

AyrDyne[®] v2.0 monitoring system

Installation, Operation, and Maintenance Manual



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INTRODUCTION

The purpose of this document is to outline proper installation, maintenance, operation, and care of the AyrDyne® Monitoring System Human Machine Interface (HMI). This document is in no way intended to be used to determine the reliability of this product outside of its originally intended application. It is the duty of the end user or integrator to perform the appropriate risk analysis in order to determine the relevance of its use within any specific application.

All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

Failure to follow the guidelines outlined in this manual may result in injury, harm, or improper operating results. Failure to observe this information may also result in equipment damage, premature wear, or failure.

1 - OVERVIEW

SAFETY

Electrical equipment should be installed, operated, serviced, and maintained only by a qualified person. No responsibility is assumed by DenTech, Inc. for any consequences arising out of the use of this material. A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.



This symbol indicates that an electrical hazard exists which could result in personal injury if the instructions are not followed.



This safety alert symbol is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

2 - INSTALLATION, WIRING & REMOVAL

2.1 INSTALLATION

This chapter describes the correct installation method for the AyrDyne controller in order to facilitate safe, reliable operation.

1. Before mounting the unit, please ensure that all of the necessary hardware is included: four (4) installation fasteners, one (1) installation gasket, and one (1) power connector. Ensure that the mounting surface is free of dirt and debris.



CAUTION!

MECHANICALLY UNSTABLE TERMINAL

Always keep HMI stable in panel cut-out while you are installing or removing installation fasteners.

FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN INJURY, OR EQUIPMENT DAMAGE.

2. Begin by carefully placing the AyrDyne Monitoring System through the opening in the control enclosure door, ensuring that the installation gasket is securely seated in the installation groove on the controller and in firm contact with the face of the enclosure door.
3. Insert the installation fasteners into the recesses on the top and bottom of the back side of the controller.
4. Using a Phillips head screwdriver, carefully drive the installation fasteners against the back side of the control enclosure door, ensuring that each installation fastener is tightened evenly to securely mount the HMI to the control enclosure door.



CAUTION!

DO NOT OVER TIGHTEN

5. Inspect the HMI to ensure that the controller is evenly mounted to the control enclosure door surface. Make sure that the installation gasket is still within its groove.

2.2 WIRING



WARNING!

ELECTRICAL SHOCK HAZARD EXISTS

- **Ensure that the control enclosure within which you are working is powered down and locked out.**
- **Verify that all power sources are in a zero energy state.**

FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN INJURY, DEATH, OR EQUIPMENT DAMAGE.

1. Ensure that the controller is securely mounted within the control enclosure door.
2. The AyrDyne Monitoring System utilizes a Telefast wiring harness to facilitate ease of installation and removal. Carefully insert the Telefast connector coming from the existing input and output modules into the Telefast receiver located on the rear side of the controller. The connector should snap into place.
3. If any expansion I/O are being utilized with the current application, the connections can be terminated at this time. Expansion discrete I/O utilize a similar wiring harness connection configuration as the base I/O.
4. Any expansion analog inputs and outputs can be terminated at this time. The terminals designated for control power, analog inputs, and analog outputs, are labeled on the analog expansion card.
5. If Variable Frequency Drive (VFD) communications are being utilized with the current application, insert the communications connector into the 9-pin D-shell receiver located on the back of the HMI and tighten the lugs on the connector.
6. Next, ensure that the HMI power connector plug connections have been terminated correctly (24vdc, 0vdc, and ground). Then carefully insert the power connector plug into the power connector opening on the back of the HMI.

2.3 REMOVAL



Figure 2.3.1



Figure 2.3.2

1. Remove the power connector plug from the HMI.

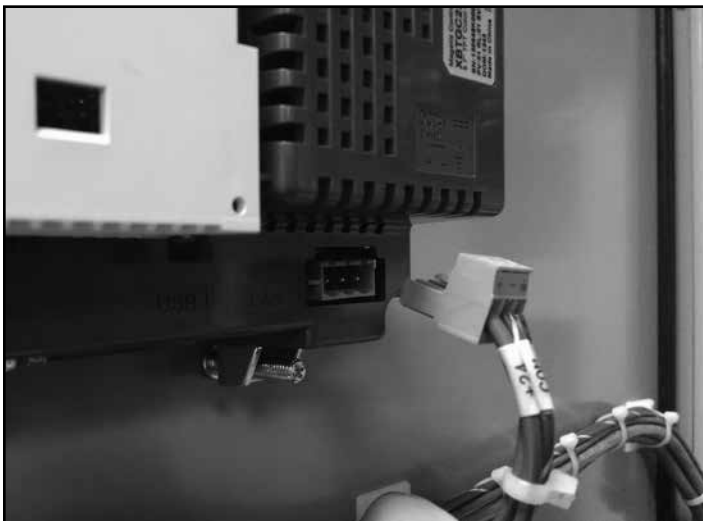


Figure 2.3.3

2. If VFD communications are being utilized with this application, loosen the lugs on the communications adapter and carefully remove it.

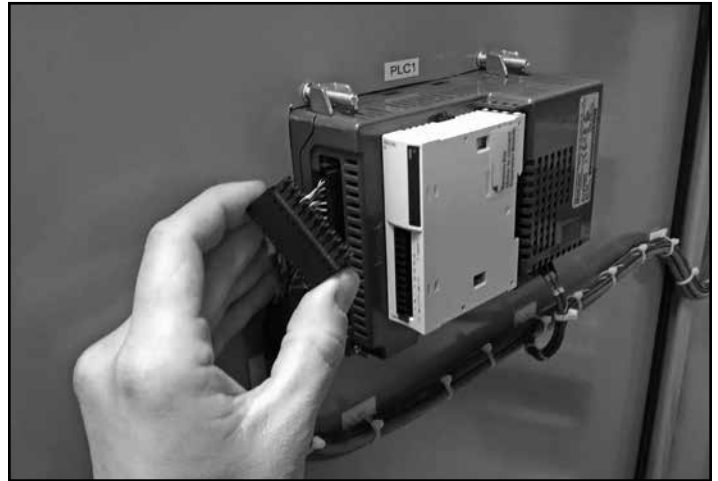


Figure 2.3.4

3. Carefully loosen and remove all Telefast connectors and analog expansion connectors.

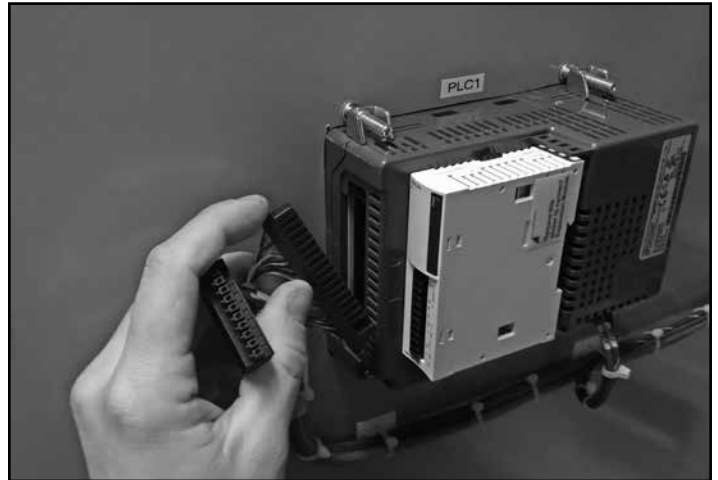


Figure 2.3.5



Figure 2.3.6

4. With the HMI free from all electrical wiring, begin to loosen the four (4) installation fasteners that secure the HMI to the control enclosure door with a Phillips head screwdriver while supporting the HMI with the other hand.



