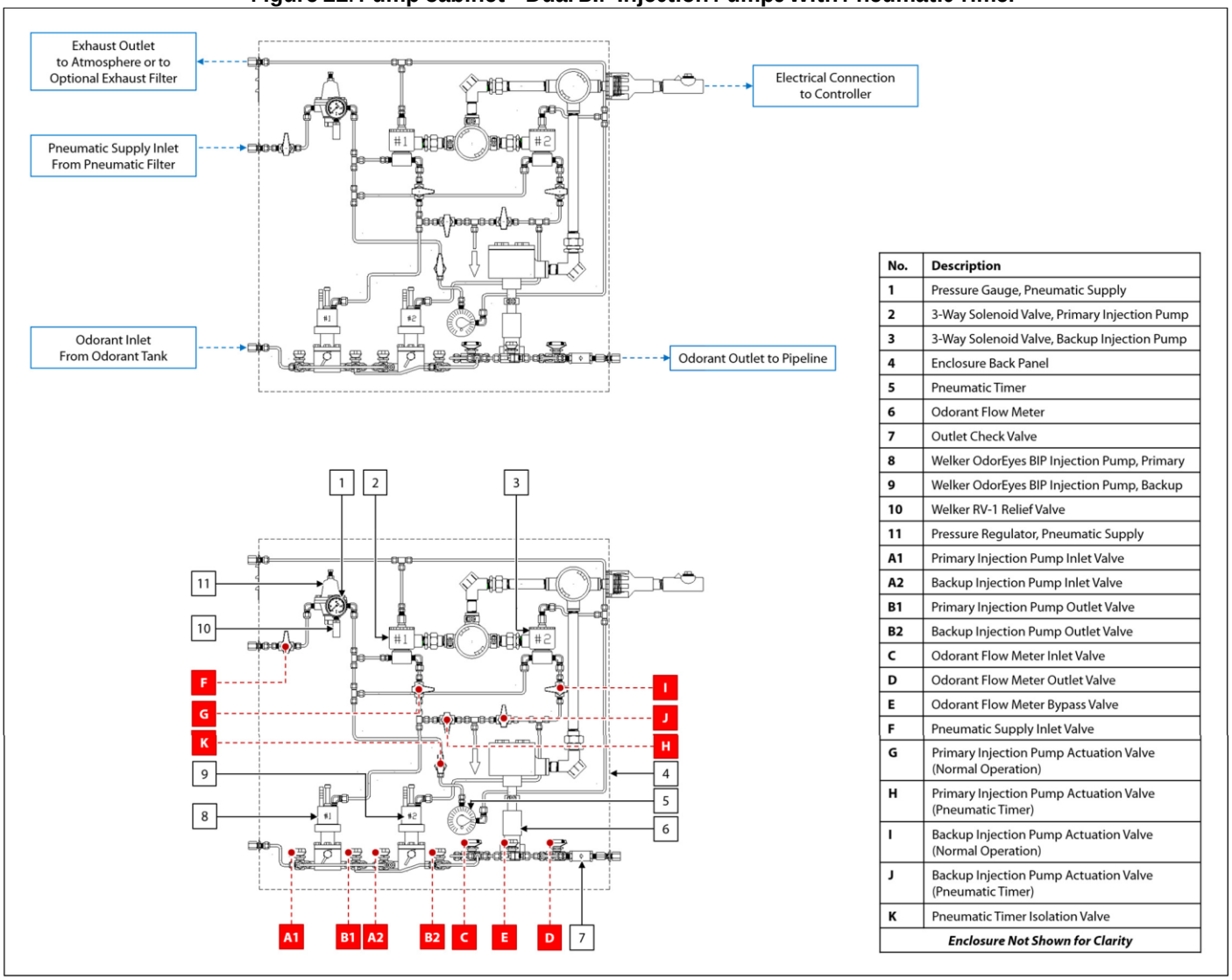
Figure 10: Pump Cabinet – Dual SSO-9 Injection Pumps With Blanket Pressure Regulator and Heater





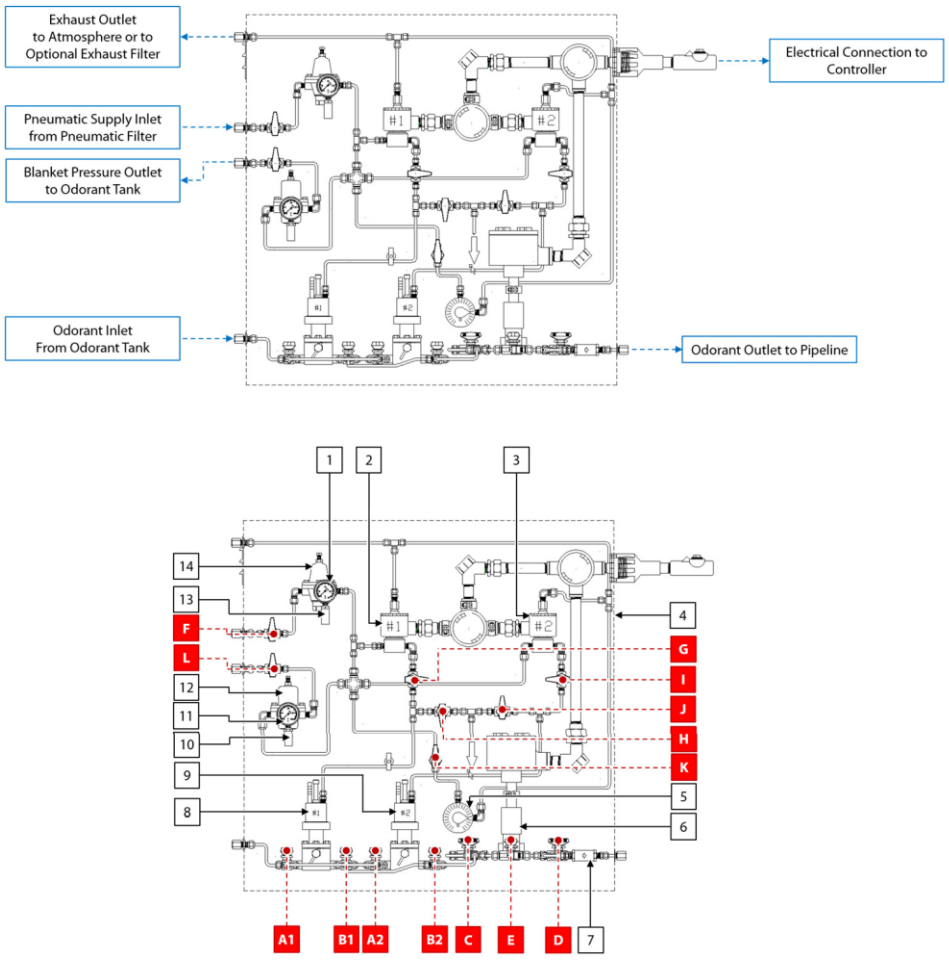
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	Welker RV-1 Relief Valve
3	3-Way Solenoid Valve, Primary Injection Pump
4	3-Way Solenoid Valve, Backup Injection Pump
5	Enclosure Back Panel
6	Outlet Check Valve
7	Odorant Flow Meter
8	Heater
9	Welker SSO-9 Injection Pump, Primary
10	Welker SSO-9 Injection Pump, Backup
11	Welker RV-1 Relief Valve
12	Pressure Gauge, Blanket Pressure
13	Pressure Regulator, Blanket Pressure
14	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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	Primary Injection Pump Actuation Valve
I	Backup Injection Pump Actuation Valve
L	Blanket Pressure Outlet Valve
M	Injection Pump Purge Outlet Valve
V1	Primary Injection Pump Breather Valve
V2	Backup Injection Pump Breather Valve
	Enclosure Not Shown for Clarity

Figure 11: Pump Cabinet – Dual BIP Injection Pumps With Pneumatic Timer



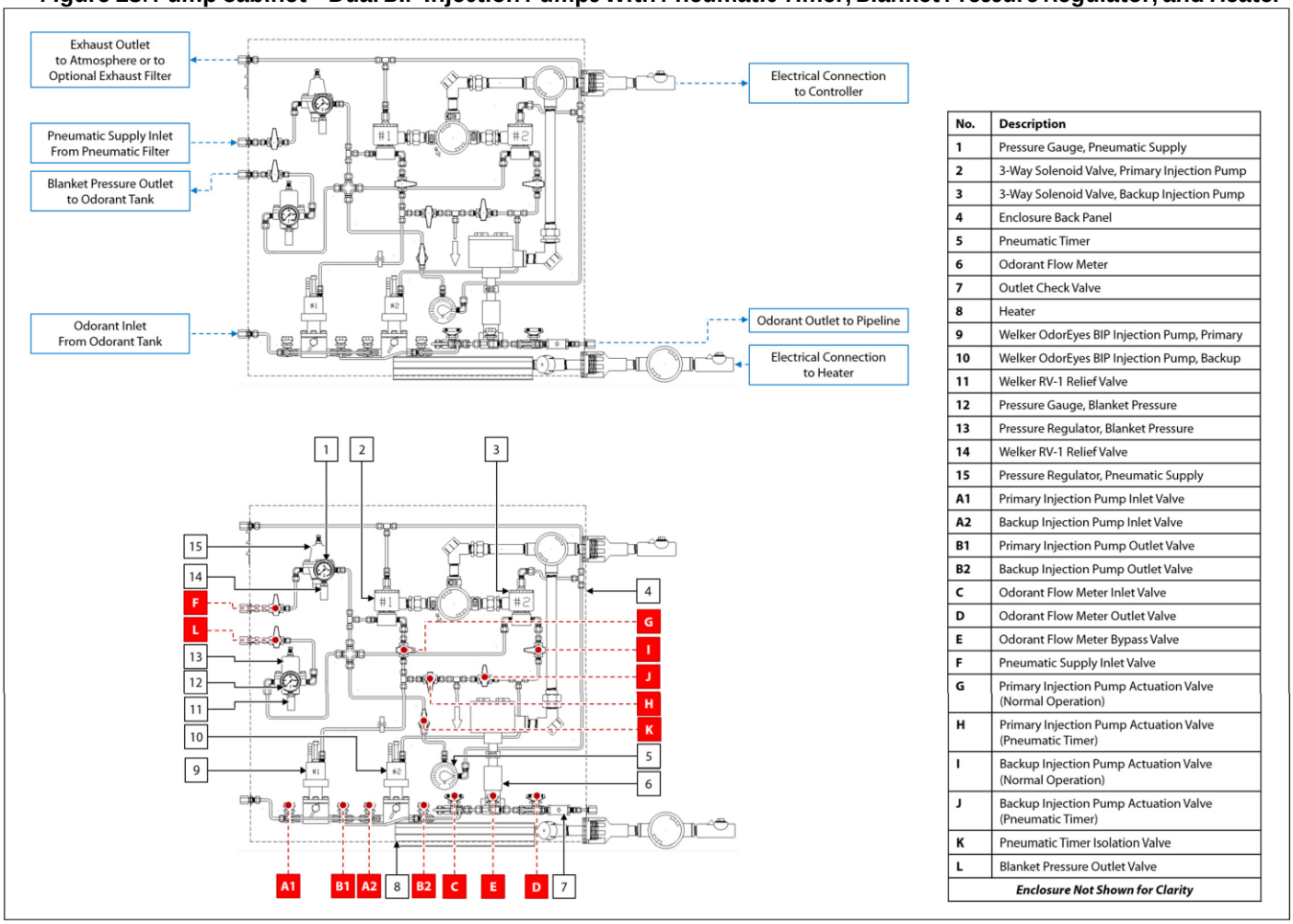
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Primary Injection Pump
3	3-Way Solenoid Valve, Backup Injection Pump
4	Enclosure Back Panel
5	Pneumatic Timer
6	Odorant Flow Meter
7	Outlet Check Valve
8	Welker OdorEyes BIP Injection Pump, Primary
9	Welker OdorEyes BIP Injection Pump, Backup
10	Welker RV-1 Relief Valve
11	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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	Primary Injection Pump Actuation Valve (Normal Operation)
H	Primary Injection Pump Actuation Valve (Pneumatic Timer)
I	Backup Injection Pump Actuation Valve (Normal Operation)
J	Backup Injection Pump Actuation Valve (Pneumatic Timer)
K	Pneumatic Timer Isolation Valve
Enclosure Not Shown for Clarity	

Figure 12: Pump Cabinet – Dual BIP Injection Pumps With Pneumatic Timer and Blanket Pressure Regulator



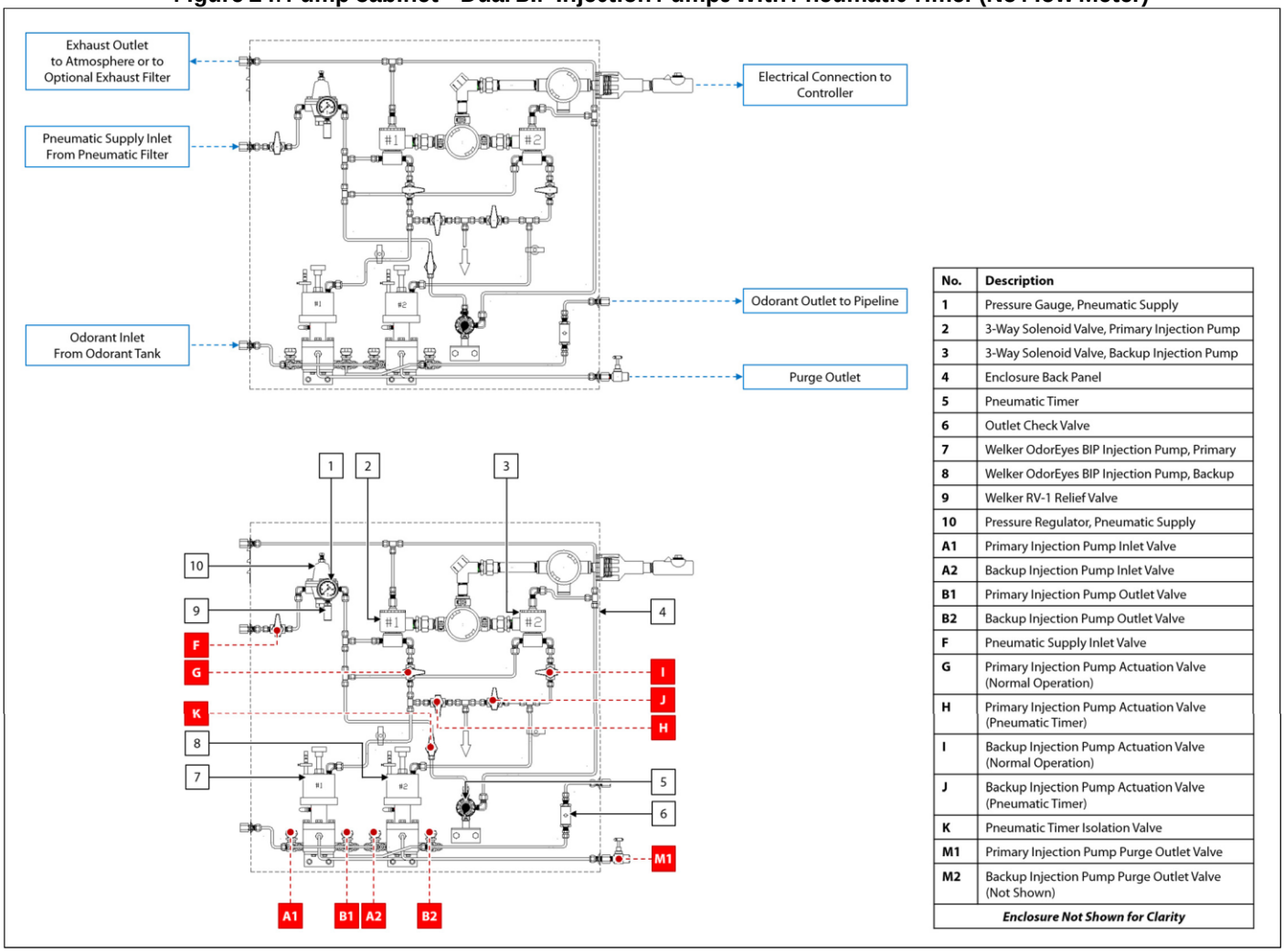
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Primary Injection Pump
3	3-Way Solenoid Valve, Backup Injection Pump
4	Enclosure Back Panel
5	Pneumatic Timer
6	Odorant Flow Meter
7	Outlet Check Valve
8	Welker OdorEyes BIP Injection Pump, Primary
9	Welker OdorEyes BIP Injection Pump, Backup
10	Welker RV-1 Relief Valve
11	Pressure Gauge, Blanket Pressure
12	Pressure Regulator, Blanket Pressure
13	Welker RV-1 Relief Valve
14	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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	Primary Injection Pump Actuation Valve (Normal Operation)
H	Primary Injection Pump Actuation Valve (Pneumatic Timer)
I	Backup Injection Pump Actuation Valve (Normal Operation)
J	Backup Injection Pump Actuation Valve (Pneumatic Timer)
K	Pneumatic Timer Isolation Valve
L	Blanket Pressure Outlet Valve
Enclosure Not Shown for Clarity	

Figure 13: Pump Cabinet – Dual BIP Injection Pumps With Pneumatic Timer, Blanket Pressure Regulator, and Heater



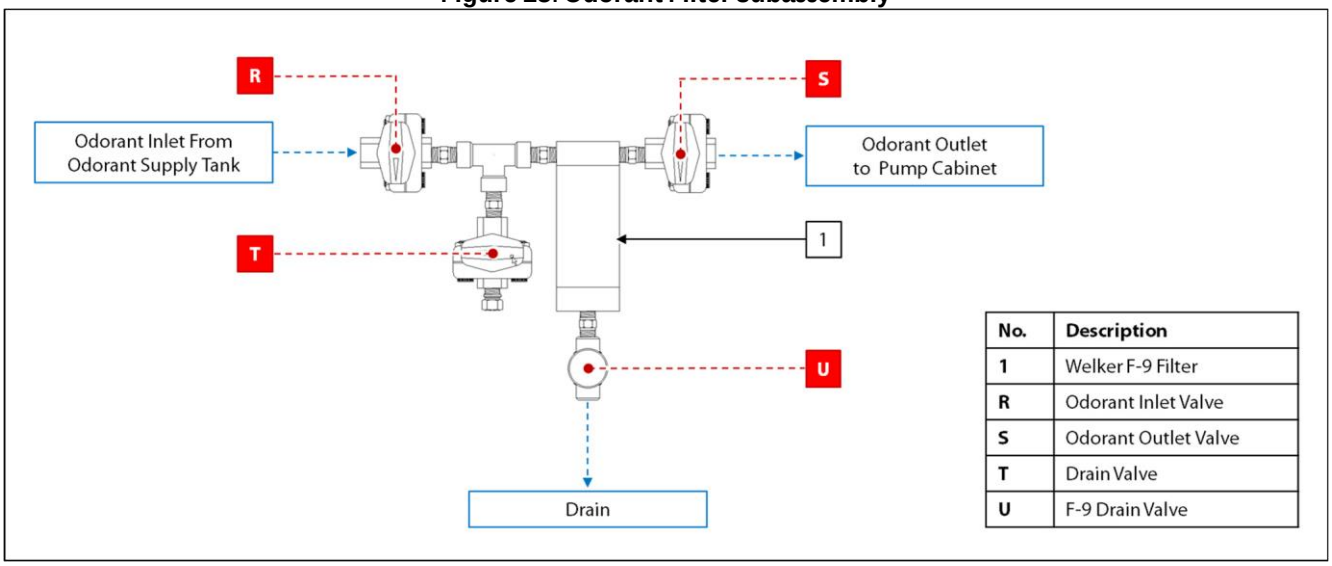
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Primary Injection Pump
3	3-Way Solenoid Valve, Backup Injection Pump
4	Enclosure Back Panel
5	Pneumatic Timer
6	Odorant Flow Meter
7	Outlet Check Valve
8	Heater
9	Welker OdorEyes BIP Injection Pump, Primary
10	Welker OdorEyes BIP Injection Pump, Backup
11	Welker RV-1 Relief Valve
12	Pressure Gauge, Blanket Pressure
13	Pressure Regulator, Blanket Pressure
14	Welker RV-1 Relief Valve
15	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup 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	Primary Injection Pump Actuation Valve (Normal Operation)
H	Primary Injection Pump Actuation Valve (Pneumatic Timer)
I	Backup Injection Pump Actuation Valve (Normal Operation)
J	Backup Injection Pump Actuation Valve (Pneumatic Timer)
K	Pneumatic Timer Isolation Valve
L	Blanket Pressure Outlet Valve
Enclosure Not Shown for Clarity	

Figure 14: Pump Cabinet – Dual BIP Injection Pumps With Pneumatic Timer (No Flow Meter)



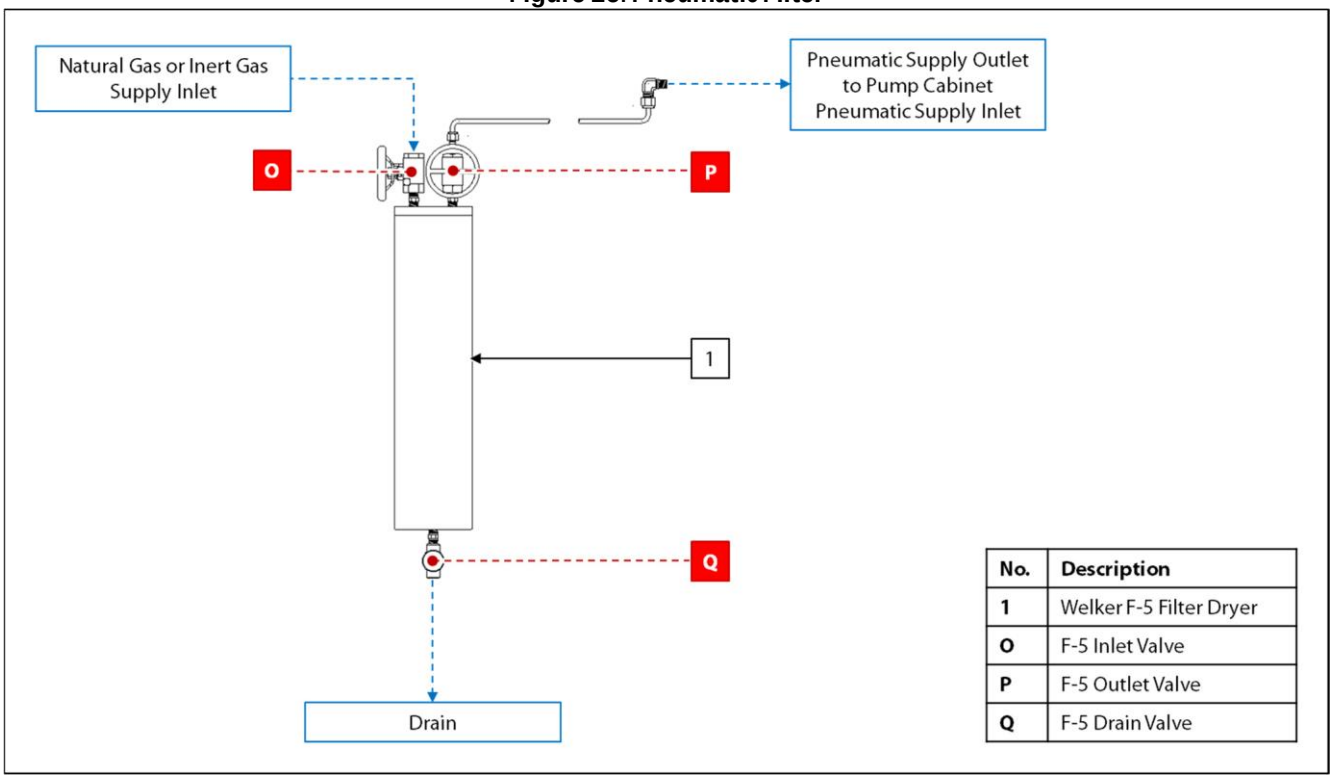
No.	Description
1	Pressure Gauge, Pneumatic Supply
2	3-Way Solenoid Valve, Primary Injection Pump
3	3-Way Solenoid Valve, Backup Injection Pump
4	Enclosure Back Panel
5	Pneumatic Timer
6	Outlet Check Valve
7	Welker OdorEyes BIP Injection Pump, Primary
8	Welker OdorEyes BIP Injection Pump, Backup
9	Welker RV-1 Relief Valve
10	Pressure Regulator, Pneumatic Supply
A1	Primary Injection Pump Inlet Valve
A2	Backup Injection Pump Inlet Valve
B1	Primary Injection Pump Outlet Valve
B2	Backup Injection Pump Outlet Valve
F	Pneumatic Supply Inlet Valve
G	Primary Injection Pump Actuation Valve (Normal Operation)
H	Primary Injection Pump Actuation Valve (Pneumatic Timer)
I	Backup Injection Pump Actuation Valve (Normal Operation)
J	Backup Injection Pump Actuation Valve (Pneumatic Timer)
K	Pneumatic Timer Isolation Valve
M1	Primary Injection Pump Purge Outlet Valve
M2	Backup Injection Pump Purge Outlet Valve (Not Shown)
Enclosure Not Shown for Clarity	

