WELKER

INSTALLATION, OPERATION, AND MAINTENANCE MANUAL
WELKER ESSENTIALS™ INJECTION ODORIZER
WITH X2 CONTROLLER

OdorEyes by WELKER

DRAWING NUMBERS
PSYS0063
PSYS0068

MANUAL NUMBER
IOM-218

REVISION
Rev. 0, 02/18/2020

TABLE OF CONTENTS

IMPORTANT SAFETY INFORMATION
READ ALL INSTRUCTIONS

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

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

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

This manual is intended to be used as a basic installation and operation guide for the Welker OdorEyes Essentials™ Injection Odorizer With X2 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 Essentials™ Injection Odorizer is of a mechanical and electrical nature.

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

If you received a damaged Essentials™ Injection Odorizer, please contact a Welker representative immediately.

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

SECTION 1: PRODUCT INFORMATION

1.1 Introduction

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

If you have any questions, please call Welker at 1-281-491-2331.

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

1.2 Product Description

The Welker OdorEyes *Essentials™ Injection Odorizer With X2 Controller* is a low-cost odorant injection system designed to inject liquid odorant proportional to flow into a natural gas pipeline.

The skid-mounted Essentials™ Injection Odorizer is comprised of a controller with LCD display, Welker SSO-9MED Injection Pump, and an odorant supply tank. When the controller receives the customer-supplied signal, the solenoid is energized, actuating the SSO-9MED to collect a set volume of liquid odorant from the odorant supply tank; when the solenoid is de-energized, the SSO-9MED injects the collected liquid odorant into the pipeline.

If desired, the odorant supply tank can be supplied with a 110% containment pan sloped to the drain port for easy draining. For Essentials™ Injection Odorizers used in remote locations, a solar panel with battery can be added to limit interruptions to operation.

Welker may custom design the Essentials™ Injection Odorizer With X2 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: Essentials ™ Injection Odorizer Specifications	
Application	Liquid Odorant Injection
Materials of Construction	316/316L Stainless Steel and Painted Carbon Steel
Maximum Allowable Operating Pressure	**Actuation:** 115 psig @ -20 °F to 104 °F (*7 barg @ -28 °C to 40 °C*) **Odorant Injection:** 1480 psig @ -4 °F to 120 °F (*102 barg @ -20 °C to 48 °C*) **Odorant Tank:** 200 psig @ -4 °F to 120 °F (*13 barg @ -20 °C to 48 °C*)
Connections	**Blanket Pressure Inlet:** ¼" FNPT **Drain Port:** ½" FNPT **Fill Inlet:** ¼" FNPT or ¾" FNPT **Odorant Outlet:** ¼" FNPT **Instrument Air Supply Inlet:** ¼" Tubing **Vent Outlet:** ¼" FNPT
Utility Requirements	**Instrument Air Supply:** To Actuate Solenoid **Instrument Air Supply:** Blanket Pressure
Electrical Connection	DC 24 V, ½" FNPT
Volume	**Injection Volume:** 0.25–7.50 cc **Odorant Tank:** 10 or 30 US Gallons
Operation	**SSO-9MED:** Piston-Operated
Features	4-Way Solenoid Controller With LCD Display Odorant Tank Level Gauge Welker SSO-9MED Injection Pump
Options	Containment Pan Solar Panel With Battery and Controller Box

1.5 Equipment Diagrams

Figure 1: Essentials™ Injection Odorizer Schematic, 10-Gallon Odorant Supply Tank

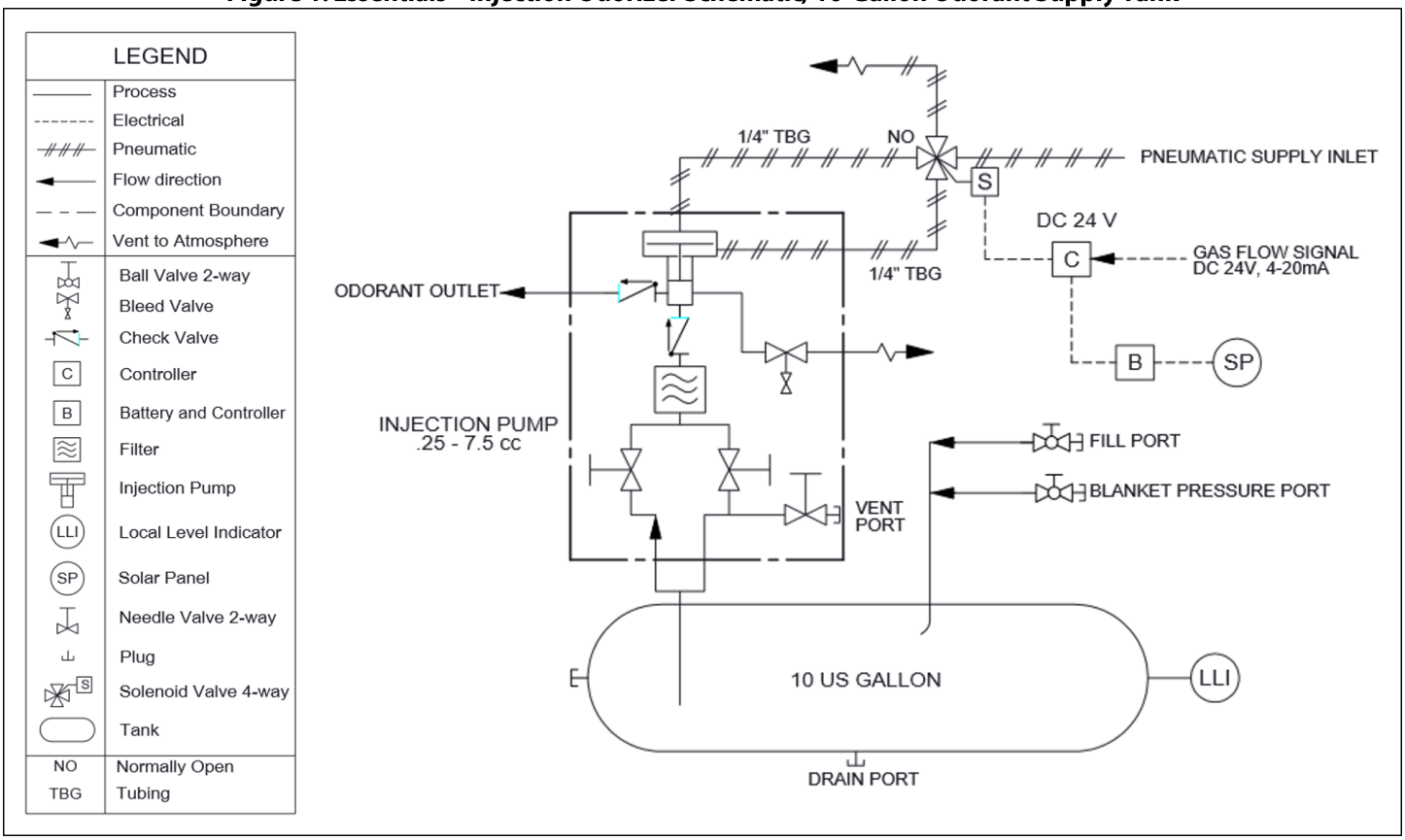


Figure 2: Essentials™ Injection Odorizer Schematic, 30-Gallon Odorant Supply Tank

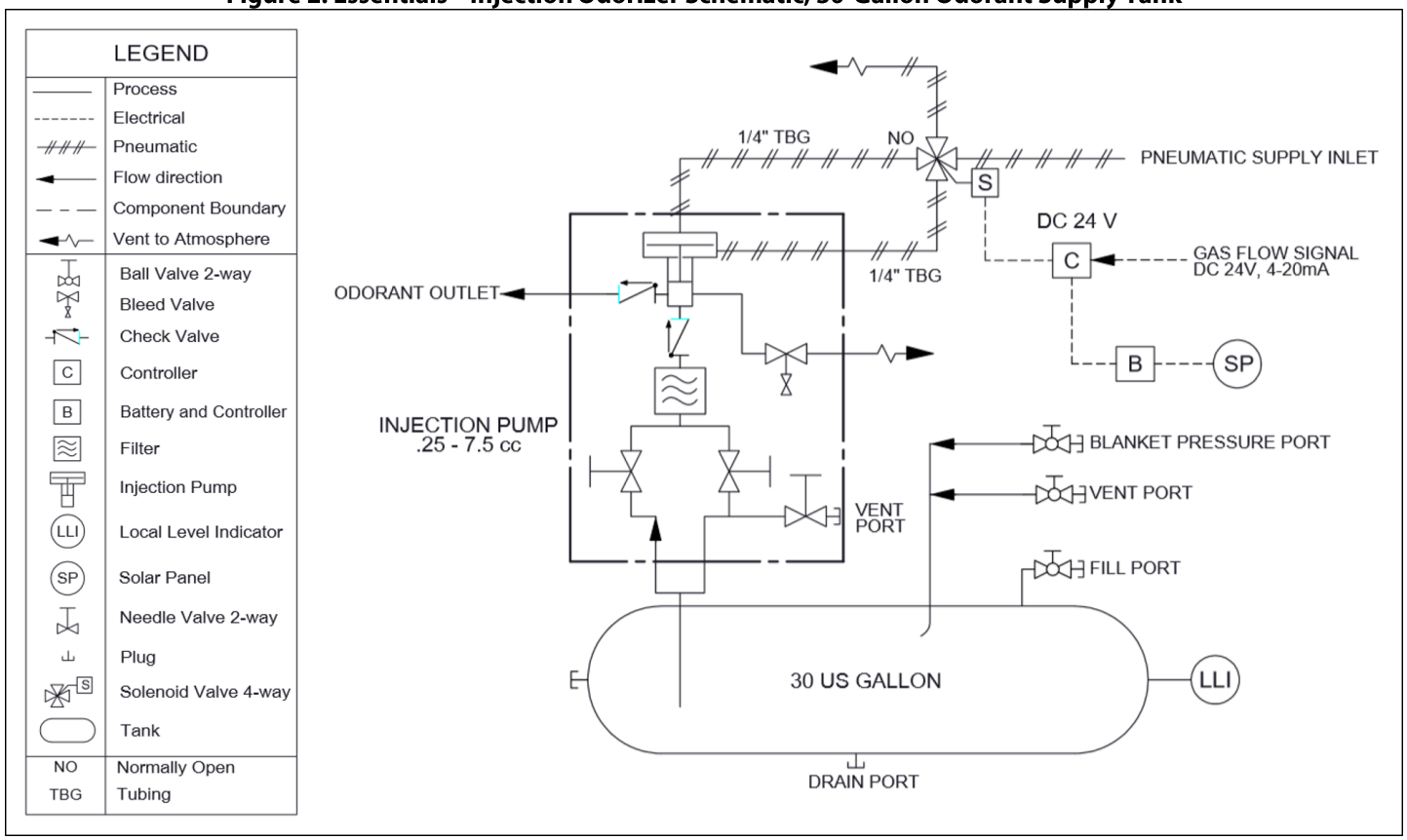


Figure 3: Essentials™ Injection Odorizer Connections Diagram, 10-Gallon Odorant Supply Tank

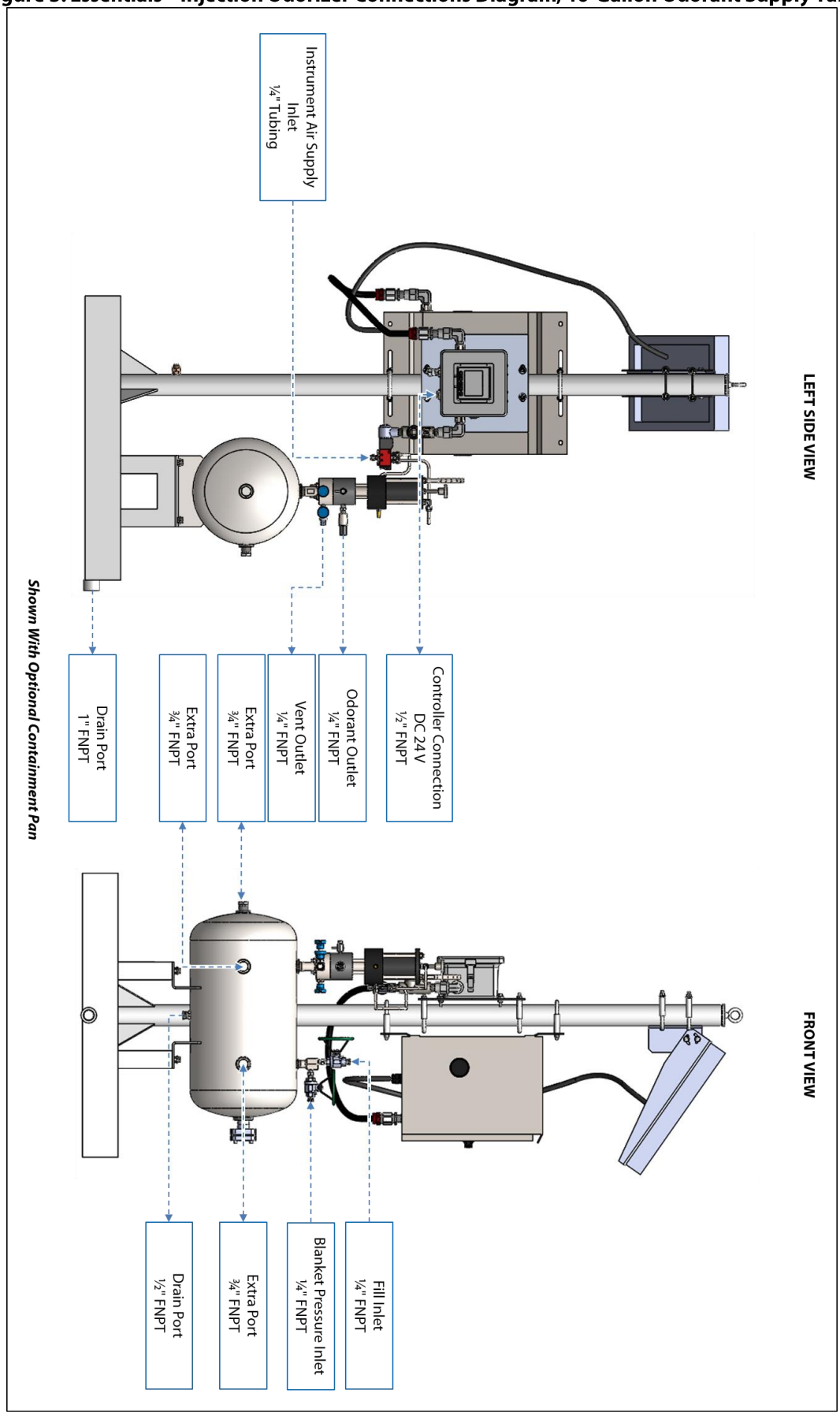


Figure 4: Essentials™ Injection Odorizer Connections Diagram, 30-Gallon Odorant Supply Tank

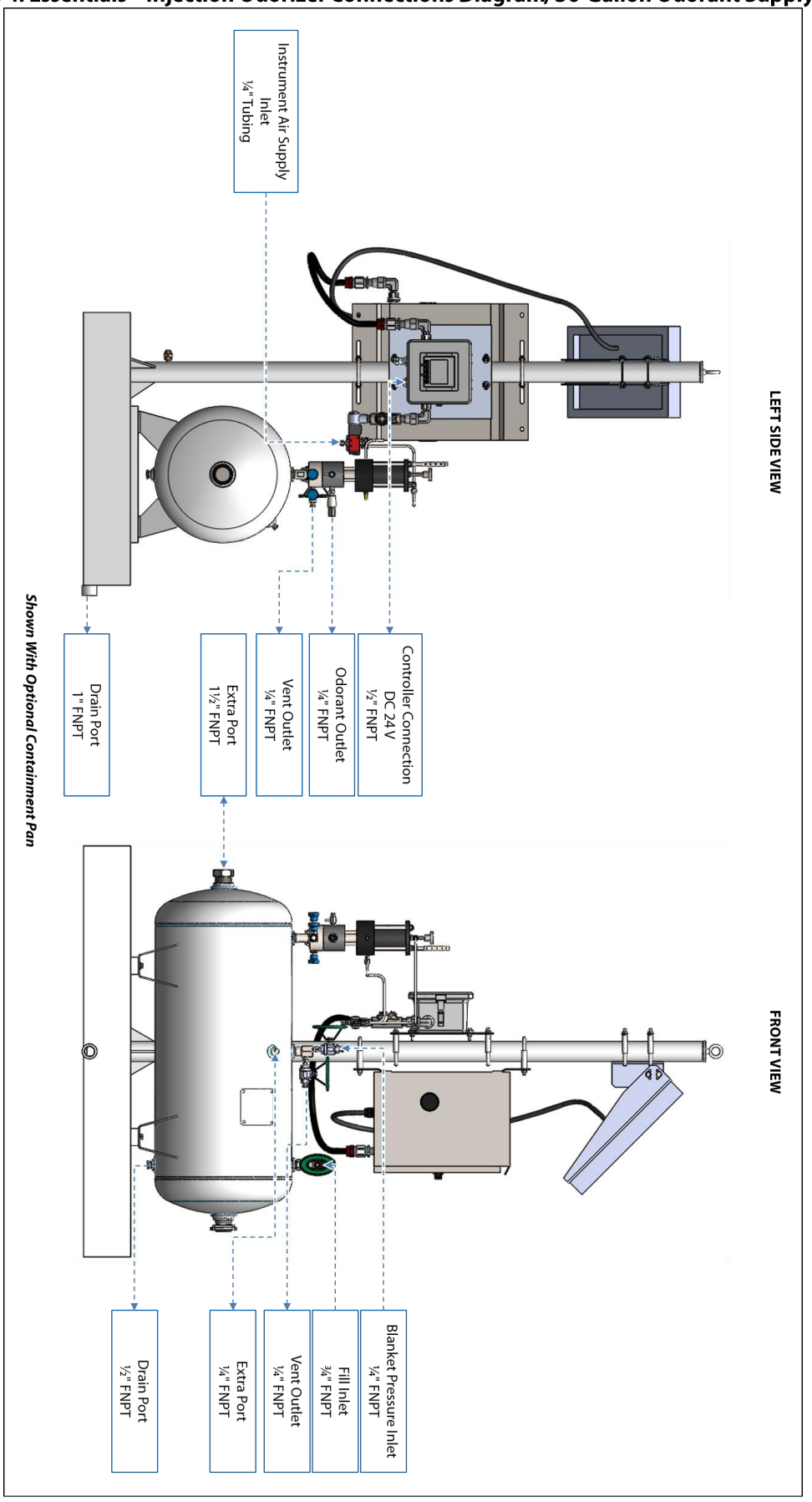
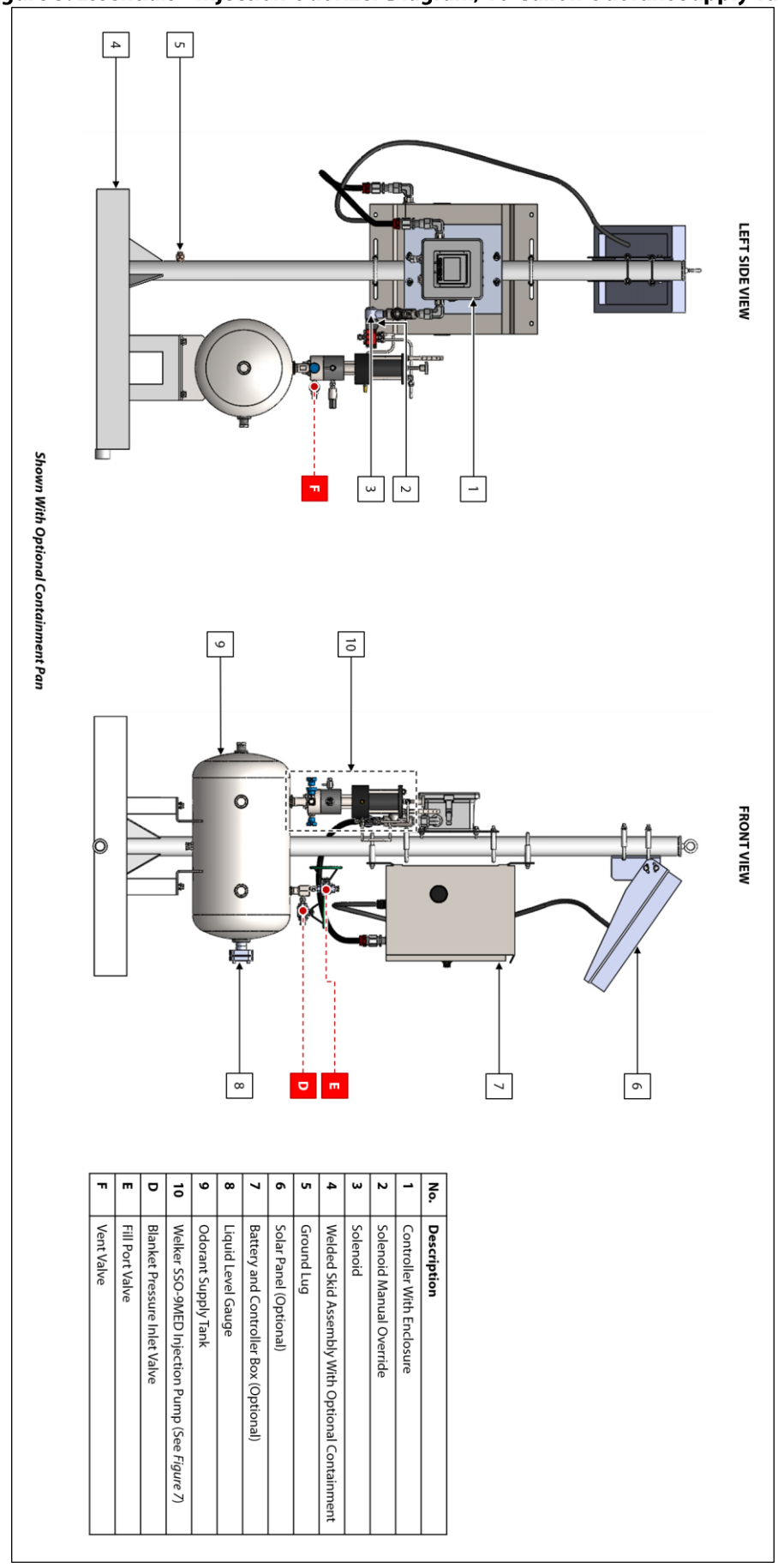
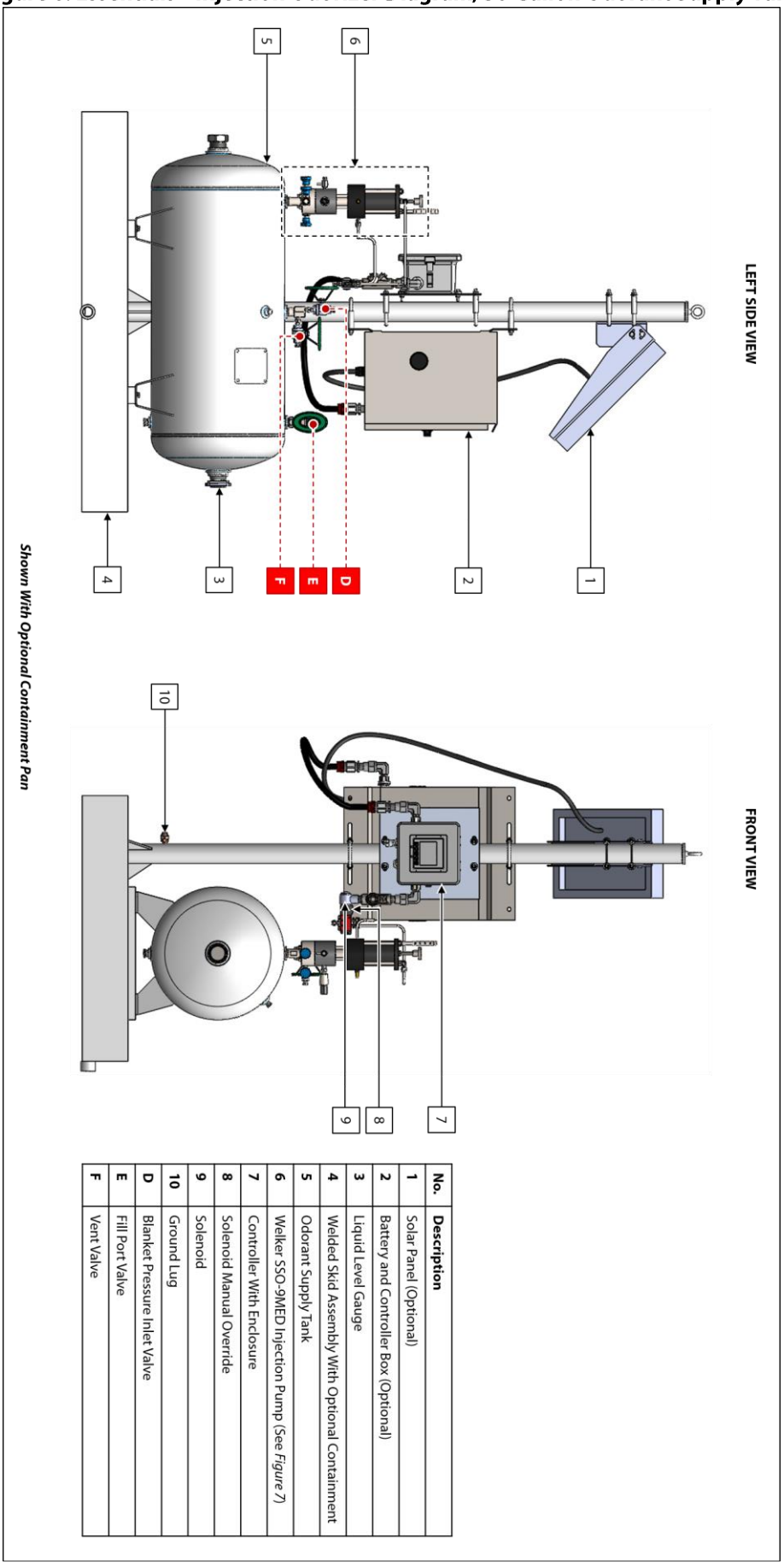