Figure 2.3.7

5. Continue to loosen the installation fasteners until they can be removed.



Figure 2.3.8: Installation fasteners removed

6. With the installation fasteners removed, gently remove the AyrDyne Monitoring System from the control enclosure door, taking care not to damage or displace the installation gasket.



Figure 2.3.9



Figure 2.3.10



Figure 2.3.11: Controller, completely removed

3 - OPERATION

This section covers the navigation and operation of the standard AyrDyne monitoring system. The operation and functionality of each screen is covered in detail.

3.1 SCREEN OVERVIEW

Depending on your system requirements and configuration, you may have a number of screens and sub-screens available to you:

Home	An overview of the system and the first screen to display when power is applied.		
	Menu	Contains buttons that can be used to navigate to other screens.	
	DP	Differential Pressure screen. Monitoring and control of the differential pressure and cleaning system.	
		Hand Clean	Allows the user to navigate to the desired module(s).
		Module X	Enables the user to manually pulse cleaning solenoids on module X.
		DP Trend	A graph of plotted differential pressure readings.
	I/O Menu	Menu to navigate to the available I/O screens.	
		I/O Base	Base Digital input and output display.
		I/O Card X	I/O screen displaying expansion analog or digital inputs and/or outputs being utilized.
	I/O Configuration	Digital input configuration.	
	Hour Meters	Total and User Hour Meters displays minutes, hours, days, and years that the system has been run.	
	Airflow	Airflow monitoring and control screen.	
	VFD Setup	Variable Frequency Drive monitoring and configuration.	
	Rotary Valve	Rotary valve status and operation.	
	Service Interval Setup	Service interval feature adjustable from this screen.	
	Isolation Valve	Isolation Valve status and configuration.	
	Double Dump	Double Dump Valve status, configuration, and operation.	
	HEPA	HEPA filter differential pressure monitoring and control screen.	
	Future Option	Inactive in this version, feature not yet available.	
	Future Option	Inactive in this version, feature not yet available.	
	Future Option	Inactive in this version, feature not yet available.	
	Future Option	Inactive in this version, feature not yet available.	
	Future Option	Inactive in this version, feature not yet available.	

3.1.1 HOME

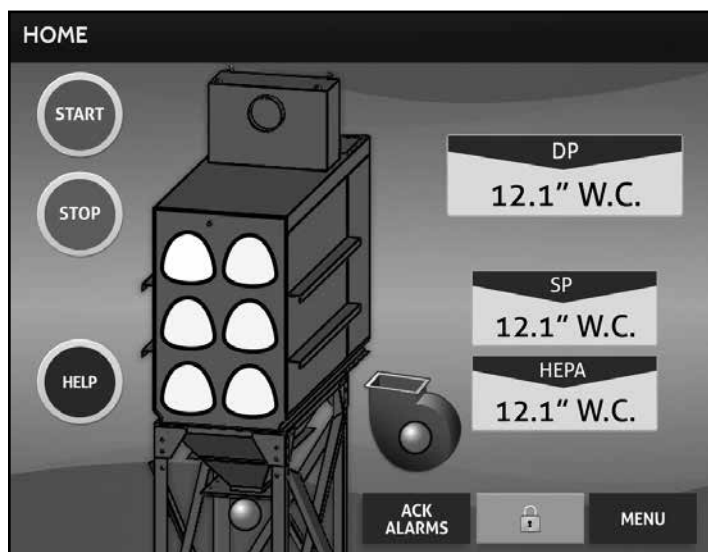


Figure 3.1.1: Home Screen

When the AyrDyne Monitoring System has been powered up, the first screen to be displayed will be the Home screen. This screen has the following features:

- a. **Stop/Start** – Push buttons used to start and stop the system are located in the upper left portion of the screen.
- b. **Help** – Press this button to obtain the required information to receive technical support

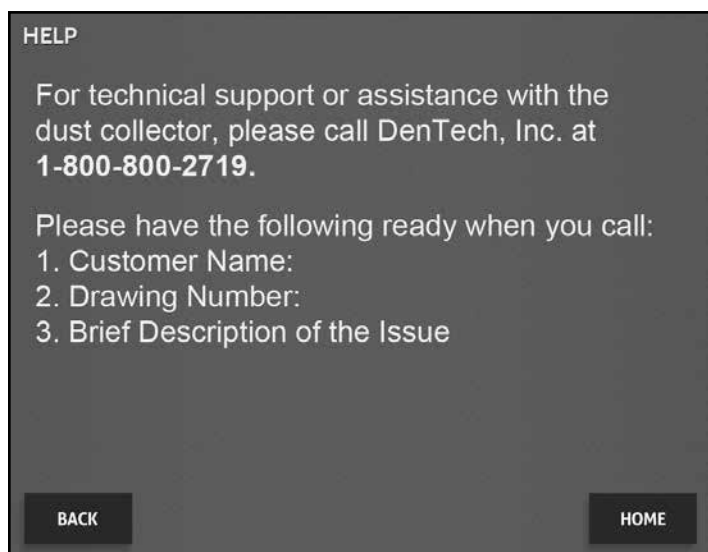


Figure 3.1.2: Help Screen

- c. **Blower Status** – Blower status consists of one indicator, three states:
 - i. Off: Red
 - ii. On: Green
 - iii. Fault: Flashing Red
- d. **Rotary Valve Status** – Rotary Valve status consists of one indicator, three states if applicable:
 - i. Off: Red
 - ii. On: Green
 - iii. Fault: Flashing Red
- e. **Differential Pressure** – Differential pressure is displayed on the home screen. This display is animated to turn orange at 4.0"W.C. and red at 6.0"W.C.
- f. **Static Pressure/Velocity** – Static pressure or velocity is displayed on the main screen if applicable.
- g. **HEPA Differential Pressure** – HEPA Differential pressure is displayed on the home screen. This display is animated to turn orange at 2.0"W.C. and red at 3.0"W.C.
- h. **Menu Navigation** – Located in the bottom right hand corner of the screen, this button will take you to the Menu screen.
- i. **Security (if applicable)** – If security is being utilized with the application, the protected screens will be greyed out on the menu screen. When a secured navigation button is pressed, the user will be prompted to login. The logout button will be located on the main screen to the left of the menu button. The user will be automatically logged out after 5 minutes of inactivity.
- j. **ACK Alarms** – This button is used to acknowledge and clear all alarms. Any alarms that are still active will be regenerated once the button is released.