Figure 15: Odorant Filter Subassembly



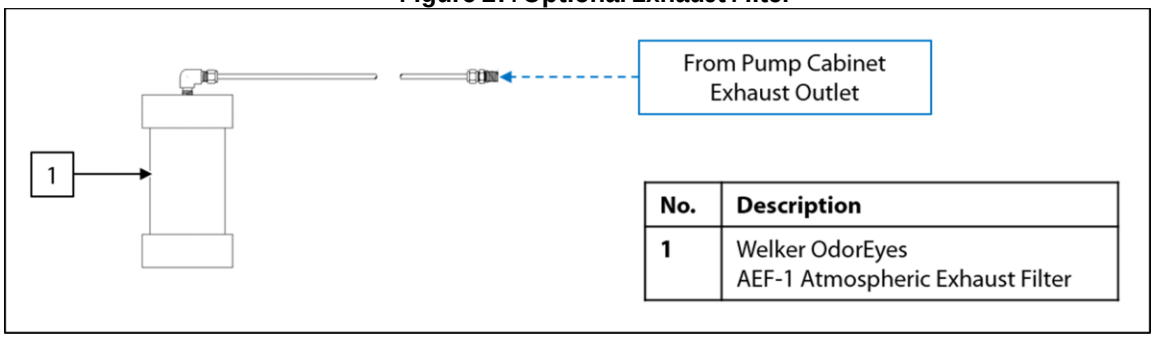
No.	Description
1	Welker F-9 Filter
R	Odorant Inlet Valve
S	Odorant Outlet Valve
T	Drain Valve
U	F-9 Drain Valve

Figure 16: Pneumatic Filter



No.	Description
1	Welker F-5 Filter Dryer
O	F-5 Inlet Valve
P	F-5 Outlet Valve
Q	F-5 Drain Valve

Figure 17: Optional Exhaust Filter



No.	Description
1	Welker OdorEyes AEF-1 Atmospheric Exhaust Filter

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 Accu/Line™ Injection System 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.

2.2 Installation

Pipeline Injection Point

1. If the Accu/Line™ will be connected to a Welker® OdorEyes SFA Sight Flow Assembly at the pipeline, install the SFA to the desired injection point. Refer to the *Installation*, *Operation*, *and Maintenance* (IOM) *Manual* for the SFA for installation instructions.
2. If the Accu/Line™ will be connected to a Welker® SP-DP Diffusing Probe at the pipeline, install the SP-DP to the desired injection point. Refer to the *Installation*, *Operation*, *and Maintenance* (IOM) *Manual* for the SP-DP for installation instructions.

System Skid

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

System Connections

6. Using appropriately sized customer-supplied tubing, connect from the odorant outlet on the pump cabinet to the inlet of the SFA or SP-DP (*Figure 3*, *Figure 4*, *Figure 5*, *Figure 6*, *Figure 7*, *Figure 8*, *Figure 9*, *Figure 10*, *Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).

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

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

7. As necessary, connect a customer-supplied unodorized natural gas or inert gas supply to the inlet of the Welker® F-5 Filter Dryer (*Figure 16*).
8. Ensure that all valves on the system are closed.
9. Ensure that all fittings, connections, and bolts are tightened.

Electrical Connections

Turn OFF the electrical supply prior to making electrical connections.

10. Connect an AC 120 V electrical supply to the controller. Refer to the 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.

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

The controller can accept analog, pulse, or Modbus input.

12. If the Accu/Line™ is not equipped with the optional flag tracker level indicator, installation is now complete; proceed to *Section 2.3, Start-Up Procedures*. If the Accu/Line™ is equipped with the optional flag tracker level indicator, continue to step 13.

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.

13. Remove the bottom drain flange from the base of the level indicator.
14. 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.

15. Replace the shipping gasket with the provided gasket.
16. Install the bottom drain flange with float to the level indicator.

2.3 Start-Up Procedures

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.

Pneumatic Supply Regulator

3. Open F-5 inlet valve O and F-5 outlet valve P (*Figure 16*).
4. Apply pneumatic supply pressure to the pump cabinet.
5. Open pneumatic supply inlet valve F to pressurize the pneumatic supply regulator (*Figure 3*, *Figure 4*, *Figure 5*, *Figure 6*, *Figure 7*, *Figure 8*, *Figure 9*, *Figure 10*, *Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
6. The pneumatic supply regulator is factory-set to the setting required to stroke the pump(s) located inside the pump cabinet according to the recommended settings in Table 3.

Table 3: Injection Pump Pressure Regulator Settings

Injection Pressure	Approximate Regulator Set Point, BIP	Approximate Regulator Set Point, SSO-9
0–400 psig (*0–27.5 barg*)	30 psig (*2 barg*)	50 psig (*3 barg*)
401–800 psig (*27.6–55.1 barg*)	50 psig (*3 barg*)	100 psig (*6 barg*)
801–1200 psig (*55.2–82.7 barg*)	80 psig (*5 barg*)	150 psig (*10 barg*)
1201–1800 psig (*82.8–124 barg*)	–	225 psig (*15 barg*)
1201–2160 psig (*82.8–148 barg*)	100 psig (*6 barg*)	–

Blanket Pressure Regulator

7. Open blanket pressure inlet valve X (*Figure 1* or *Figure 2*).
8. Open blanket pressure outlet valve L or open the regulated external blanket pressure supply source (*Figure 4*, *Figure 5*, *Figure 7*, *Figure 8*, *Figure 10*, *Figure 12*, or *Figure 13*).
9. Check the blanket pressure connections for leaks and repair as necessary.

Valve Configuration

10. Slowly open the valves indicated in Table 4.

Table 4: Start-Up Valve Orientation

Valve Letter	Valve Description	Reference Figure(s)
R	Odorant Inlet	15
S	Odorant Outlet	15
A (A1 and A2)	Injection Pump Inlet	3–14
B (B1 and B2)	Injection Pump Outlet	3–14
E	Odorant Flow Meter Bypass	3–13

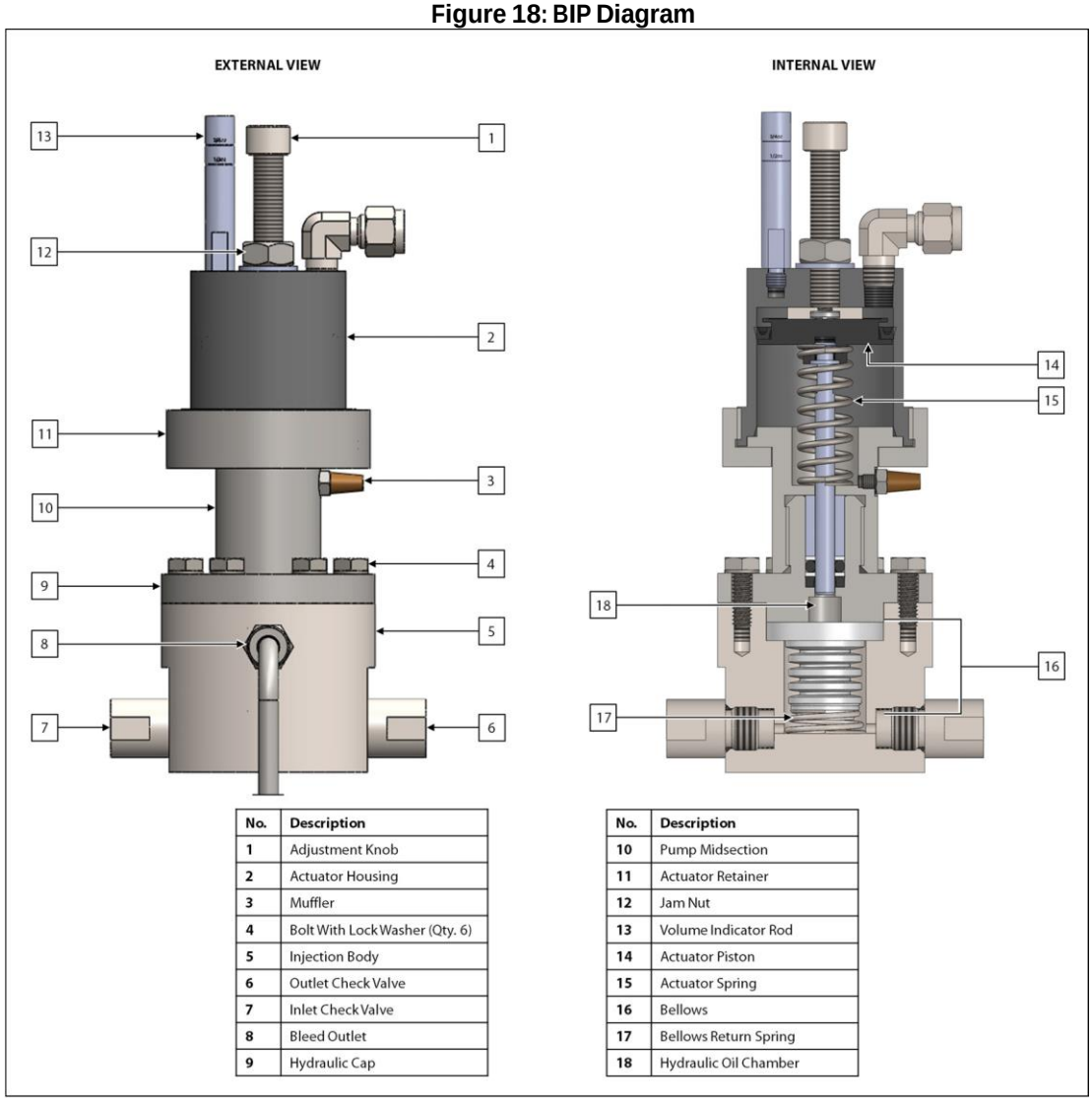
11. If the Accu/Line™ is connected to an SFA or SP-DP at the pipeline, slowly open any valves between the odorant outlet on the pump cabinet and the SFA or SP-DP.
12. Check for leaks and repair as necessary.

Purging the Injection Pump

13. Open injection pump purge outlet valve M to purge the injection chamber of any trapped air (*Figure 3*, *Figure 5*, *Figure 8*, *Figure 10*, or *Figure 14*).
14. Once all air has been purged from the injection chamber, close injection pump purge outlet valve M (*Figure 3*, *Figure 5*, *Figure 8*, *Figure 10*, or *Figure 14*).
15. 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.

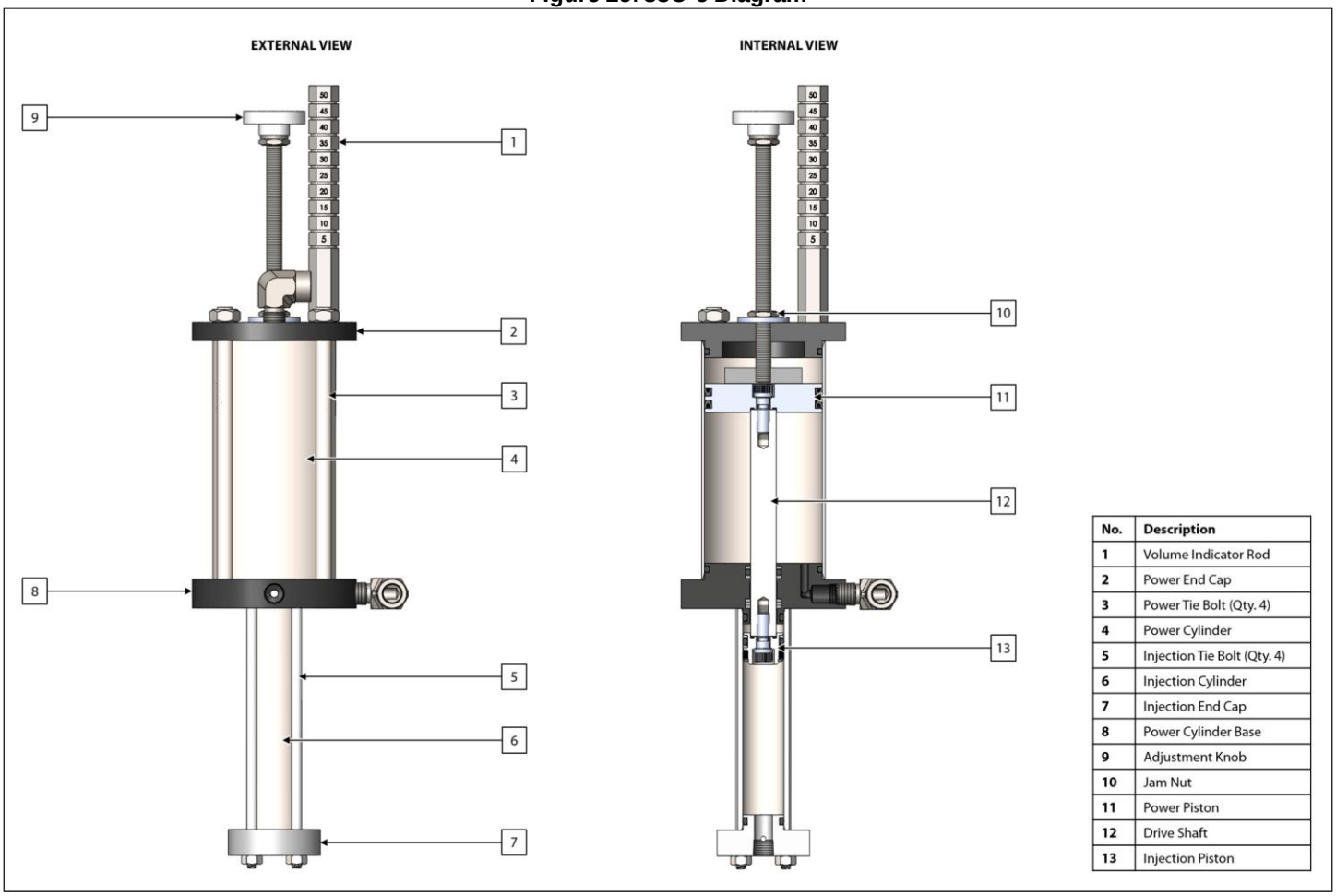
Figure 18: BIP Diagram



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

Figure 19: SSO-9 Diagram



No.	Description
1	Volume Indicator Rod
2	Power End Cap
3	Power Tie Bolt (Qty. 4)
4	Power Cylinder
5	Injection Tie Bolt (Qty. 4)
6	Injection Cylinder
7	Injection End Cap
8	Power Cylinder Base
9	Adjustment Knob
10	Jam Nut
11	Power Piston
12	Drive Shaft
13	Injection Piston

16. As necessary, repeat steps 13–15 for the backup injection pump (*Figure 6*, *Figure 7*, *Figure 8*, *Figure 9*, *Figure 10*, *Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
17. **Slowly** open flow meter outlet valve D and flow meter inlet valve C, and then close flow meter bypass valve E (*Figure 3*, *Figure 4*, *Figure 5*, *Figure 6*, *Figure 7*, *Figure 8*, *Figure 9*, *Figure 10*, *Figure 11*, *Figure 12*, or *Figure 13*).
18. Open the valve on the inlet of the SFA or SP-DP, if applicable, or any valve(s) restricting the flow of odorant from the Accu/Line™ to the pipeline.

Verifying Pump Operation

Pump operation can be verified using the optional pneumatic timer or using the controller.
To verify pump operation using the optional pneumatic timer, continue to step 19.
To verify pump operation using the controller, proceed to step 32.

Using the Optional Pneumatic Timer

19. Close primary injection pump actuation valve G (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
20. Open pneumatic timer isolation valve K (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
21. Open primary injection pump actuation valve H (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
22. Turn the dial on the front of the pneumatic timer to set the stroke frequency of the primary injection pump.

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

23. As the injection pump strokes, verify liquid odorant is being injected into the pipeline.

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

> The injection of liquid odorant into the pipeline can be verified a number of ways.
> - If an SFA is used, product flow can be observed by visually examining the incorporated Welker SG-4 Sight Glass.
> - If an SP-DP is used, product flow can be indicated by a sight glass or pressure gauge. If the SP-DP is equipped with a Welker SG-4 Sight Glass, the Visual Flow Indicator (a.k.a. Spinner Wheel) should spin. If a pressure gauge is installed upstream of the inlet check valve, the pressure gauge will spike as pressure builds to overcome the check valve.

24. Once the collection and injection of the primary injection pump have been verified, prepare to verify the collection and injection of the backup injection pump.
25. Open primary injection pump actuation valve G (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
26. Close primary injection pump actuation valve H (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
27. Close backup injection pump actuation valve I (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
28. Open backup injection pump actuation valve J (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14*).
29. As necessary, turn the dial on the front of the pneumatic timer to set the stroke frequency of the backup injection pump.

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

30. As the injection pump strokes, verify liquid odorant is being injected into the pipeline.

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

> The injection of liquid odorant into the pipeline can be verified a number of ways.
> - If an SFA is used, product flow can be observed by visually examining the incorporated Welker SG-4 Sight Glass.
> - If an SP-DP is used, product flow can be indicated by a sight glass or pressure gauge. If the SP-DP is equipped with a Welker SG-4 Sight Glass, the Visual Flow Indicator (a.k.a. Spinner Wheel) should spin. If a pressure gauge is installed upstream of the inlet check valve, the pressure gauge will spike as pressure builds to overcome the check valve.

31. Once injection of liquid odorant has been verified, proceed to step 42.

Using the Controller

32. As necessary, ensure that (primary) injection pump actuation valve G is open (*Figure 4*, *Figure 5*, *Figure 8*, *Figure 10*, *Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14)*.
33. As necessary, ensure that primary injection pump actuation valve H and pneumatic timer isolation valve K are closed (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14)*.
34. Set the controller gas flow signal to fixed rate. Use the gas flow meter on the customer pipeline to obtain a current flow rate, and then use this value to set the fixed rate gas flow (*Figure 54*). Set the fixed mode to "enabled" (*Figure 54*). See *Section 3.3*, *Navigating the Setup Menus*, for instructions on changing numeric and text values in the Setup submenus.
35. From the controller, stroke the primary pump. From the System Setup Menu, select Odorant Pump Setup (*Figure 36*). From the Odorant Pump Menu, select Pump 1 Setup (*Figure 37*). The Manual Stroke field will highlight just before the controller strokes the pump (*Figure 37*).
36. As the injection pump strokes, verify liquid odorant is being injected into the pipeline.

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

The injection of liquid odorant into the pipeline can be verified a number of ways.

- If an SFA is used, product flow can be observed by visually examining the incorporated Welker SG-4 Sight Glass.
- If an SP-DP is used, product flow can be indicated by a sight glass or pressure gauge. If the SP-DP is equipped with a Welker SG-4 Sight Glass, the Visual Flow Indicator (a.k.a. Spinner Wheel) should spin. If a pressure gauge is installed upstream of the inlet check valve, the pressure gauge will spike as pressure builds to overcome the check valve.
- Readout from the flow meter.

37. Once the collection and injection of the primary injection pump have been verified, prepare to verify the collection and injection of the backup injection pump. If the Accu/Line™ is not equipped with a backup injection pump, proceed to step 42.
38. As necessary, ensure that backup injection pump actuation valve I is open (*Figure 8*, *Figure 10*, *Figure 11*, or *Figure 14*).
39. As necessary, ensure that backup injection pump action valve J and pneumatic timer isolation valve K are closed (*Figure 11*, *Figure 12*, *Figure 13*, or *Figure 14)*.
40. From the controller, stroke the backup injection pump. From the Setup Menu, select System Setup (*Figure 34*). From the System Setup Menu, select Odorant Pump Setup (*Figure 36*). From the Odorant Pump Menu, select Pump 2 Setup (*Figure 37*). The Manual Stroke field will highlight just before the controller strokes the pump (*Figure 37*).
41. As the injection pump strokes, verify liquid odorant is being injected into the pipeline.

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

The injection of liquid odorant into the pipeline can be verified a number of ways.

- If an SFA is used, product flow can be observed by visually examining the incorporated Welker SG-4 Sight Glass.
- If an SP-DP is used, product flow can be indicated by a sight glass or pressure gauge. If the SP-DP is equipped with a Welker SG-4 Sight Glass, the Visual Flow Indicator (a.k.a. Spinner Wheel) should spin. If a pressure gauge is installed upstream of the inlet check valve, the pressure gauge will spike as pressure builds to overcome the check valve.
- Readout from the flow meter.

Controller Configuration

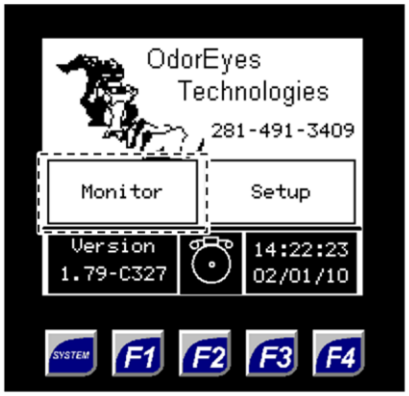
42. Verify that the customer set points have been correctly set by the manufacturer.
43. Once the collection and injection of liquid odorant have been confirmed, the Accu/Line™ is operational.