Figure 5: Essentials™ Injection Odorizer Diagram, 10-Gallon Odorant Supply Tank



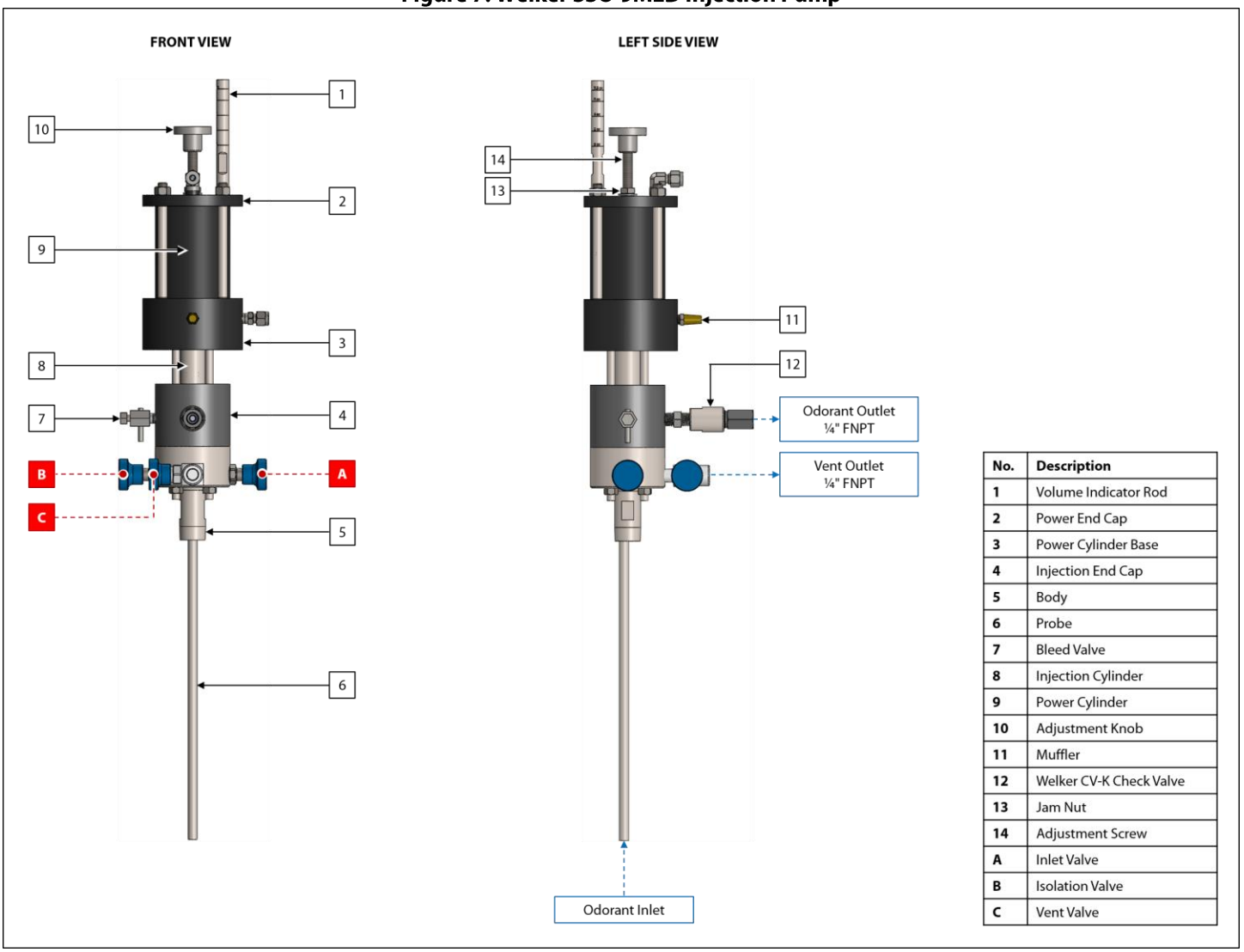
No.	Description
1	Controller With Enclosure
2	Solenoid Manual Override
3	Solenoid
4	Welded Skid Assembly With Optional Containment
5	Ground Lug
6	Solar Panel (Optional)
7	Battery and Controller Box (Optional)
8	Liquid Level Gauge
9	Odorant Supply Tank
10	Welker SSO-9MED Injection Pump (See *Figure 7*)
D	Blanket Pressure Inlet Valve
E	Fill Port Valve
F	Vent Valve

Figure 6: Essentials™ Injection Odorizer Diagram, 30-Gallon Odorant Supply Tank



No.	Description
1	Solar Panel (Optional)
2	Battery and Controller Box (Optional)
3	Liquid Level Gauge
4	Welded Skid Assembly With Optional Containment
5	Odorant Supply Tank
6	Welker SSO-9MED Injection Pump (See *Figure 7*)
7	Controller With Enclosure
8	Solenoid Manual Override
9	Solenoid
10	Ground Lug
D	Blanket Pressure Inlet Valve
E	Fill Port Valve
F	Vent Valve

Figure 7: Welker SSO-9MED Injection Pump



No.	Description
1	Volume Indicator Rod
2	Power End Cap
3	Power Cylinder Base
4	Injection End Cap
5	Body
6	Probe
7	Bleed Valve
8	Injection Cylinder
9	Power Cylinder
10	Adjustment Knob
11	Muffler
12	Welker CV-K Check Valve
13	Jam Nut
14	Adjustment Screw
A	Inlet Valve
B	Isolation Valve
C	Vent Valve

SECTION 2: INSTALLATION & OPERATION

2.1 Before You Begin

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

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

The Essentials™ Injection Odorizer 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.

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

2.2 Installation

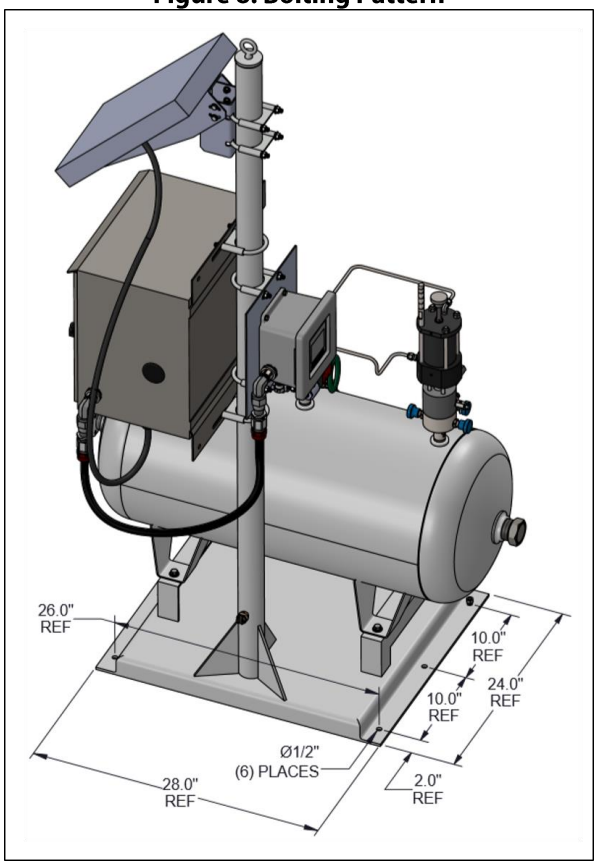
Pipeline Injection Point

1. If the Essentials™ Injection Odorizer 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 Essentials™ Injection Odorizer 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 in accordance with the bolting pattern to a flat, level surface, such as a concrete slab (*Figure 8*).

Figure 8: Bolting Pattern



4. Connect a grounding wire to the ground lug to safely ground the system (*Figure 5* and *Figure 6*).
5. If the Essentials™ Injection Odorizer is equipped with the optional solar panel, install the solar panel to the top of the center post.

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

6. If the Essentials™ Injection Odorizer is equipped with the optional solar panel, install the battery to the battery and controller box, and then connect the solar panel to the battery (*Figure 5* and *Figure 6*).

System Connections

7. Using ¼" customer-supplied tubing, connect from the odorant outlet on the Welker SSO-9MED Injection Pump to the injection point (e.g., the inlet of the SFA or SP-DP) (*Figure 3* and *Figure 4*).
8. Using ¼" customer-supplied tubing, connect a customer-supplied instrument air supply to the solenoid (*Figure 3* and *Figure 4*).
9. Using ¼" customer-supplied tubing, connect a customer-supplied regulated instrument air supply to the blanket pressure inlet (*Figure 3* and *Figure 4*).

A minimum blanket pressure of 25 psig (*1.7 barg*) is required. Do not exceed the maximum allowable operating pressure of the odorant supply tank.

Welker recommends a gauge be installed to monitor the pressure of the odorant supply tank.

10. If desired, use ¼" customer-supplied tubing to tube away from the vent outlet on the SSO-9MED and the odorant supply tank, if applicable, to an area away from personnel and equipment (*Figure 3* and *Figure 4*).

If the vent outlet tubing will terminate outdoors, Welker recommends installing a screen or muffler to prevent dust and insects from entering the tube and restricting flow.

11. If desired, install a valve to the drain port on the odorant supply tank (*Figure 3* and *Figure 4*).
12. Ensure that all valves on the system are closed.
13. Ensure that all fittings, connections, and bolts are tightened.

Electrical Connections

Turn OFF the electrical supply prior to making electrical connections.

14. Connect a DC 24 V electrical supply to the controller (*Figure 3* and *Figure 4*). Refer to the industry standards for appropriate electrical connections to interface with the controller.

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

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

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

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.

Venting the SSO-9MED

3. Slowly open vent valve C to purge the SSO-9MED body and odorant supply tank of any trapped air (*Figure 7*).
4. Once all air has been purged, close vent valve C.

> Welker recommends plugging vent valve C when not in use.

Blanket Pressure

5. Open blanket pressure inlet valve D (*Figure 5* and *Figure 6*).
6. Open the regulated external blanket pressure supply source.
7. Check the blanket pressure connections for leaks and repair as necessary.

Valve Configuration

8. Slowly open inlet valve A (*Figure 7*).
9. If the Essentials™ Injection Odorizer is connected to an SFA or an SP-DP at the pipeline, slowly open any valves between the odorant outlet on the SSO-9MED and the SFA or SP-DP.
10. Check for leaks and repair as necessary.

Purging the SSO-9MED

11. Using a wrench, slowly loosen the cap on the bleed valve to purge the injection chamber of any trapped air (*Figure 7*).

> Take the necessary precautions and wear appropriate personal protective equipment (PPE) to protect from potential harm caused by exposure to the injection chemical.

> If desired, a small hose may be connected to the bleed valve to collect any chemical that may appear at the purge outlet.

12. Once all air has been purged from the injection chamber, tighten the bleed valve cap.
13. As necessary, adjust the injection volume.

> Loosen the jam nut on the adjustment screw (*Figure 7*).
> To increase the injection volume, turn the adjustment knob counterclockwise (*Figure 7*).
> 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.

14. 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 Essentials™ Injection Odorizer to the pipeline.

Verifying Pump Operation

15. Pump operation can be verified by energizing the solenoid to actuate the SSO-9MED. To energize the solenoid, press and hold the manual override on the solenoid (*Figure 5* and *Figure 6*).
16. As the SSO-9MED strokes, verify liquid odorant is being injected into the pipeline.

> Welker recommends a minimum of ten (10) actuations to verify the sample volume.

> 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.

Controller Configuration

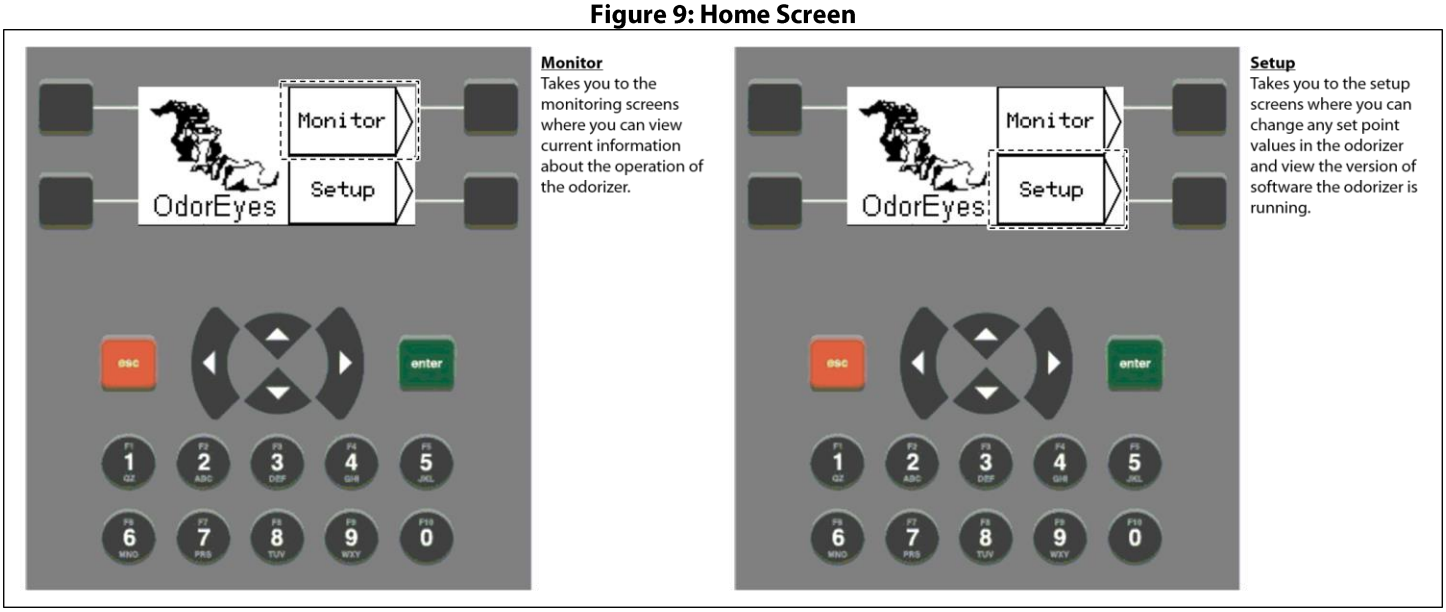
17. Verify that the customer set points have been correctly set by the manufacturer.
18. Once the collection and injection of liquid odorant have been confirmed, the Essentials™ Injection Odorizer is operational.

3.1 Understanding the Display

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

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

Figure 9: Home Screen

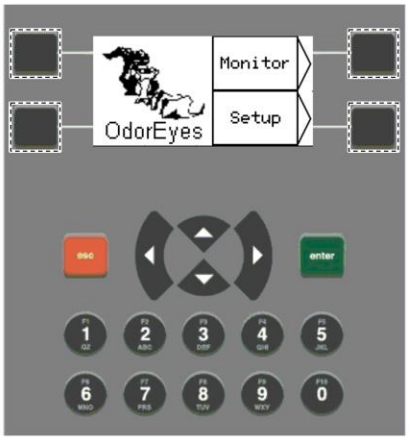


From the home screen, the user can access three (3) types of screens:

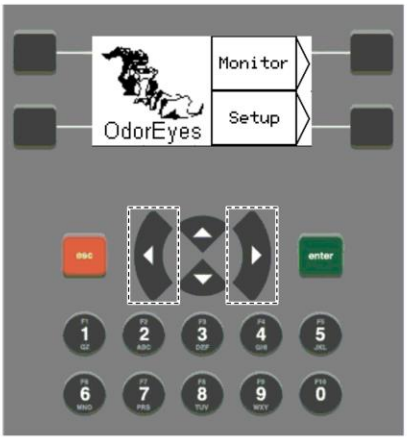
- **Menu** - from this type of screen, the user can access submenus.
- **Informational** - from this type of screen, the user can monitor the odorizer and view current operating conditions.
- **Setup** - from this type of screen, numeric and/or text values that affect the setup of the odorizer can be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

Navigating the Display

Figure 10: Controller Toolbar

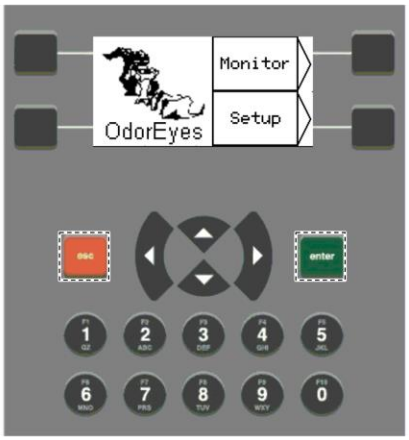


Soft Keys
Press to select the on-screen button directly next to the soft key.



Left Arrow
Press to scroll backward.

Right Arrow
Press to scroll forward.

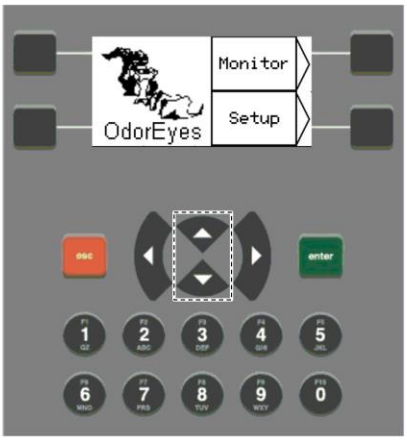


ESC
Takes you back one (1) level in the menu tree to the previous screen.

Press to discard unwanted changes.

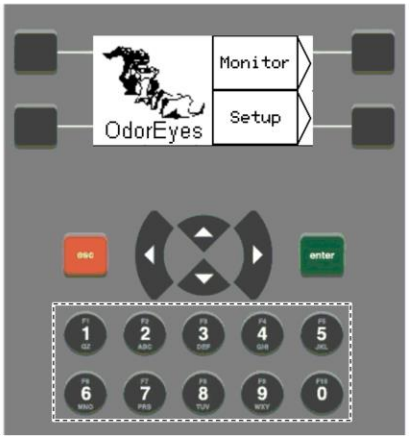
ENT
Press to select a value to edit.

Press to save changes made.



Up Arrow
Press to move up on the screen.

Down Arrow
Press to move down on the screen.



Keypad
Press to change numerical or alphabetical values in the odorizer.

Based on the field, the value will automatically switch between numbers and letters

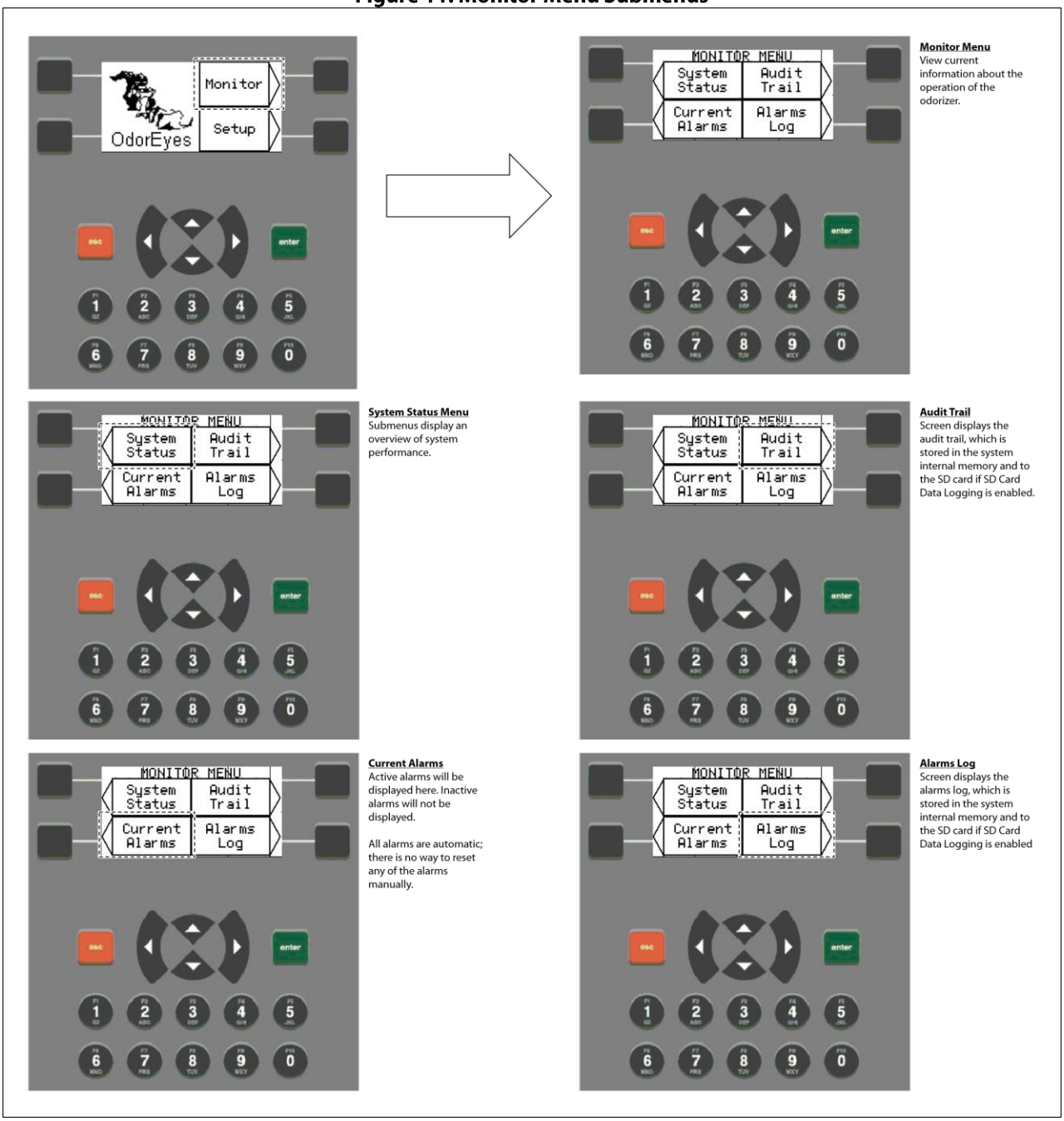
If no buttons or arrows are pressed for a certain amount of time, the sleep function will cause the backlight on the screen to turn off. To wake up the controller, press one of the buttons or arrows.