3.1.2 MENU

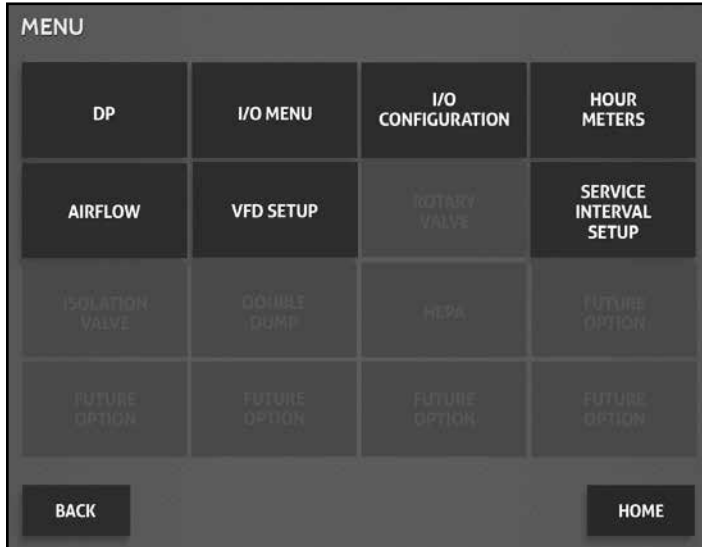


Figure 3.1.3: Menu Screen

This screen allows the user to navigate to other screens that are available on the controller. Any screen that is not available will be lighter than the available navigation buttons.

- a. **DP** – Navigation to the Differential Pressure screen.
- b. **I/O Menu** – Navigation to the I/O Menu screen.
- c. **I/O Configuration** – Navigation to the I/O Configuration screen.
- d. **Hour Meters** – Navigation to the Hour Meter screen.
- e. **Airflow** – Navigation to the Airflow screen.
- f. **VFD Setup** – Navigation to the VFD Setup screen.
- g. **Rotary Valve** – Navigation to the Rotary Valve screen.
- h. **Service Interval Setup** – Navigation to the Service Interval Setup screen.
- i. **Isolation Valve** – Navigation to the Isolation Valve screen.
- j. **Double Dump** – Navigation to the Double Dump screen.

- k. **HEPA** – Navigation to the HEPA screen.
- l. **Future Option** – Inactive in this version, feature not yet available.
- m. **Back** – Back to the previous screen.
- n. **Home** – Navigation to the Home screen.

3.2 DP

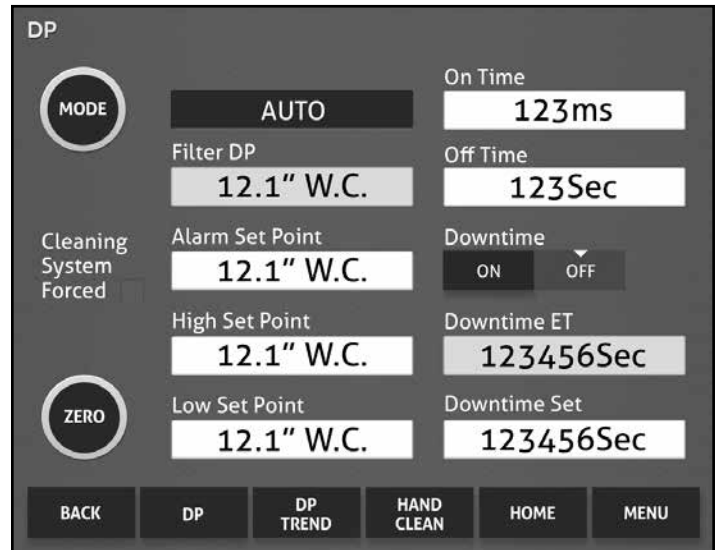


Figure 3.2: DP Screen

The Differential Pressure screen displays the filter differential pressure as well as all settings related to differential pressure alarms, and any filter cleaning based on differential pressure.

- a. **Mode** – The Mode toggle push button toggles between manual and automatic filter cleaning modes. Automatic is the default mode and the recommended method of normal operation. In automatic mode, the text bar at the top of the left column will display AUTO, and the system will initiate pulse cleaning based on differential pressure. In manual mode, the text bar at the top of the left column will display MANUAL, and the system will begin its pulse cleaning cycle. The system will continue to clean until the toggle button is pressed again to switch the system back into automatic mode. While in manual mode, “Cleaning System Forced” text will appear below the mode button and a red indicator will flash.

- b. **Zero** – The Zero push button will zero any differential pressure reading, should it wander from zero over the lifespan of the differential pressure sensor. This can only be done when the system is not running. Additionally, the pneumatic tubing should be disconnected from the control panel.
- c. **Filter DP** – This numeric display shows filter differential pressure as detected between the dirty and clean sides of the filters.
- d. **Alarm Set Point** – This numeric entry/display shows the set point that the differential pressure must exceed to initiate an alarm. This value is adjustable between the High Set Point and 20.0.
- e. **High Set Point** – This numeric entry/display shows the set point that the differential pressure must exceed to initiate a cleaning cycle. This value is adjustable between the Low Set Point and Alarm Set point.
- f. **Low Set Point** – This numeric entry/display shows the set point that the differential pressure must be less than to stop the cleaning cycle. This value is adjustable between 0.1 and the High Set Point.
- g. **On Time** – This numeric entry/display shows the duration of each cleaning pulse. This value is adjustable between 50 and 500 milliseconds.
- h. **Off Time** – This numeric entry/display shows the amount of time between pulses. This value is adjustable between 1 and 20 seconds.
- i. **Downtime On/Off** – Toggle switch that enables or disables the downtime cleaning cycle.
- j. **Downtime ET** – This numeric display shows the elapsed time of the downtime cleaning cycle.
- k. **Downtime Set** – Numeric entry/display that displays and sets the duration of the downtime cleaning cycle.
- l. **Back** – Back to the previous screen.
- m. **Hand Clean** – Navigation to the Hand Clean screen.
- n. **DP Trend** – Navigation to the DP Trend screen.
- o. **Home** – Navigation to the Home screen.
- p. **Menu** – Navigation to the Menu screen.