3.1 Understanding the Display

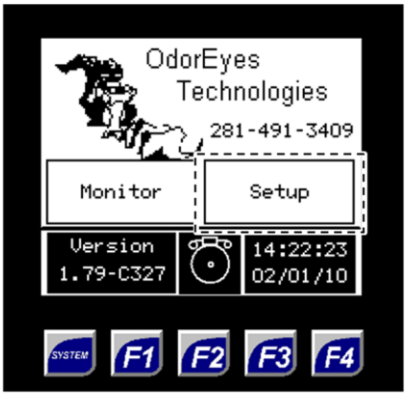
The touch screen controller is used to modify system parameters and view current system information and current alarm status.

The touch screen controller is a menu-driven system. The Home screen is the top screen in the menu tree (*Figure 20*).

Figure 20: 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 21: Toolbar and Function Keys

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 22*).

Figure 22: Current Alarms Screen

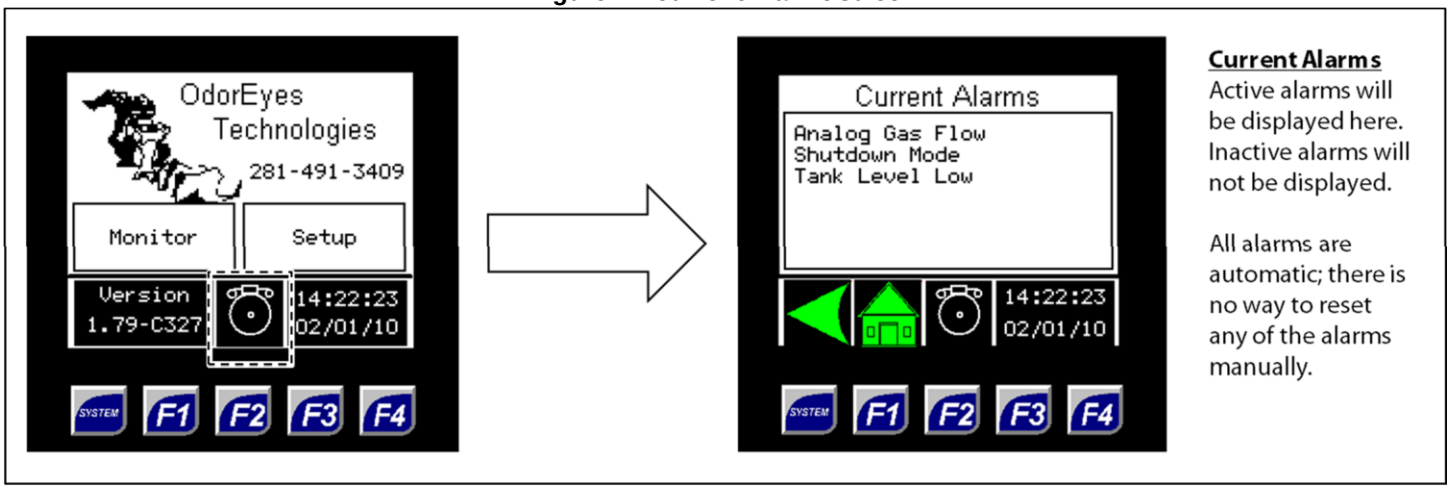


Table 5: Current Alarms

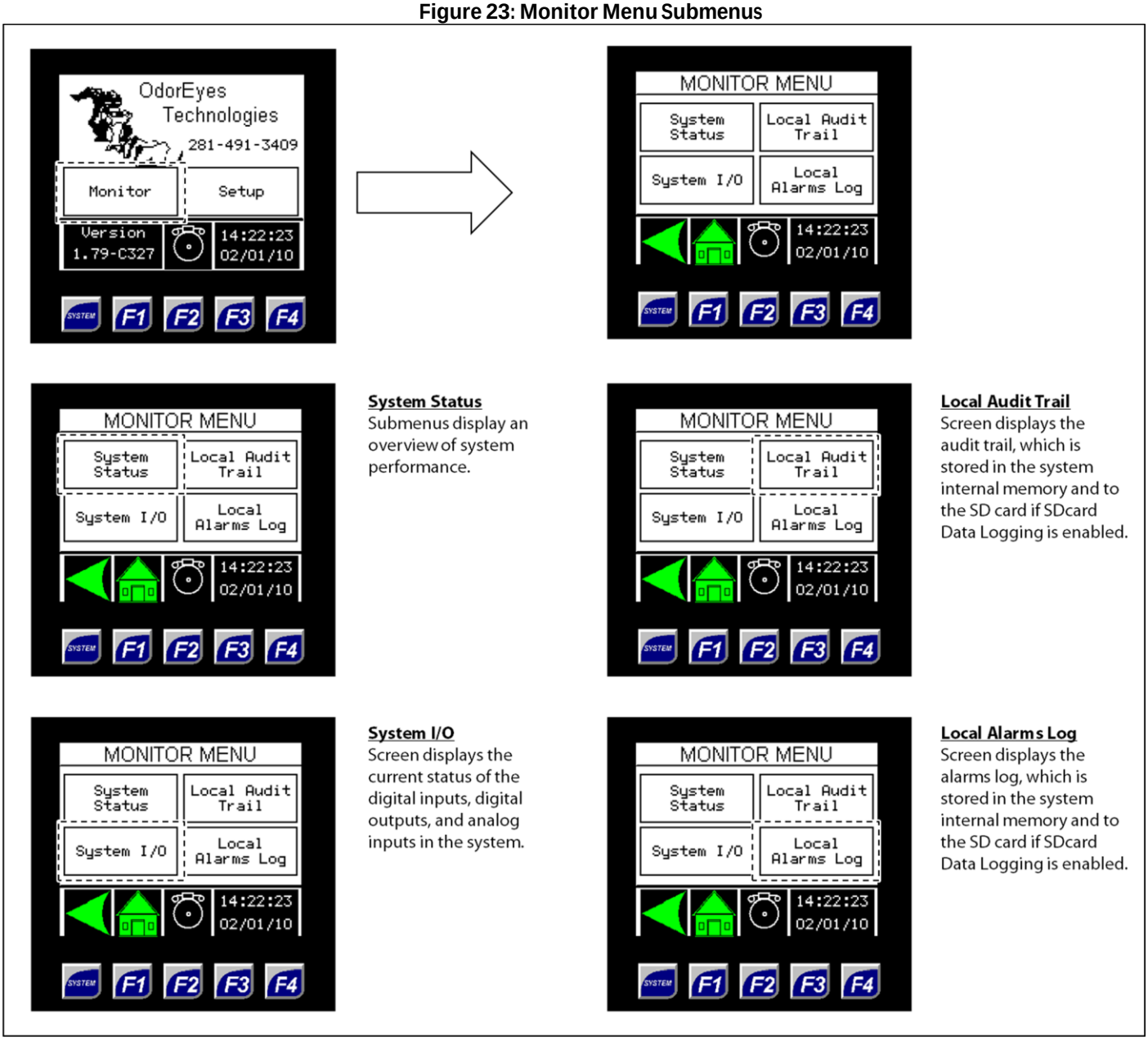
Analog Flow	Can only be active if Analog Input method is selected.
Pulse Flow	Can only be active if Pulse Input method is selected.
Constant Rate	Can only be active if Constant Rate mode is specified as the desired fail mode. The controller will enter this gas flow fail mode when there is a gas flow 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(2) Overflow	Active if the pump output for the last ten (10) strokes exceeds the allowable average deviation.
P1(2) Low Flow	Active if the pump output for the last ten (10) strokes is below the allowable average deviation.
P1(2) 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 23: Monitor Menu Submenus



SYSTEM STATUS

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

Figure 24: System Status Submenus

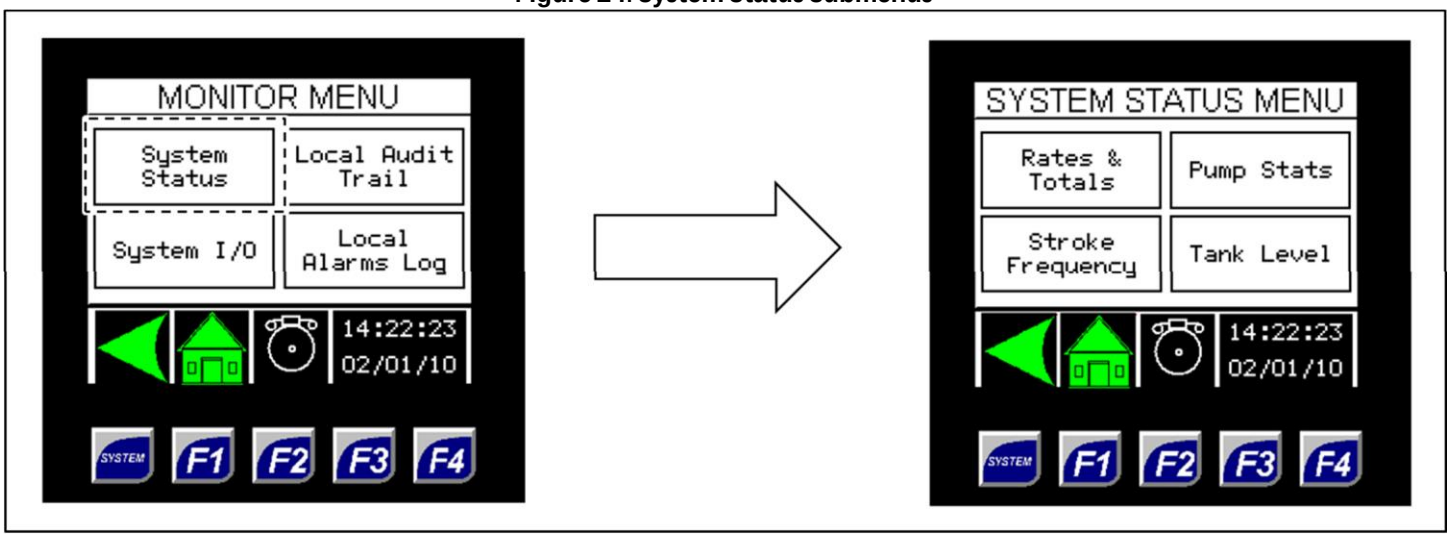


Figure 25: System Status – Rates & Totals

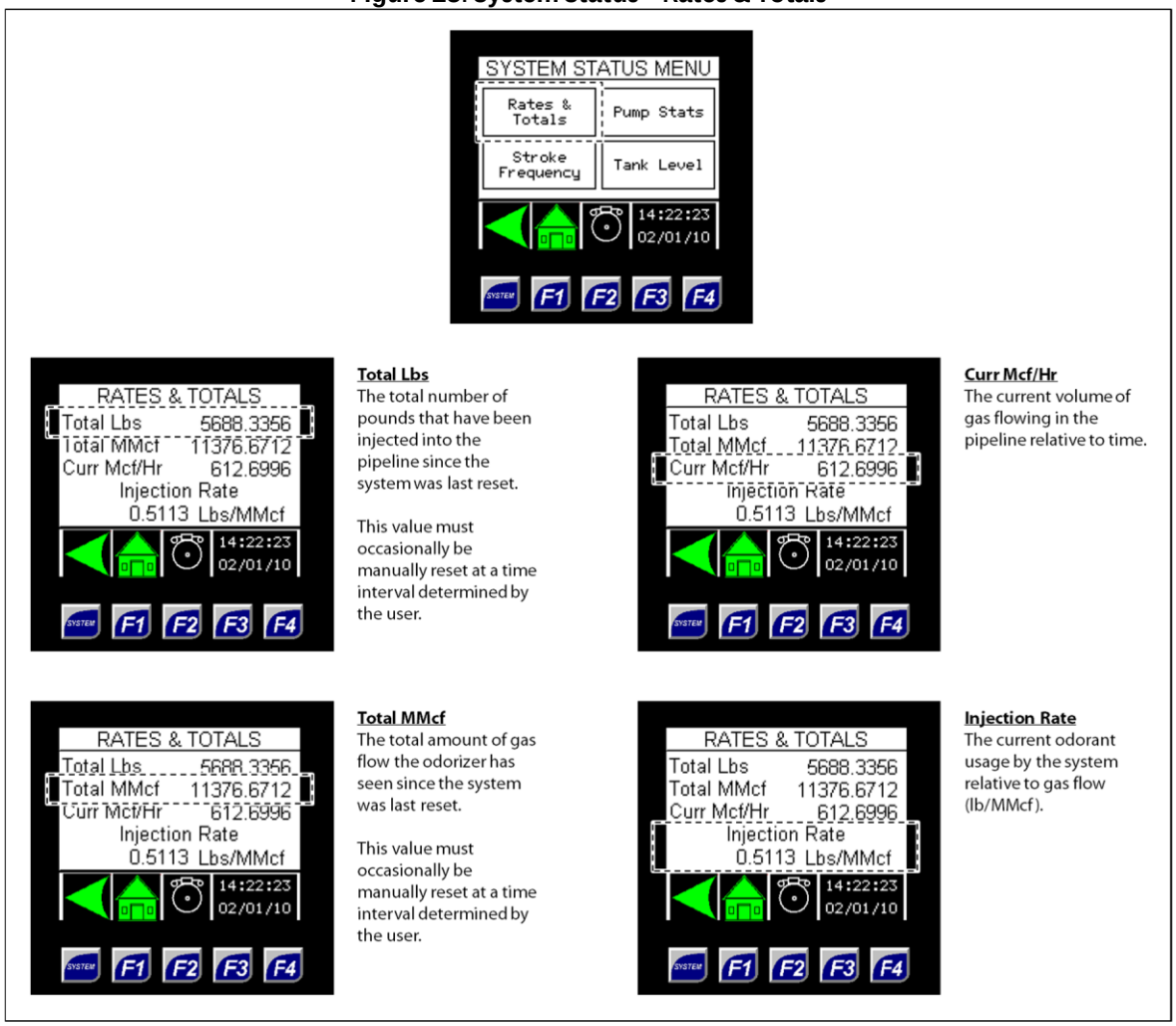
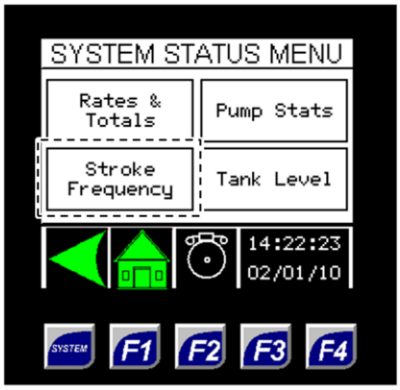
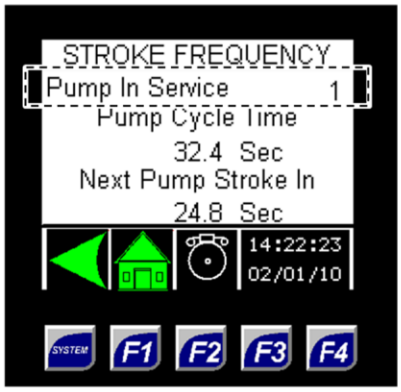
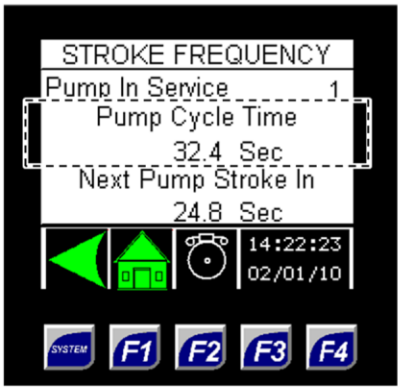


Figure 26: System Status – Stroke Frequency

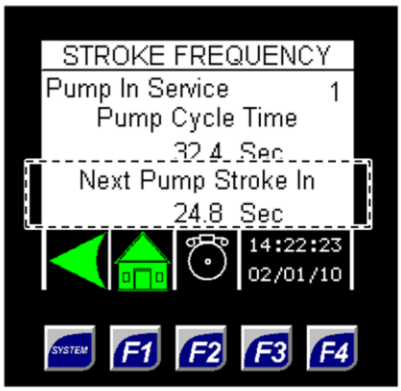




Pump In Service
This indicates which pump is currently injecting odorant into the pipeline.

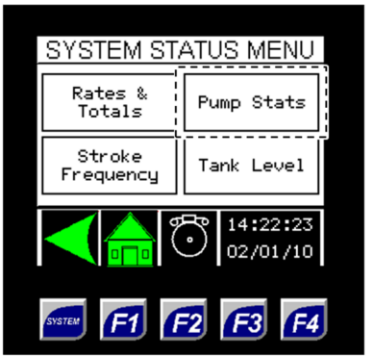


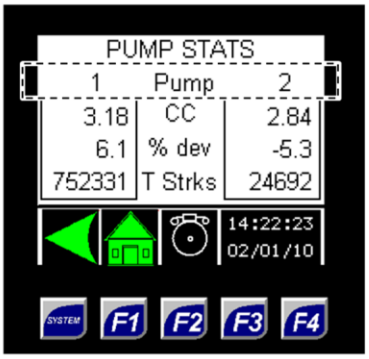
Pump Cycle Time
This indicates the current cycle time (in seconds) of the currently operating pump.



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.

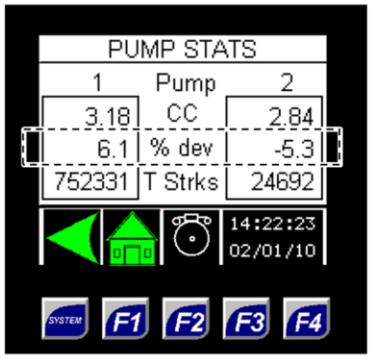
Figure 27: System Status – Pump Stats





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

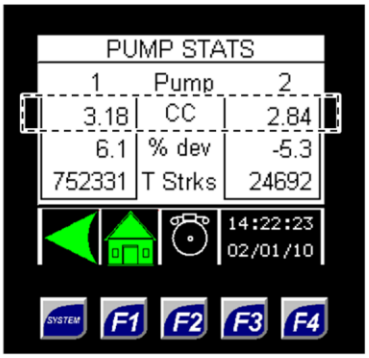
The (2) column displays statistics for the second pump, if applicable.



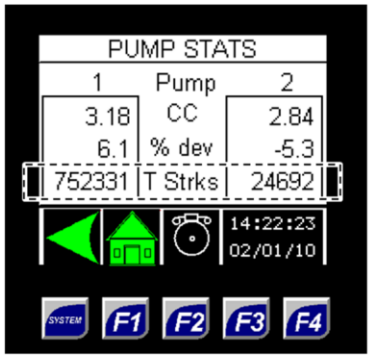
% dev
The 10-stroke average deviation of the pump from the user's set point.

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.



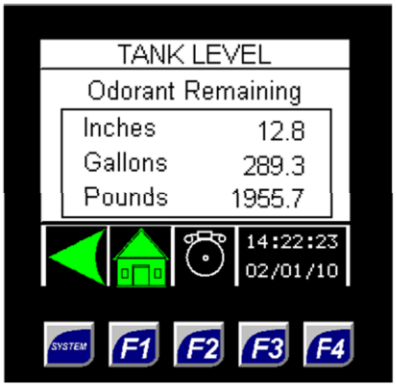
CC
The volume of odorant the pump injected on its last stroke. The volume is given in cubic centimeters (cc).



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.

Figure 28: 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 29: System I/O, 1 of 2

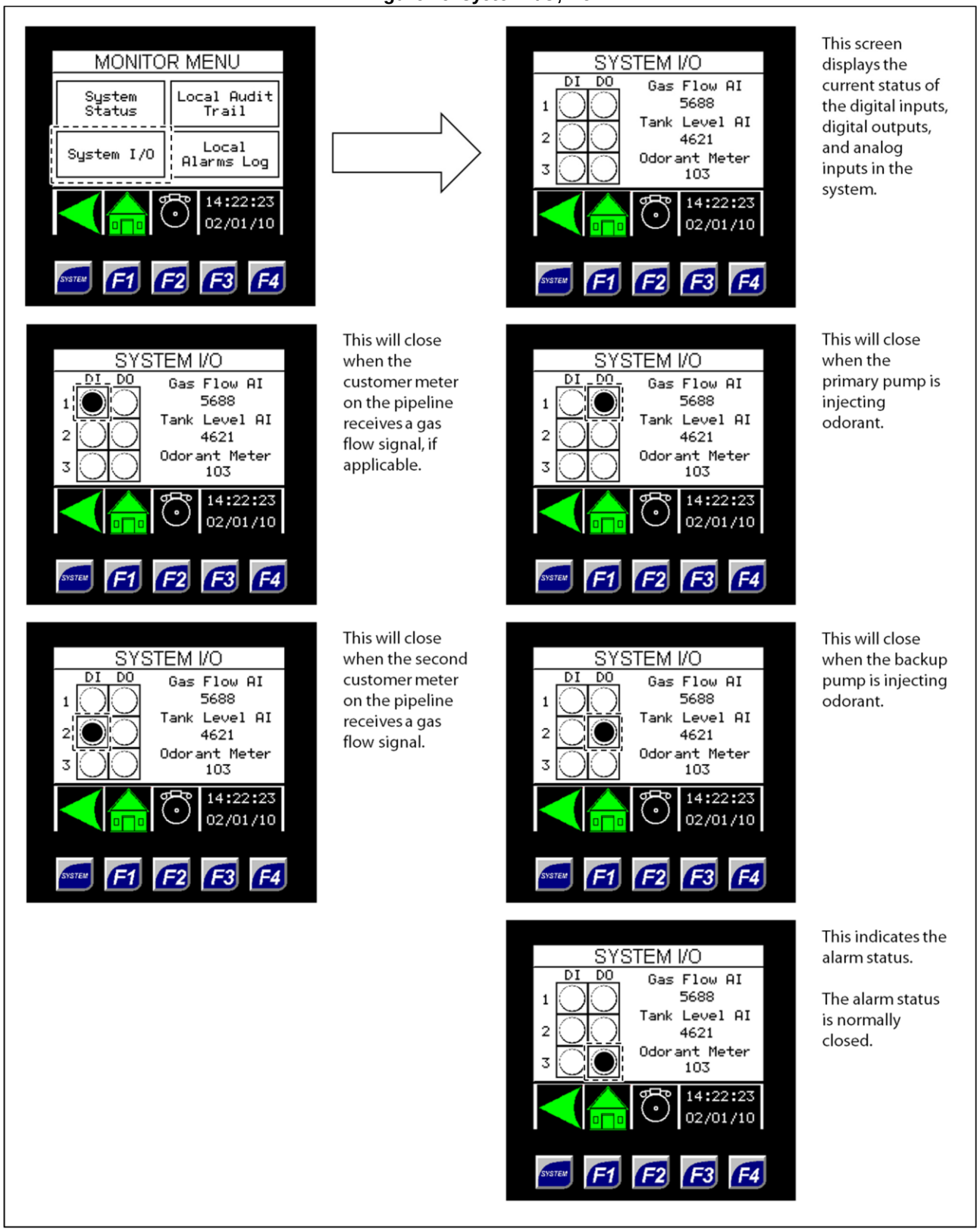
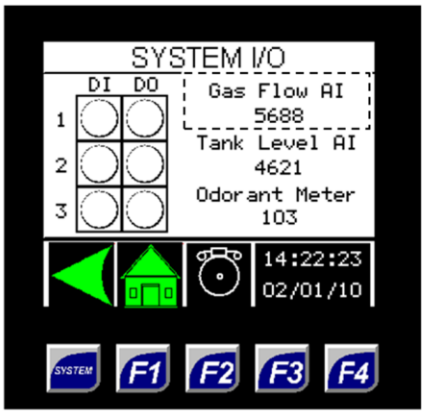
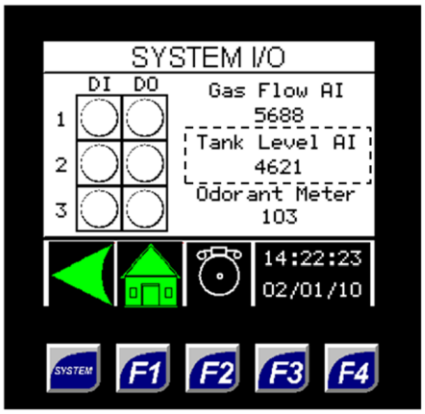


Figure 30: System I/O, 2 of 2

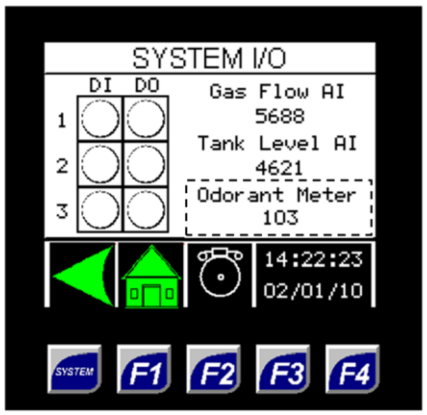


This analog signal is the raw count coming into the odorizer after the signal has been converted from milliamps. This value will vary according to the output from the customer gas flow meter.