3.2 Navigating the Monitor Menus

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

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

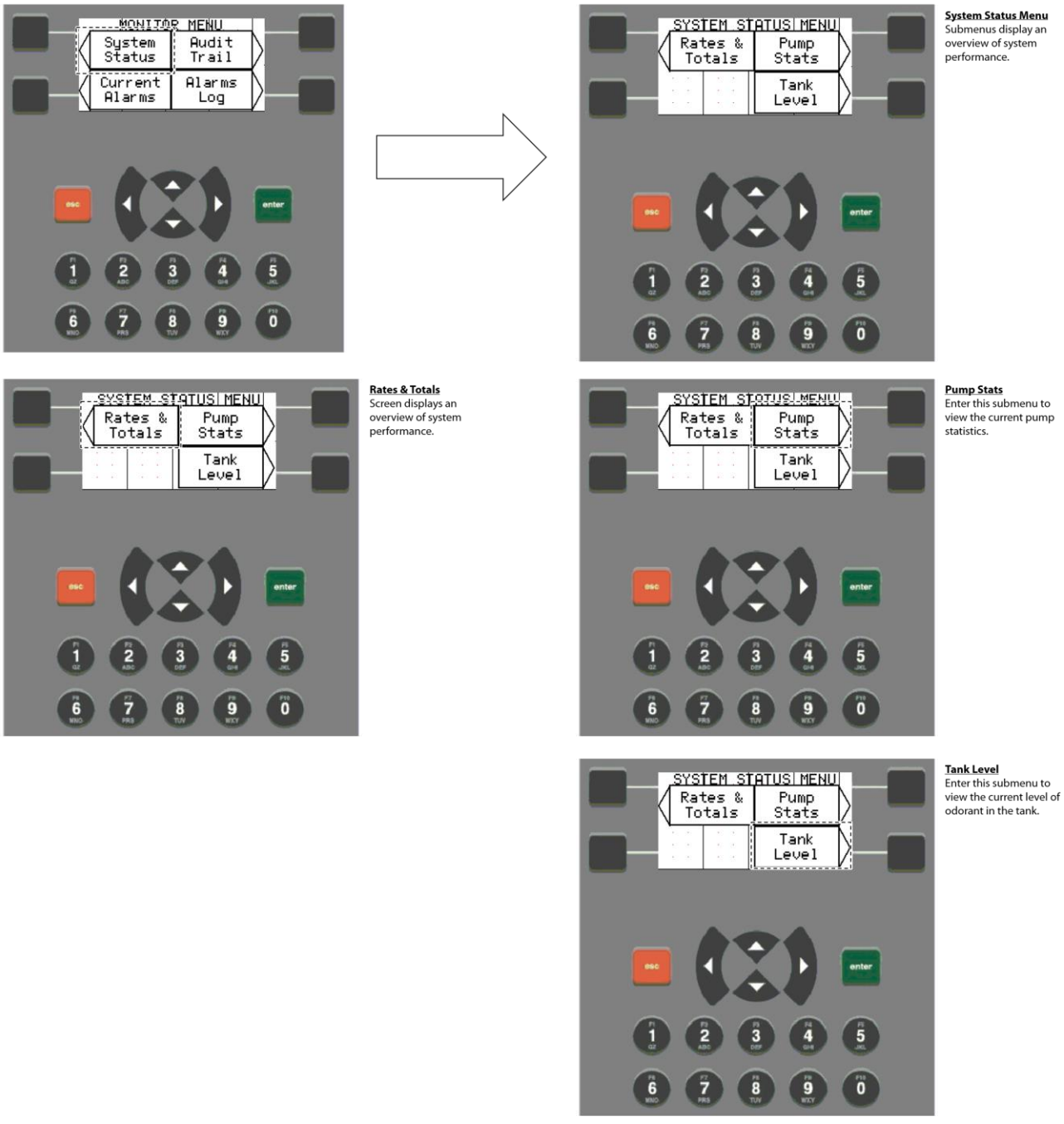
Figure 11: Monitor Menu Submenus



System Status

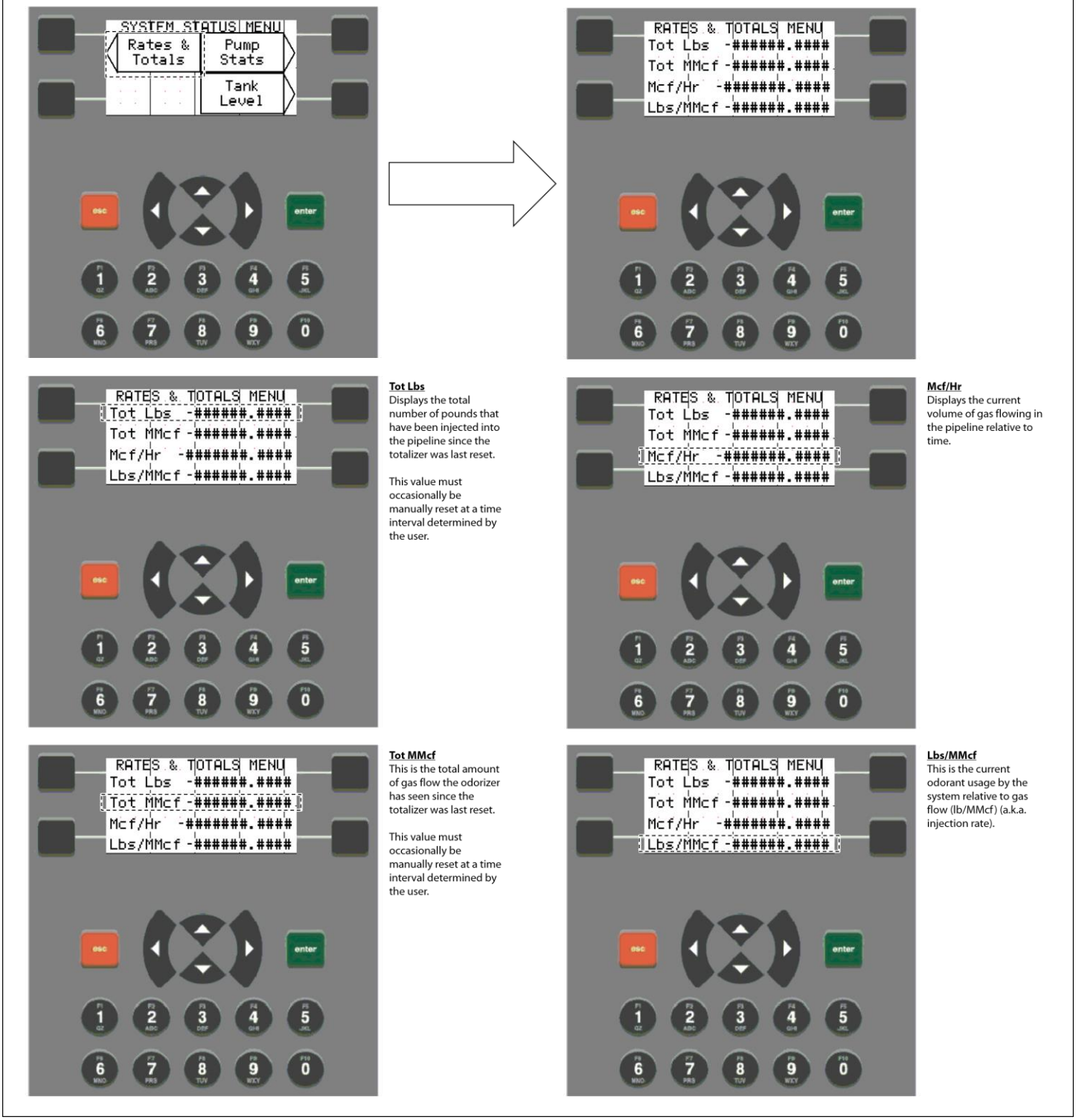
The System Status submenus provide the user with an overview of system performance.

Figure 12: System Status Submenus



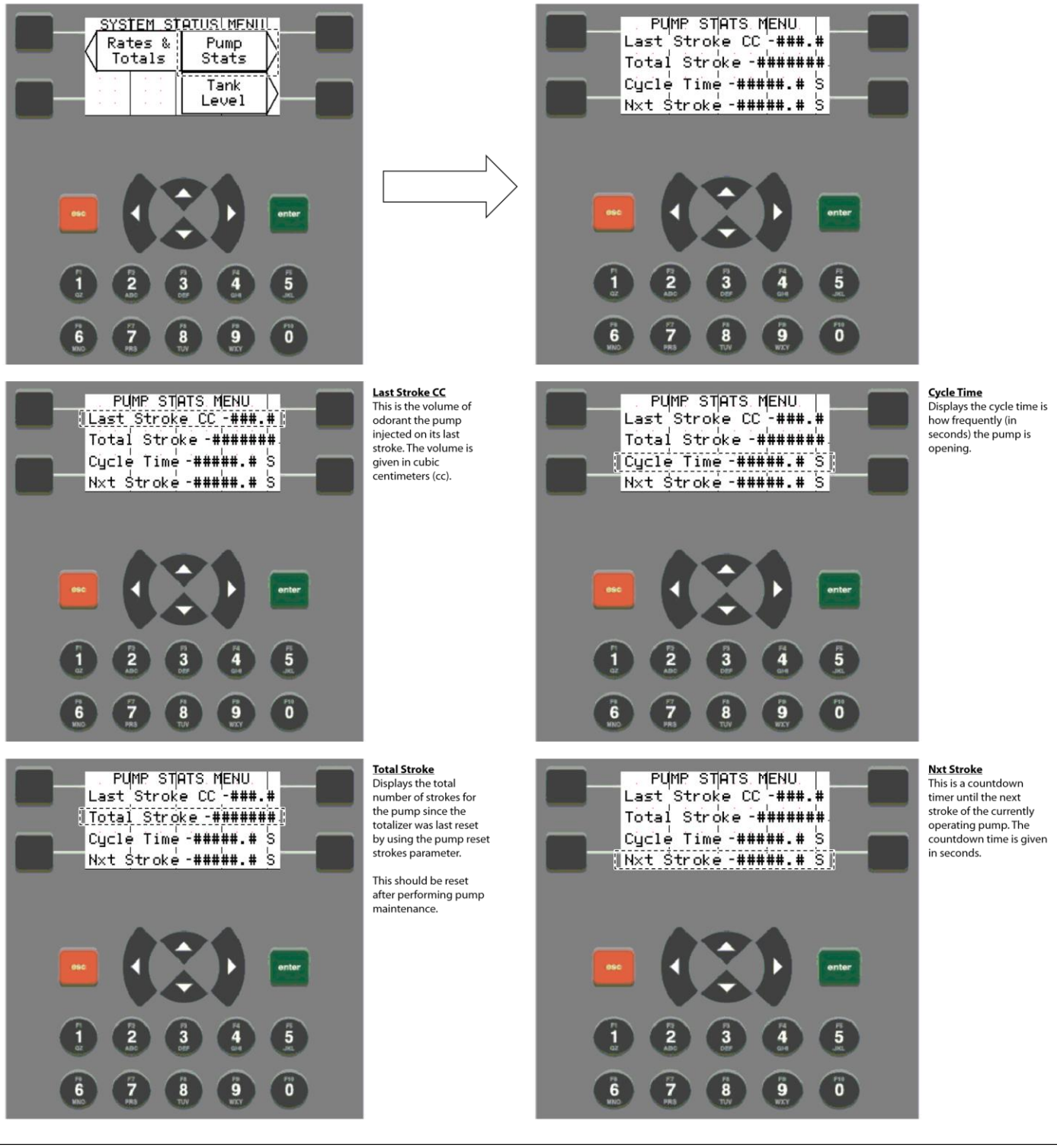
Rates & Totals

Figure 13: System Status – Rates & Totals



Pump Stats

Figure 14: System Status – Pump Stats



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

Cycle Time
Displays the cycle time is how frequently (in seconds) the pump is opening.

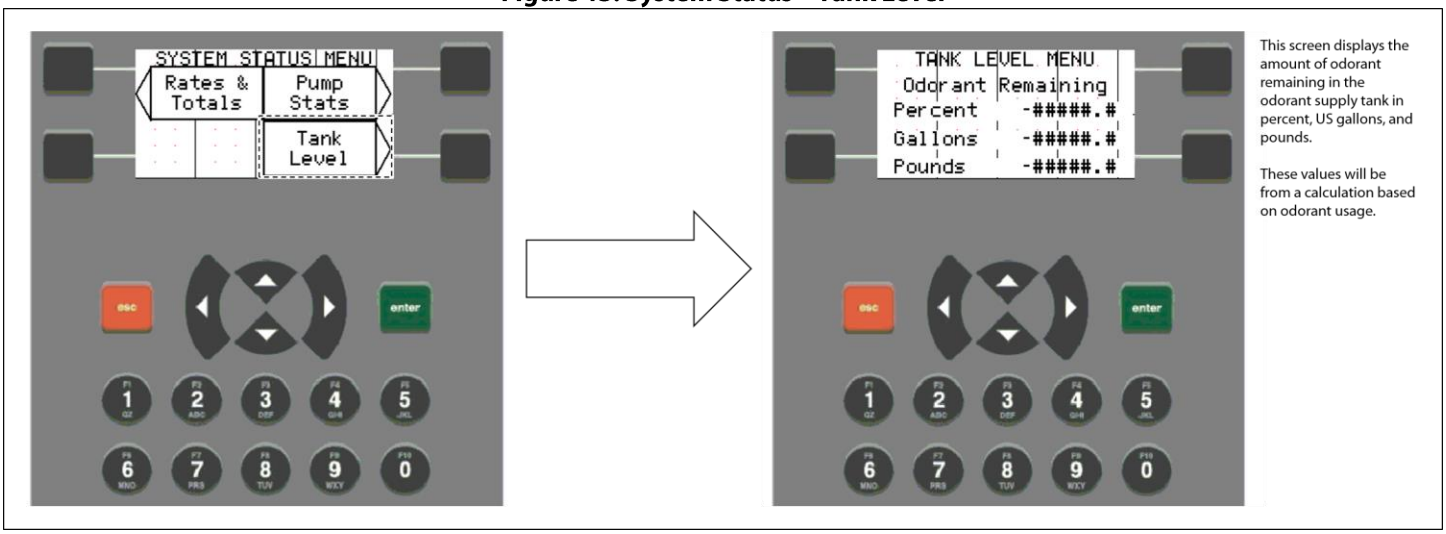
Total Stroke
Displays the total number of strokes for the pump since the totalizer was last reset by using the pump reset strokes parameter.

This should be reset after performing pump maintenance.

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

Tank Level

Figure 15: System Status – Tank Level



Current Alarms

Figure 16: Current Alarms

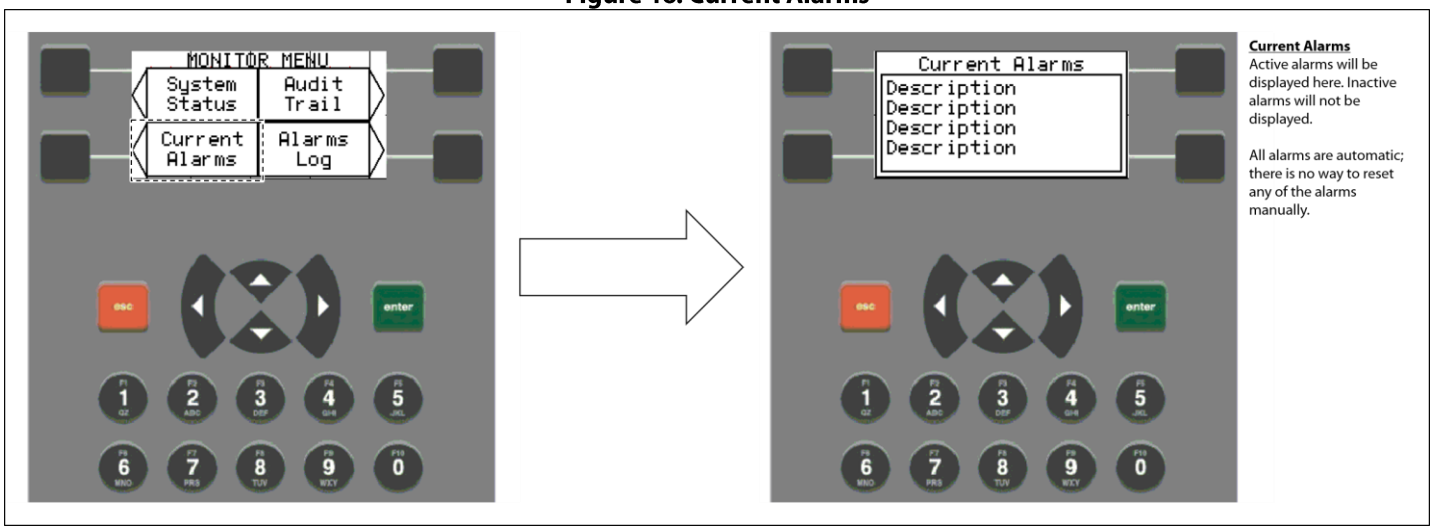


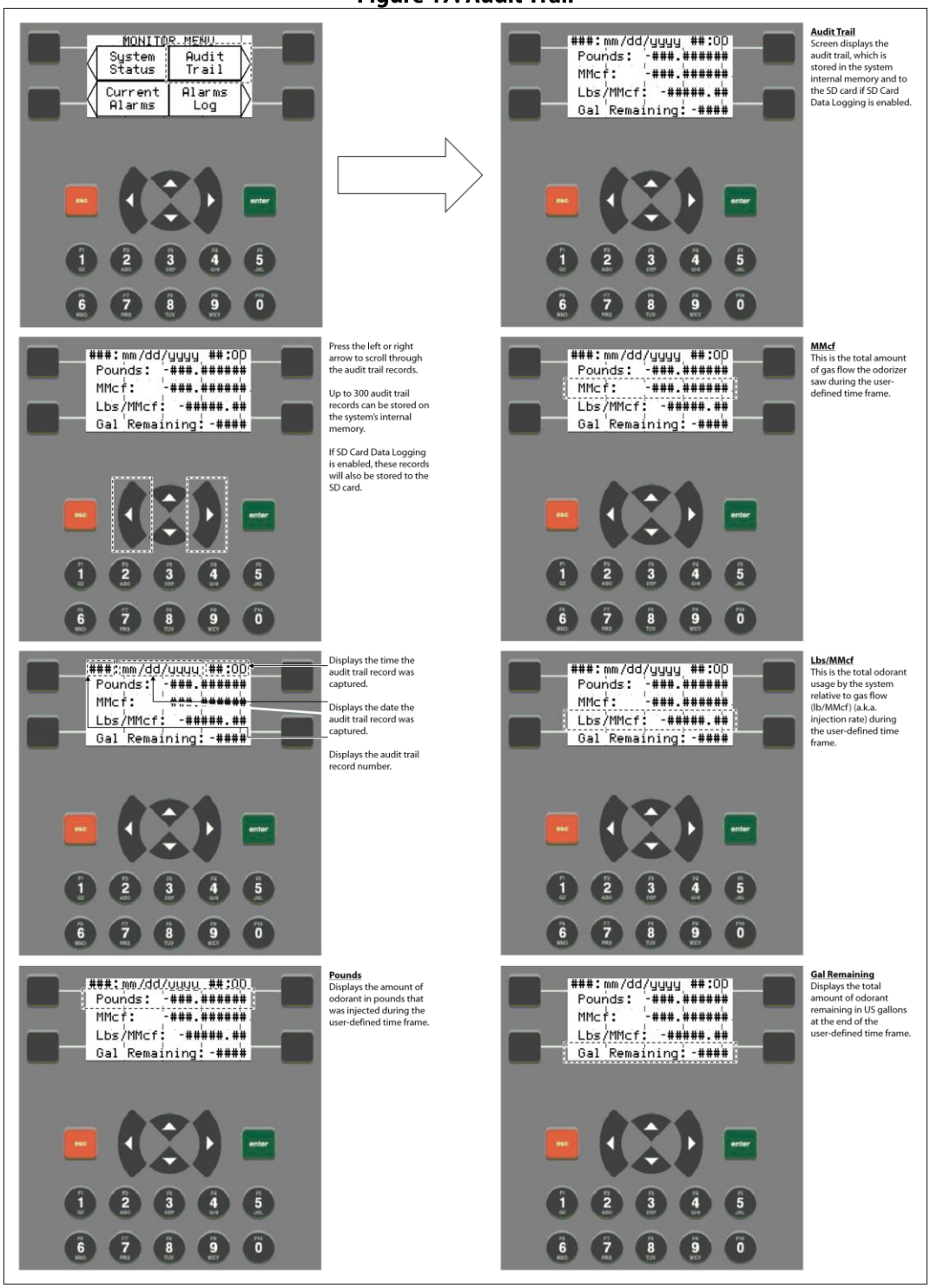
Table 2: Current Alarms	
Analog Flow	Can only be active if Analog Input method is selected
Pulse Flow	Can only be active if Pulse Input method is selected
Constant Rate	Can only be active if Constant Rate mode is specified as the desired fail mode The controller will enter this gas flow fail mode when 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 Low Level	Active if the odorant tank level has dropped below the specified value
SD Card Error	Active if SD Card Data Logging is enabled but no micro SD card is installed

Audit Trail

From the Audit Trail submenu, the user can access the audit trail records stored on internal memory. Up to 300 audit trail records can be stored and viewed.

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

Figure 17: Audit Trail

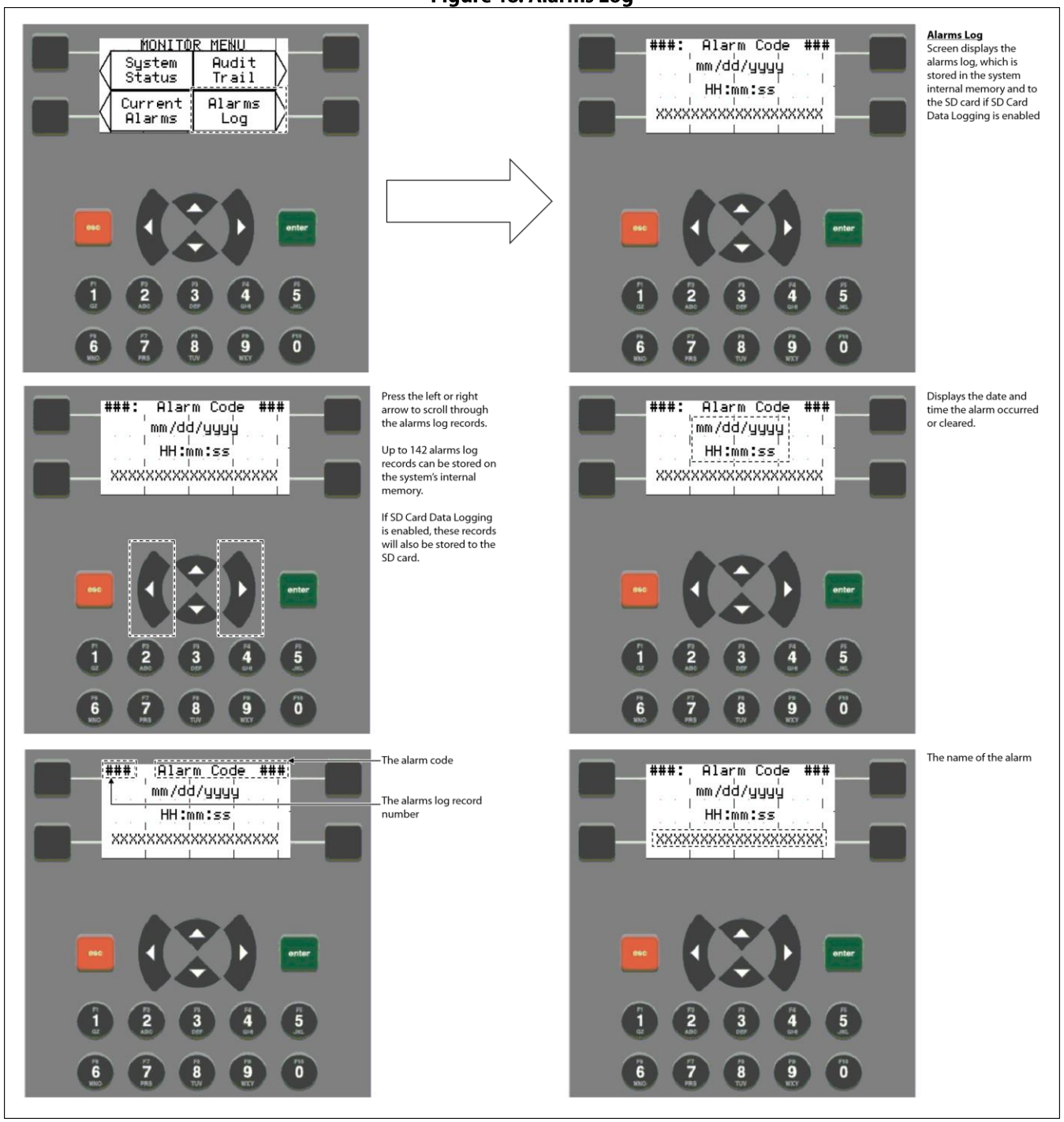


Alarms Log

From the Alarms Log submenu, the user can access the alarms log records stored on internal memory. Up to 142 alarms log records can be stored and viewed.

If SD Card Data Logging is enabled, the alarms log records will also be stored on the installed micro SD card. The micro SD card is equipped with 2 GB of storage.