3.2.1 HAND CLEAN

1. MODULE SELECTION

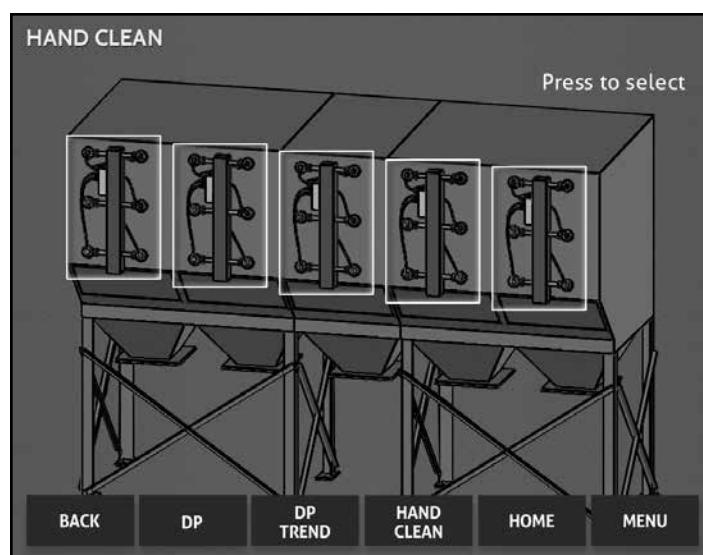


Figure 3.2.1.1: Hand Clean Screen

The Hand Clean screen is used to select the different modules of the dust collector.

- a. **Back** – Back to the previous screen.
- b. **DP** – Navigation to the DP screen.
- c. **DP Trend** – Navigation to the DP Trend screen.
- d. **Home** – Navigation to the Home screen.
- e. **Menu** – Navigation to the Menu screen.

2. MODULE (X) MANUAL PULSING

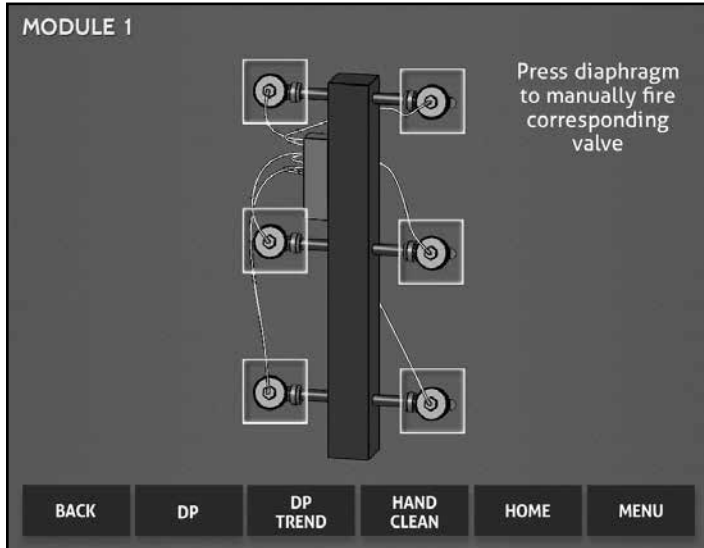


Figure 3.2.1.2: Hand Clean Screen

This screen enables the user to manually pulse each solenoid valve on the selected module. Press within the box surrounding the valve to be pulsed in order to manually fire the solenoid valve. The number of modules and valves per module is dependent upon the user's system.

- a. **Back** – Back to the previous screen.
- b. **DP** – Navigation to the DP screen.
- c. **DP Trend** – Navigation to the DP Trend screen.
- d. **Hand Clean** – Navigation to the Hand Clean screen.
- e. **Home** – Navigation to the Home screen.
- f. **Menu** – Navigation to the Menu screen.

3.2.2 DP TREND



Figure 3.2.2: DP Trend Screen

The DP Trend screen shows the historical differential pressure for a user defined interval. The sampling interval is set from the Trend Time entry/display.

- a. **Trend Time** – This numeric entry/display displays and sets the amount of time between samples. This value is adjustable between 1 and 1440 minutes.
- b. **Back** – Back to the previous screen.
- c. **DP** – Navigation to the Differential Pressure screen.
- d. **DP Trend** – Navigation to the Differential Pressure Trending screen.
- e. **Hand Clean** – Navigation to the Hand Clean screen.
- f. **Home** – Navigation to the Home screen.
- g. **Menu** – Navigation to the Menu screen.

3.3 I/O MENU

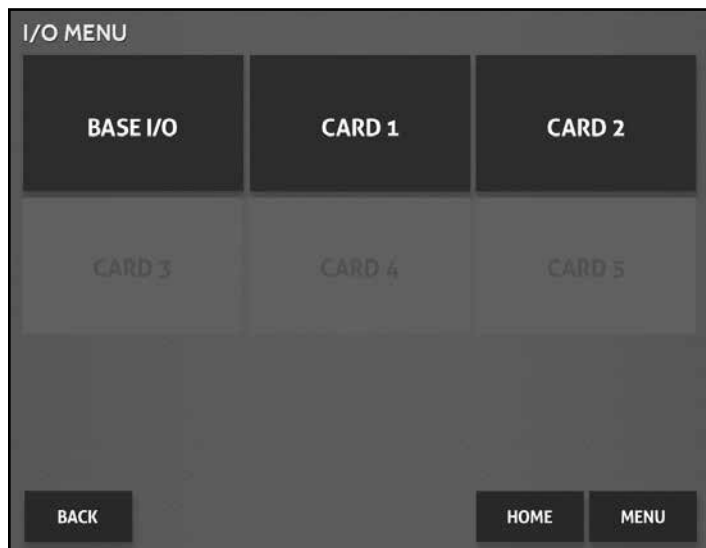


Figure 3.3: I/O Menu Screen

Navigation to the I/O Menu screen.

- Base I/O** – Navigation to the Base I/O screen.
- Card X** – Navigation to expansion analog and/or digital input and/or output card screens.
- Back** – Back to the previous screen.
- Home** – Navigation to the Home screen.
- Menu** – Navigation to the Menu screen.

3.3.1 BASE I/O

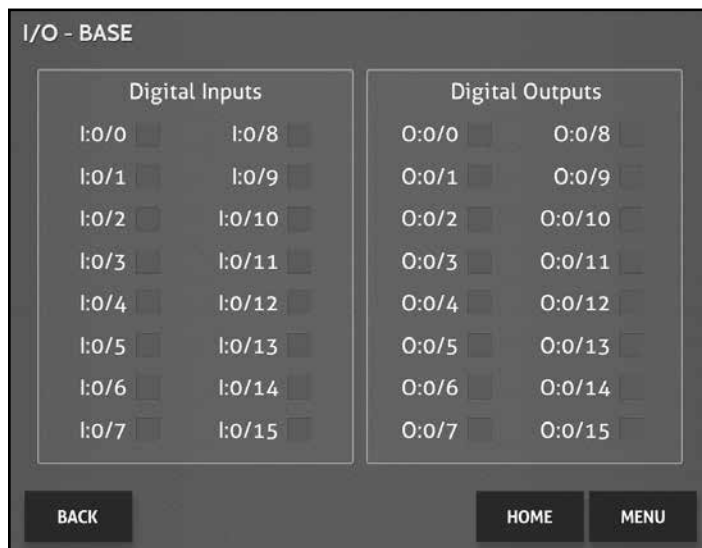


Figure 3.3.1: Base I/O Screen

This screen displays the status of the base I/O. An indicator that is red signifies that the corresponding input or output is off; green signifies that the corresponding input or output is on.