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.



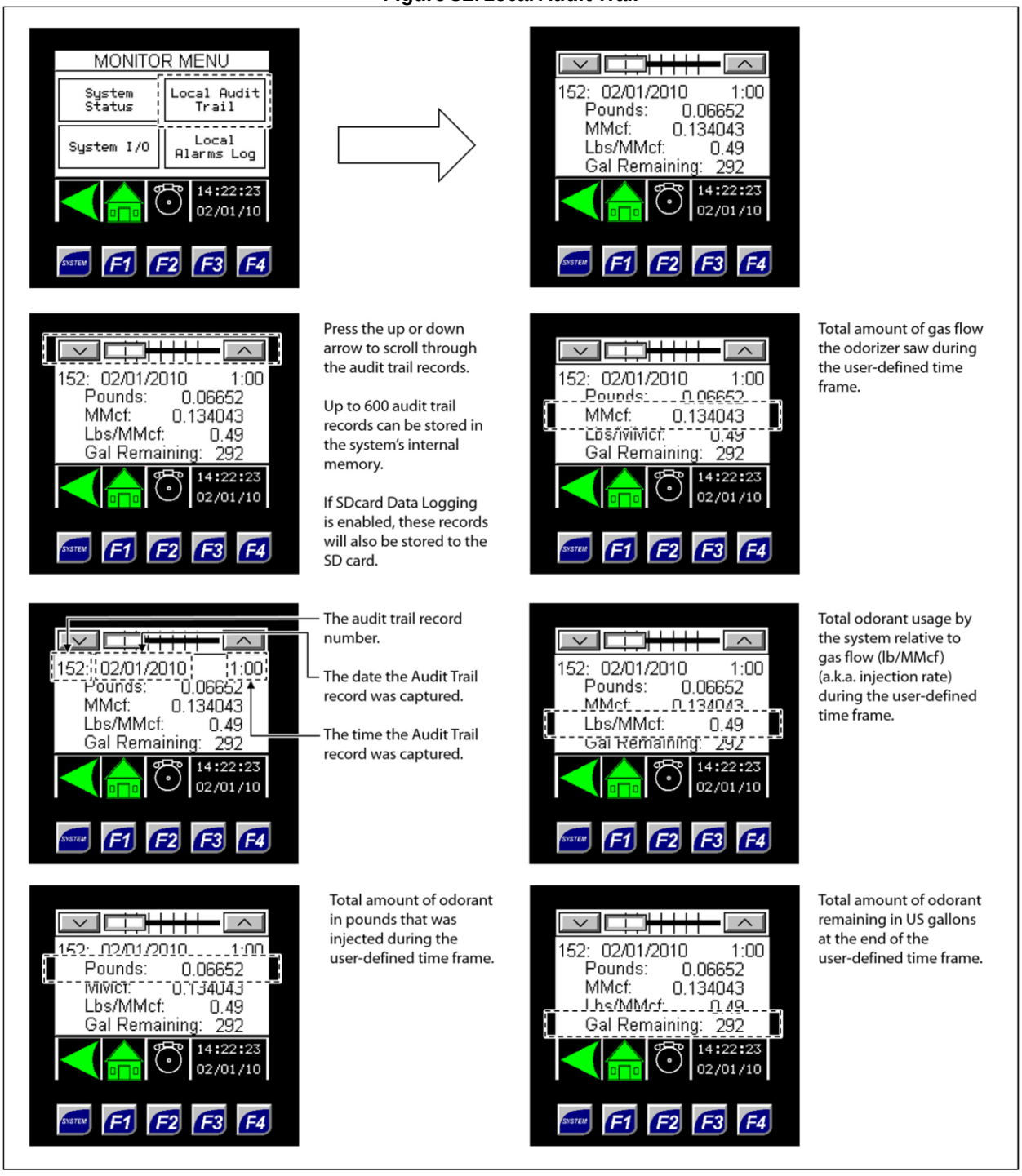
This value indicates how many high-speed pulses were received from the odorant flow meter. This value appears after each pump stoke and reverts to zero (0) after two (2) seconds.

Local Audit Trail

From the Local Audit Trail submenu, the user can access the audit tail records stored on 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 on the installed micro SD card. The micro SD card is equipped with 8 GB of storage.

Figure 31: Local Audit Trail

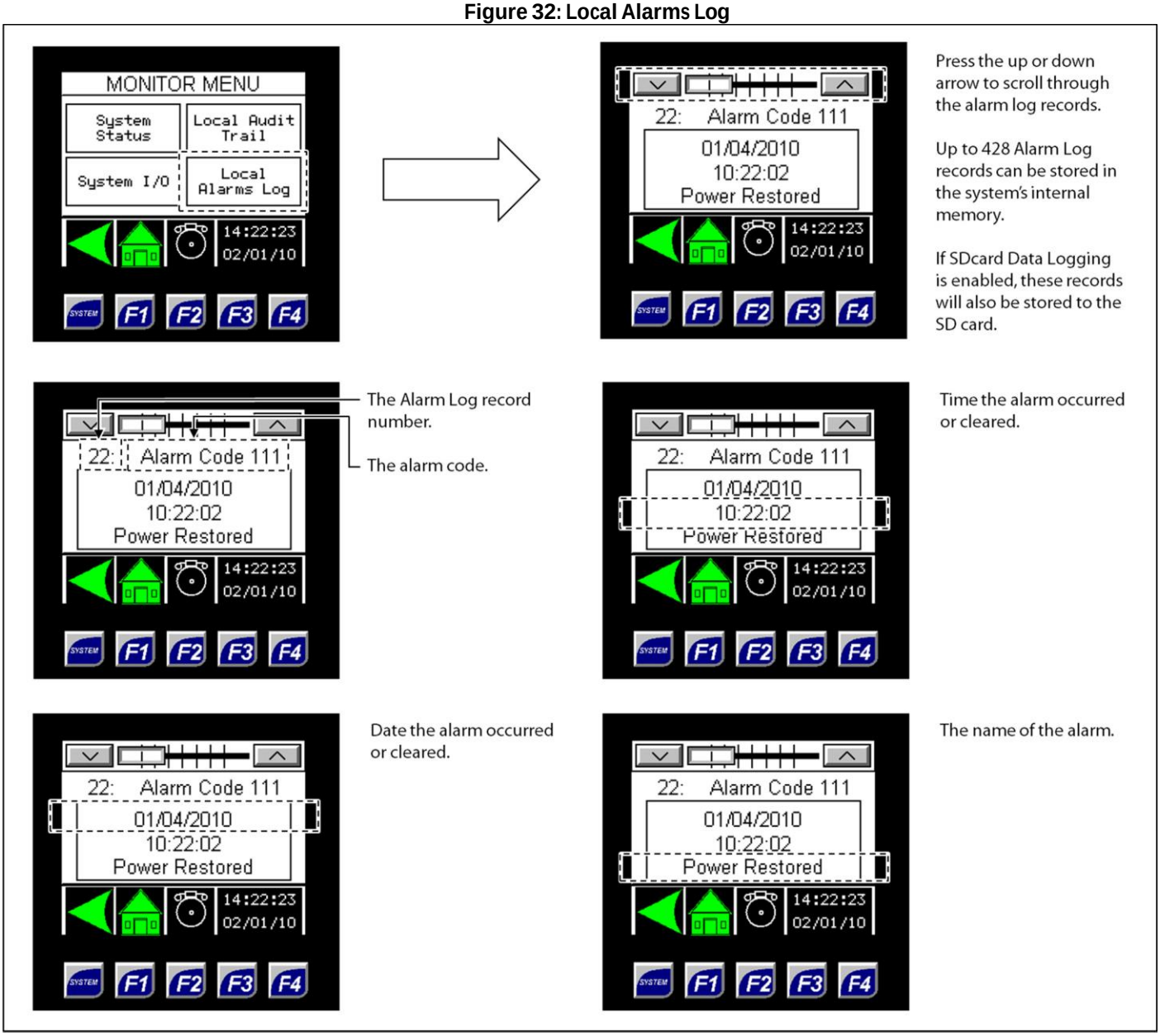


Local Alarms Log

From the Local Alarms Log submenu, the user can access the alarm logs stored on 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 on the installed micro SD card. The micro SD card is equipped with 8 GB of storage.

Figure 32: Local Alarms Log

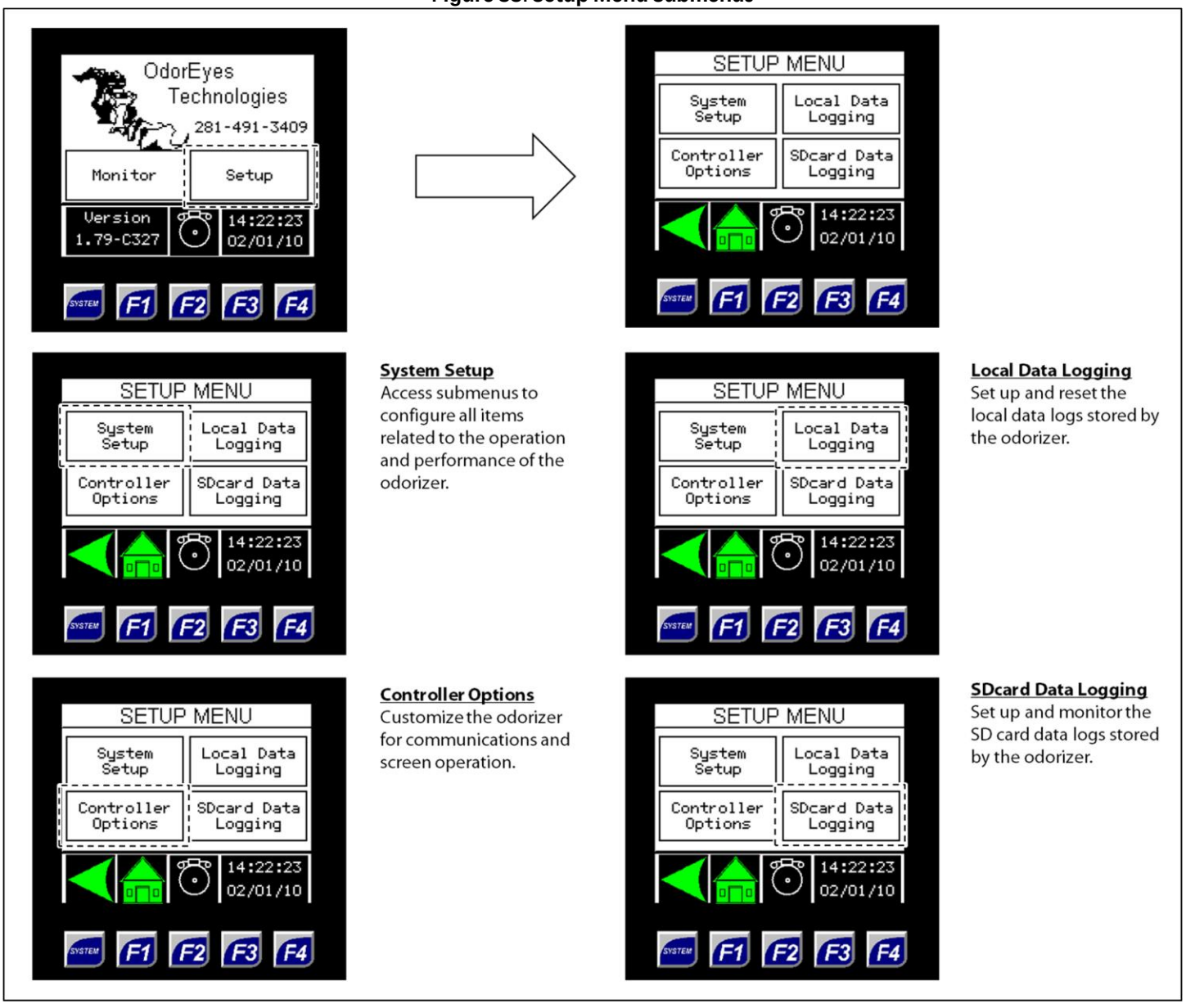


3.3 Navigating the Setup Menus

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 33: 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

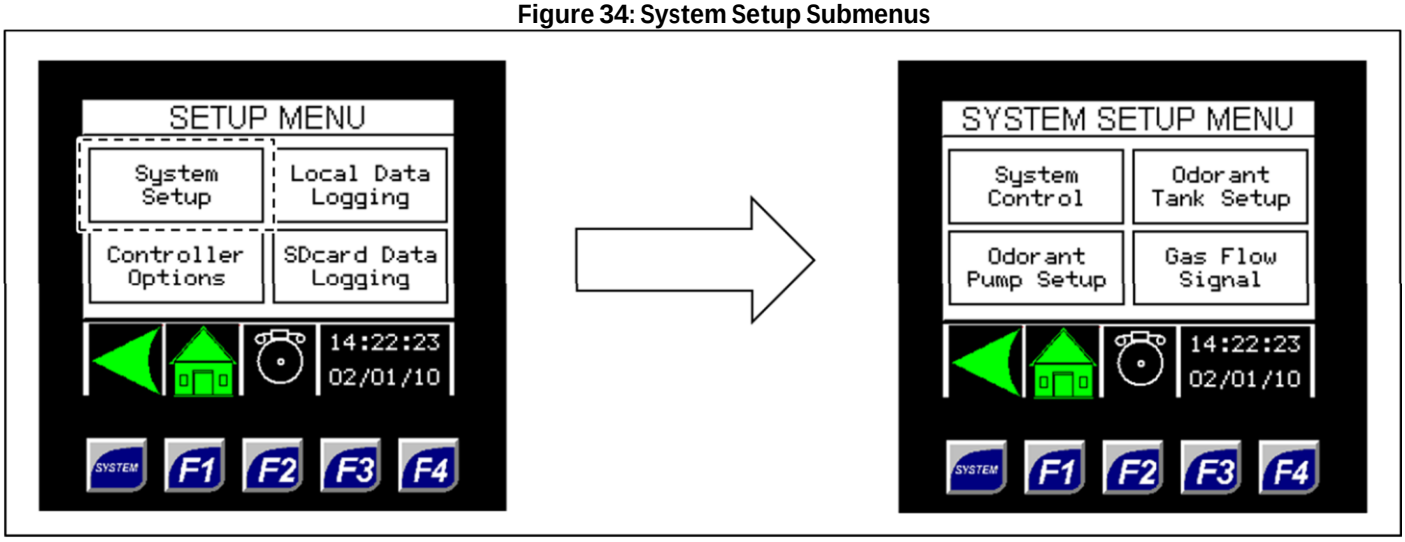
4. To change a text value, press on the value to be changed. A dropdown menu will appear on the screen.
5. Scroll through the value's options using the arrow keys in the dropdown menu.
6. Highlight the desired text value, and then press ENTER to save the changes.

> 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 34: System Setup Submenus



System Control

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

Figure 35: System Setup – System Control

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

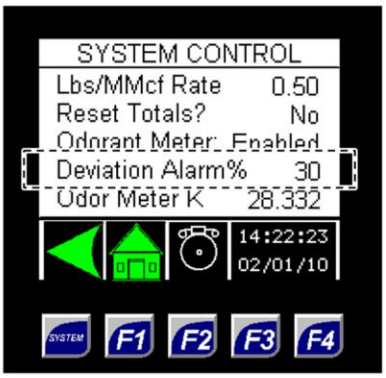
The system will stroke the pump(s) faster or slower in order to odorize proportional to flow and to maintain this injection rate.

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."

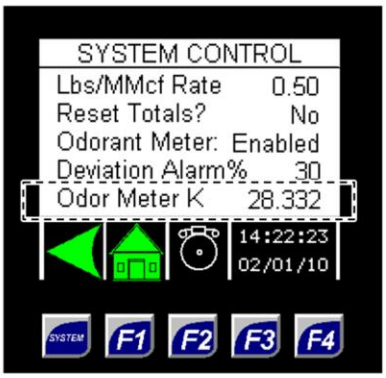
Odorant Meter
When enabled, each stroke of the pump is measured, monitored, and recorded, and the pump stroke frequency will adjust based on this value.

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



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

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

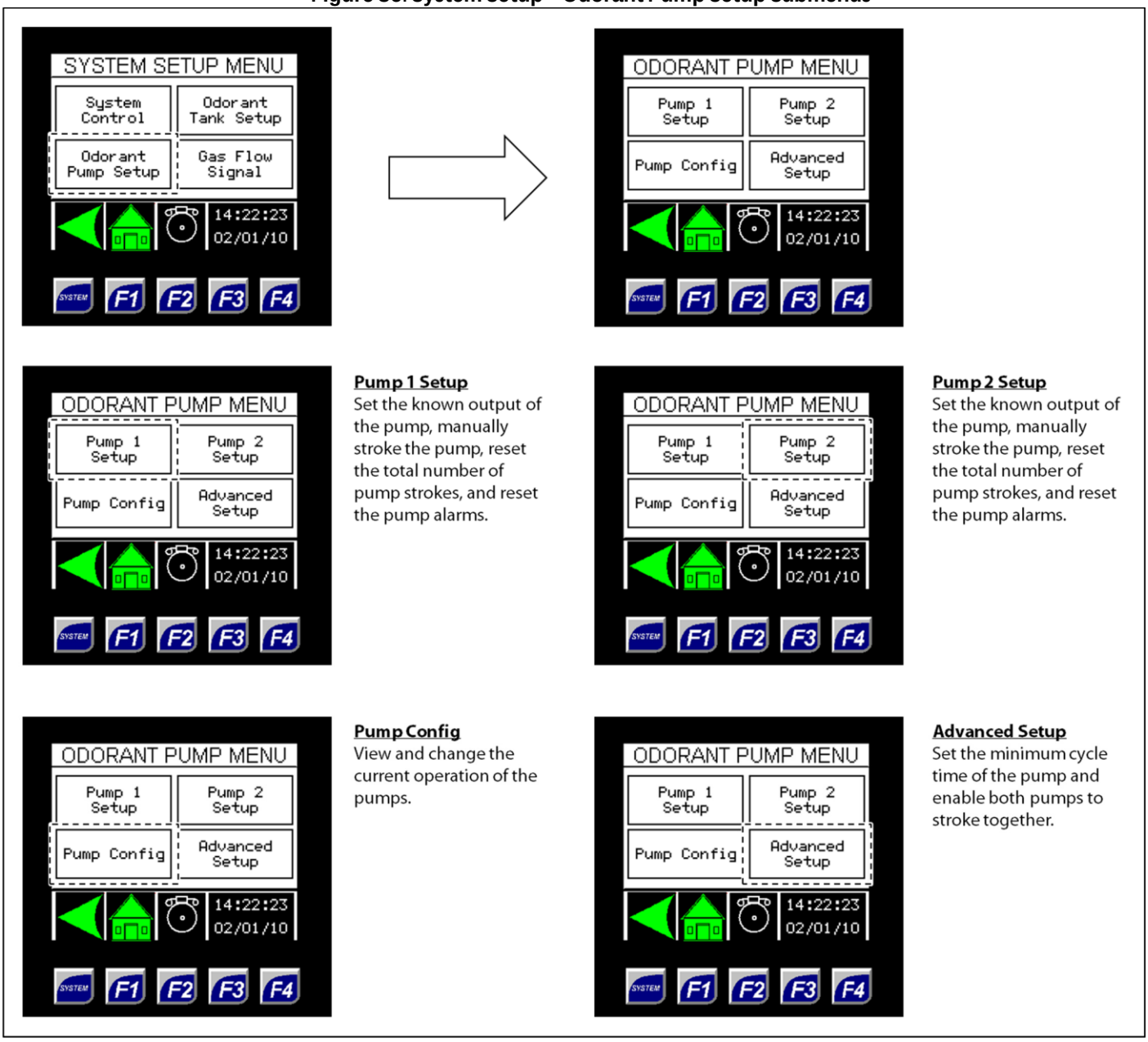


Odor Meter K
This value is factory-set for the odorant flow meter. This value represents how many revolutions of the meter it takes to equal 1 cc of liquid.

Odorant Pump Setup

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

Figure 36: 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.

Pump 2 Setup
Set the known output of the pump, manually stroke the pump, reset the total number of pump strokes, and reset the pump alarms.

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

Advanced Setup
Set the minimum cycle time of the pump and enable both pumps to stroke together.