Figure 18: Alarms Log

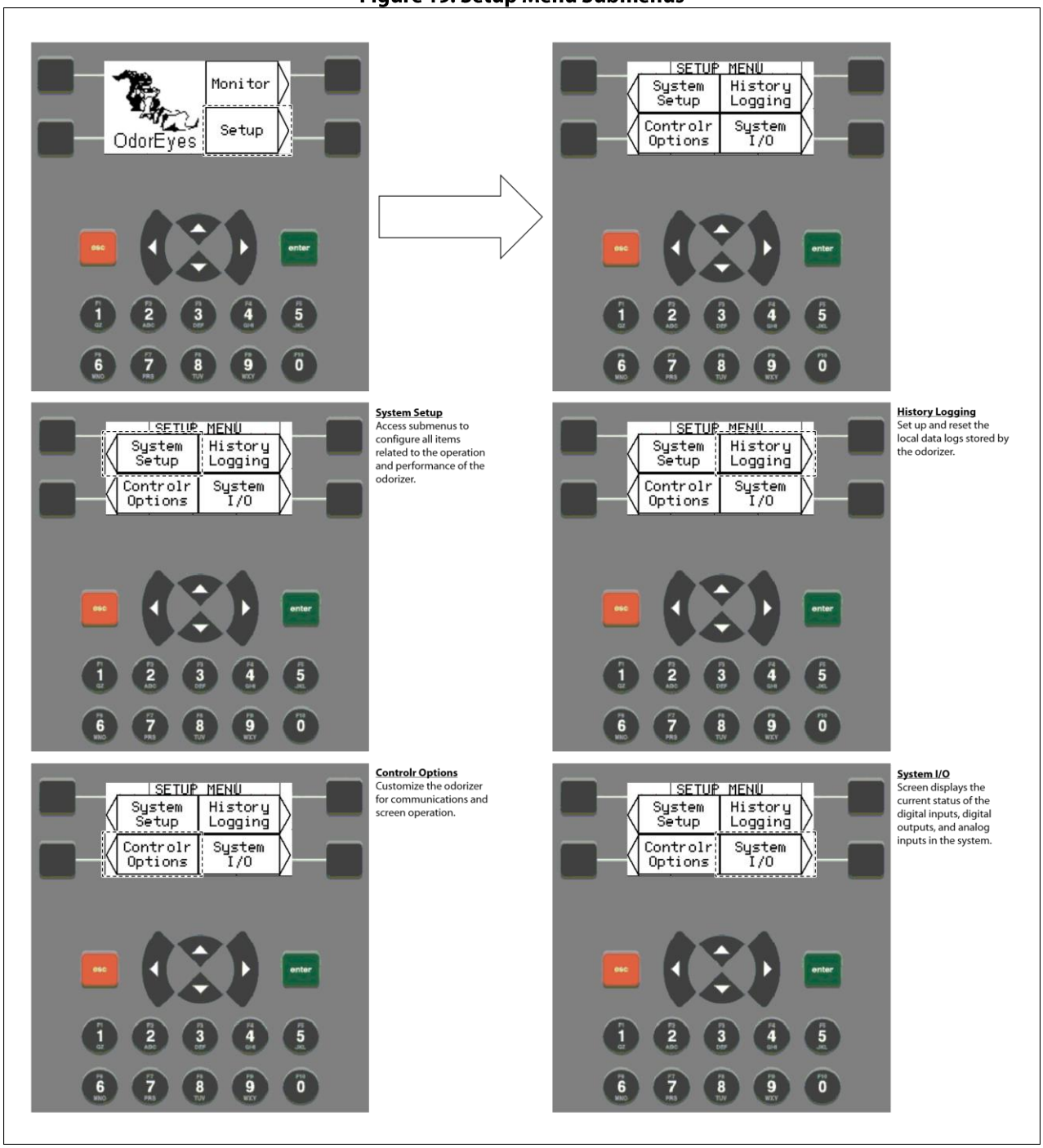


3.3 Navigating the Setup Menus

Through the Setup menu, the user can access the System Setup, Controller Options, History Logging, and System I/O 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 19: Setup Menu Submenus



Changing Values on Setup Screens

If a mistake is made while entering a new value or if the value does not need to be changed, press ESC to discard unwanted changes (*Figure 10*).

Numeric Values

1. To change a numeric value, use the appropriate arrow on the side of the screen to select the value to be changed (*Figure 10*).
2. Once the value is highlighted, press ENTER to edit the value (*Figure 10*).
3. Using the numbers on the keypad, type in the new numeric value (*Figure 10*).
4. Once the new numeric value has been entered, press ENTER to save the changes (*Figure 10*).

If the new value entered is outside the range of allowable values, the value will revert to the previous value once ENTER is pressed.

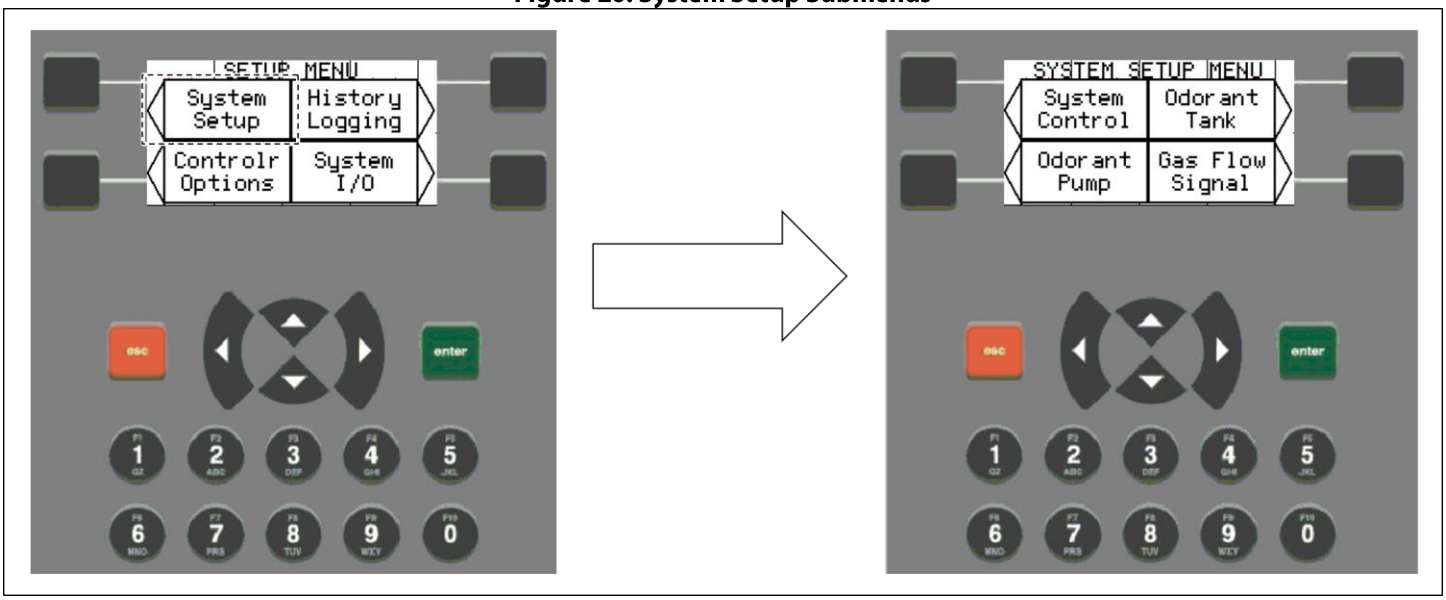
Text Values

5. To change a text value, use the appropriate arrow on the side of the screen to select the field to be changed (*Figure 10*).
6. Once the value is highlighted, press ENTER to edit the value (*Figure 10*).
7. Scroll through the value's options using the up and down arrows (*Figure 10*).
8. Highlight the desired text value, and then press ENTER to save the changes (*Figure 10*).

System Setup

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

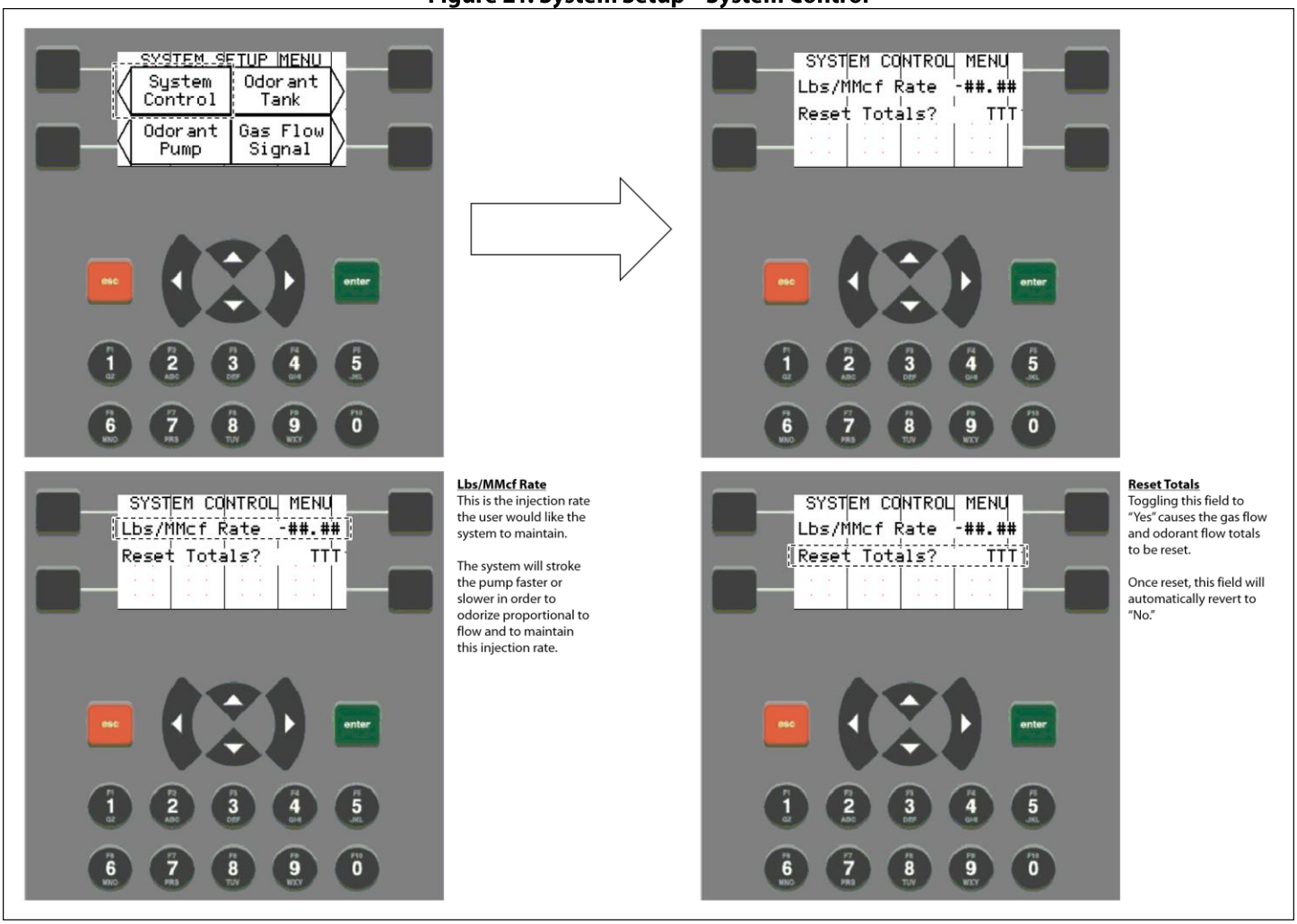
Figure 20: System Setup Submenus



System Control

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

Figure 21: System Setup – System Control



Odorant Pump

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

Figure 22: System Setup – Odorant Pumps

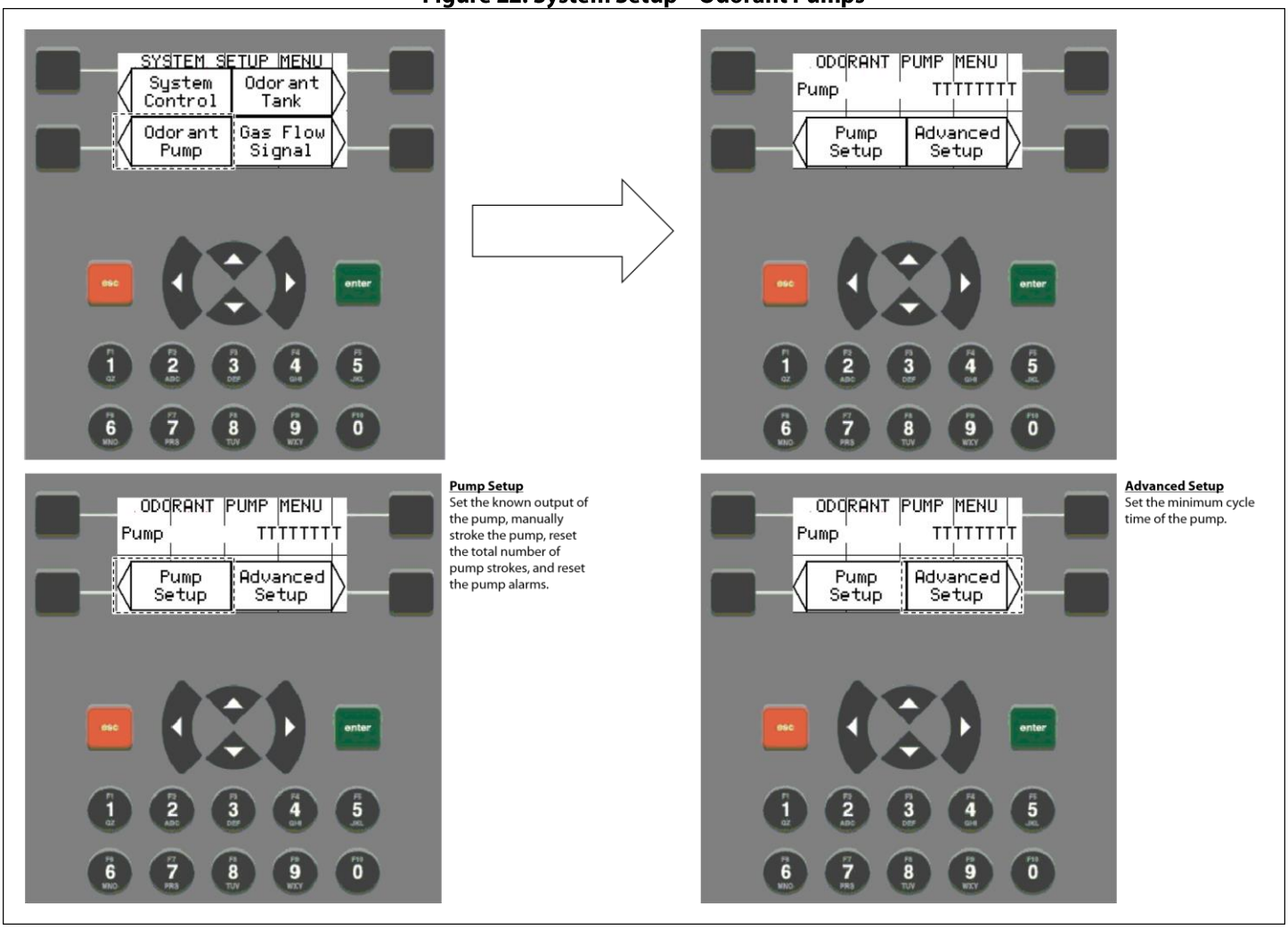
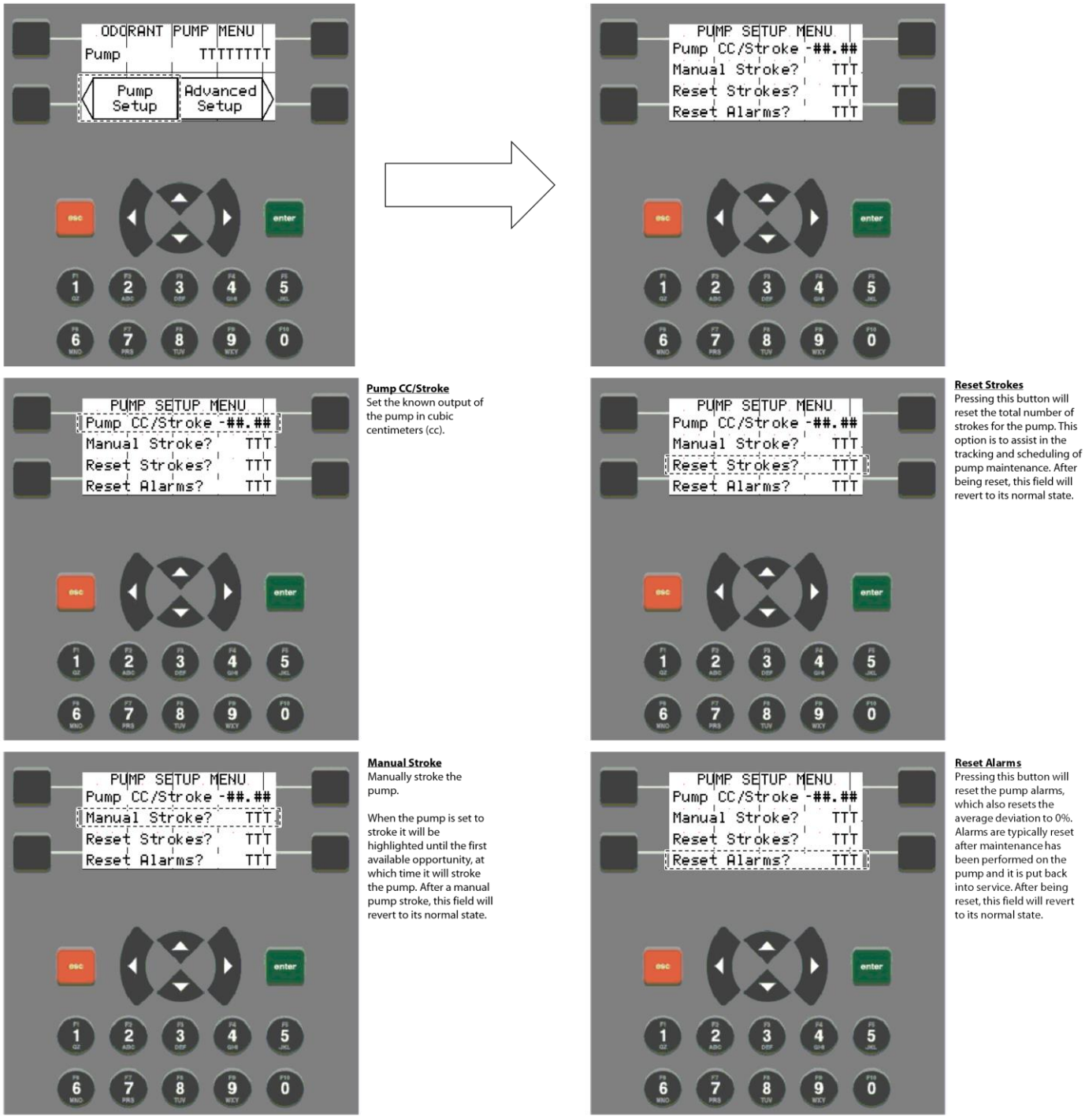


Figure 23: Odorant Pump Setup



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

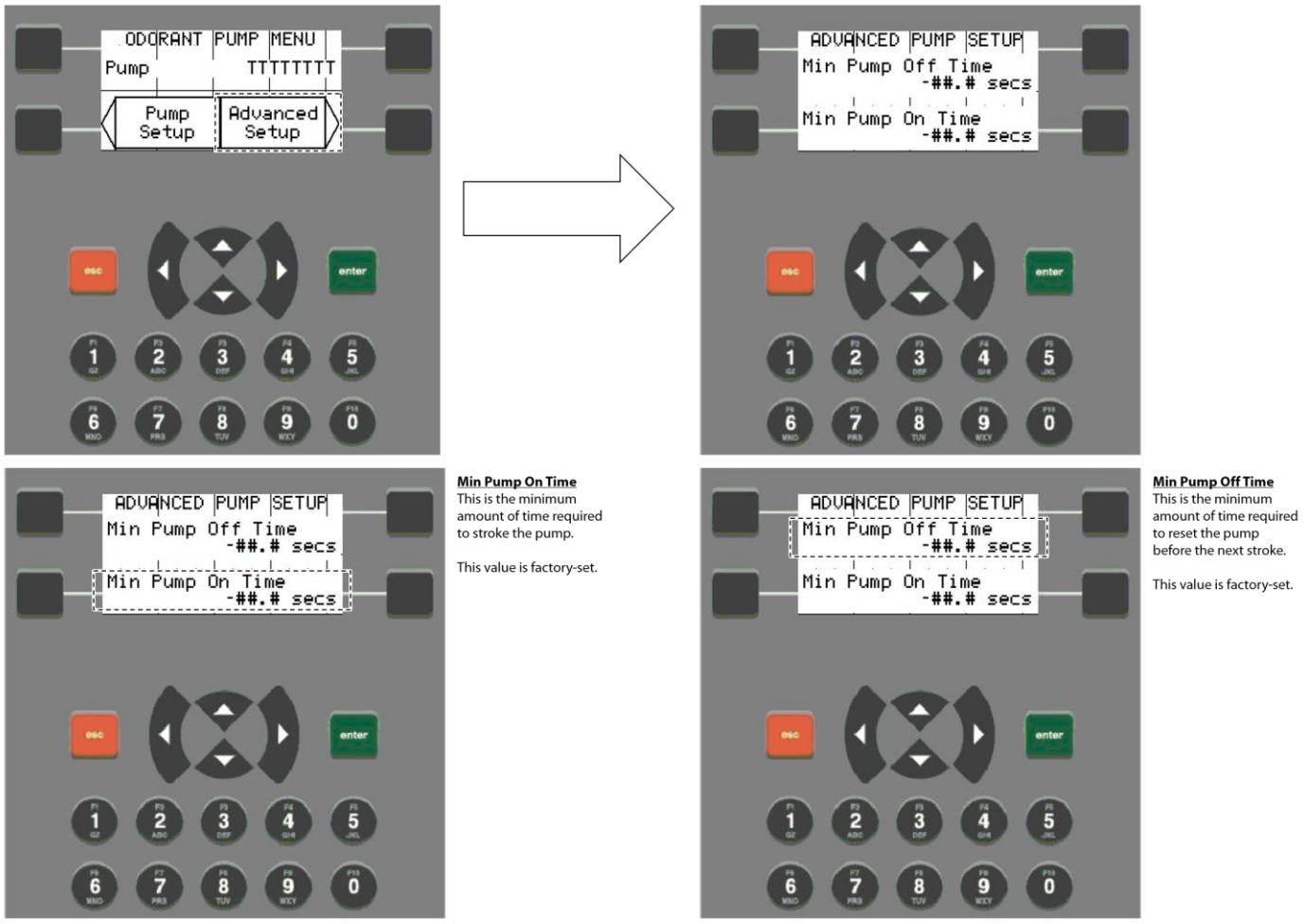
Reset Strokes
Pressing this button will reset the total number of strokes for the pump. This option is to assist in the tracking and scheduling of pump maintenance. After being reset, this field will revert to its normal state.

Manual Stroke
Manually stroke the pump.