- Back** – Back to the previous screen.
- Home** – Navigation to the Home screen.
- Menu** – Navigation to the Menu screen.

3.3.2 I/O CARD X



Figure 3.3.2a: I/O - Card 1 Screen

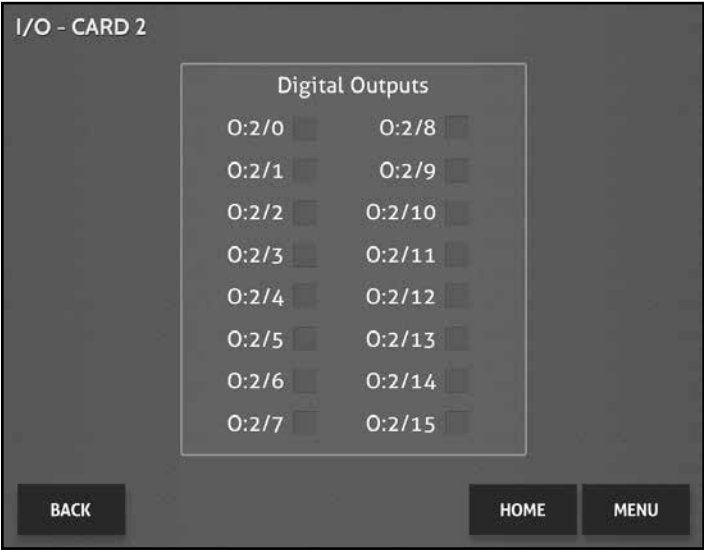


Figure 3.3.2b: I/O - Card 2 Screen

The I/O Card screen(s) allow the user to view analog and/or digital, input and/or output expansion card data.

- a. **Back** – Back to the previous screen.
- b. **Home** – Navigation to the Home screen.
- c. **Menu** – Navigation to the I/O Menu screen.

3.3.3 I/O CONFIGURATION

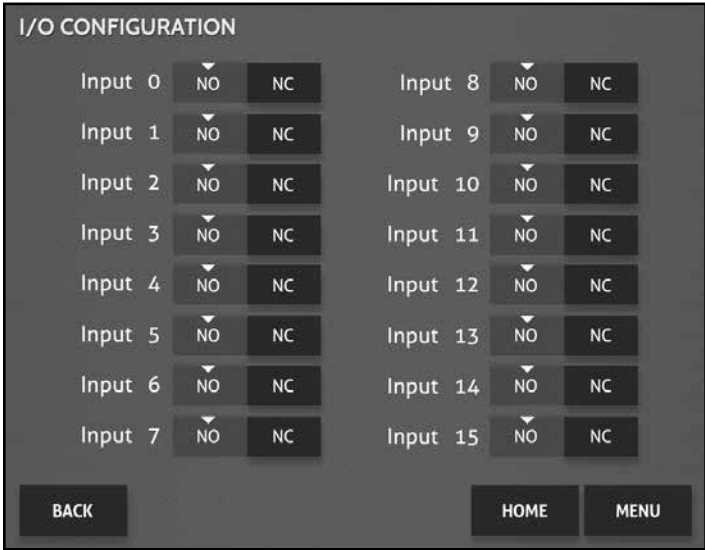


Figure 3.3.3: I/O Configuration Screen

The I/O Configuration screen allows the end user to configure the way that the program interprets the input(s).

- a. **Back** – Back to the previous screen.
- b. **Home** – Navigation to the Home screen.
- c. **Menu** – Navigation to the I/O Menu screen.

3.4 HOUR METERS

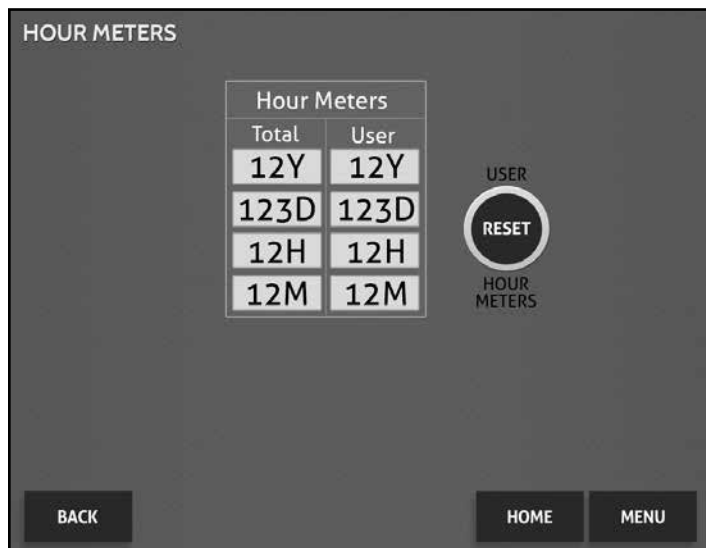


Figure 3.4: Hour Meters Screen

The hour meter consists of two parts: total operation time and user run time.

- a. **Total** – This display shows the total minutes, hours, days, and years that the system has been run.
- b. **User** – This display shows the user minutes, hours, days, and years that the system has been run. It is resettable and is intended to aid in preventative maintenance.
- c. **User Hour Meter Reset Button** – This reset button will clear the accumulated values from the User Hour Meter.

3.5 AIRFLOW

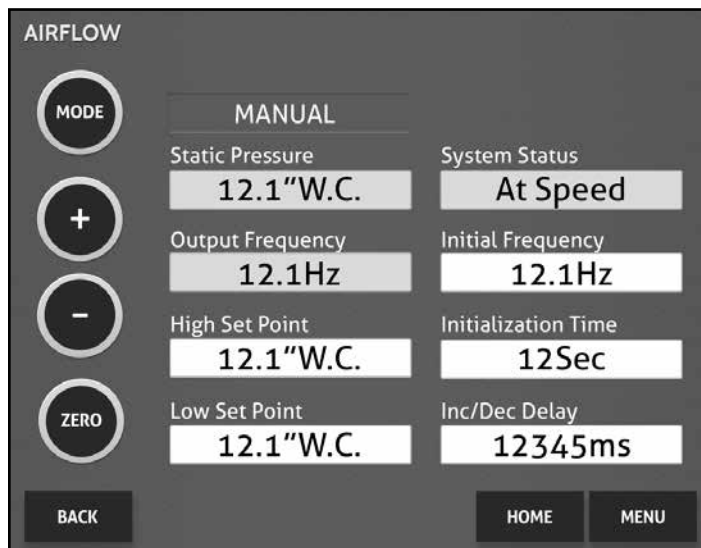


Figure 3.5: Airflow Screen

The Airflow screen enables the user to view airflow control readings and settings, as well as to make changes to set points and control airflow manually if necessary.