Figure 37: Odorant Pump Setup

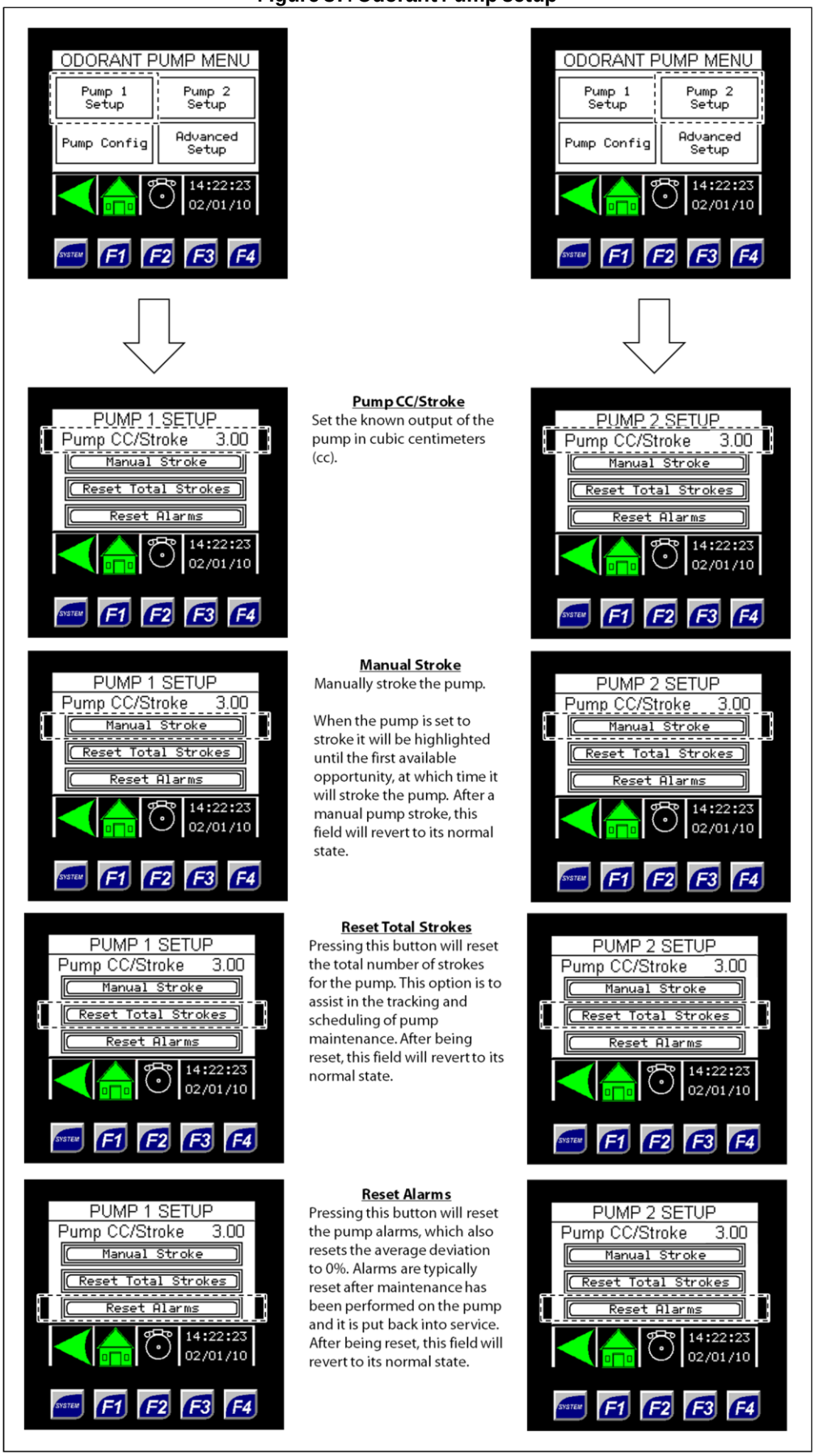
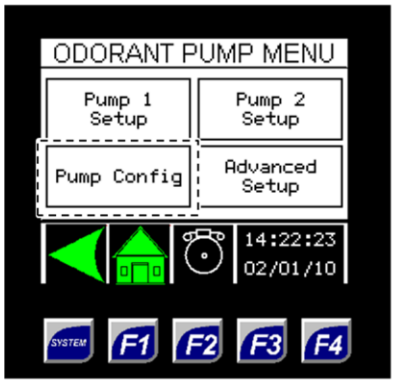
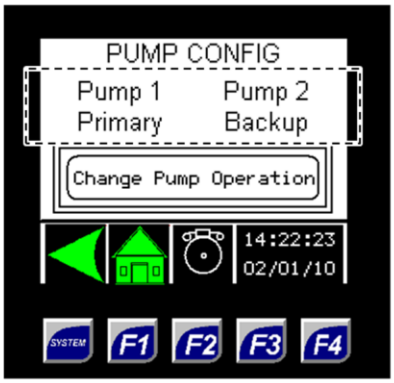
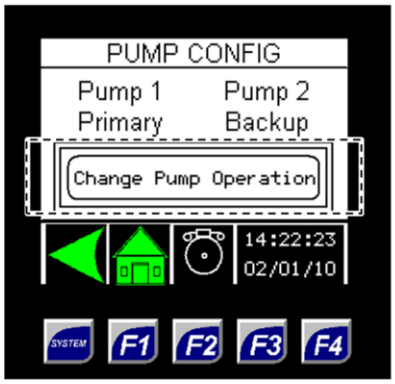


Figure 38: Odorant Pump Setup – Pump Configuration





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

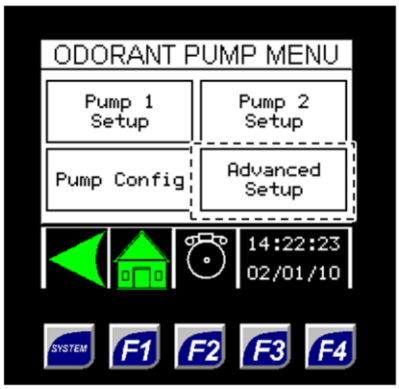


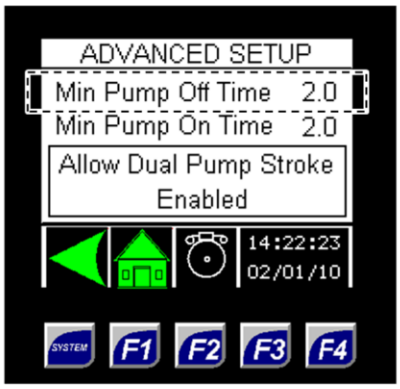
Change Pump Operation
Change the current operation of the pump as displayed above this button.

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

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

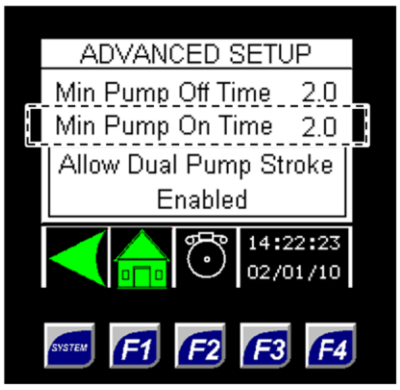
Figure 39: Odorant Pump Setup – Advanced Setup





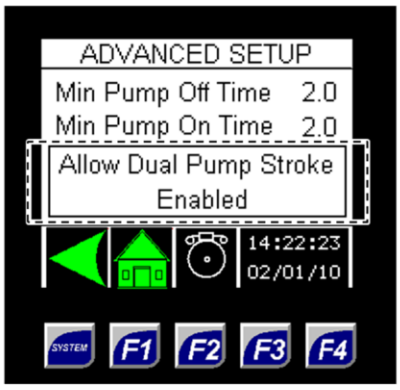
Min Pump Off Time
The minimum amount of time required to reset the pump before the next stroke.

This value is factory-set.



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

This value is factory-set.



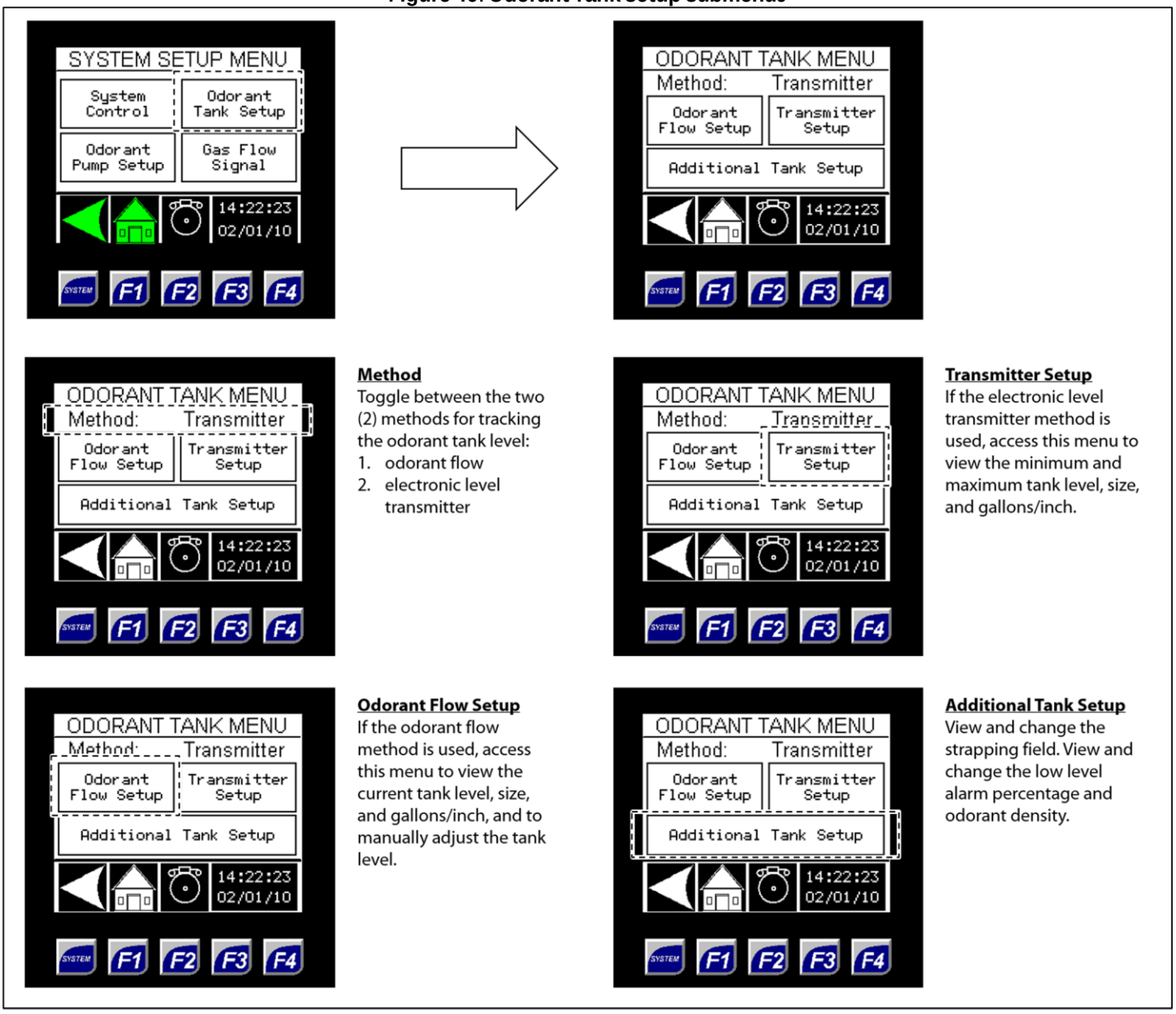
Allow Dual Pump Stroke
Enabling this option will allow both pumps to stroke simultaneously when one pump cannot keep up with the demand for odorant.

If the cycle time is longer than twelve (12) seconds, this option will automatically be disabled, and the system will return to single pump operation.

Odorant Tank Setup

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

Figure 40: 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.

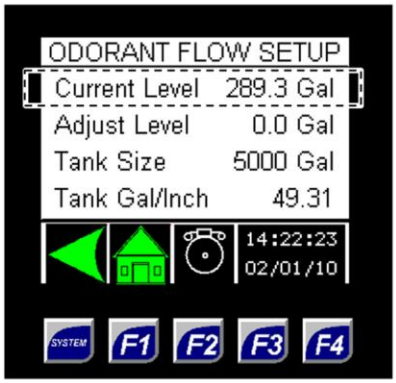
Odorant Flow Setup
If the odorant flow method is used, access this menu to view the current tank level, size, and gallons/inch, and to manually adjust the tank level.

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

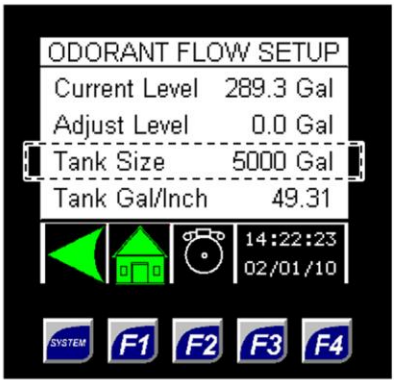
When using an electronic level transmitter to track the odorant tank level, the Method should be set to Transmitter.
When estimating the odorant tank level based on odorant usage, the Method should be set to Odorant Flow.

Odorant Flow Setup

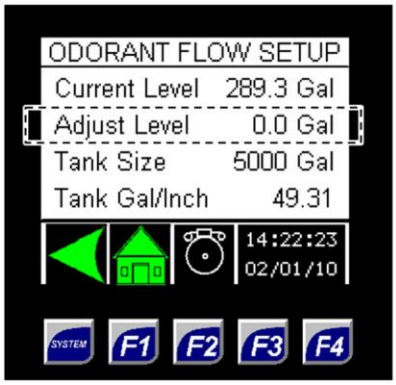
Figure 41: Odorant Tank Setup – Odorant Flow Setup



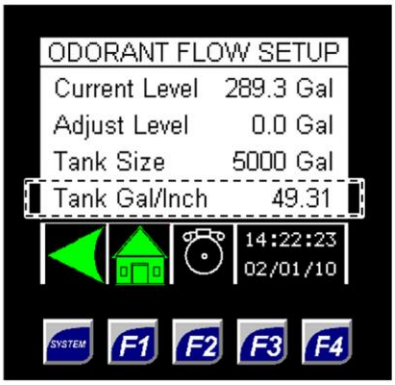
Current Level
View the current level of the tank in US gallons.



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.

Figure 42: 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 43: 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**.

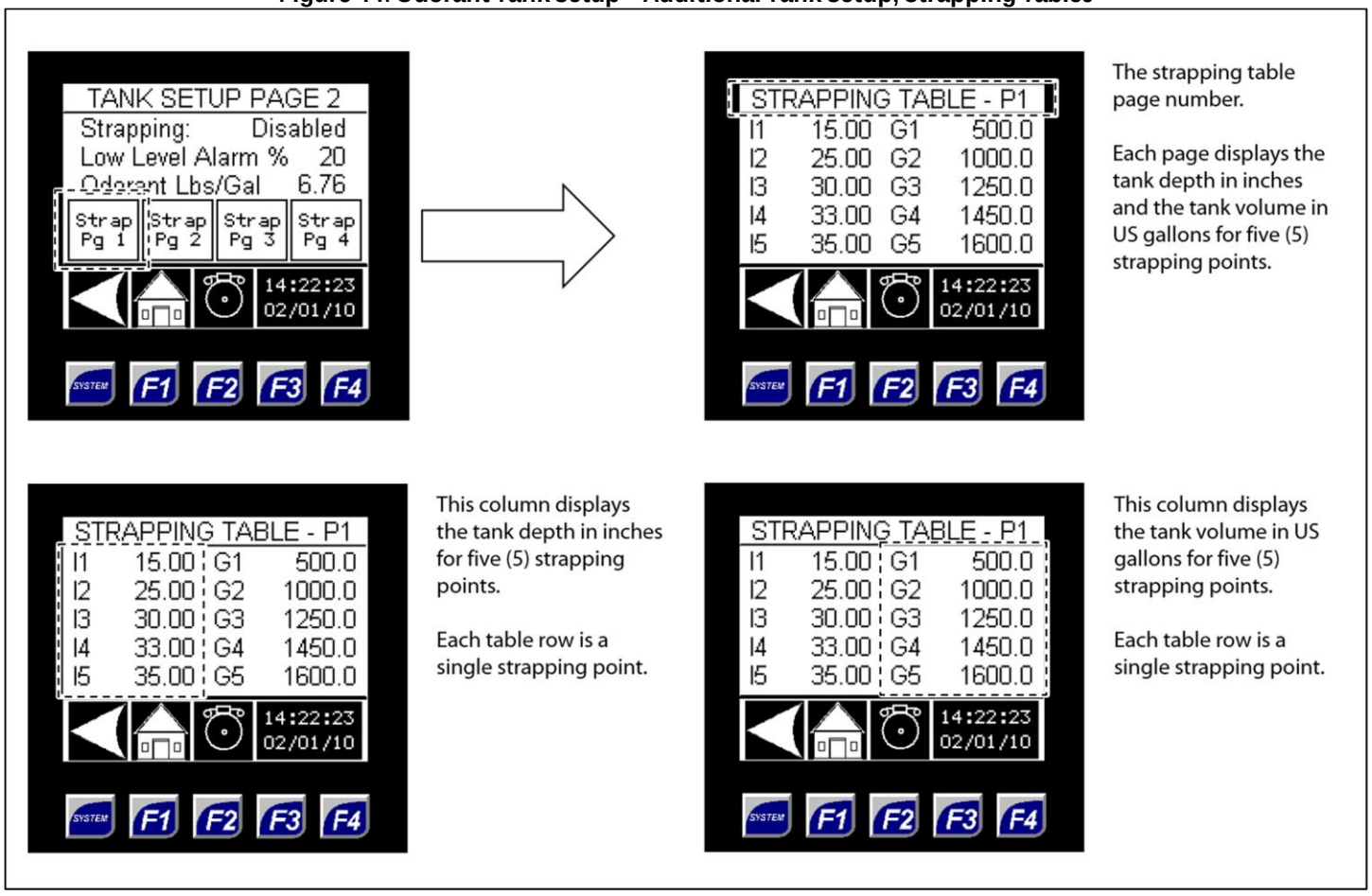
Odorant Lbs/Gal
The odorant density will vary according to the odorant used.

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 44: 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 45: System Setup – Gas Flow Signal Submenus

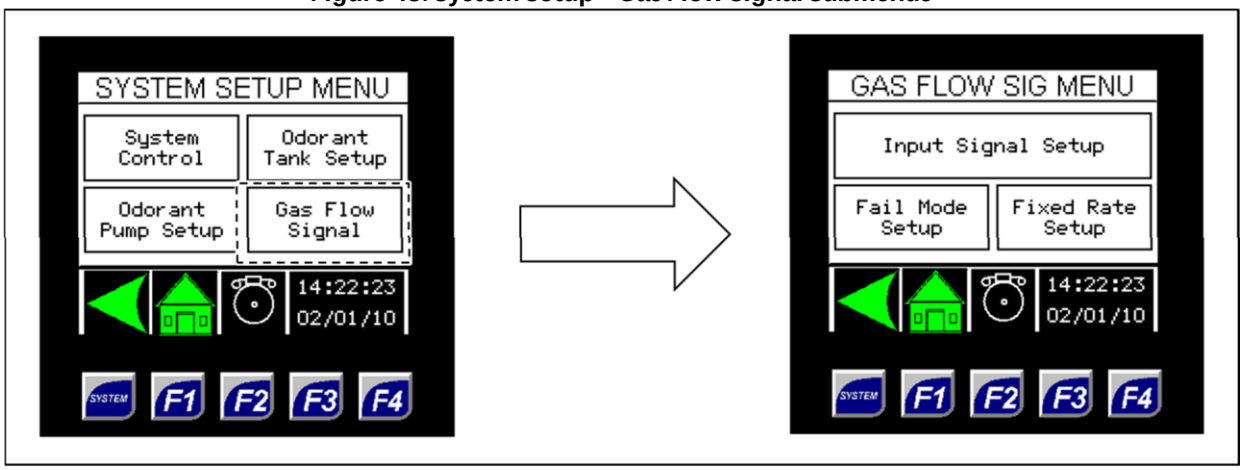


Figure 46: Gas Flow Signal – Input Signal Setup

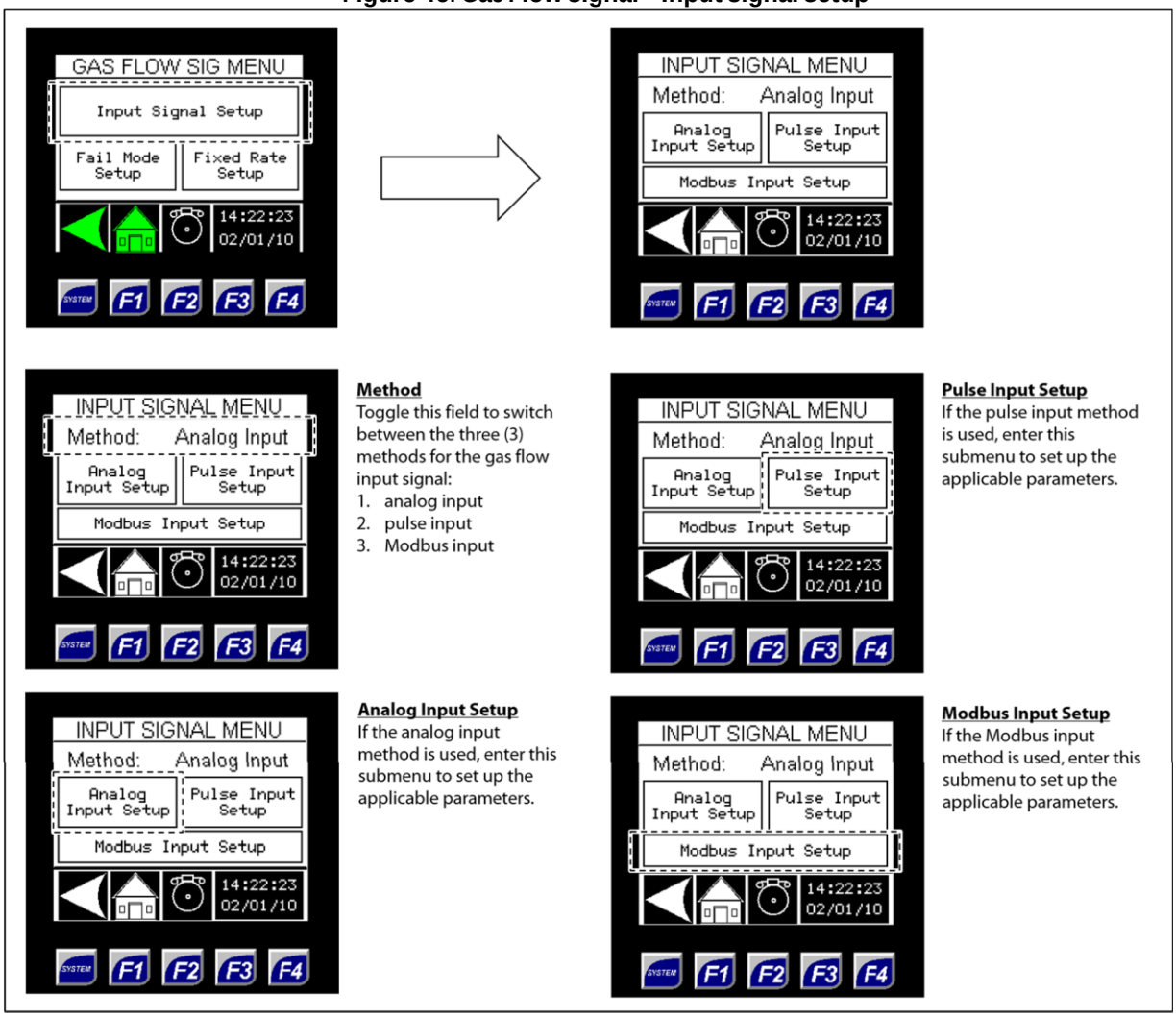
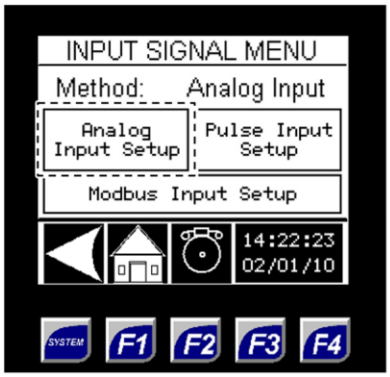
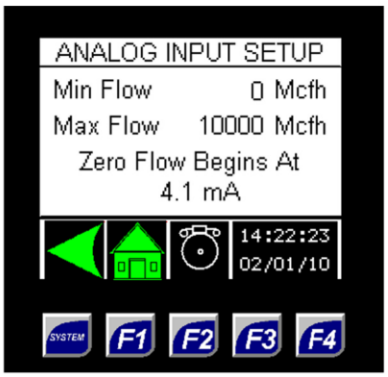
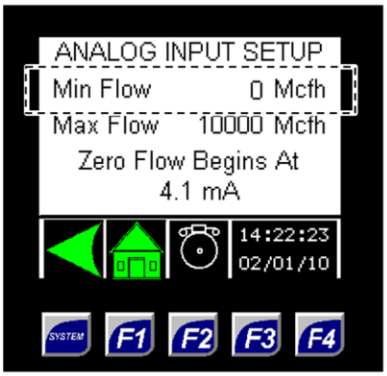


Figure 47: Gas Flow Signal – Analog Input Setup

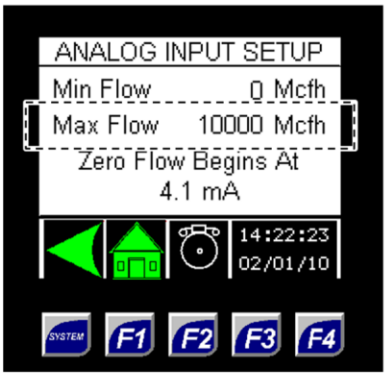




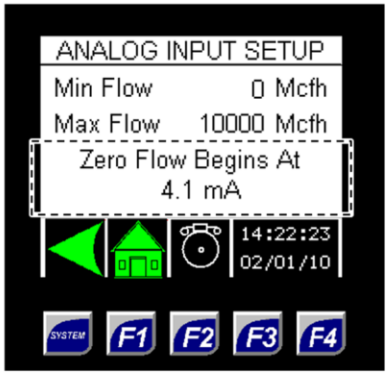


Min Flow
If the analog input method is used, this value is the 4 mA signal.