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

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

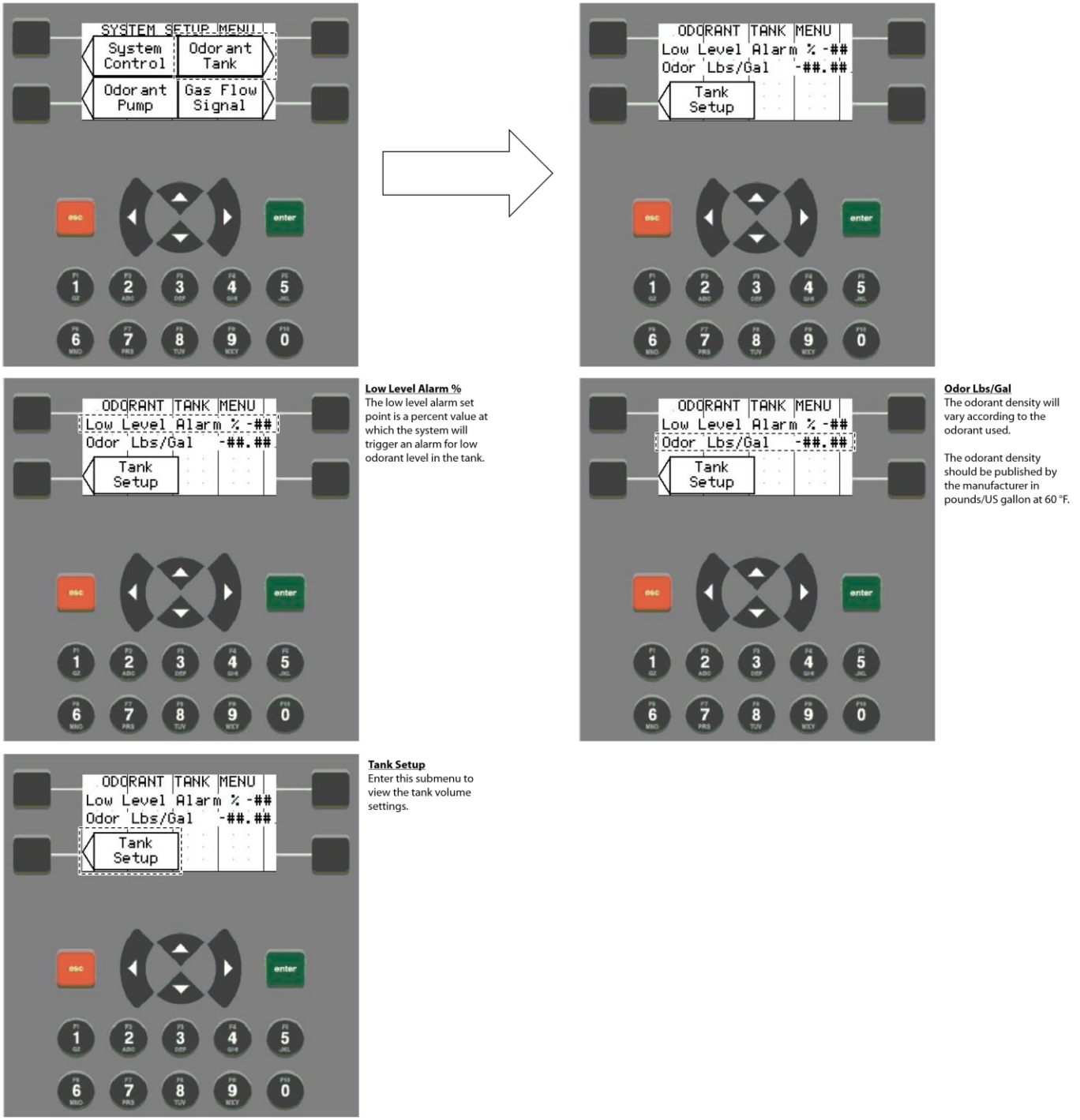
Figure 24: Odorant Pump – Advanced Setup



Odorant Tank

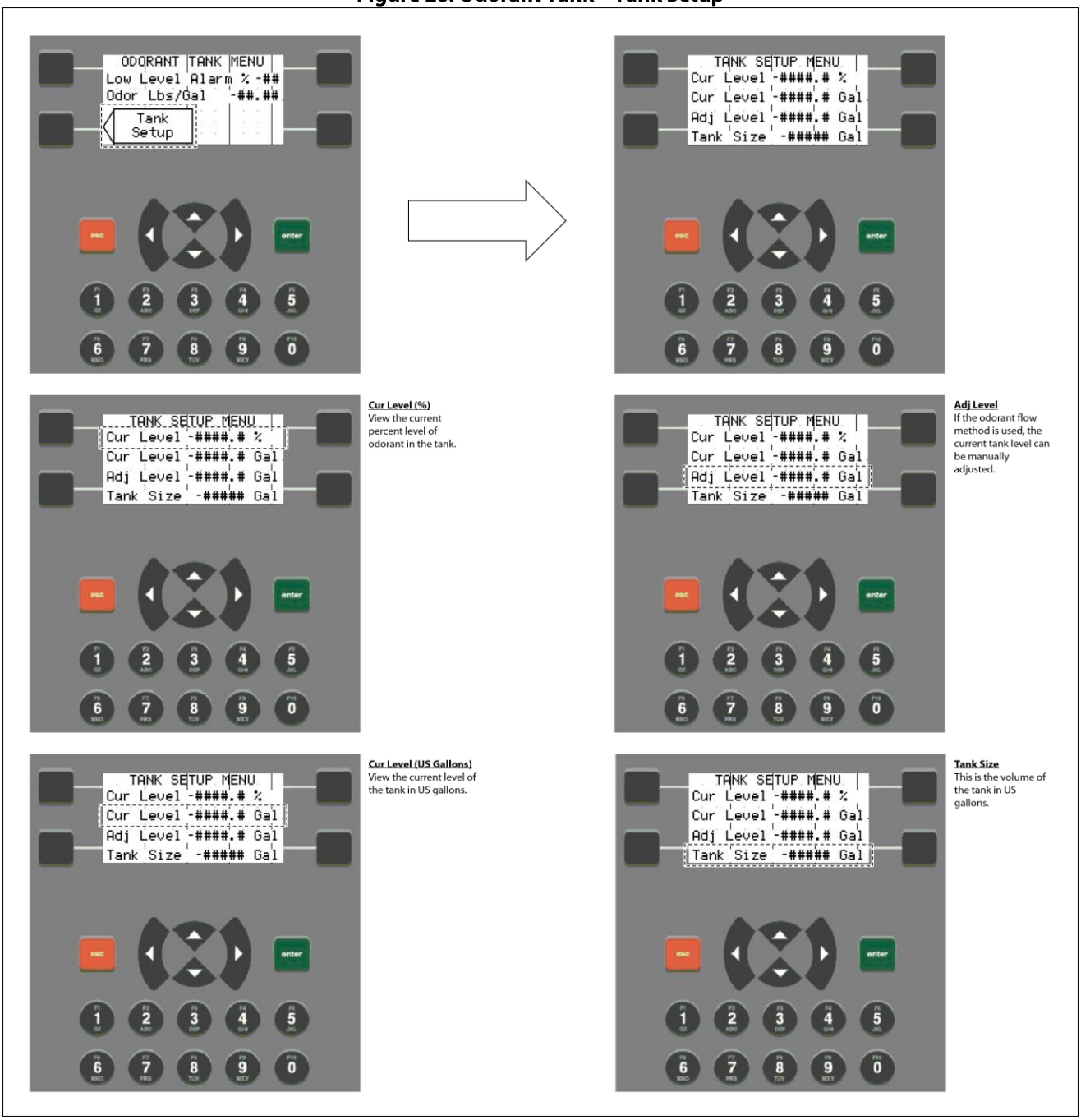
Through the Odorant Tank submenus, the user can input information for the odorant tank.

Figure 25: System Setup – Odorant Tank



When estimating the odorant tank level based on odorant usage, the Method should be set to Odorant Flow.

Figure 26: Odorant Tank – Tank Setup



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

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

Note this system is not equipped with a level transmitter.

Gas Flow Signal

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

Figure 27: System Setup – Gas Flow Signal Submenus

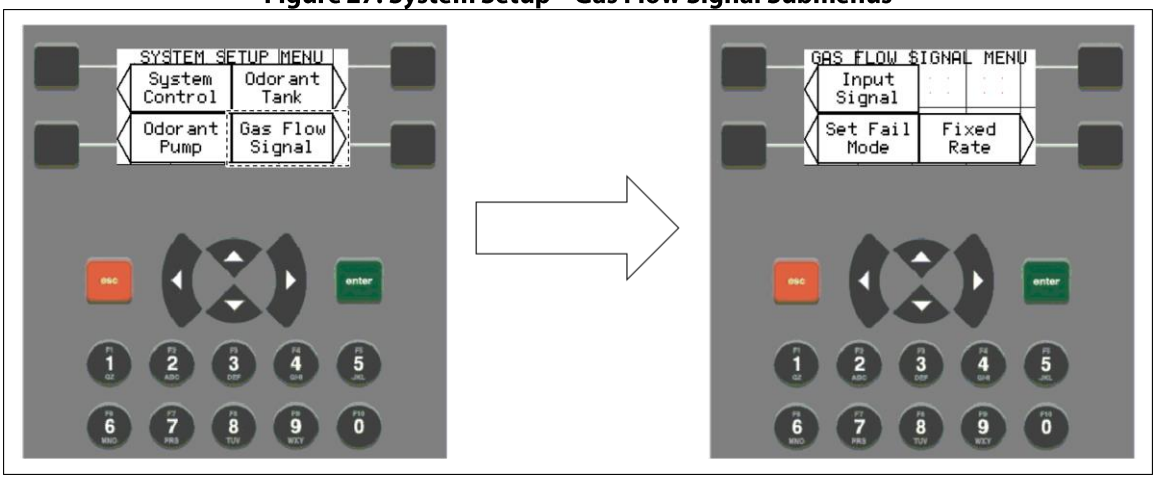


Figure 28: Gas Flow Signal – Input Signal

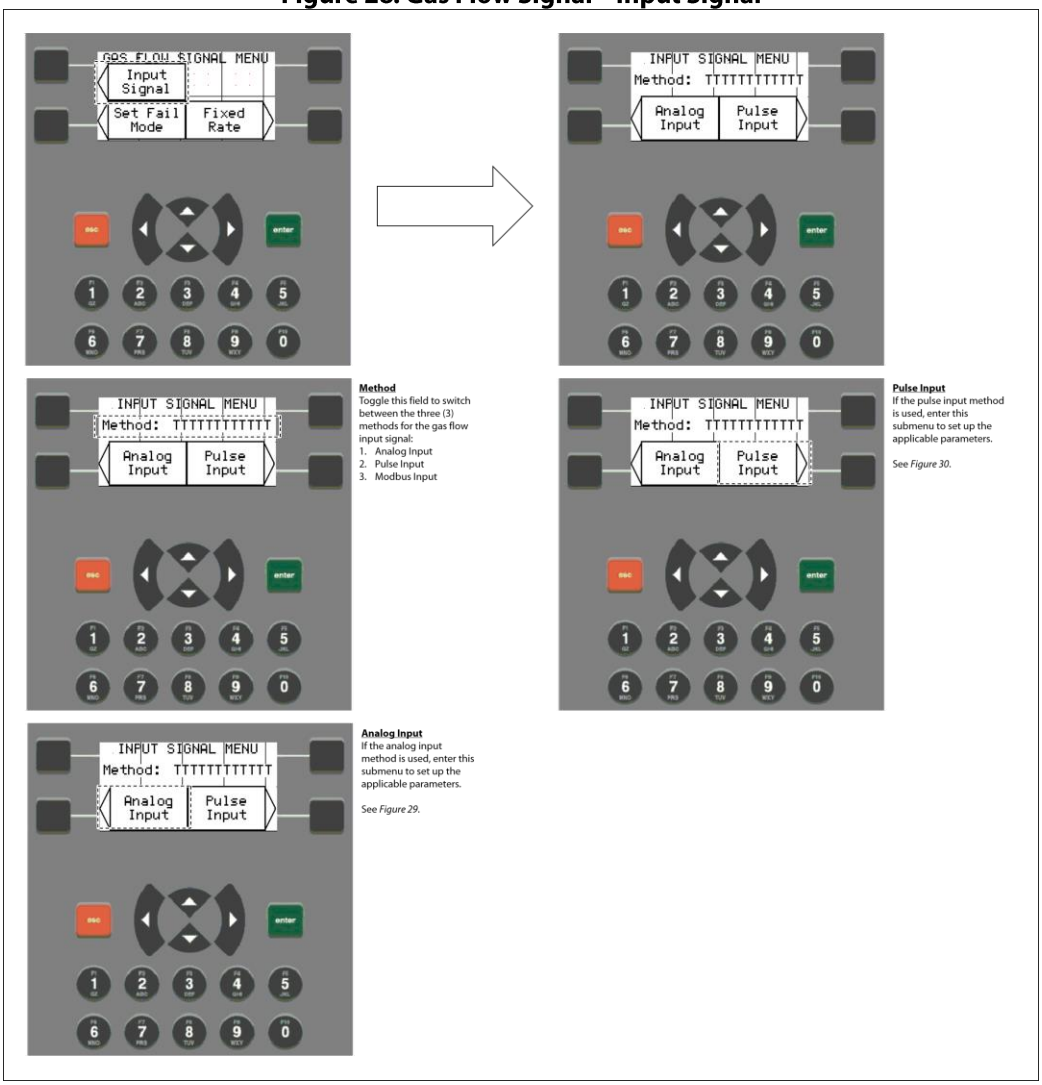
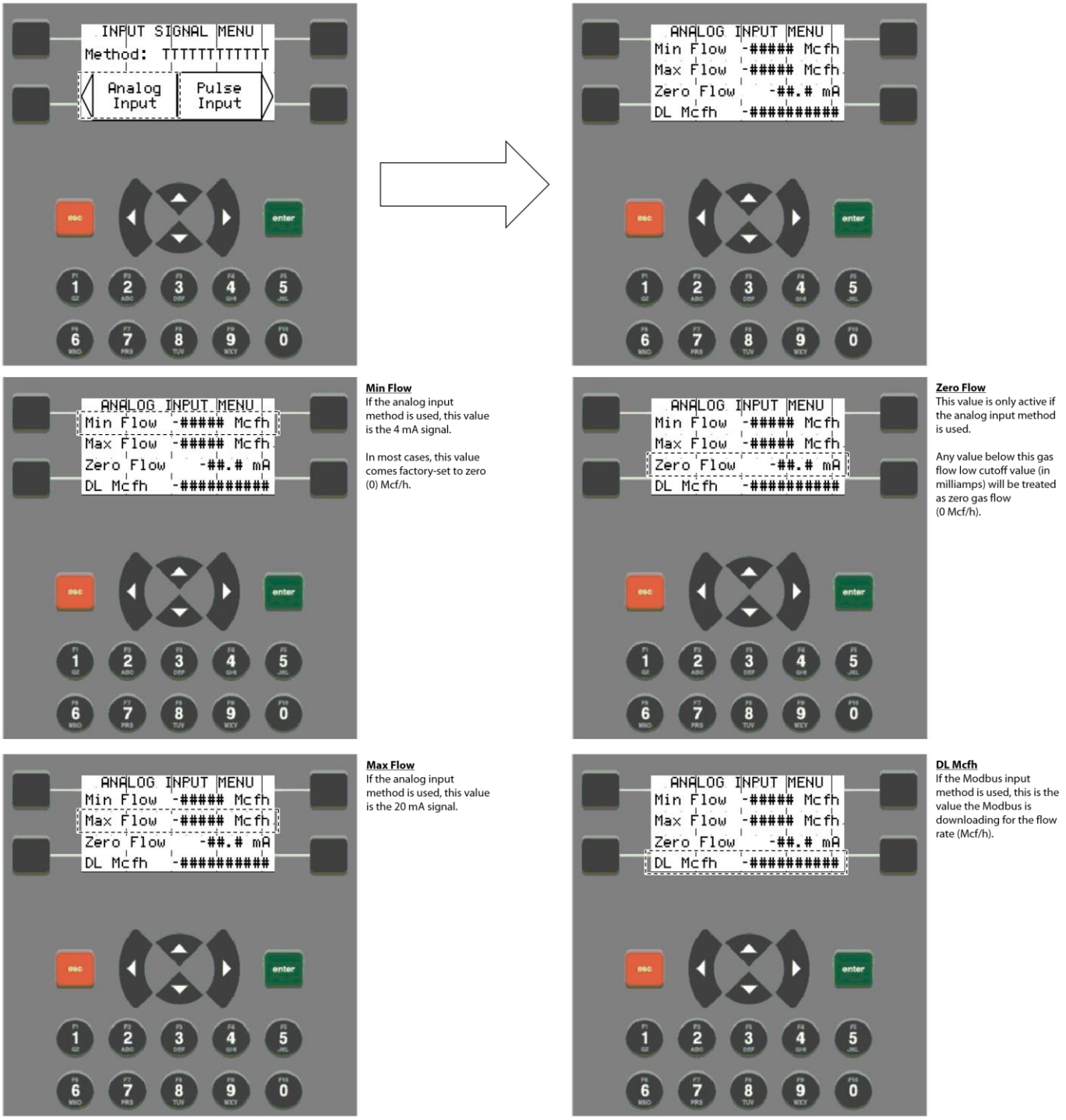
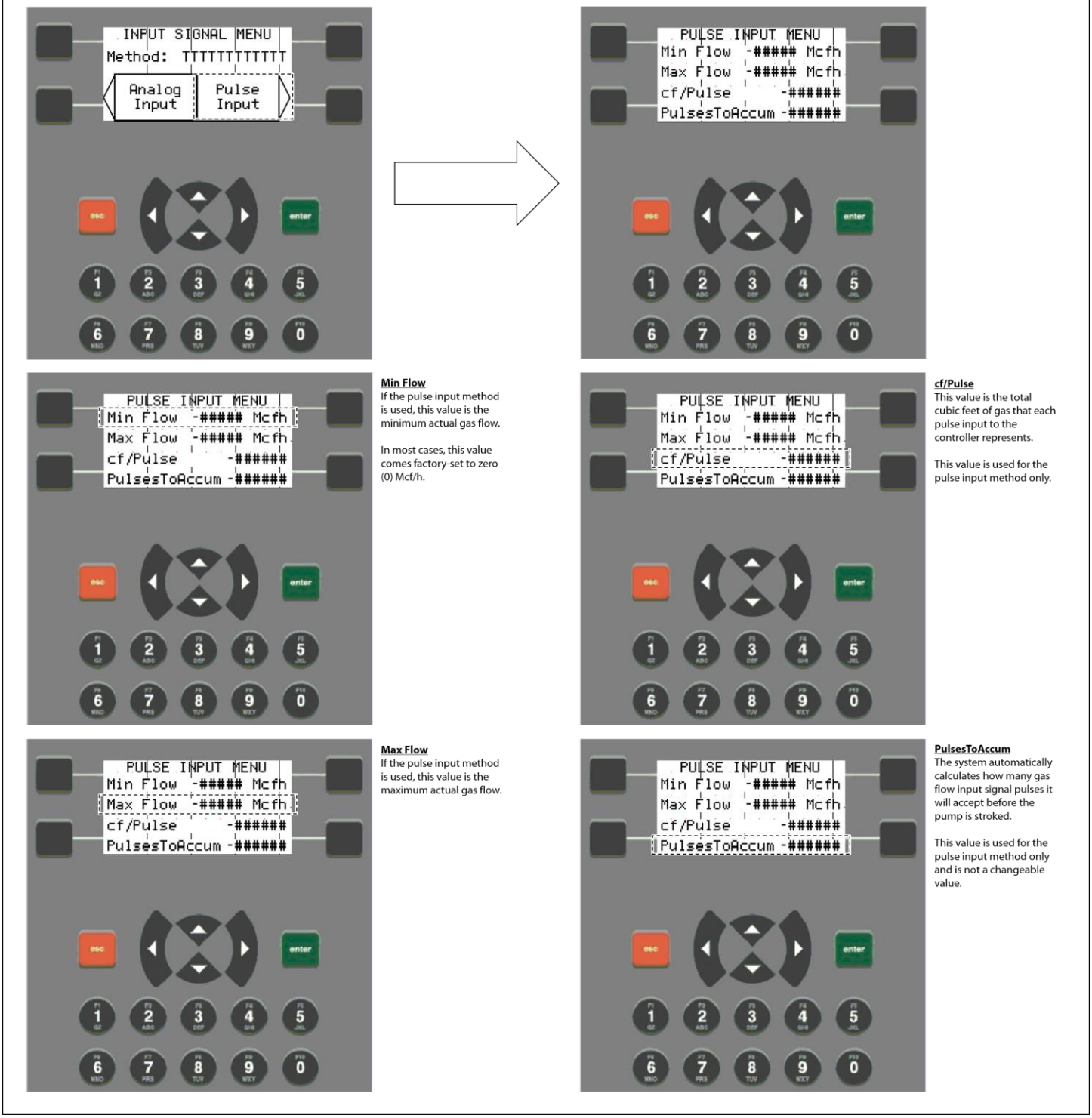


Figure 29: Gas Flow Signal – Analog Input



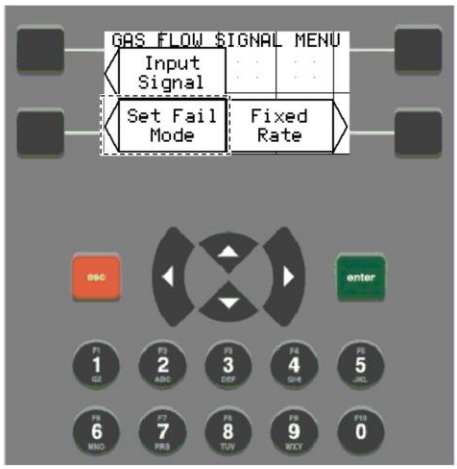
If the gas flow signal will be analog, the analog signal must be 4–20 mA powered by the user.

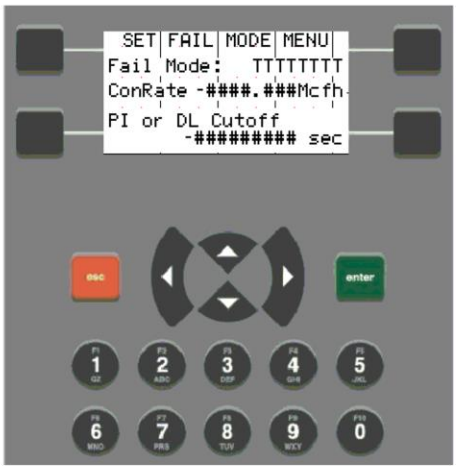
Figure 30: Gas Flow Signal – Pulse Input



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

Figure 31: Gas Flow Signal – Set Fail Mode





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.

PI or DL Cutoff
The amount of time (in seconds) the system will wait between pulse inputs or changes of the downloaded Modbus value before it will determine there is a gas flow signal loss.

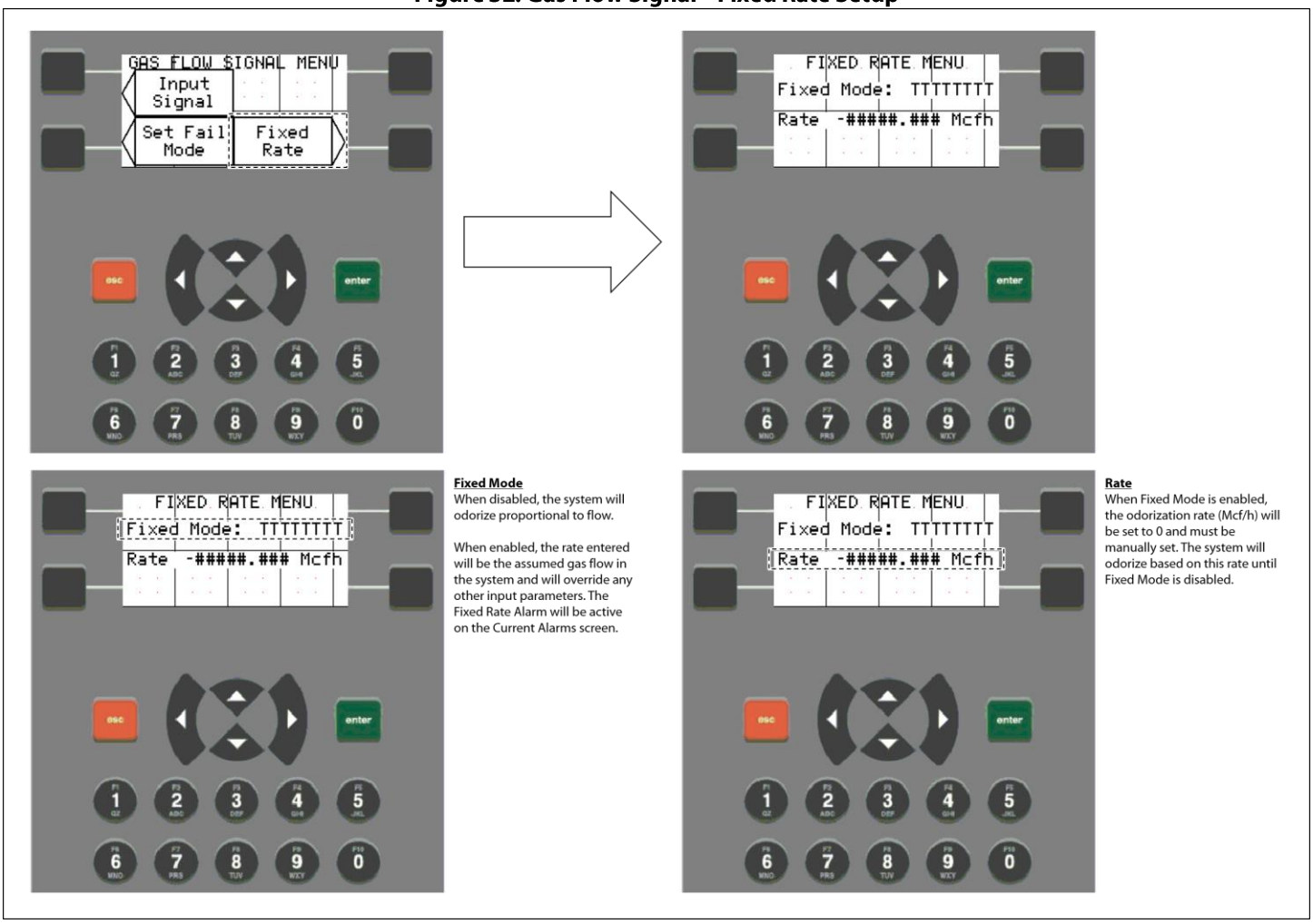
ConRate
This value is only active if the fail mode is set to constant rate mode.