- a. **Mode** – The Mode toggle push button allows the user to choose between manual and automatic modes of controlling airflow. Automatic is the default mode and the recommended method of normal operation. In the automatic mode, the AyrDyne controller will automatically control the speed of the blower to maintain a constant airflow. While in the manual mode, a + and - button are visible. These buttons can be used to increase and decrease the speed of the blower, respectively. The current mode is displayed by the indicator to the right of the mode button.
- b. **Zero** – The Zero push button will zero any differential pressure reading, should it wander from zero over the lifespan of the differential pressure sensor. This can only be done when the system is not running. Additionally, the pneumatic tubing should be disconnected from the control panel.

- c. **Static Pressure/Velocity** – This numeric display shows system static pressure in inches of water column, or velocity in feet per minute depending on system configuration.
- d. **Output Frequency** – This numeric display shows the VFD output frequency.
- e. **High Set Point** – This numeric entry/display shows the high set point for airflow control. If in the automatic mode and the static pressure/velocity is above this set point, the AyrDyne will decrease the speed of the blower. This value is adjustable between the Low Set Point and 20.0.
- f. **Low Set Point** – This numeric entry/display shows the low set point for airflow control. If in the automatic mode and the static pressure/velocity is below this set point, the AyrDyne will increase the speed of the blower. This value is adjustable between 0.1 and the High Set Point.
- g. **System Status** – This display shows the airflow control status and has multiple states: Waiting; Increasing Speed; Decreasing Speed; and At Speed. While Waiting, the controller is waiting for the system to start or adjust. While Increasing Speed, the VFD is being ramped up to allow more air to flow. If the VFD is at 60Hz, but the minimum set point hasn't been exceeded, the status will be Increasing Speed. While Decreasing Speed, the VFD is being ramped down to allow less air to flow. While at speed, the static pressure/velocity will be between the high and low set points; therefore, no adjustment is necessary.
- h. **Initial Frequency** – This numeric entry/display shows the initial frequency that the VFD will ramp to. This value is adjustable between 20.0 and 60.0 hertz.
- i. **Initialization Time** – This numeric entry/display shows the amount of time that the VFD will maintain its Initialization Frequency. Once complete, automatic control will be based on the high and low set points. This value is adjustable between 0 and 300 seconds.
- j. **Inc/Dec Delay** – This numeric entry/display shows the delay before increasing or decreasing speed. It is applicable in automatic and manual modes. This value is adjustable between 0 and 5000 milliseconds.
- k. **Back** – Back to the previous screen.
- l. **Home** – Navigation to the Home screen.
- m. **Menu** – Navigation to the Menu screen.

3.6 VFD SETUP

The screenshot shows the 'VFD 1 SETUP' screen with the following elements:

- Parameters (Left Column):**
 - Acc: 123456Sec
 - Dec: 123456Sec
 - FLA: 123.1A
 - OL: 123.1A
 - Volts: 123.1V
- Parameters (Right Column):**
 - DC Bus Voltage: 1234.1VDC
 - Output Frequency: 123.1Hz
 - Last Fault Code: 12345
- Controls (Bottom Center):**
 - A circular 'RESET' button with 'FAULT' text to its left.
 - A 'PRESS TO WRITE' button with 'Stop VFD Then:' text to its left.
 - A 'Complete' button below 'PRESS TO WRITE'.
- Freelance Write Section (Bottom Left):**
 - Freelance Write: 123456
 - Parameter: 123
- Freelance Read Section (Bottom Right):**
 - Freelance Read: 12345
 - Parameter: 123
- Navigation Buttons (Bottom):**
 - BACK (bottom left)
 - HOME (bottom right)
 - MENU (bottom right)

Figure 3.6: VFD Setup Screen

The VFD Setup screen allows the user to read and write any VFD parameter.

- a. **Acc** – This numeric entry/display shows the acceleration time. This value is adjustable between 0 and 500 seconds.

- b. **Dec** – This numeric entry/display shows the deceleration time. This value is adjustable between 0 and 500 seconds.
- c. **FLA** – This numeric entry/display shows the motor full load amperage.
- d. **OL** – This numeric entry/display shows the motor overload setting.
- e. **Volts** – This numeric entry/display shows the line voltage that the VFD is supplied with. This value is adjustable between 208 and 480 volts.
- f. **Freelance Write** – This numeric entry/display shows the value that will be written to the parameter number.
- g. **Parameter** – This numeric entry/display shows the parameter that Freelance Write will be written to.
- h. **DC Bus Voltage** – This numeric display shows the VFD DC bus voltage. This value is only updated when the blower is not running.
- i. **Output Frequency** – This numeric display shows VFD output frequency.
- j. **Last Fault Code** – This numeric display shows the last fault code of the VFD.
- k. **Freelance Read** – This numeric display shows the value of the Freelance Read Parameter.
- l. **Parameter** – This numeric entry/display shows the parameter to be read.
- m. **Stop VFD Then: Press To Write** – With the VFD stopped, pressing this button will write the data to the VFD. When pressed, a status bar will appear below the Press To Write button. When the bar is filled, a COMPLETE message will be displayed within it. This indicates that the information was written to the VFD.
- n. **Back** – Back to the previous screen.
- o. **Home** – Navigation to the Home screen.
- p. **Menu** – Navigation to the Menu screen.

3.7 ROTARY VALVE

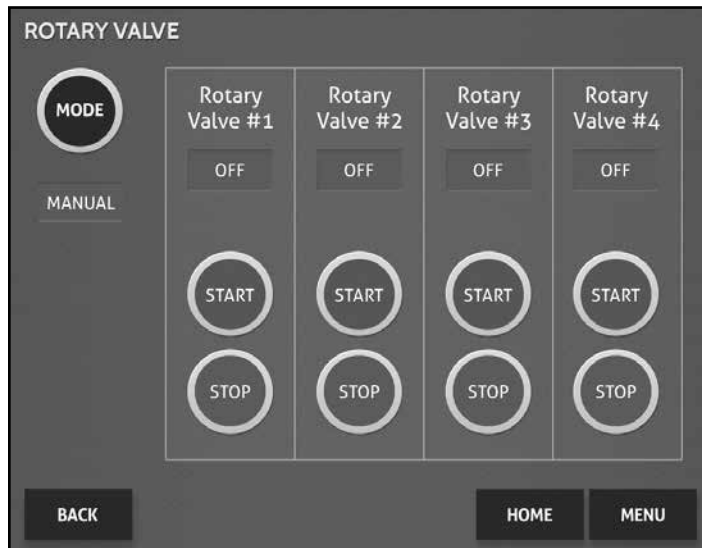


Figure 3.7: Rotary Valve Screen

The Rotary Valve screen allows users to view the status of any Rotary Valve and manually stop or run any Rotary Valve in the system.