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.

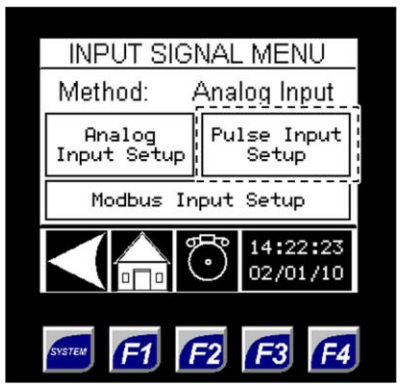


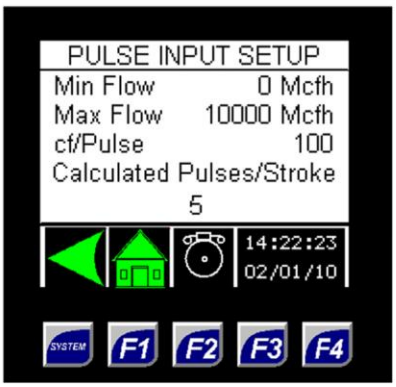
Zero Flow Begins At
This value is only active if the analog input method is used.

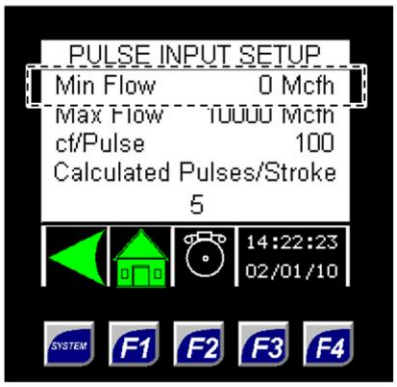
Any value below this gas flow low cutoff value (in milliamps) will be treated as zero gas flow (0 Mcf/h).

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

Figure 48: Gas Flow Signal – Pulse Input Setup

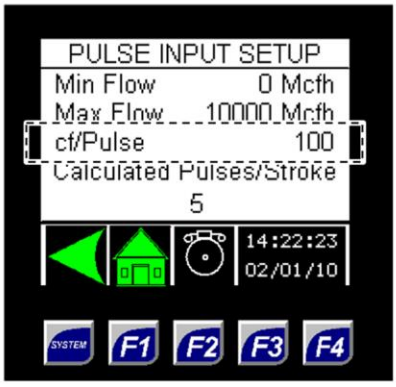






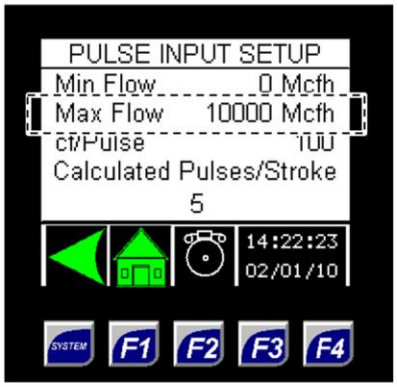
Min Flow
If the pulse input method is used, this value is the minimum actual gas flow.

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

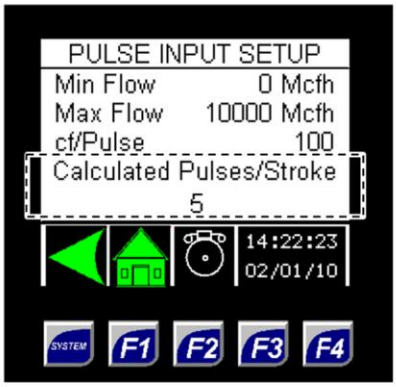


cf/Pulse
This value is the total cubic feet of gas that each pulse input to the controller represents.

This value is used for the pulse input method only.



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

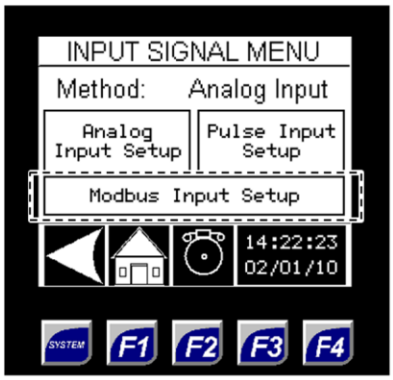


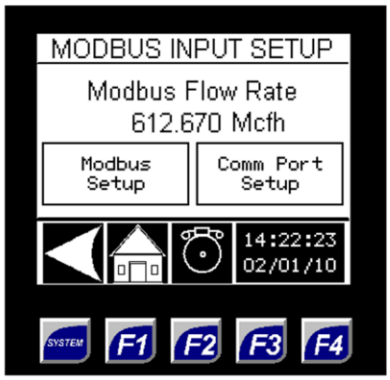
Calculated Pulses/Stroke
The system automatically calculates how many gas flow input signal pulses it will accept before the pump is stroked.

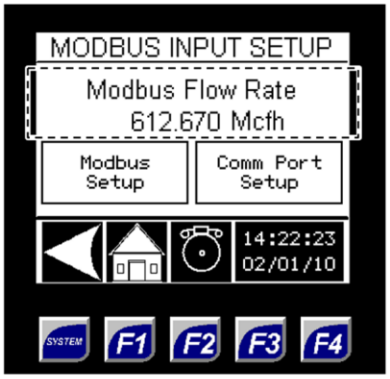
This value is used for the pulse input method only and is not a changeable value.

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

Figure 49: Gas Flow Signal – Modbus Input Setup Submenus

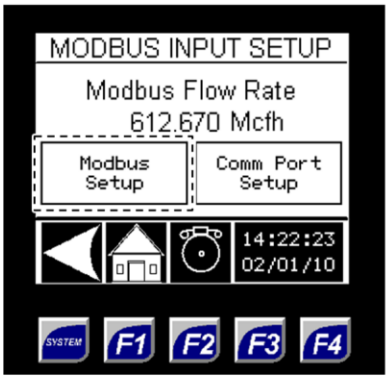






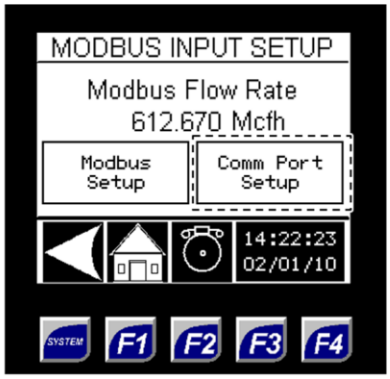
Modbus Flow Rate
If the Modbus input method is used, this is the value the Modbus is downloading for the flow rate (Mcf/h)

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 50* and *51*.

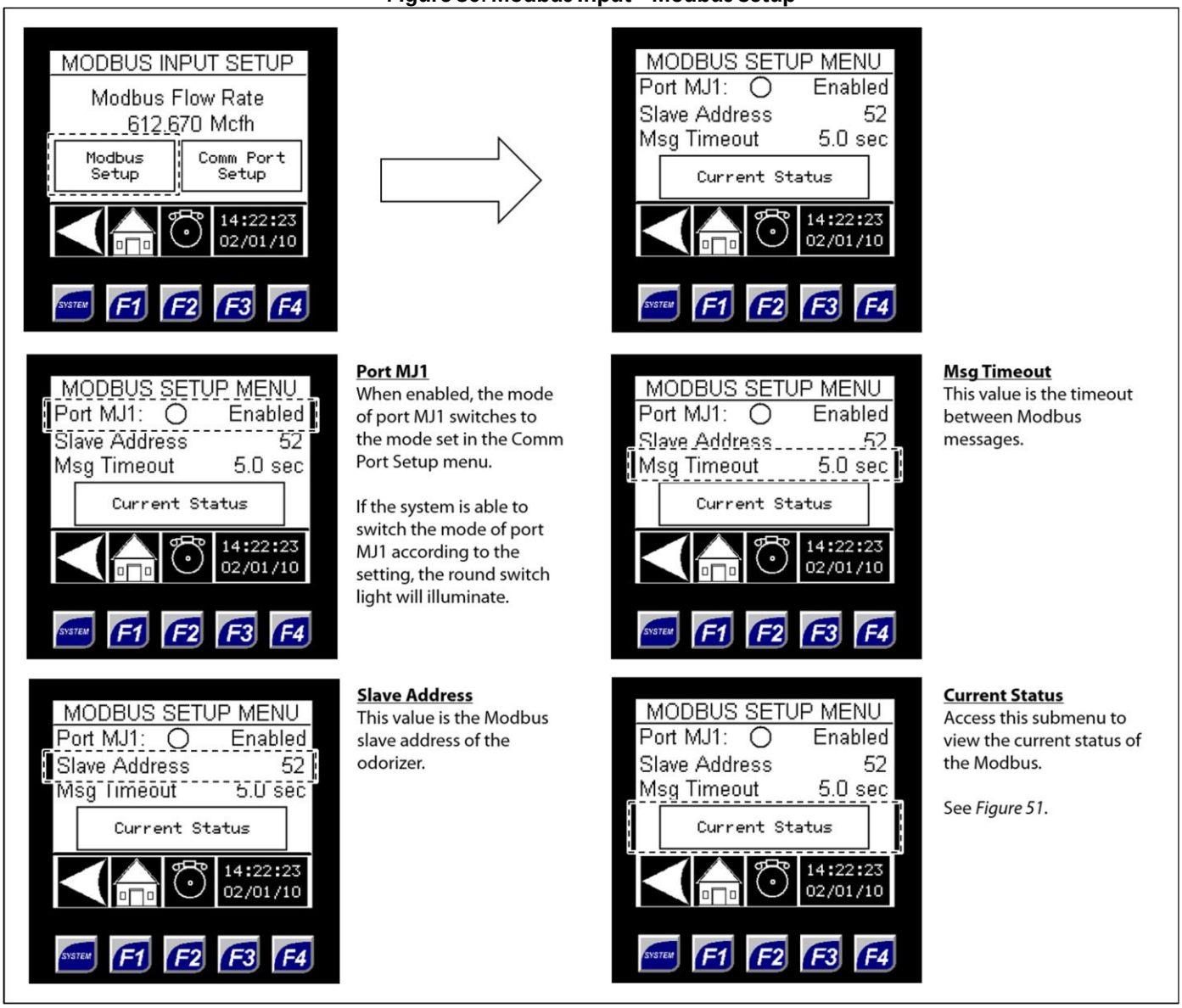


Comm Port Setup
If the Modbus input method is used, enter this submenu to configure the communication settings for the Modbus.

See *Figure 52*.

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 50: 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.

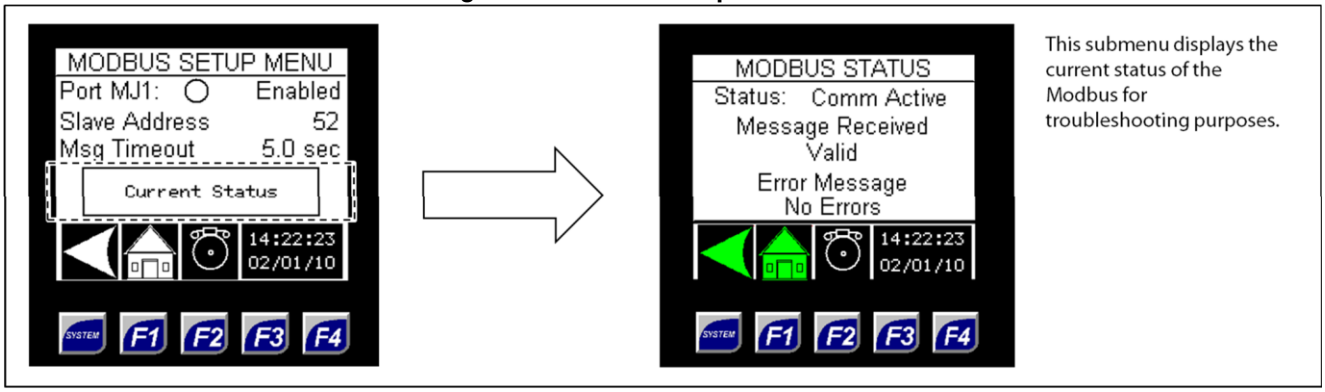
Slave Address
This value is the Modbus slave address of the odorizer.

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

See *Figure 51*.

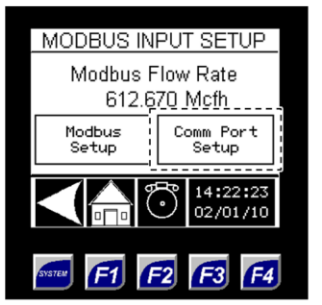
Modbus Setup can also be accessed through the Controller Options submenu (*Figure 55*).

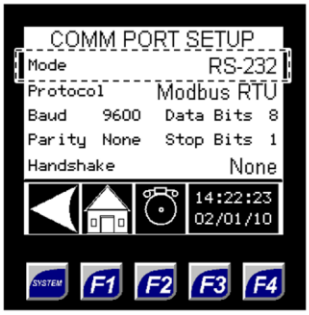
Figure 51: Modbus Setup – Current Status



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

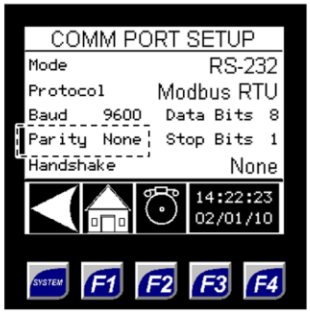
Figure 52: Modbus Input – Comm Port Setup



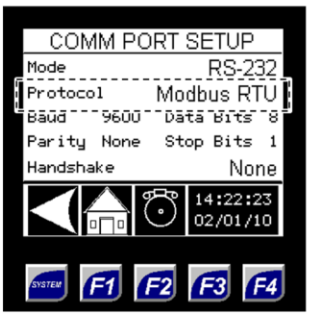


Mode
The mode setting applies to port MJ1 only.

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

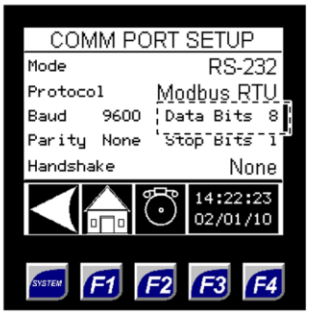


Parity
This value can be set to None, Odd, or Even.

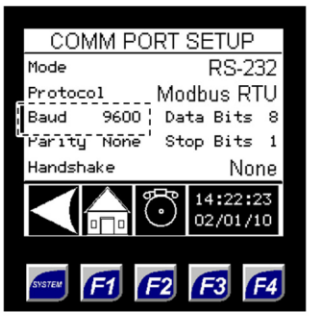


Protocol
The protocol setting applies to port MJ1 only.

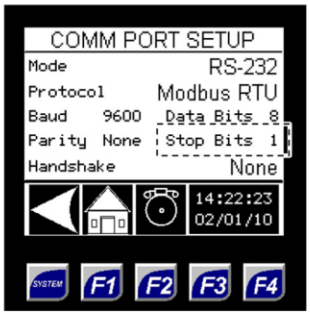
The protocol can be set to:
- CsCAN
- Generic
- Modbus RTU
- Modbus ASCII
- Modbus TCP



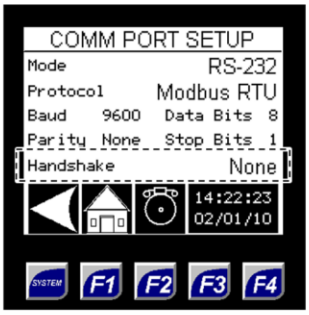
Data Bits
This value can be set to 7 or 8.



Baud
The available baud rate ranges from 300 to 115200.



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

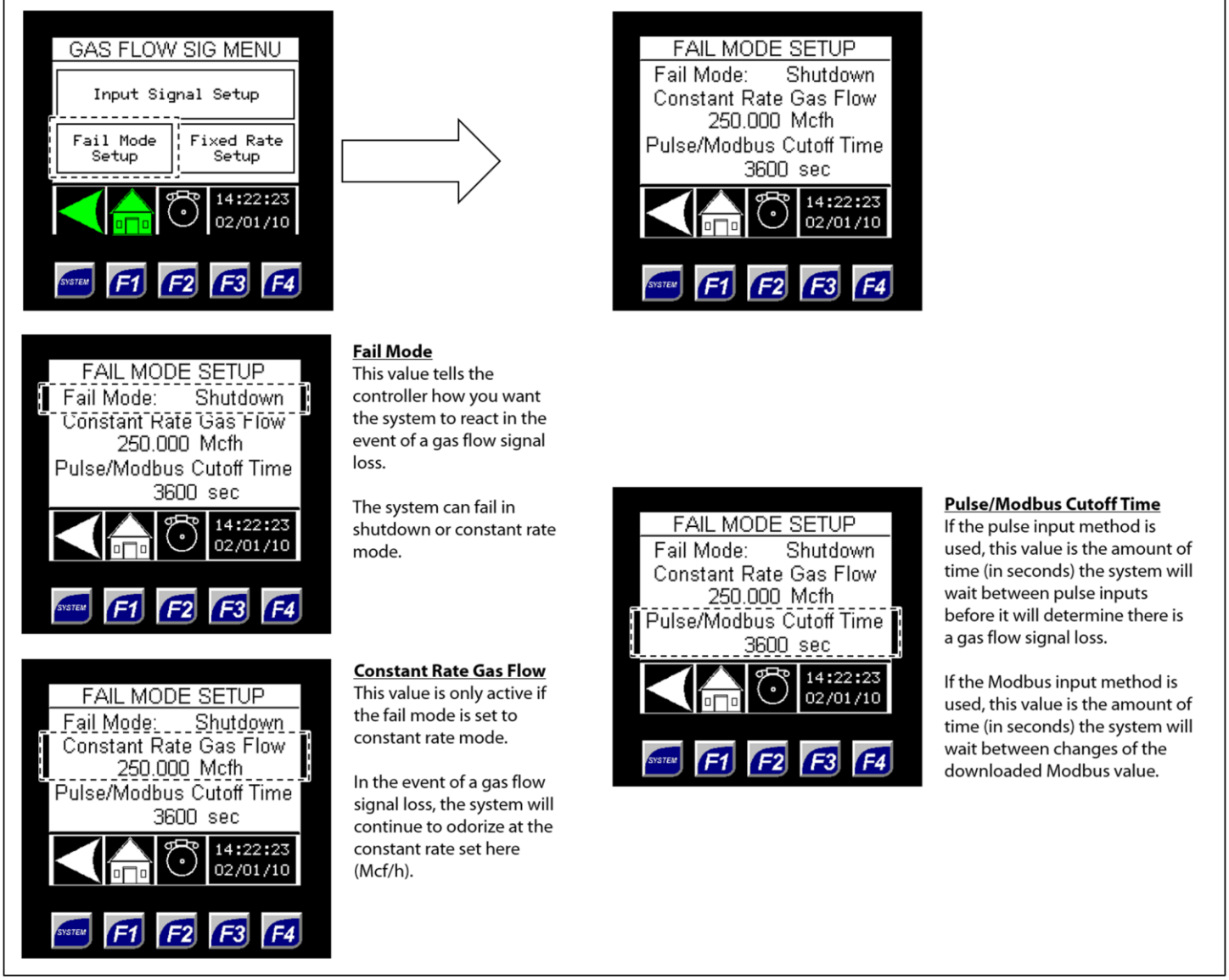


Handshake
The required handshake can depend on the Mode and/or Protocol used.

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 60*).

Figure 53: 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).

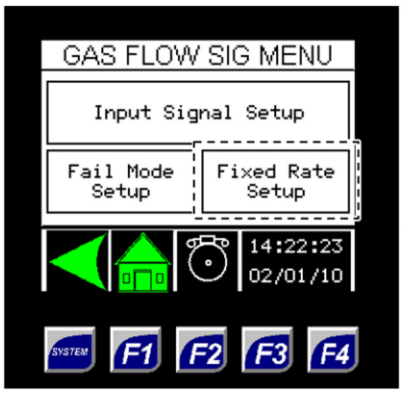
Pulse/Modbus Cutoff Time
If the pulse input method is used, this value is the amount of time (in seconds) the system will wait between pulse inputs before it will determine there is a gas flow signal loss.