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

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 PI or DL Cutoff, 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 32: Gas Flow Signal – Fixed Rate Setup



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

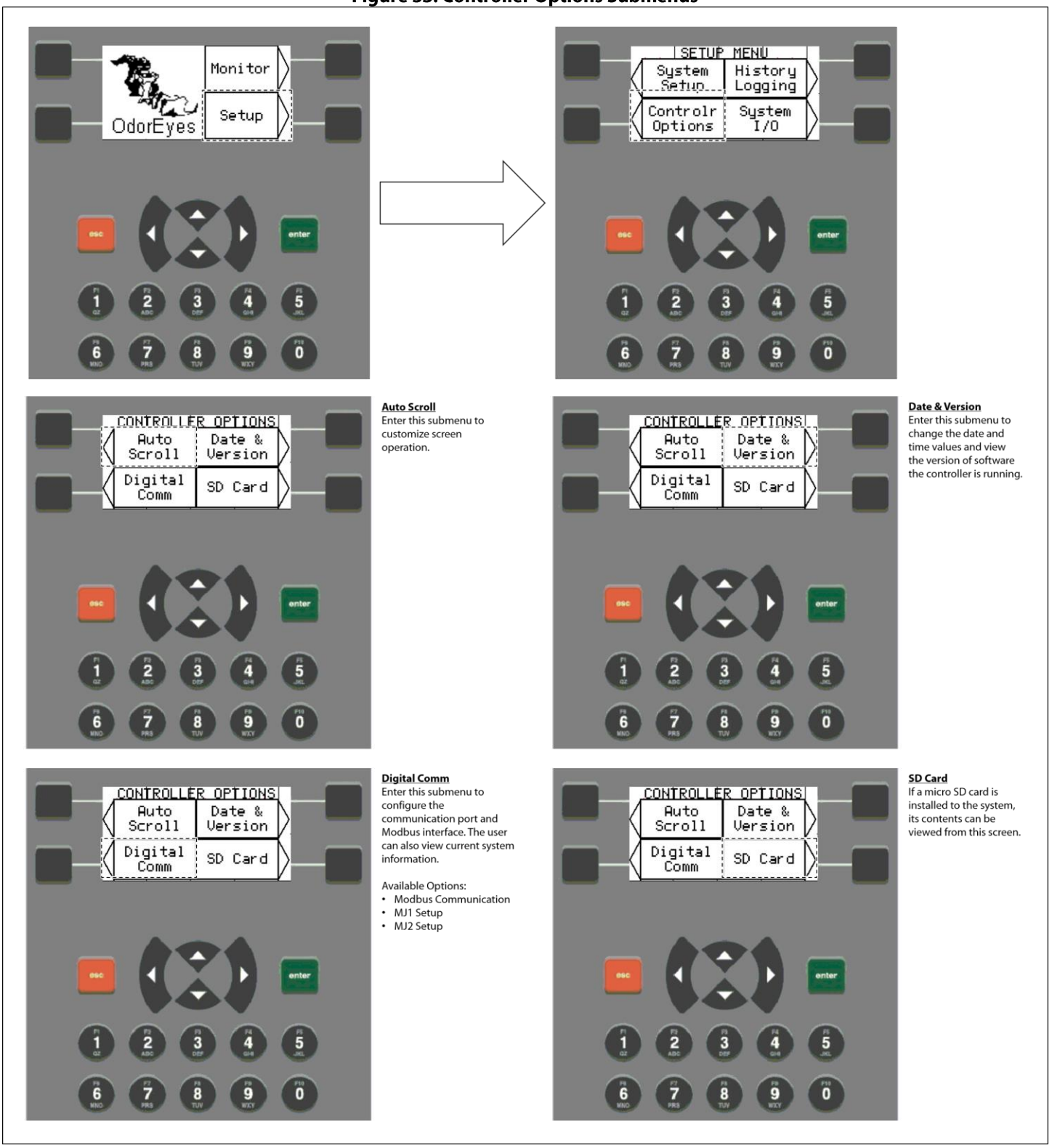
When enabled, the rate entered will be the assumed gas flow in the system and will override any other input parameters. The Fixed Rate Alarm will be active on the Current Alarms screen.

Rate
When Fixed Mode is enabled, the odorization rate (Mcf/h) will be set to 0 and 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 33: Controller Options Submenus



Auto Scroll
Enter this submenu to customize screen operation.

Date & Version
Enter this submenu to change the date and time values and view the version of software the controller is running.

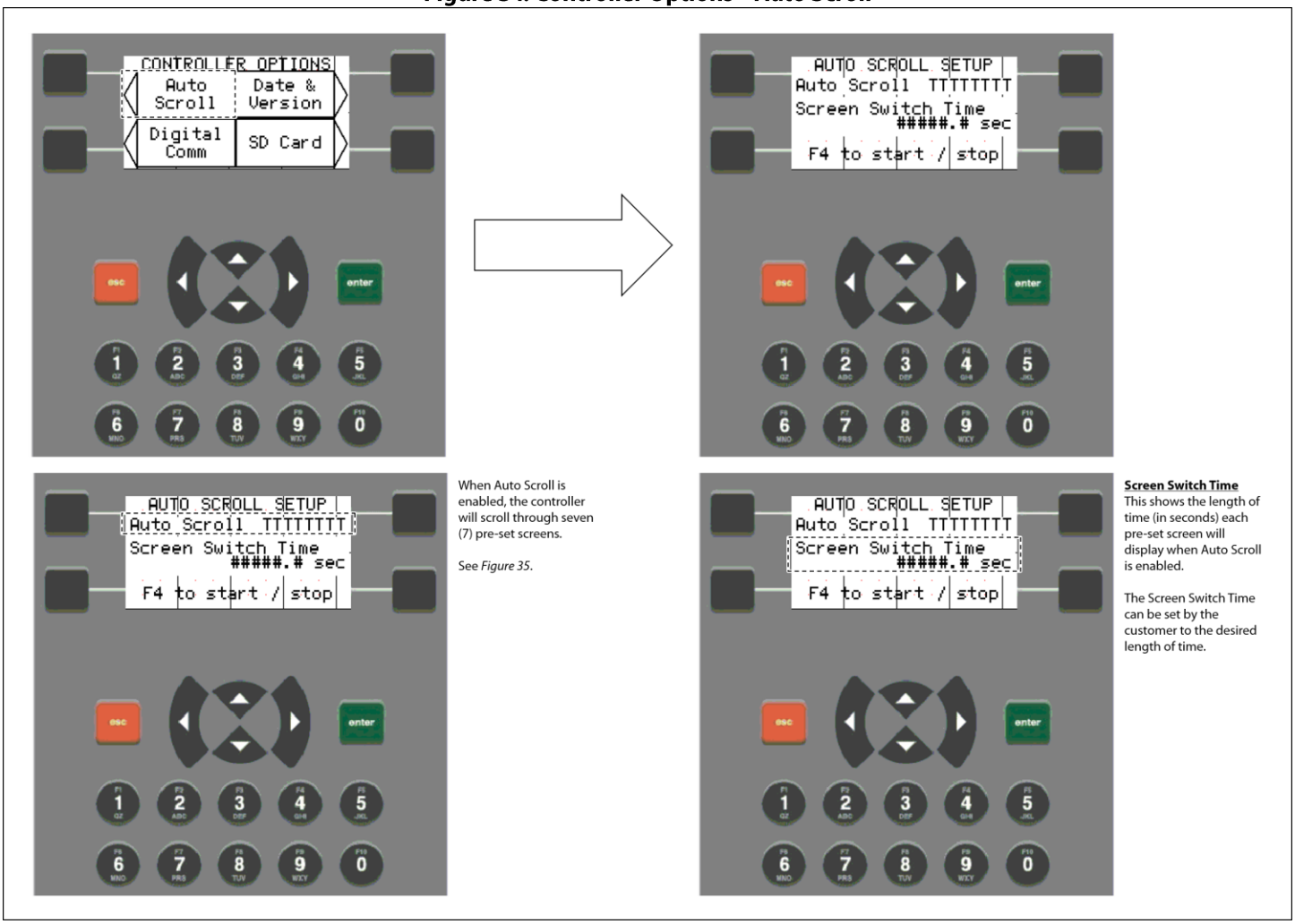
Digital Comm
Enter this submenu to configure the communication port and Modbus interface. The user can also view current system information.

Available Options:
- Modbus Communication
- MJ1 Setup
- MJ2 Setup

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

Auto Scroll

Figure 34: Controller Options – Auto Scroll



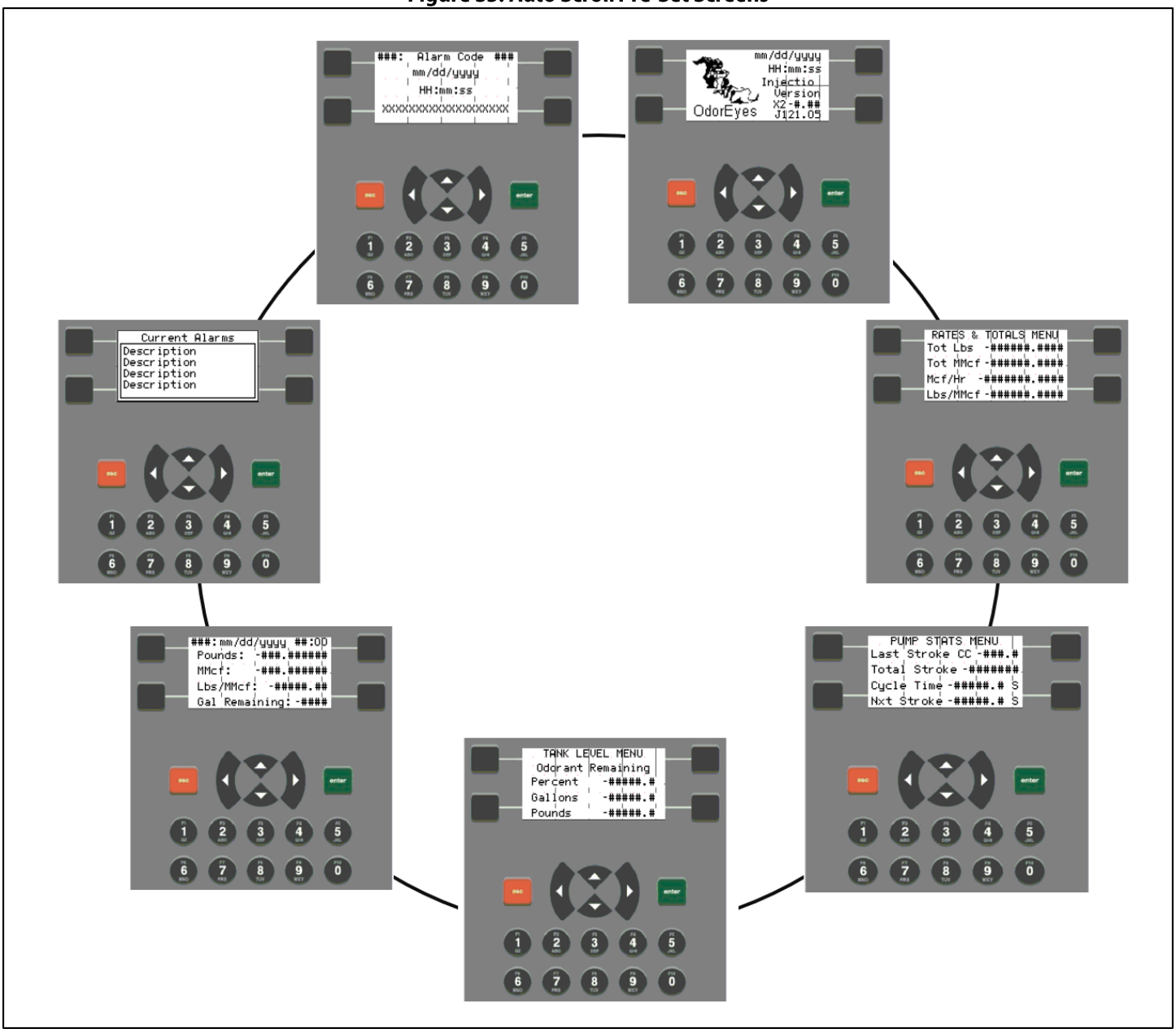
When Auto Scroll is enabled, the controller will scroll through seven (7) pre-set screens.

See *Figure 35*.

Screen Switch Time
This shows the length of time (in seconds) each pre-set screen will display when Auto Scroll is enabled.

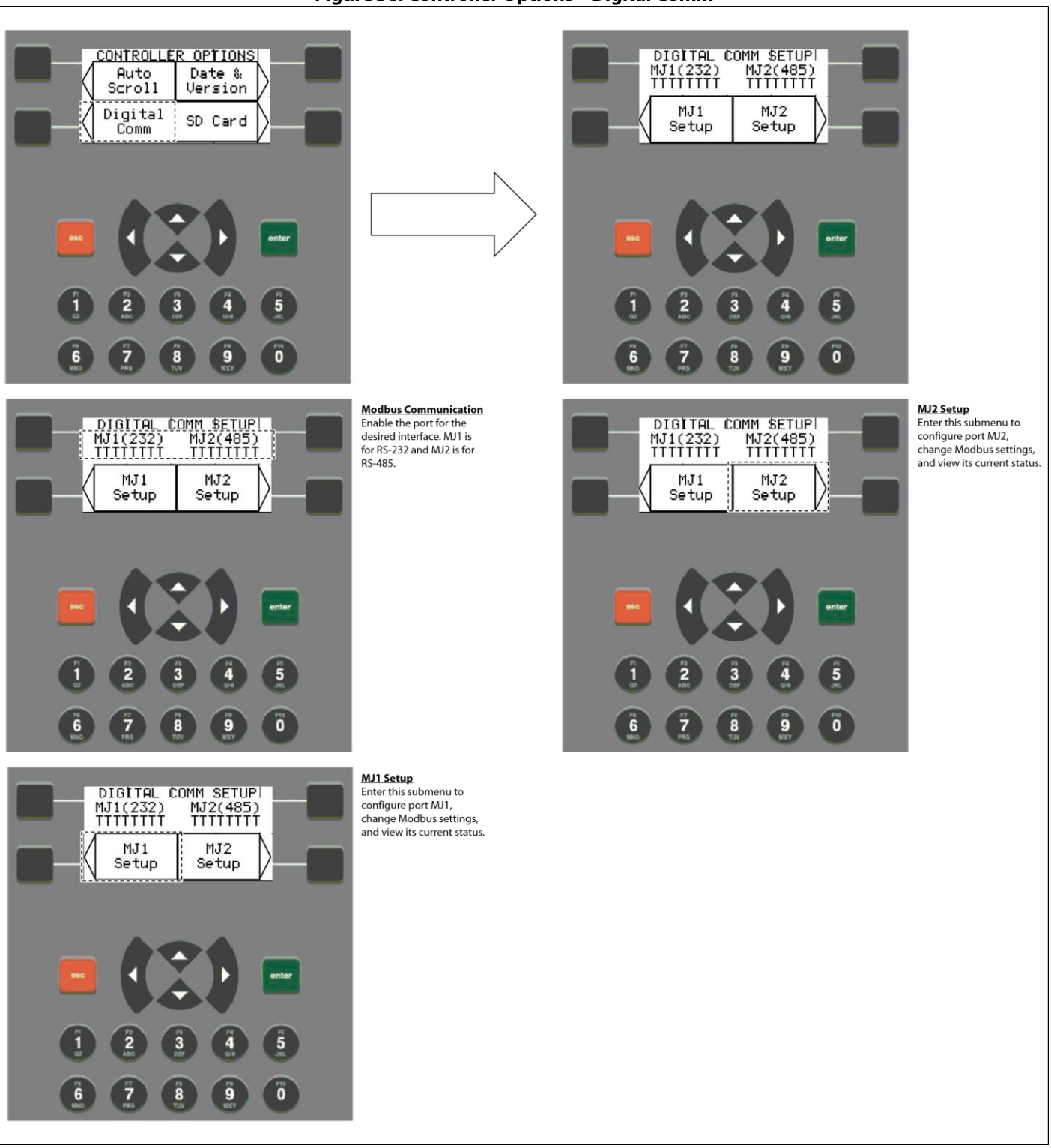
The Screen Switch Time can be set by the customer to the desired length of time.

Figure 35: Auto Scroll Pre-Set Screens



Modbus Setup

Figure 36: Controller Options – Digital Comm



Modbus Communication
Enable the port for the desired interface. MJ1 is for RS-232 and MJ2 is for RS-485.

MJ2 Setup
Enter this submenu to configure port MJ2, change Modbus settings, and view its current status.

MJ1 Setup
Enter this submenu to configure port MJ1, change Modbus settings, and view its current status.

Figure 37: Digital Comm Setup – MJ1/MJ2 Setup Menu

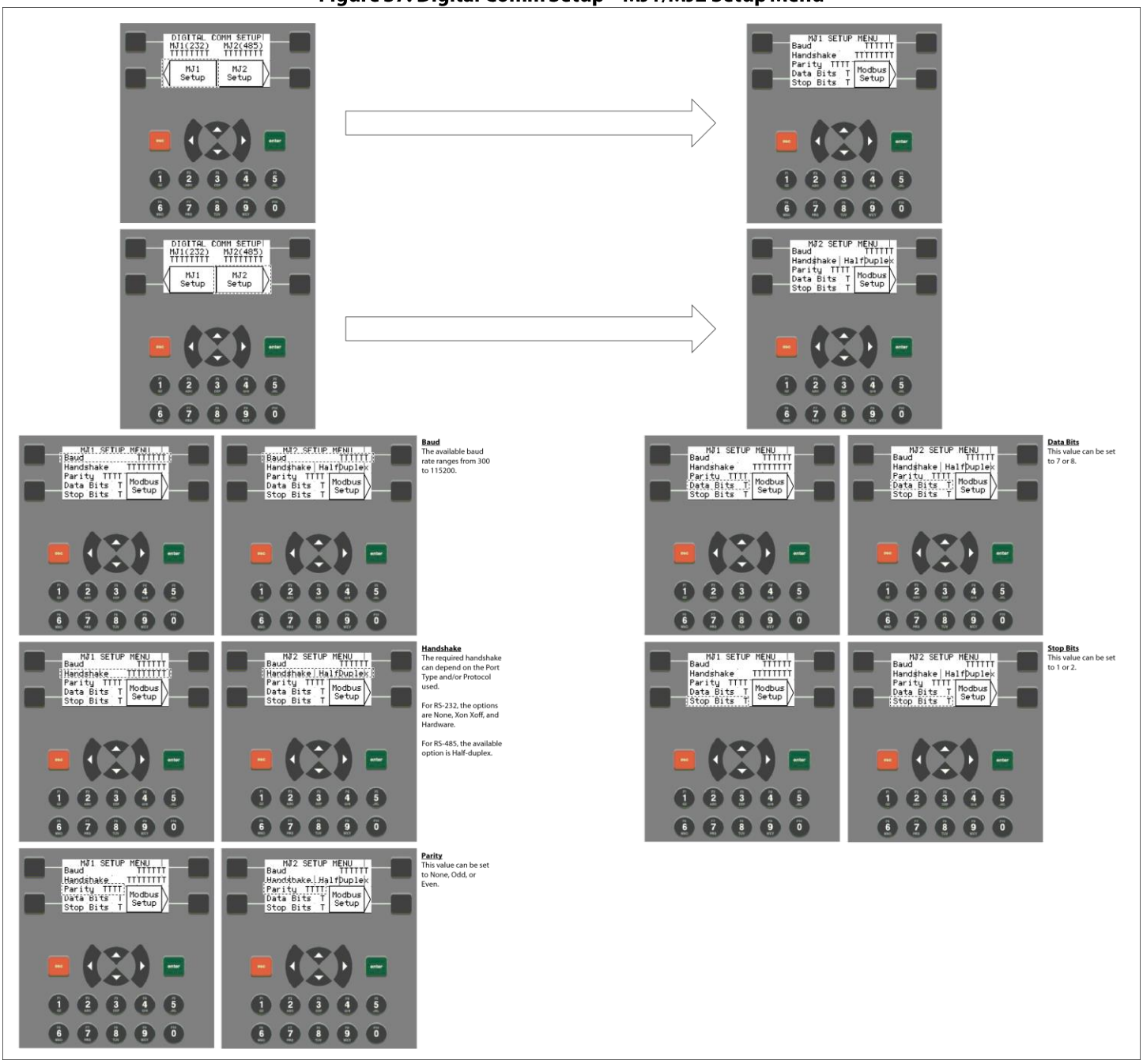
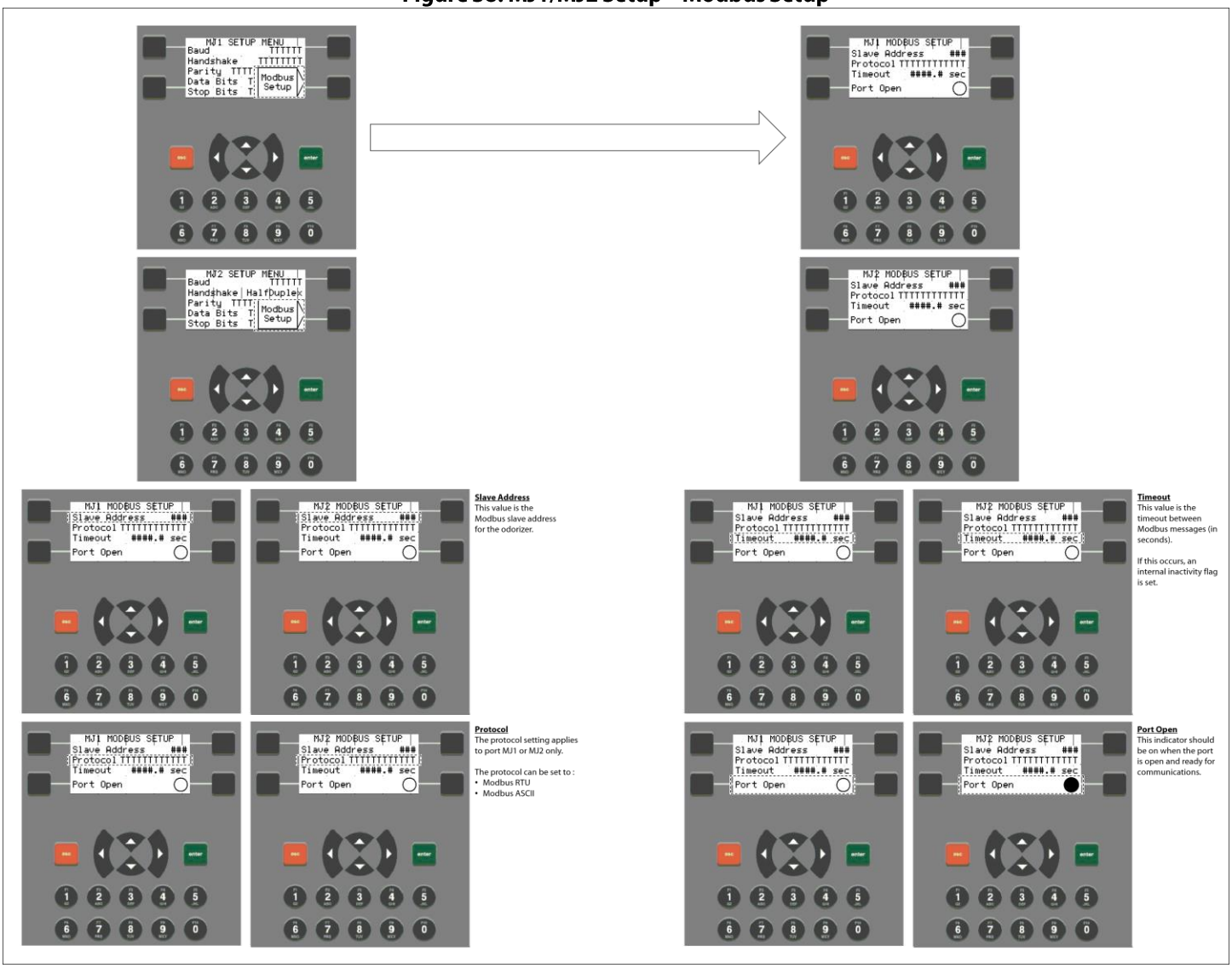
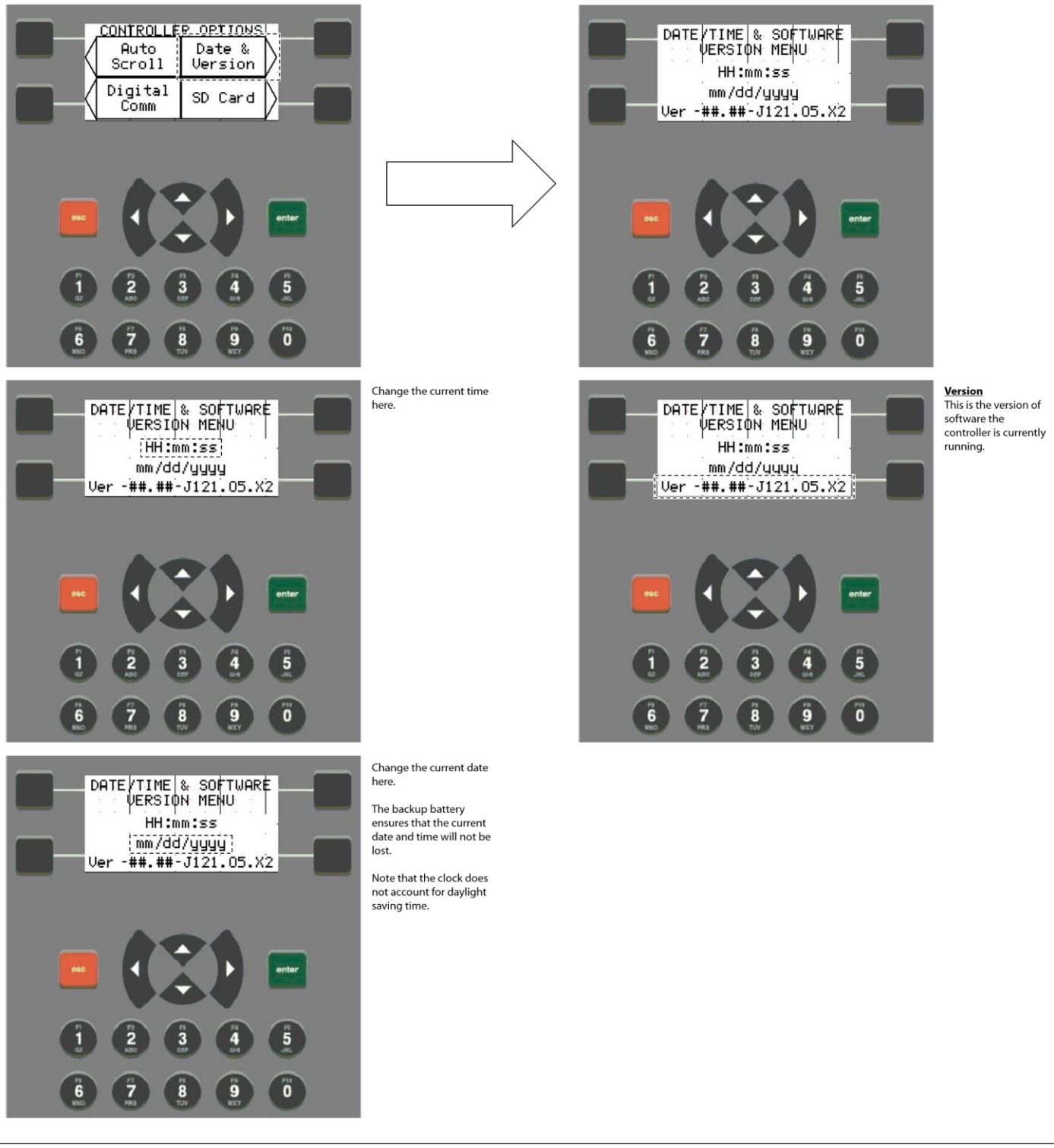