WARNING!

USE CAUTION WHEN MANUALLY ENABLING ROTARY VALVE AIR LOCK.

Be sure all personnel are clear and equipment is in mechanically sound condition. Failure to follow this instruction could result in injury, death, or equipment damage.

- a. **Mode** – This toggle push button switches between manual and automatic operation of the Rotary Valve(s). In Auto mode, the Rotary Valve(s) will run when the system is running, during downtime cleaning, and when started and in manual cleaning mode. In Manual mode, each Rotary Valve may be started or stopped independent of the operation of the system.
- b. **Status Indicator** – At the top of each Rotary Valve column is a status indicator that will display one of the following conditions: ON, OFF, or FAULT.

- c. **Start** – This push button allows the corresponding rotary valve to be started when in manual mode.
- d. **Stop** – This push button allows the corresponding Rotary Valve to be stopped when in manual mode.
- e. **Back** – Back to the previous screen.
- f. **Home** – Navigation to the Home screen.
- g. **Menu** – Navigation to the Menu screen.

3.8.1 ACKNOWLEDGING A SERVICE INTERVAL

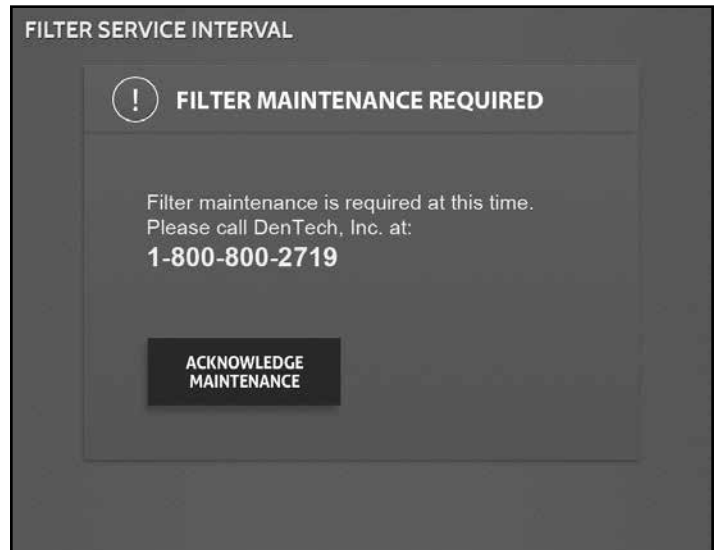


Figure 3.8.1a: Filter Service Interval Screen

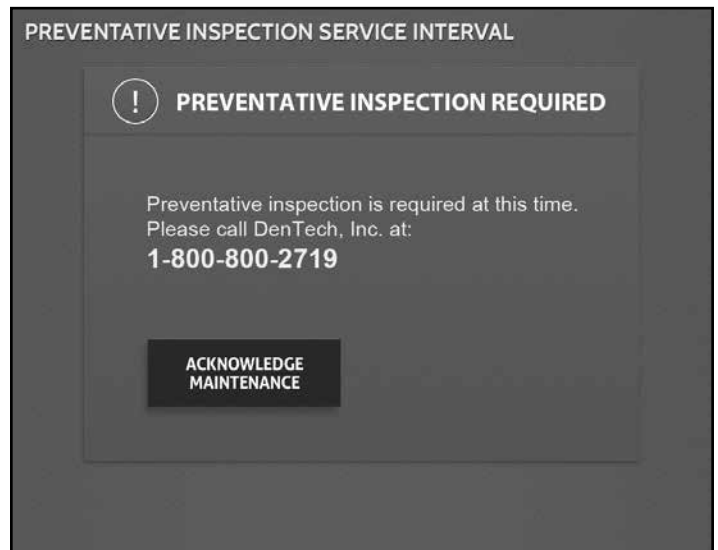


Figure 3.8.1b: Preventative Inspection Service Interval Screen

3.8 SERVICE INTERVALS

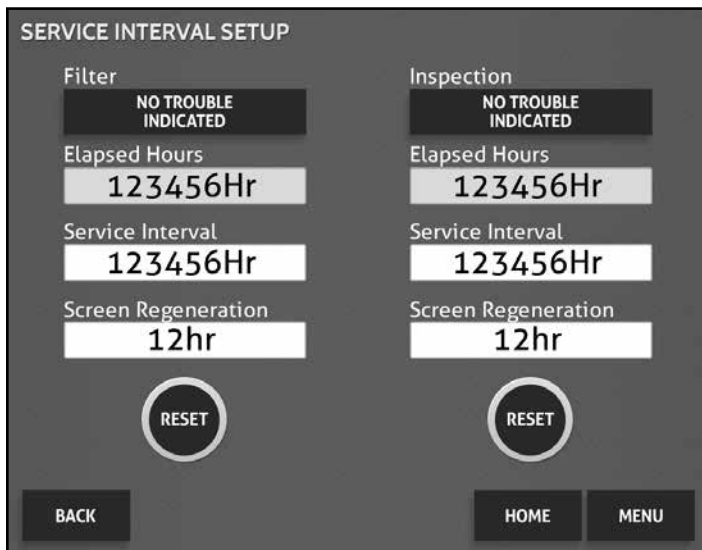


Figure 3.8: Service Interval Setup Screen

The service interval feature is used to alert the end user of recommended maintenance periods. When a service interval is complete, a screen will pop-up to alert the user that maintenance is recommended. This screen will not affect the current run status of the equipment and this feature is adjustable on the “Service Interval Setup” screen. The user can reset the service interval time and adjust the interval time in hours.

To return to the previous screen, the user must press the “Acknowledge Maintenance” button at the bottom of the service interval screen. Doing so will clear the suggested maintenance warning screen for a programmed interval. The default time interval is (8) hours. This interval is adjustable via the “Service Interval Setup” screen. The service interval screen will continue to be regenerated until the “Reset” button on the “Service Interval Setup” screen is pressed.