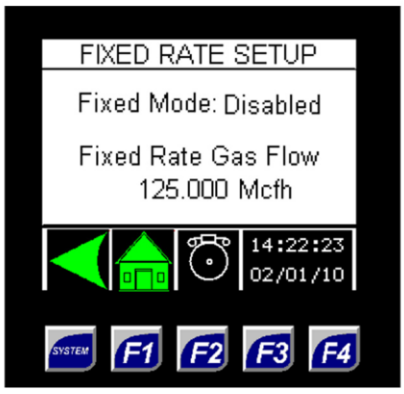
If the Modbus input method is used, this value is the amount of time (in seconds) the system will wait between changes of the downloaded Modbus value.

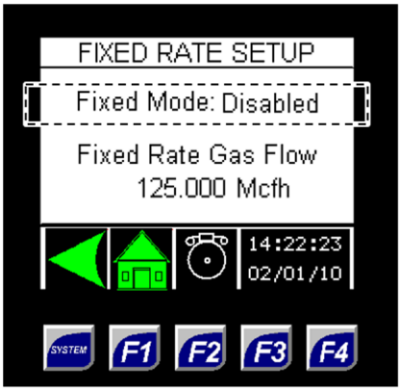
Setting the Fail Mode to Shutdown will halt odorization until the alarm is cleared.
Setting the Fail Mode to Constant Rate will allow odorization to continue at the specified rate.

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 54: Gas Flow Signal – Fixed Rate Setup

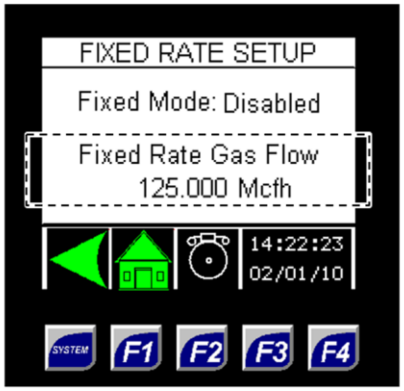






Fixed Mode
When disabled, the system will odorize proportional to flow.

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.

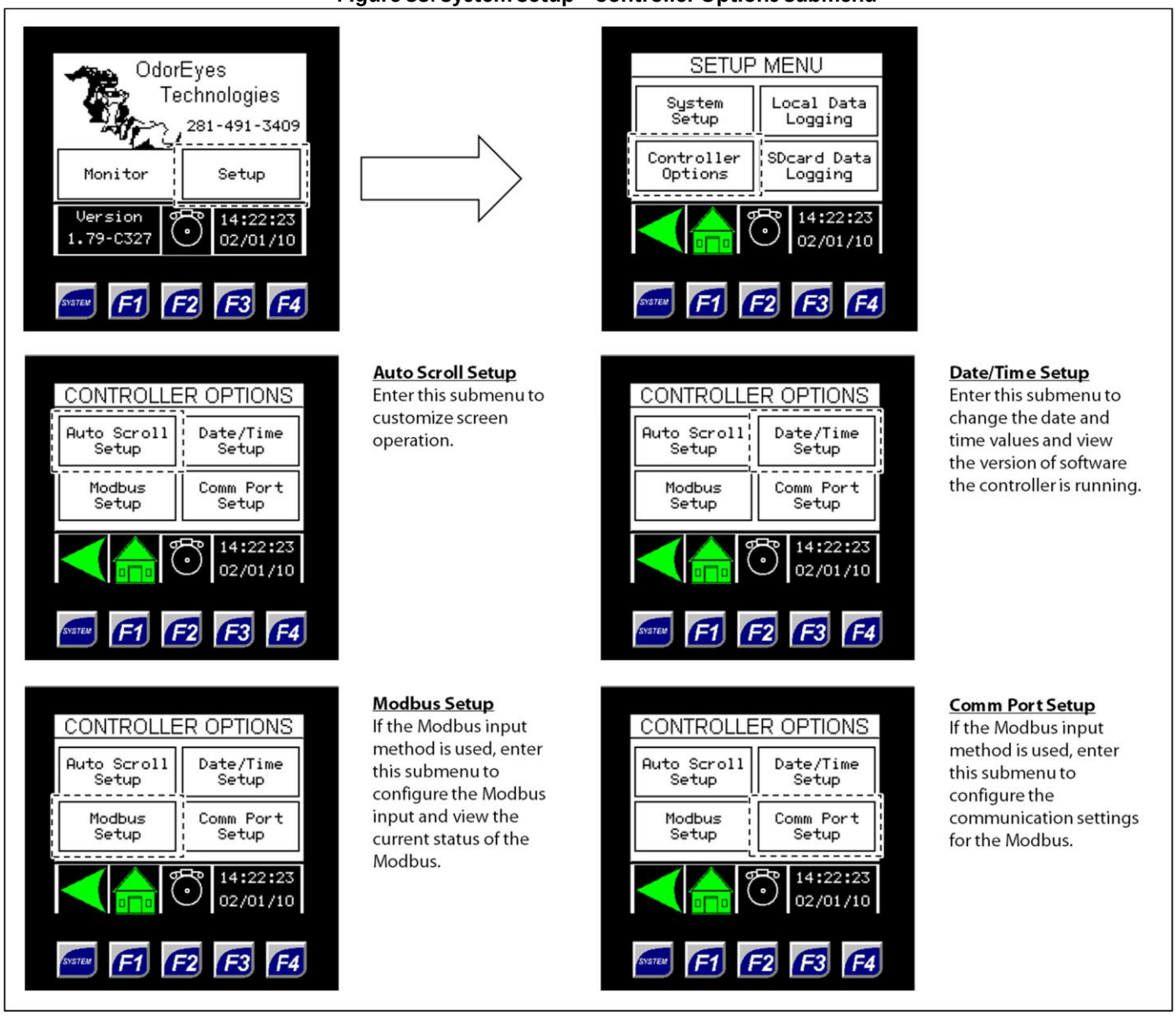


Fixed Rate Gas Flow
When Fixed Mode is enabled, the flow rate (Mcf/h) must be manually set. The system will odorize based on this rate until Fixed Mode is disabled.

Controller Options

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

Figure 55: System Setup – Controller Options Submenu



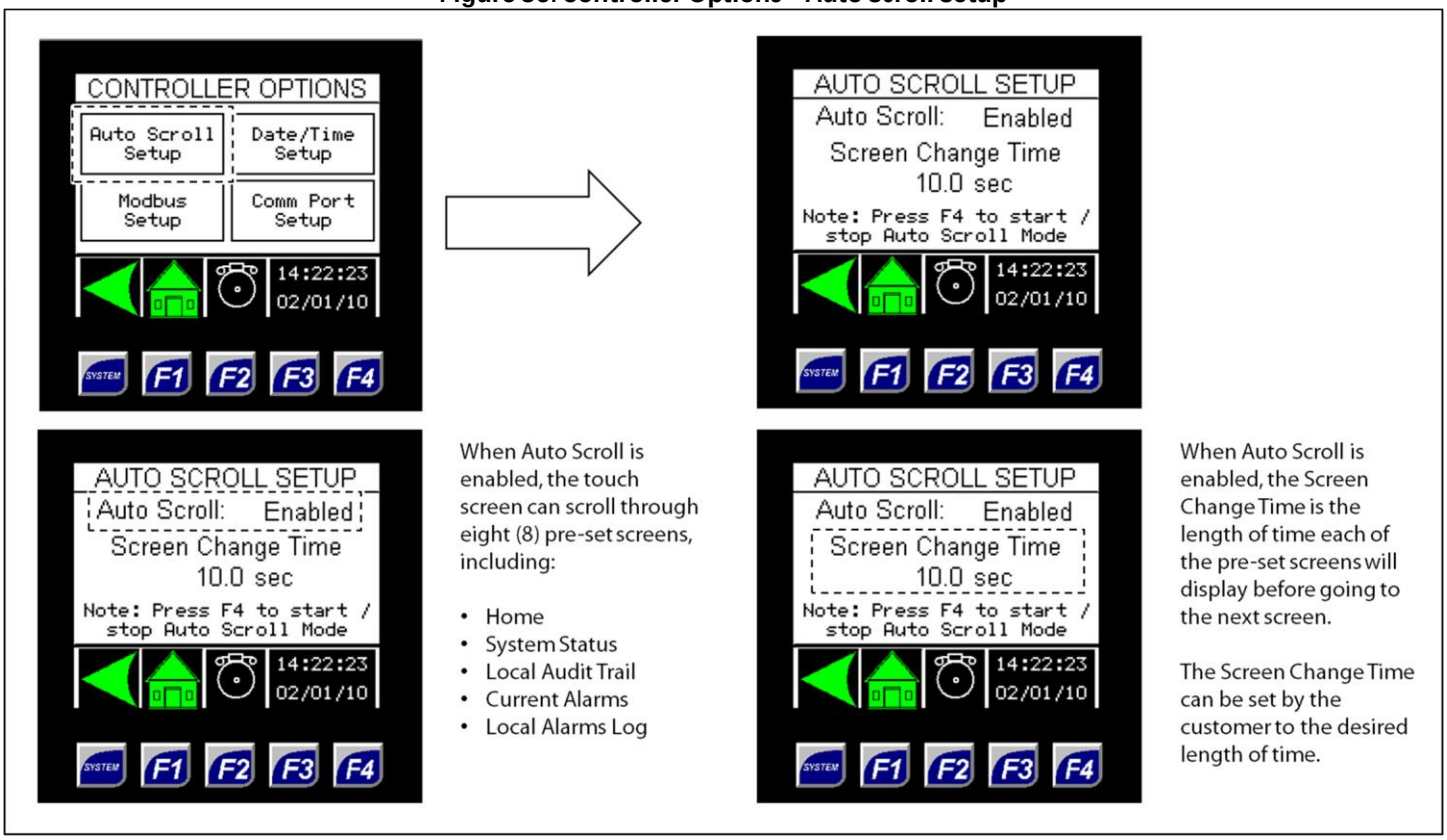
Auto Scroll Setup
Enter this submenu to customize screen operation.

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.

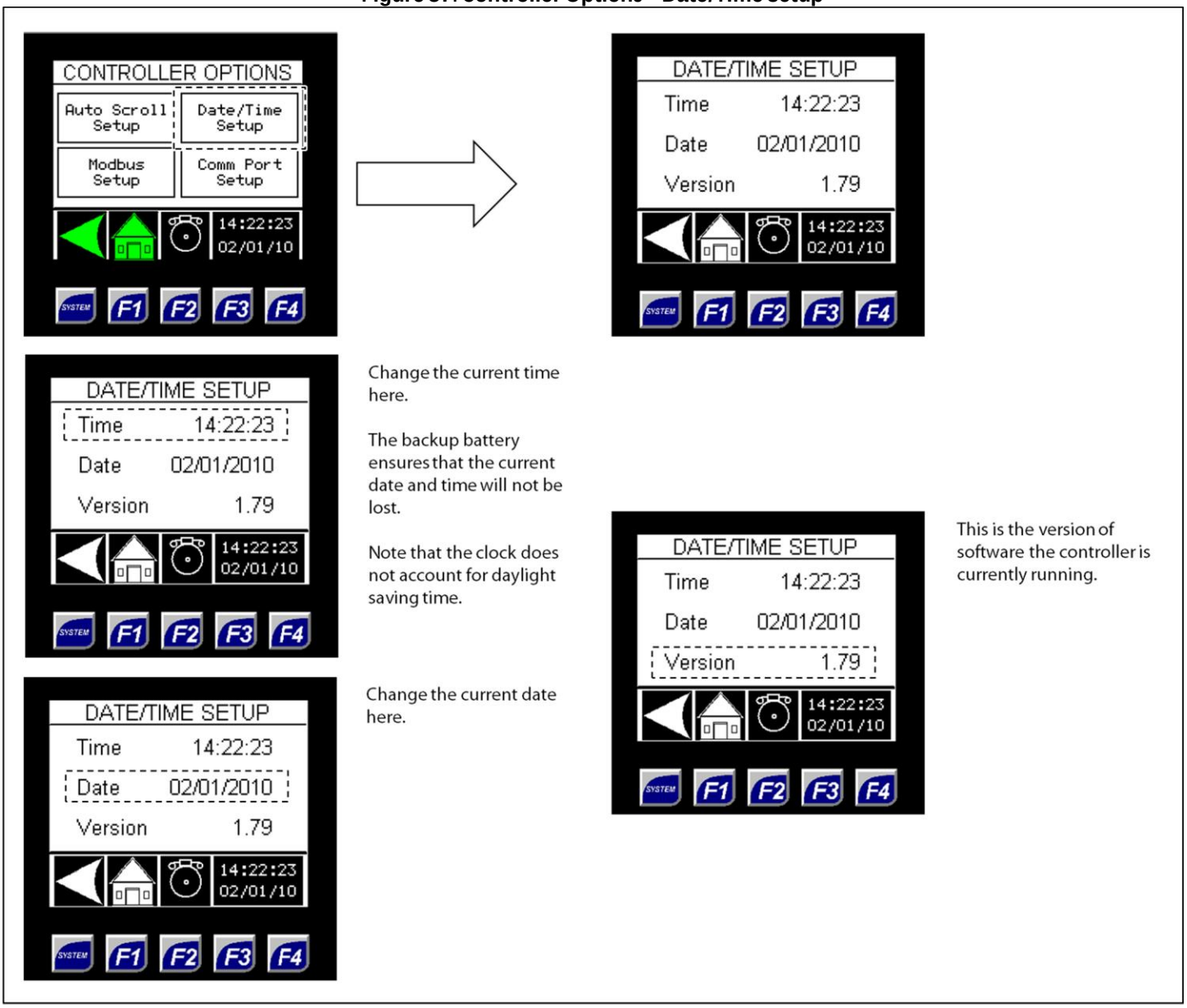
Comm Port Setup
If the Modbus input method is used, enter this submenu to configure the communication settings for the Modbus.

Figure 56: Controller Options – Auto Scroll Setup



The auto scroll behavior can also be started and stopped by pressing the F4 function key (*Figure 21*).

Figure 57: Controller Options – Date/Time Setup



The date and time can also be edited by selecting the current date and time on any screen (*Figure 21*).

Figure 58: Controller Options – Modbus Setup

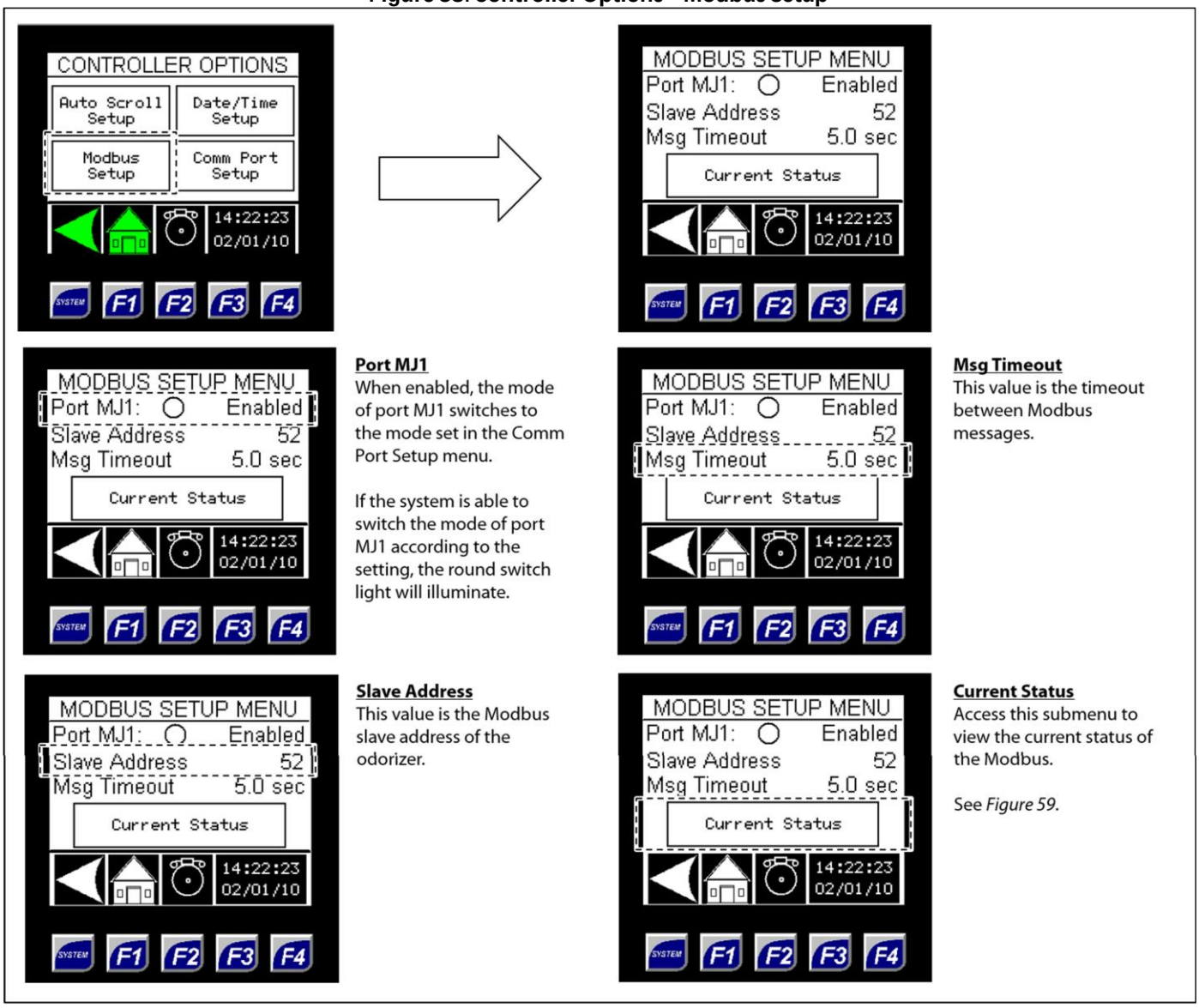
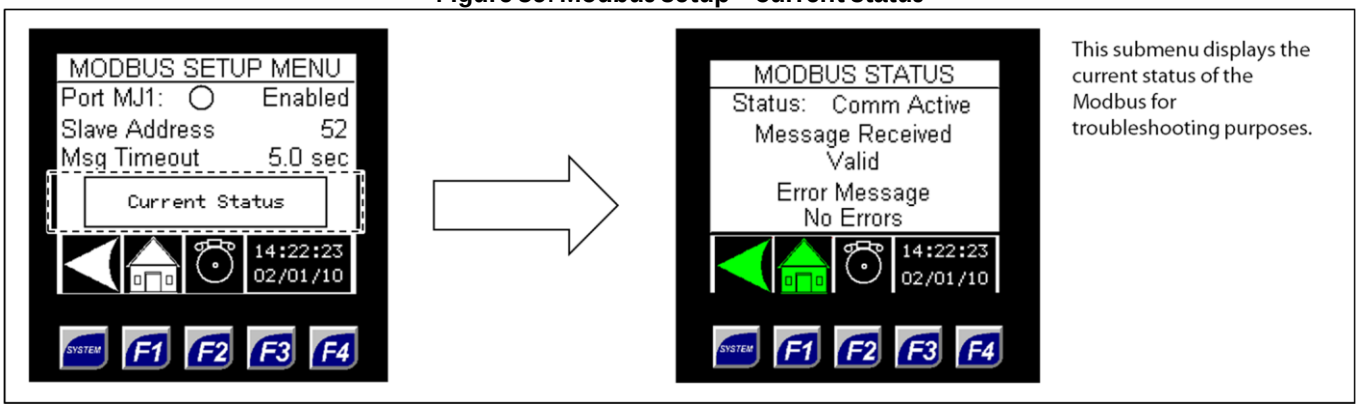
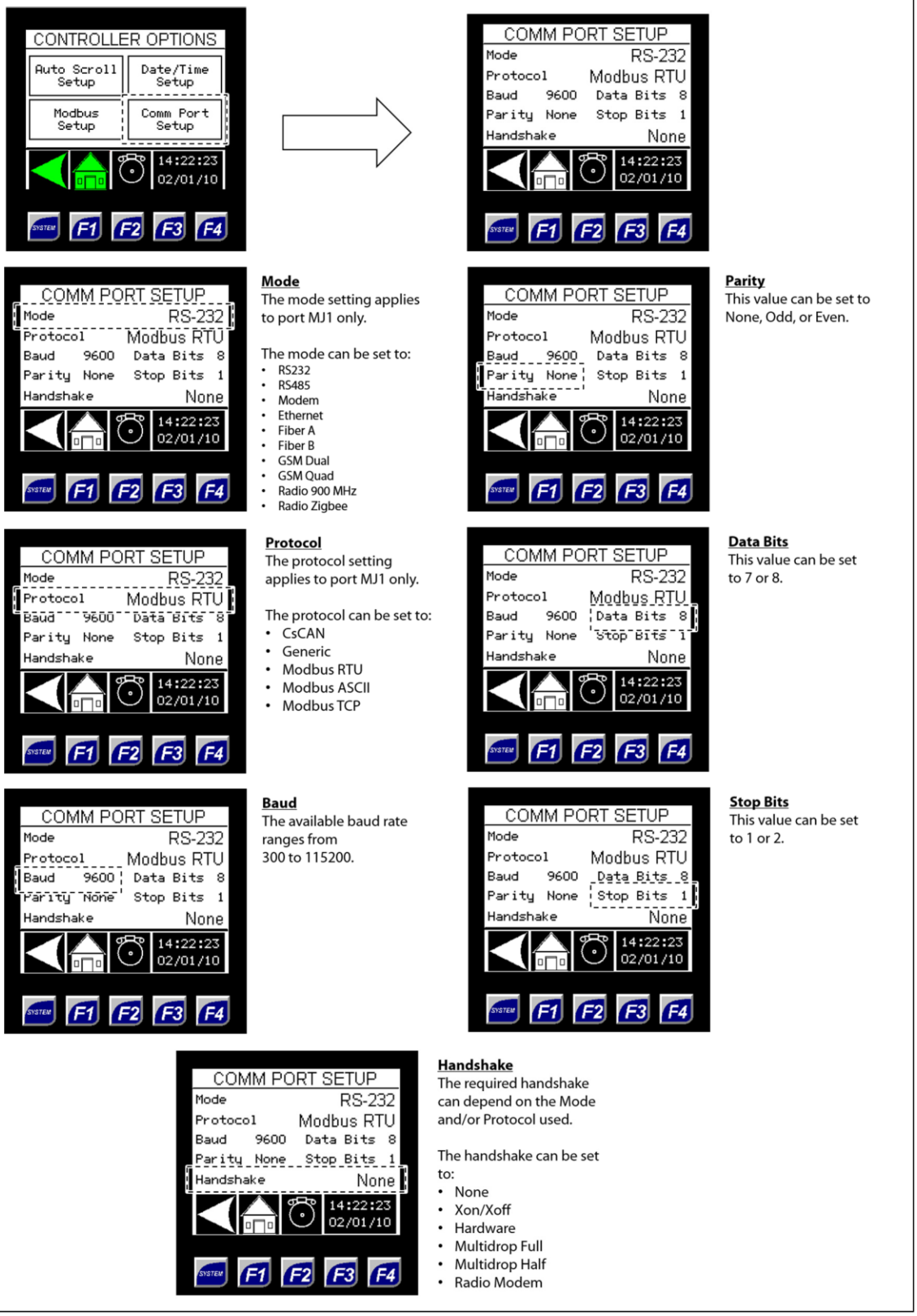


Figure 59: Modbus Setup – Current Status



Modbus Setup can also be accessed through Gas Flow Signal submenus (*Figure 49*).