Figure 38: MJ1/MJ2 Setup – Modbus Setup



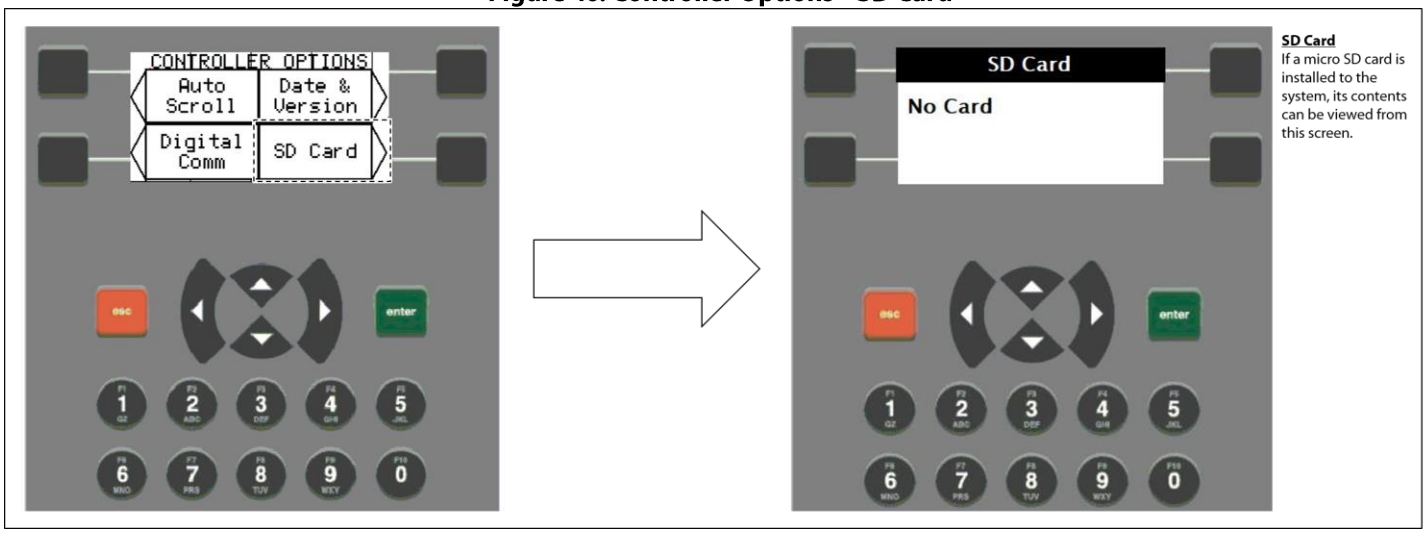
Date & Version

Figure 39: Controller Options – Date & Version



SD Card

Figure 40: Controller Options – SD Card

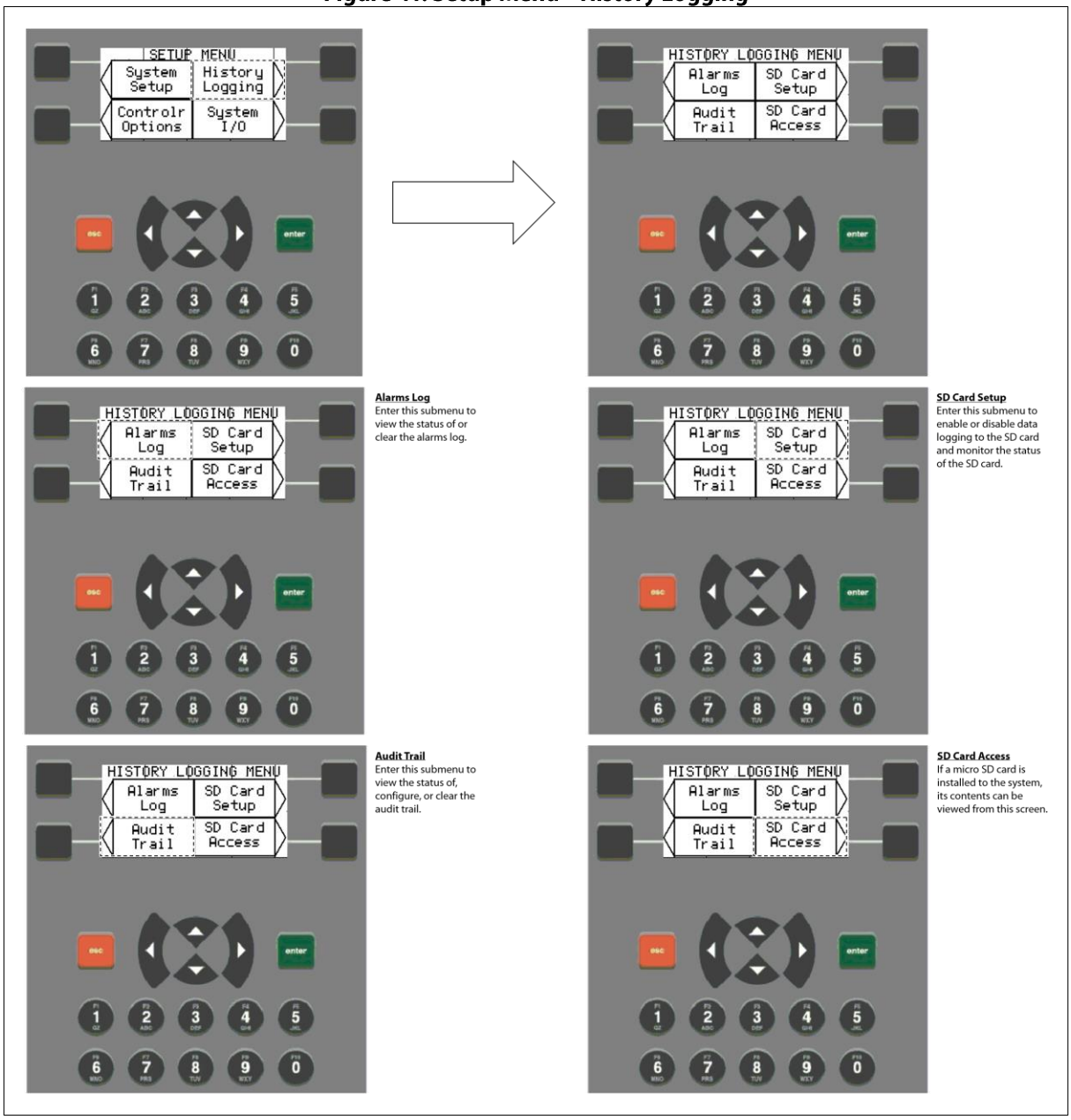


History Logging

Through the History Logging submenu, 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 be automatically logged to the installed card when SD Card Data Logging is enabled.

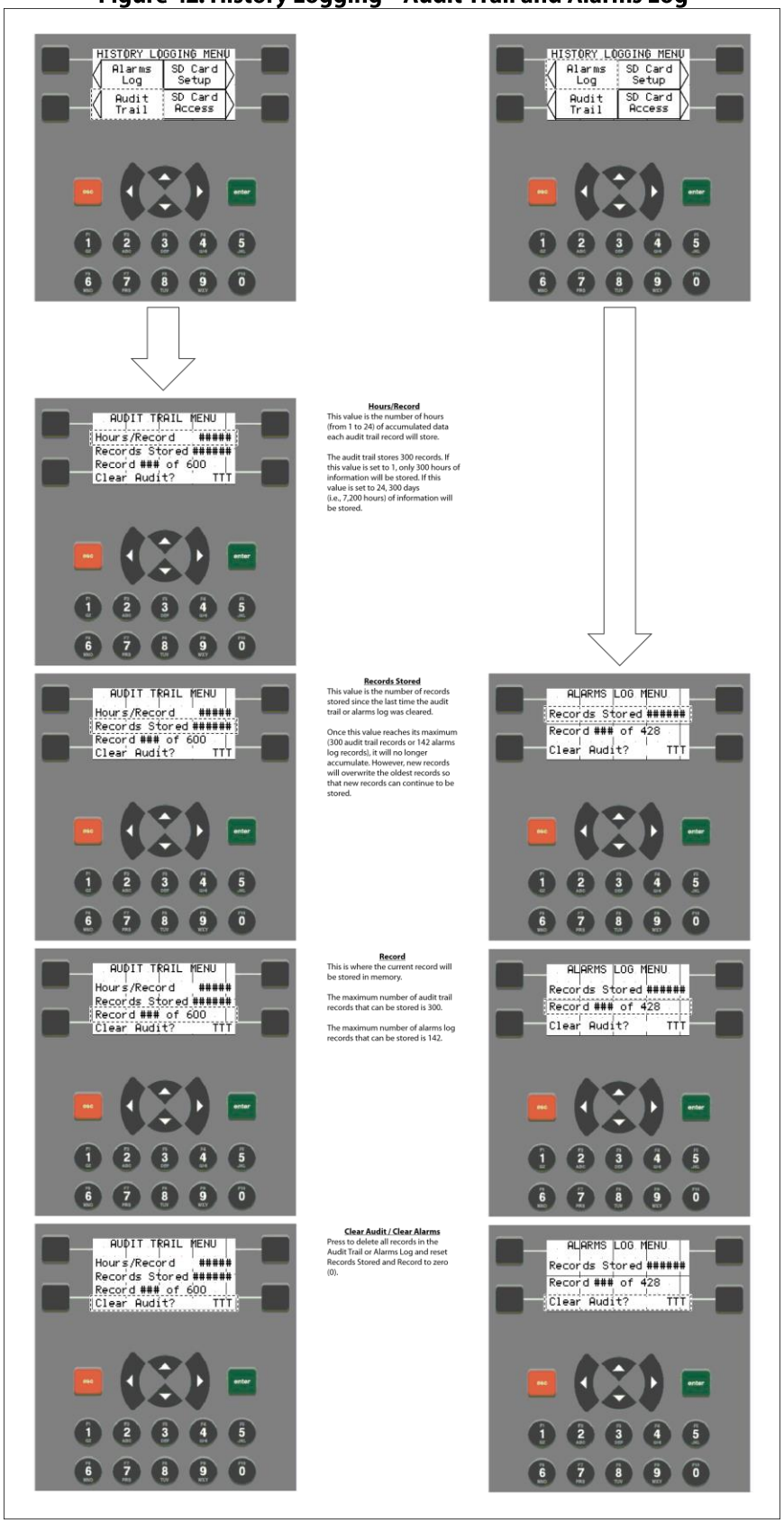
Figure 41: Setup Menu – History Logging



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

Through the Alarms Log and Audit Trail submenus, the user can set up and reset the data logs stored locally.

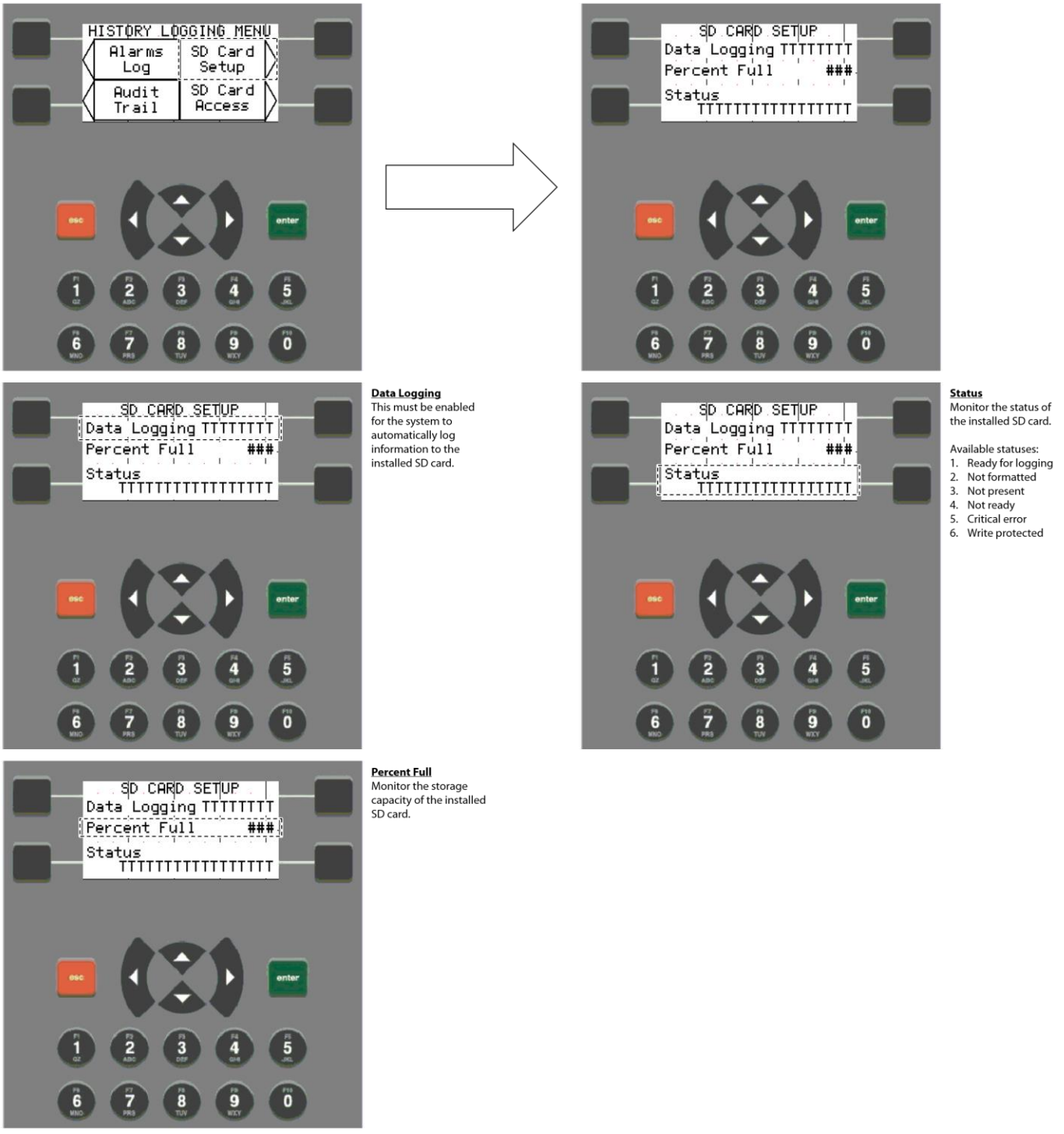
Figure 42: History Logging – Audit Trail and Alarms Log



Through the SD Card Setup submenu, 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 SD Card Data Logging is enabled.

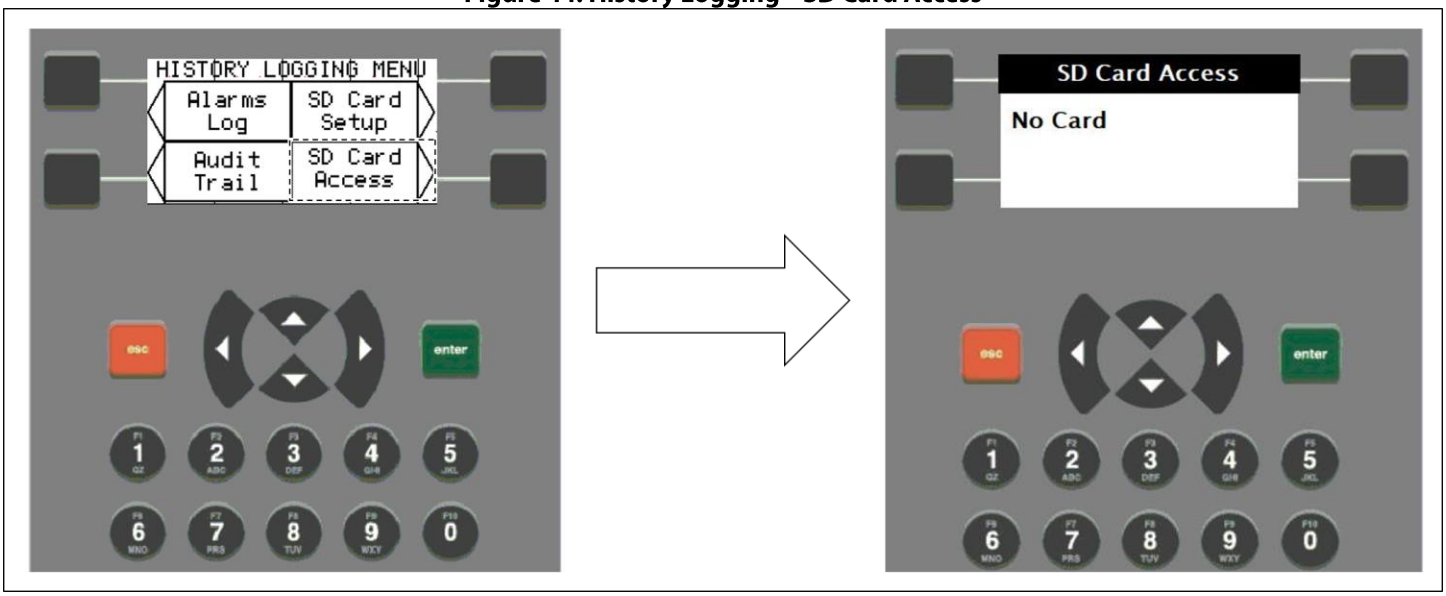
Figure 43: History Logging – SD Card Setup



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

To continue data logging, insert a new micro SD card, and then enable SD Card Data Logging through the SD Card Setup.

Figure 44: History Logging – SD Card Access



System I/O

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

Figure 45: Setup Menu – System I/O Submenus

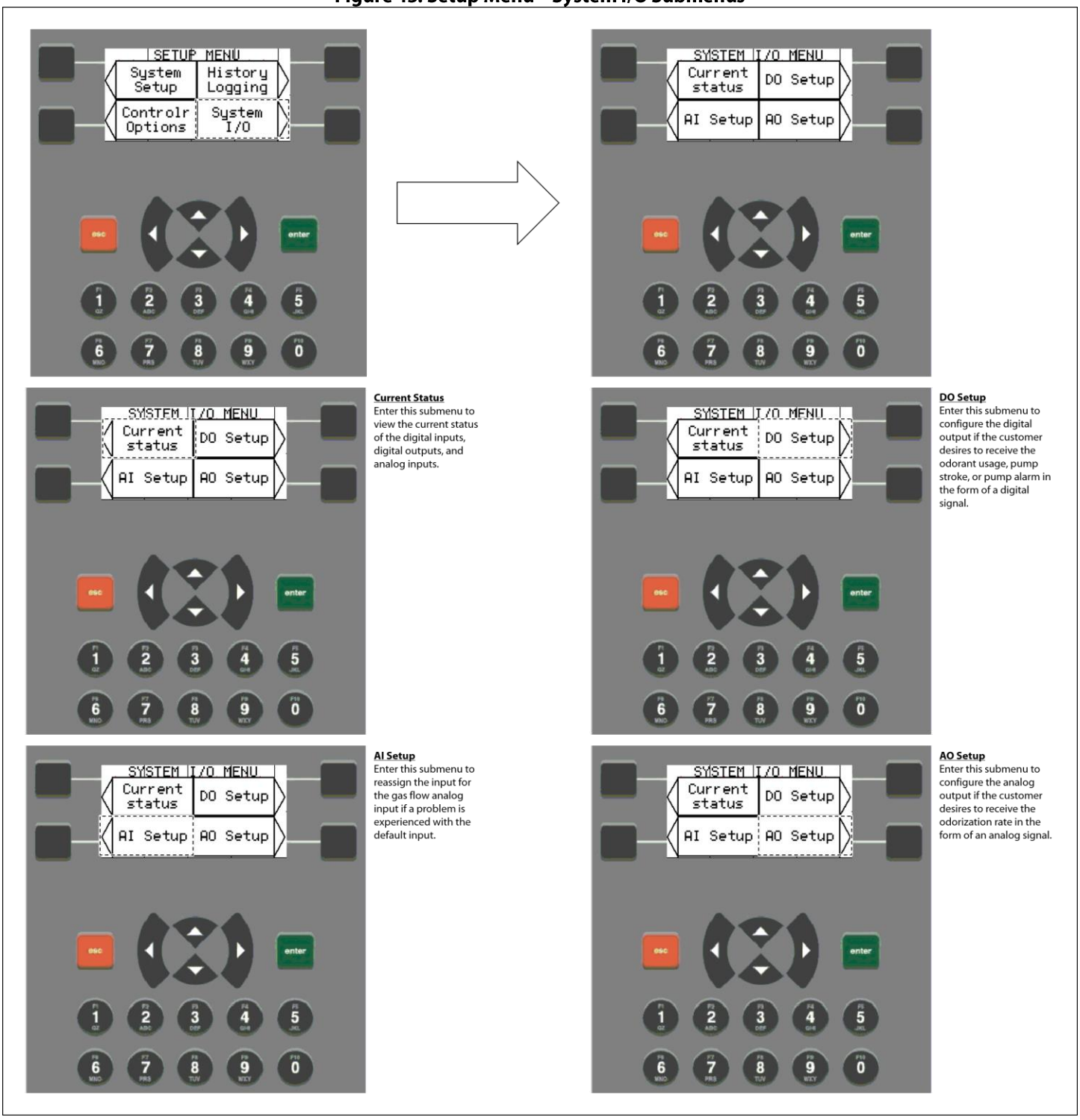
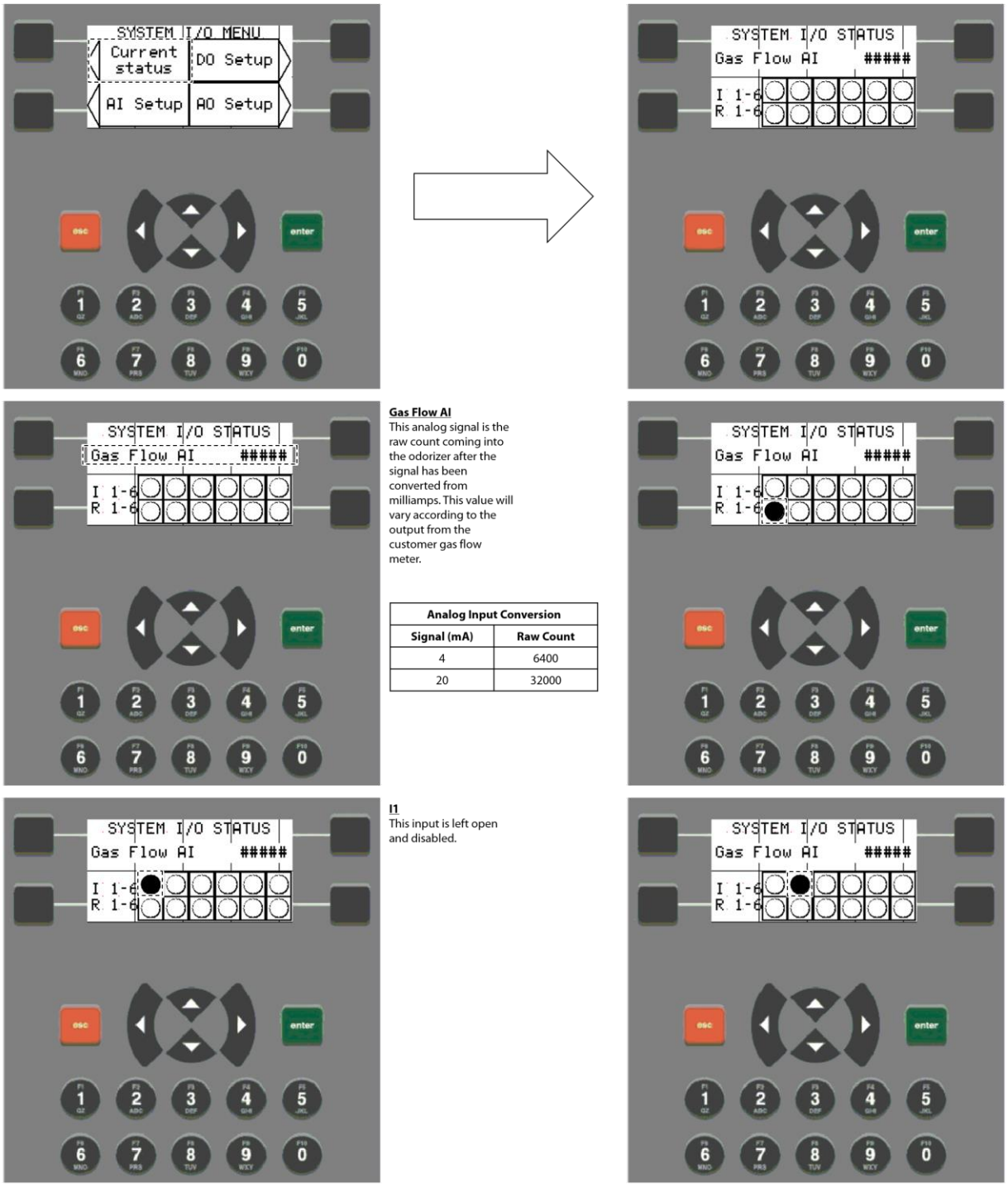


Figure 46: Setup Menu – System I/O Submenu - Current Status, 1 of 2



Gas Flow AI
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.

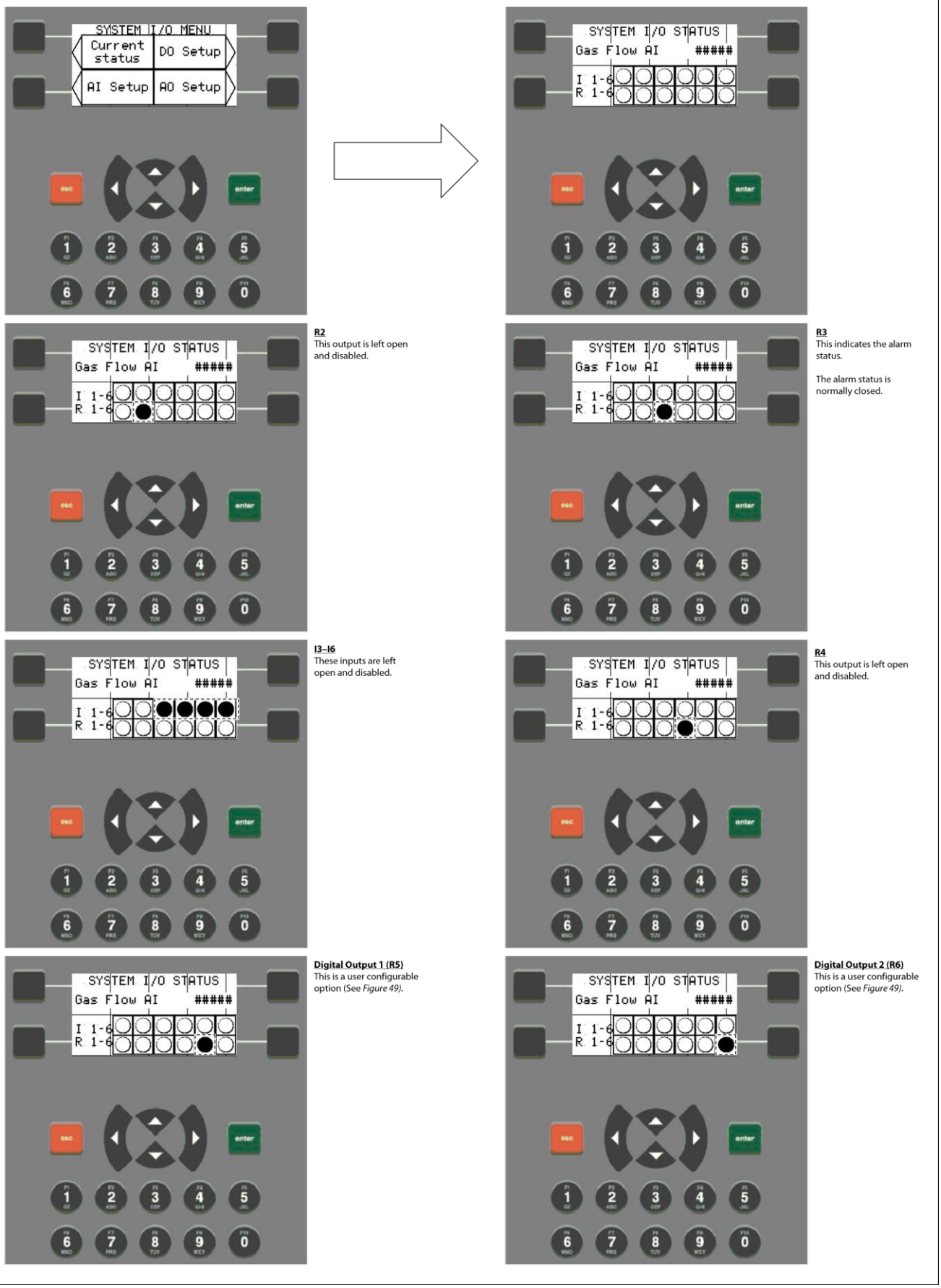
Analog Input Conversion	
Signal (mA)	**Raw Count**
4	6400
20	32000

R1
This will close when the pump is injecting odorant.

I1
This input is left open and disabled.

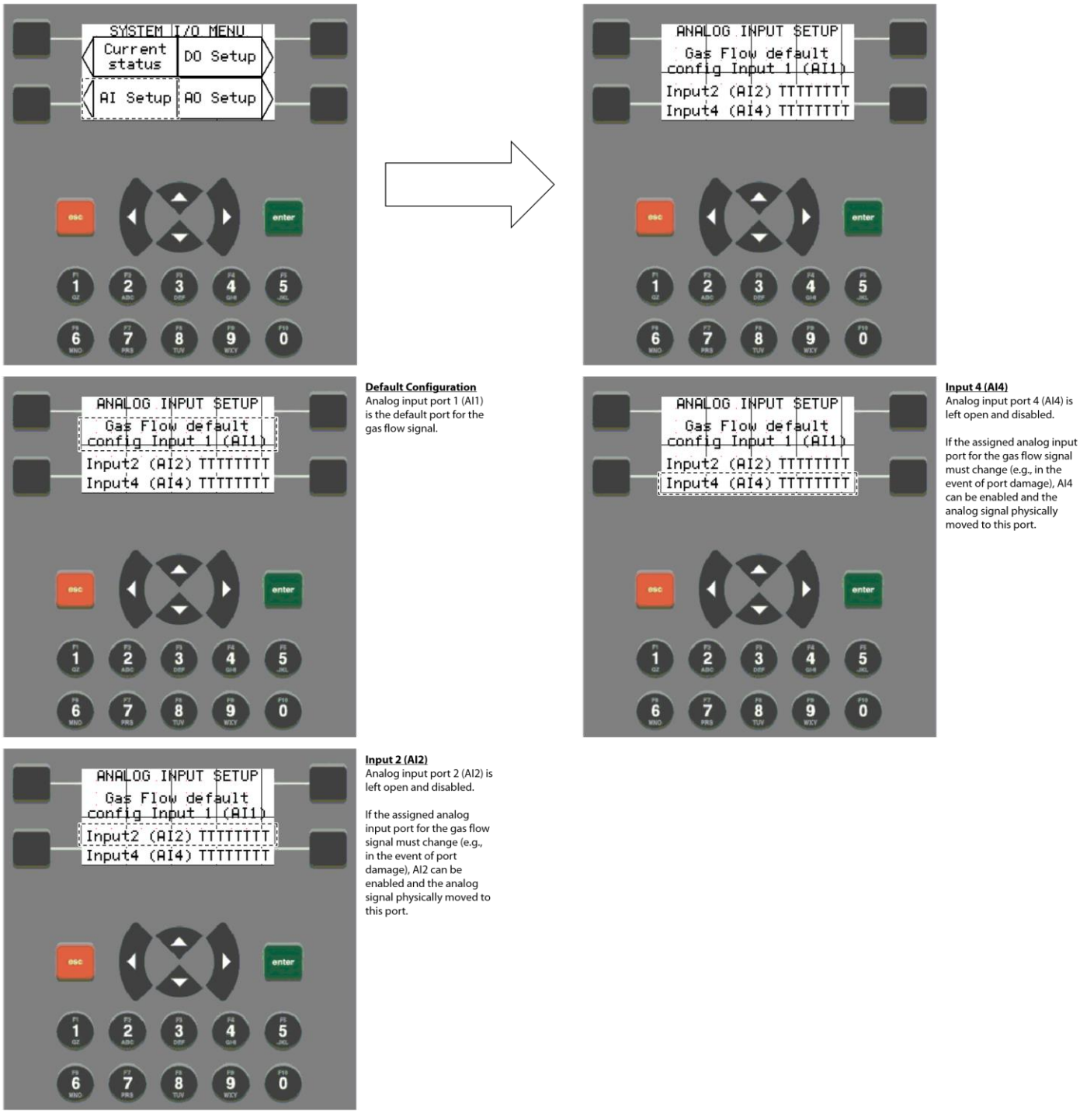
I2
This is the gas flow pulse input and will close when the customer meter on the pipeline transmits a gas flow signal, if applicable.

Figure 47: Setup Menu – System I/O - Current Status, 2 of 2



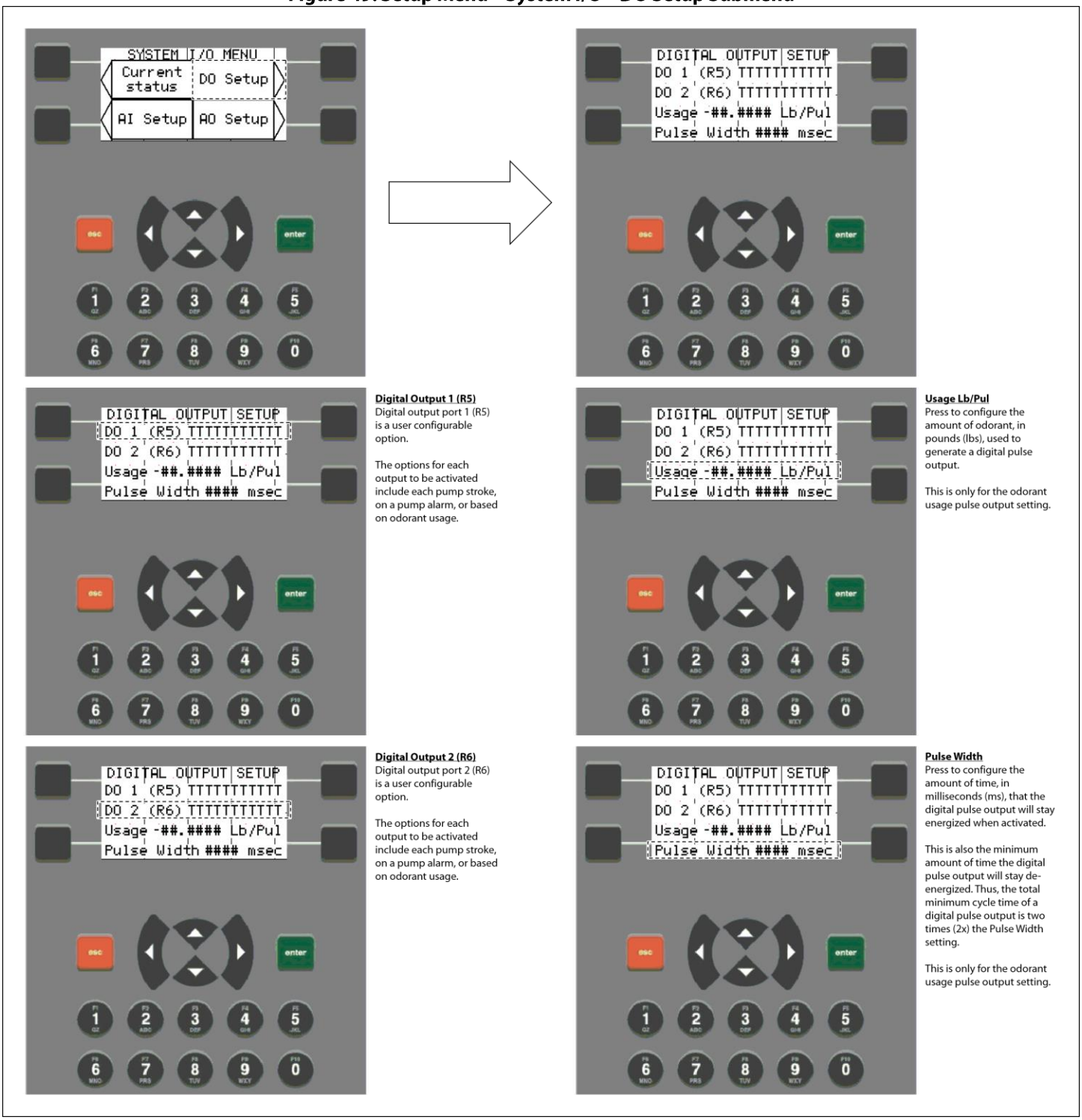
The AI Setup submenu allows the user to change the configuration of the analog input ports for the gas flow signal.

Figure 48: Setup Menu – System I/O – AI Setup Submenu



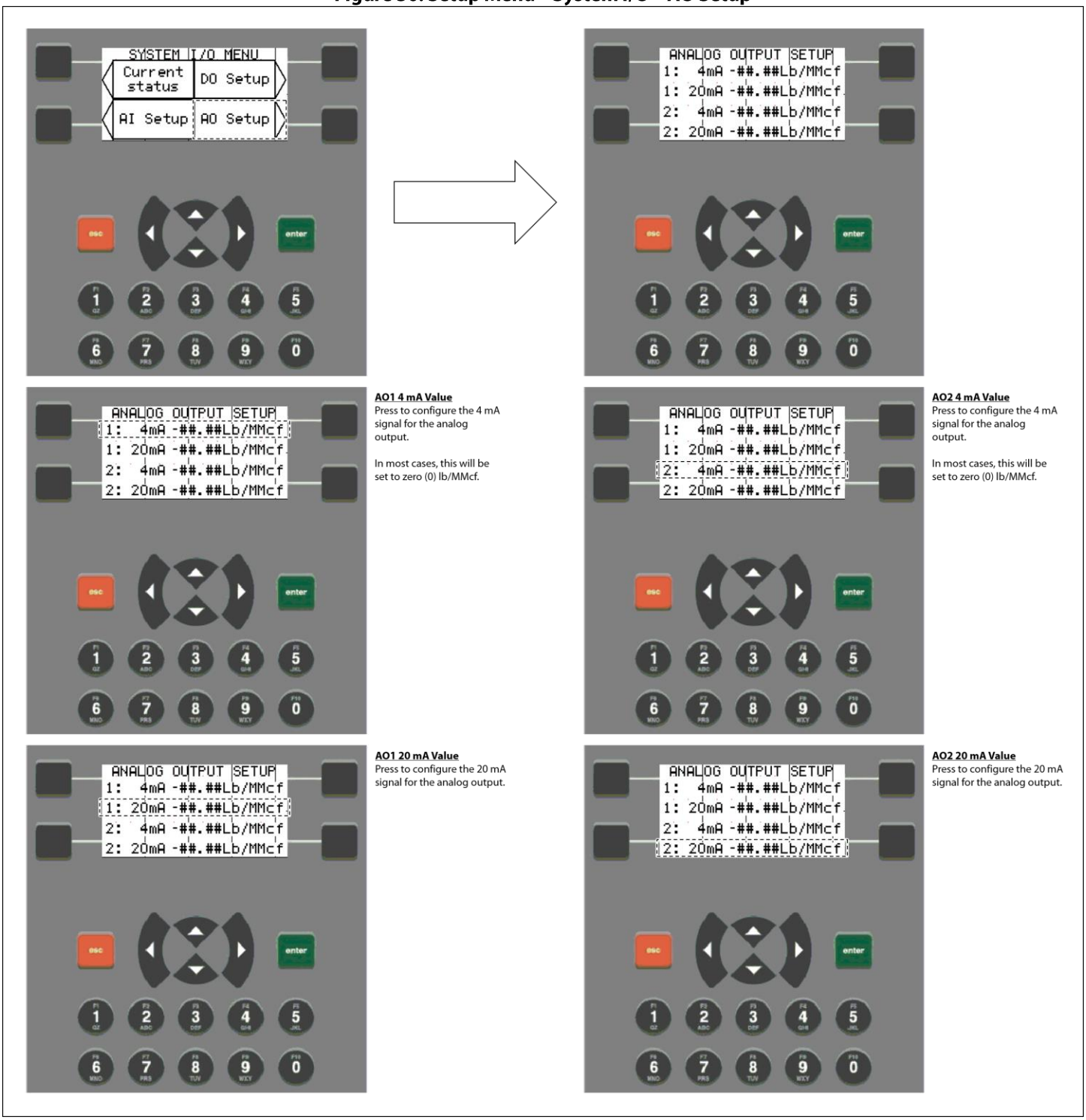
The DO Setup submenu allows the user to change the configuration of the digital output ports and the settings for the odorant usage pulse output.

Figure 49: Setup Menu – System I/O – DO Setup Submenu



The AO Setup submenu allows the user to change the configuration of the odorization rate 4–20 mA signals for the analog output ports.

Figure 50: Setup Menu – System I/O – AO Setup



SECTION 4: MAINTENANCE

4.1 Before You Begin

1. **Refer to *Appendix B, Maintenance Schedule,* for the itemized Welker recommended maintenance schedule for the Essentials™ Injection Odorizer.**
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. Welker recommends having the following tools available for maintenance. Please note that the exact tools required may vary by model.
    a. Adjustable Wrench
    b. Crescent Wrench
    c. Flat Head Screwdriver
    d. Hex Key Set
    e. Phillips Head Screwdriver
    f. Seal Pick

4.2 Maintenance

1. During injection, monitor the system for leaks. If leaks are present, halt operation and repair as necessary.
2. Occasionally, a system component may need to be repaired or replaced for manufacturer recommended maintenance. To perform maintenance on components:
    a. Turn OFF all electrical power to the system.
    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.*

4.3 Troubleshooting

Table 3: Essentials™ Injection Odorizer Troubleshooting		
Issues	**Possible Causes**	**Solutions**
Nothing is happening.	The battery is dead or not charging.	Ensure that the solar panel has been connected to the battery. As necessary, adjust the solar panel so that it faces the direction of the sun and is not shaded.
	Power input wires may be loose or disconnected.	Ensure power input wires are properly and securely connected in terminal blocks and that power is being supplied.
The SSO-9MED is not actuating properly.	The instrument air supply may be too high, too low, or not operating.	Inspect the instrument air supply. As necessary, regulate the instrument air supply to ensure air is supplied at the appropriate pressure.
	The solenoid may not be actuating properly.	Use the manual override button to check the solenoid and ensure proper operation. If the solenoid is operating improperly, refer to the *Installation, Operation, and Maintenance* (IOM) *Manual* for the solenoid.
The SSO-9MED is not injecting the correct amount of odorant.	The SSO-9MED is not set to the desired injection volume.	Adjust the injection volume. See *Section 2.3, Start-Up Procedures*, for instructions on adjusting the injection volume.

APPENDIX A: REFERENCED OR ATTACHED DOCUMENTS

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

- IOM-101: Welker PP-1, PP-1W, PP-2, and PP-3 Pitot Probes
- IOM-175: Welker SSO-9MED Injection Pump
- IOM-187: Welker OdorEyes SFA Sight Flow Assembly
- IOM-203: Welker SP-DP Diffusing Probe

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

- Ameresco, Inc. 10W Photovoltaic Module 10J (Welker IOM-V345)
- Horner APG, LLC X2 OCS Module (Welker IOM-V448)
- Inline Industries, Inc. 201F Ball Valve (Welker IOM-V222)
- Morningstar Corporation SunSaver™ Solar Controller (Welker IOM-V346)
- Rochester Gauges, Inc. 6200 Series Magnetic Liquid-Level Gauges for LP Gas Service (Welker IOM-V344)
- Versa Products Company, Inc. C Series Solenoid Valves (Welker IOM-V041)

Welker drawings and schematics suggested for use with this unit:

- System Drawing: PSYS0063 (Essentials™ Injection Odorizer With 30-Gallon Odorant Supply Tank)
- System Drawing: PSYS0068 (Essentials™ Injection Odorizer With 10-Gallon Odorant Supply Tank)

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: Essentials™ Injection Odorizer Maintenance Schedule

Action	Every 12 Months	As Necessary
Rebuild the SSO-9MED using a Welker repair kit. • **Replace the seals.** • **Maintain the check valves.** • **Inspect the seat, screen, wiper, and power and injection cylinders for damage or wear.**	**X**	
Verify the instrument air supply pressure and blanket pressure.		**X**
View the controller's current alarms.		**X**
Inspect the SSO-9MED, tubing, valves, and fittings on the system for leaks.		**X**
Maintain the solenoid.		**X**

NOTES

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

welker.com