Figure 60: Controller Options – Comm Port Setup



Comm Port Setup can also be accessed through Gas Flow Signal submenus (*Figure 52*).

Local Data Logging

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

Figure 61: System Setup – Local Data Logging Submenus

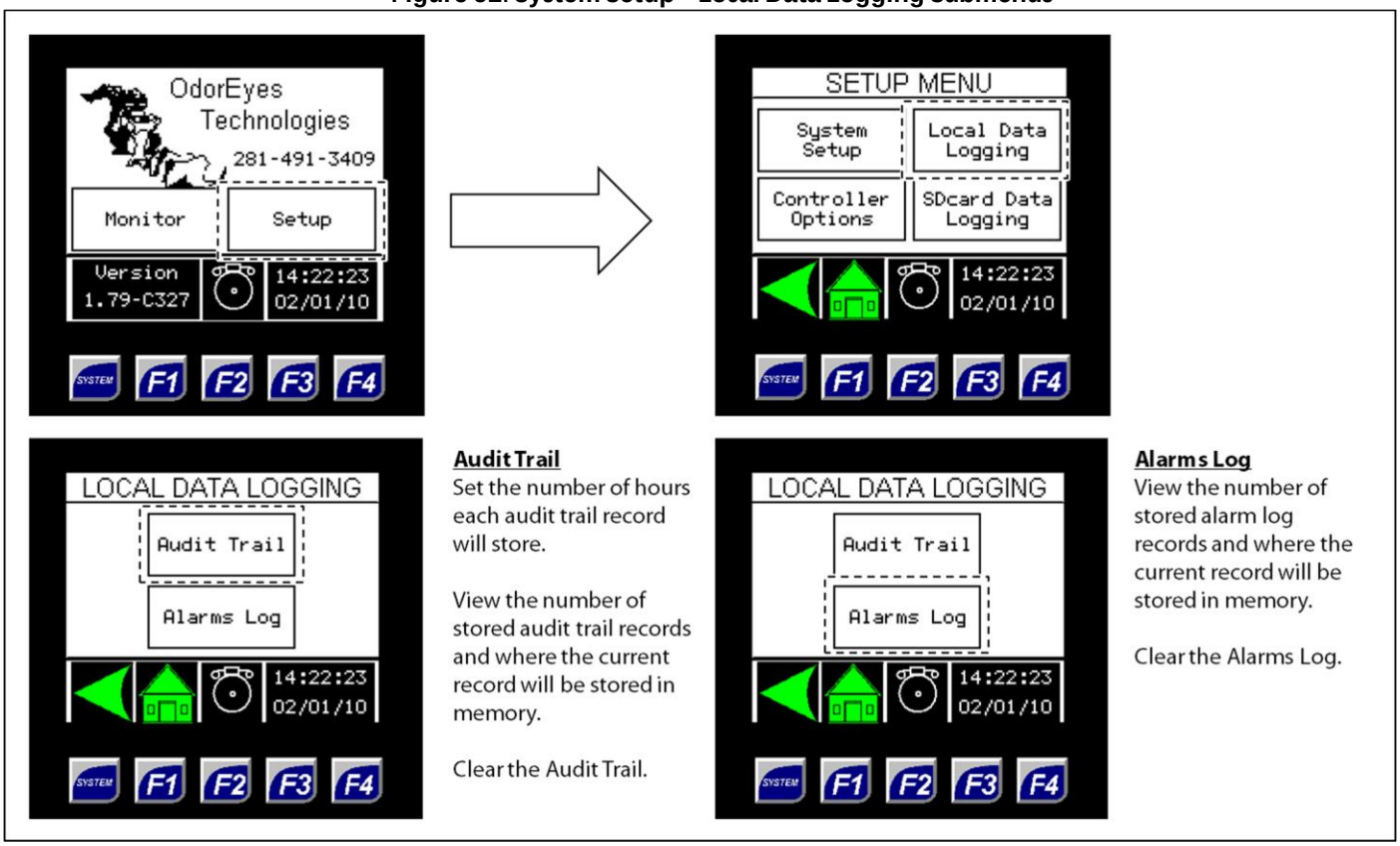
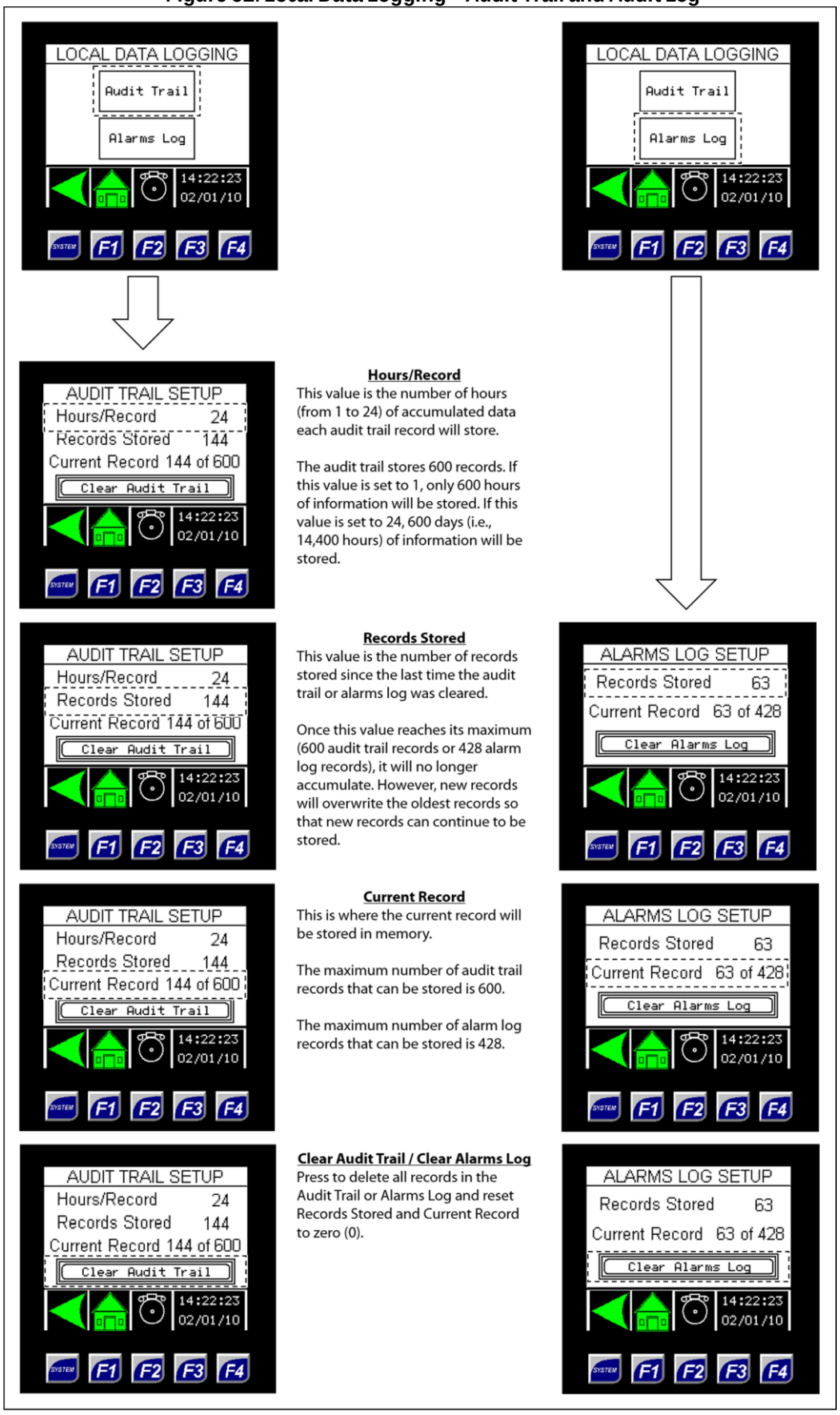


Figure 62: Local Data Logging – Audit Trail and Audit Log



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.

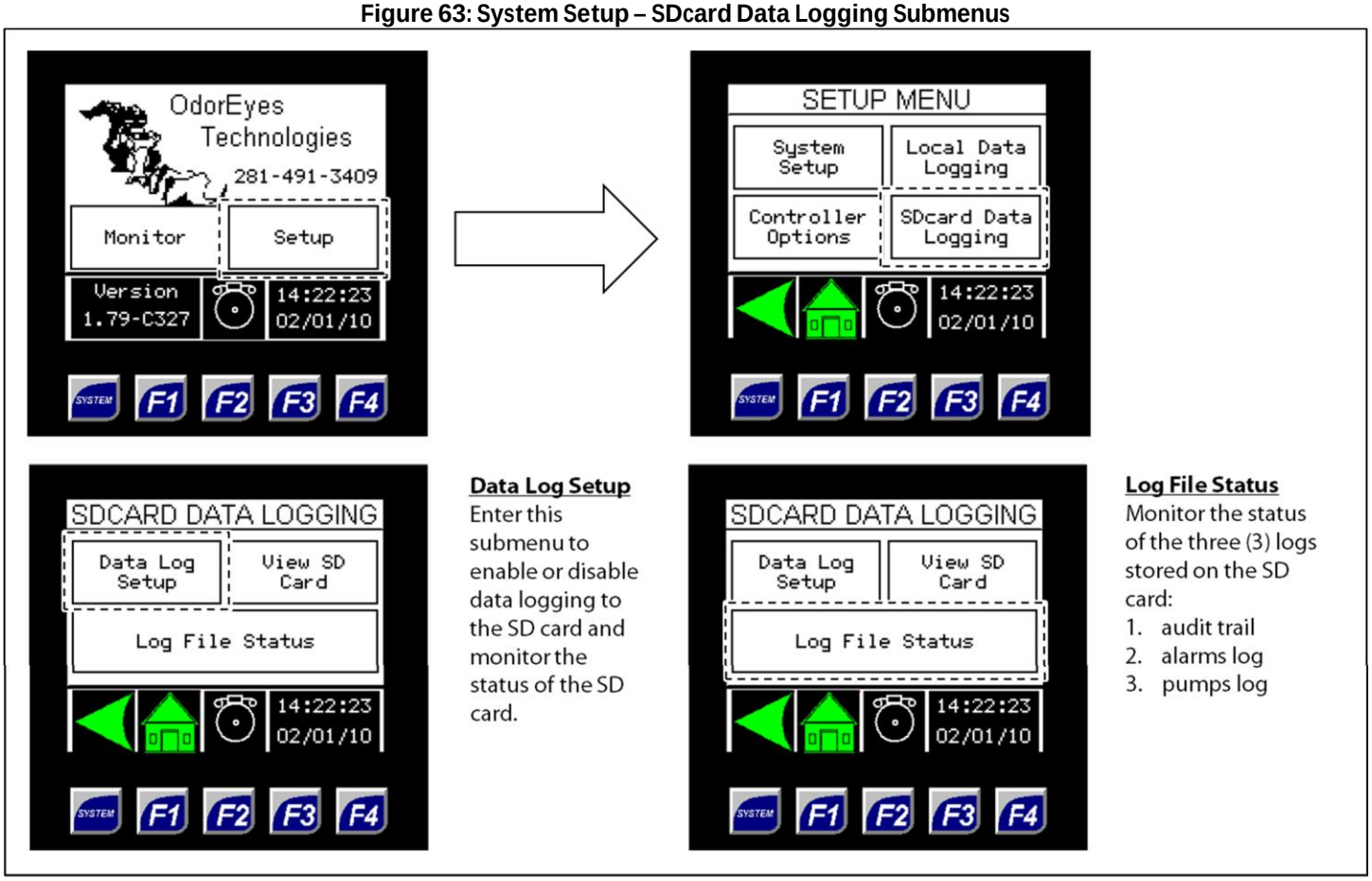
Clear Audit Trail / Clear Alarms Log
Press to delete all records in the Audit Trail or Alarms Log and reset Records Stored and Current Record to zero (0).

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.

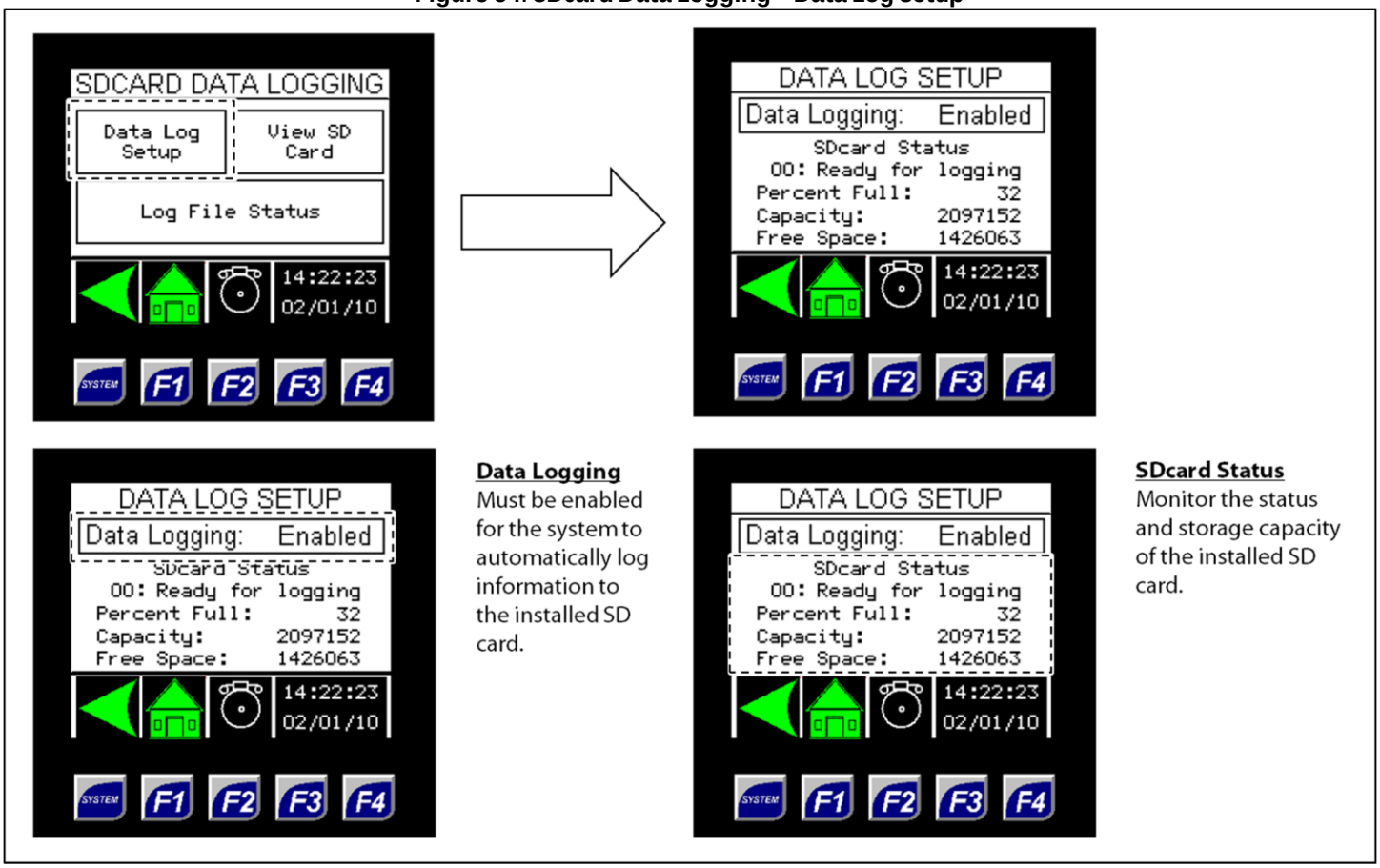
Figure 63: System Setup – SDcard Data Logging Submenus



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 64*).

Figure 64: 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 65: 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 Accu/Line™.**
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. To perform maintenance on a single injection pump system, continue to step 3. To perform maintenance on a dual injection pump system, proceed to step 4.

Single Injection Pump System

3. 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.
    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*.

Dual Injection Pump System

Primary Injection Pump

4. Prior to performing maintenance on the primary injection pump, the pump operation must be changed in the controller. From the Setup Menu, select System Setup (*Figure 34*). From the System Setup Menu, select Odorant Pump Setup (*Figure 36*). From the Odorant Pump Menu, select Change Pump Operation (*Figure 38*). Set Pump 1 to "None" and Pump 2 to "Primary."
5. Once the primary injection pump has been set to "None," the primary injection pump can be removed from the pump cabinet for maintenance. Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the Welker® OdorEyes BIP Injection Pump or for the Welker® SSO-9 Sample/Injection Pump for maintenance instructions.
6. After maintenance has been performed on the primary injection pump, reinstall the pump to the pump cabinet.
7. To return to normal operation, the pump operation must be changed in the controller. From the Setup Menu, select System Setup (*Figure 34*). From the System Setup Menu, select Odorant Pump Setup (*Figure 36*). From the Odorant Pump Menu, select Change Pump Operation (*Figure 38*). Set Pump 1 to "Primary" and Pump 2 to "Backup," or set Pump 1 to "Backup" and Pump 2 to "Primary."
8. To perform maintenance on the backup injection pump, continue to step 9. To perform maintenance on other system components, proceed to step 13. If no other components require maintenance, maintenance is now complete.

Backup Injection Pump

9. Prior to performing maintenance on the backup injection pump, the pump operation must be changed in the controller. From the Setup Menu, select System Setup (*Figure 34*). From the System Setup Menu, select Odorant Pump Setup (*Figure 36*). From the Odorant Pump Menu, select Change Pump Operation (*Figure 38*). Set Pump 1 to "Primary" and Pump 2 to "None."
10. Once the backup injection pump has been set to "None," the backup injection pump can be removed from the pump cabinet for maintenance. Refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the BIP or for the Welker® SSO-9 for maintenance instructions.
11. After maintenance has been performed on the backup injection pump, reinstall the pump to the pump cabinet. To return to normal operation, the pump operation must be changed in the controller. From the Setup Menu, select System Setup (*Figure 34*). From the System Setup Menu, select Odorant Pump Setup (*Figure 36*). From the Odorant Pump Menu, select Change Pump Operation (*Figure 38*). Set Pump 1 to "Primary" and Pump 2 to "Backup," or set Pump 1 to "Backup" and Pump 2 to "Primary."
12. To perform maintenance on other system components, continue to step 13. If no other components require maintenance, maintenance is now complete.

System Components

13. 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.
    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-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-058: Welker® SSO-9 Sample/Injection Pump
- IOM-105: Welker® NV-1 and NV-2 Instrument Valves
- IOM-169: Welker® F-5 Filter Dryer
- IOM-180: Welker® OdorEyes AEF-1 Atmospheric Exhaust Filter
- IOM-182: Welker® CV-K Check Valve
- IOM-187: Welker® OdorEyes SFA Sight Flow Assembly
- IOM-203: Welker® SP-DP Diffusing Probe
- IOM-213: Welker® F-9 and F-10 Filters

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

- Cellex Manufacturing, Inc. ESE 150 and ESE 200 Constant Watt Heaters (Welker® IOM-V252)
- 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)
- 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)
- Max Machinery, Inc. 286-300 Series Transmitters (Welker® IOM-V220)
- Max Machinery, Inc. High Resolution, Linearized Frequency Transmitters Models 269, 294 and 295 (Welker® IOM-V221)
- Max Machinery, Inc. Positive Displacement Flowmeters Models P001, P002, 213, 214, and 215 (Welker® IOM-V106)
- Morgan Products Inc. Model TR2 Air Actuated Timer (Welker® IOM-V219)
- MTS Systems Corporation Level Plus® Liquid-Level Sensors With Temposonics® Technology M-Series Model MR Analog Transmitter (Welker® IOM-V036)
- Parker Hannifin Corporation Ball and Plug Valves (Welker® IOM-V213)
- Parker Hannifin Corporation 3-Way Solenoid Valves Types 71313, 71315, 71335, 71385, 71395, 7131V, and 7133V (Welker® IOM-V016)
- Power-Sonic Corporation PS-1270 12 Volt 7.0 AH Rechargeable Sealed Lead Acid Battery (Welker® IOM-V223)
- Solutions With Innovation L505 Visual Level Indicator Dip-Tape Visual Level Indicator (Welker® IOM-V037)
- Swagelok Company Bleed Valves and Purge Valves (Welker® IOM-V208)
- 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)
- Versa Products Company, Inc. C Series Solenoid Valves (Welker® IOM-V041)
- 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: OE160VS (Dual BIP Injection Pump Valve Section)
- System Drawing: OE161VS (Dual BIP Injection Pump Valve Section With Pneumatic Timer)
- System Drawing: OE162VS.124 (Dual BIP Injection Pump Valve Section With Blanket Pressure Regulator)
- System Drawing: OE162VS.624 (Dual SSO-9 Injection Pump Valve Section With Blanket Pressure Regulator)
- System Drawing: OE163VS (Dual BIP Injection Pump Valve Section With Heater)
- System Drawing: OE163VS.624 (Dual SSO-9 Injection Pump Valve Section With Blanket Pressure Regulator and Heater)
- System Drawing: OE164VS (Dual BIP Injection Pump Valve Section With Pneumatic Timer, Blanket Pressure Regulator, and Heater)
- System Drawing: OE165VS (Dual BIP Injection Pump Valve Section With Pneumatic Timer and Blanket Pressure Regulator)
- System Drawing: OE166VS.124 (Dual BIP Injection Pump Valve Section With Pneumatic Timer and Purge System but Without Flow Meter)
- System Drawing: OE170VS.224 (Single BIP Injection Pump Valve Section With Purge System)
- System Drawing: OE172VS.124 (Single BIP Injection Pump Valve Section With Blanket Pressure Regulator)
- System Drawing: OE173VS.624 (Single SSO-9 Injection Pump Valve Section With Blanket Pressure Regulator and Heater)

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: Accu/Line™ Maintenance Schedule

Action	Weekly	Every 12 Months	As Necessary
If applicable, confirm proper functioning of the heater.	X		
Open F-5 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(s) 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 SSO-9(s) using a Welker® repair kit. • Replace the O-rings, back ups, U-cups, seal, and retaining ring. • Examine the cylinders for scratches and pits.		X	
Rebuild the F-5 using a Welker® repair kit. • Replace the O-rings and filter cartridge.		X	
View the controller's current alarms.			X
Inspect the injection pump(s), tubing, valves, and fittings on the system for leaks.			X
Open F-9 drain valve U to allow moisture to drain from the filter.			X
Rebuild the F-9 using a Welker® repair kit. • Replace the O-rings and filter element.			X
Rebuild the RV-1(s) 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 regulator(s).			X
Maintain the solenoid(s).			X
If applicable, maintain the atmospheric exhaust filter.			X
If applicable, maintain the pneumatic timer.			X

NOTES

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