3.9 ALARM BANNER

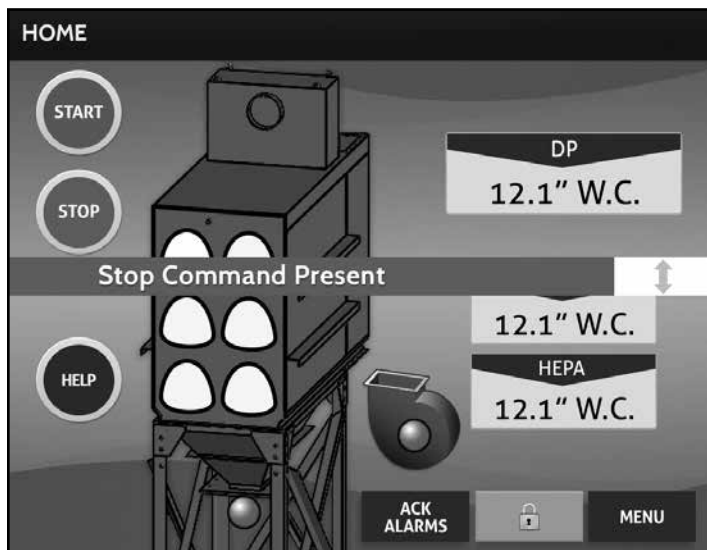


Figure 3.9: Home Screen with Alarm Banner

The alarm banner will display system faults automatically as they occur. All active alarms will scroll across the HMI screen in a continuous format until acknowledged. A green arrow on the right-hand side of the banner will allow the user to relocate the banner to the top, middle, or bottom of the HMI screen.

3.10 ACKNOWLEDGING ALARMS

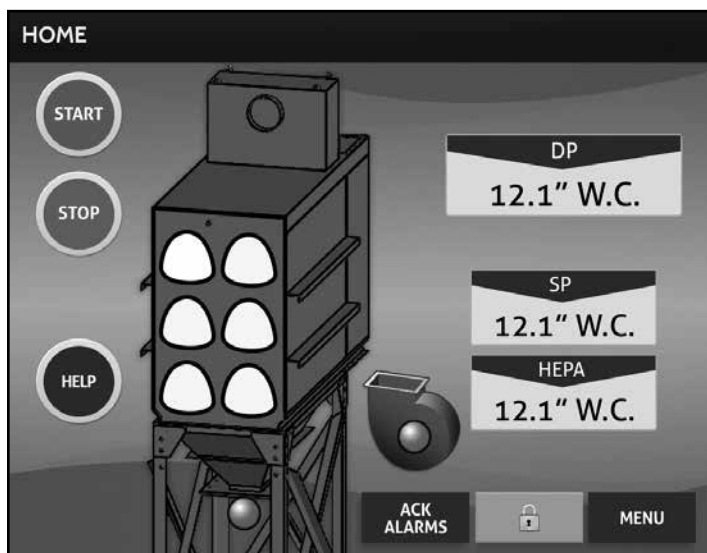


Figure 3.10: Home Screen

The “Acknowledge Alarms” button can be found on the HMI next to the Logout button at the bottom right of the home screen. Pressing this button will acknowledge all active alarms on the alarm banner. Should the cause of an alarm not be resolved before pressing the “Acknowledge Alarms” button, the corresponding alarm will continue to be displayed in the alarm banner.

3.11 ISOLATION VALVE

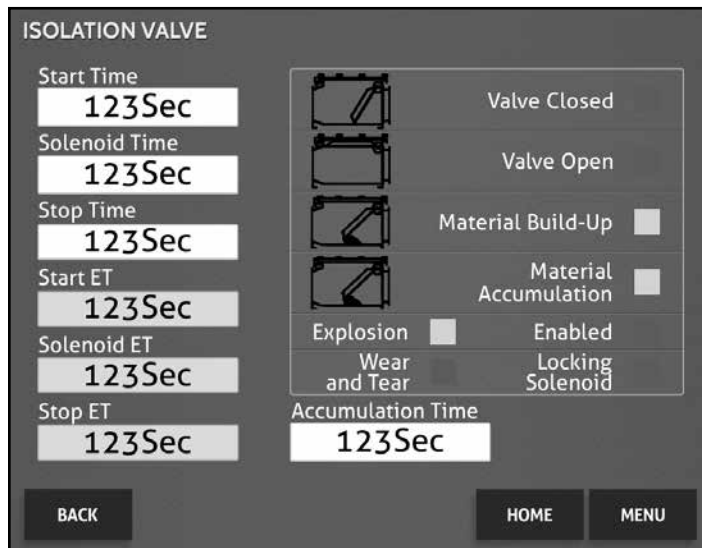


Figure 3.11: Isolation Valve Screen

This screen allows the configure and monitor the Isolation Valve.

- Start Time** – This numeric entry/display shows the amount of time that the Isolation Valve will be given to open once the system has been started. This value is adjustable between 10 and 180 seconds and must be greater than or equal to the Solenoid Time.
- Solenoid Time** – This numeric entry/display shows the amount of time the locking solenoid will remain energized to allow the Isolation Valve to open. This value is adjustable between 10 and 180 seconds and must be less than or equal to the Start Time.
- Stop Time** – This numeric entry/display shows the amount of time that the Isolation Valve will be given to close once the system has been stopped. This is adjustable between 10 and 180 seconds.

- d. **Accumulation Time** – This numeric entry/display shows the amount of time that the Isolation Valve will be given to experience a material accumulation before the system will shut off. If this value is exceeded, a power cycle will be required.
- e. **Start ET** – This numeric display shows the elapsed start time.
- f. **Solenoid ET** – This numeric display shows the elapsed solenoid time.
- g. **Stop ET** – This numeric display shows the elapsed stop time.
- h. **Valve Closed** – This indicator is green if the valve is closed, red if the valve is not closed.
- i. **Valve Open** – This indicator is green if the valve is open, red if the valve is not open.
- j. **Material Build-Up** – This indicator is green if material Build-Up is not detected, red if material build-up is detected. Material Build-Up will not shut the system down, but would prevent it from starting.
- k. **Material Accumulation** – This indicator will be green if material accumulation is not detected, red if material accumulation is detected. This condition will shut the system down and requires a power cycle to clear.
- l. **Explosion** – This indicator will be green if an explosion is not detected, red if an explosion is detected. This condition will shut the system down and requires a power cycle to clear.
- m. **Wear and Tear** – This indicator will be green if wear and tear is not detected, red means wear and tear is detected. This condition will not shut the system down, but is intended to indicate that maintenance is required.
- n. **Enabled** – This indicator is green if the Isolation Valve is enabled, red if the Isolation Valve is not enabled. This condition will shut the system down and requires a power cycle to clear.

- o. **Locking Solenoid** – This indicator is green when the locking solenoid is energized, red when not energized.
- p. **Back** – Back to the previous screen.
- q. **Home** – Navigation to the Home screen.
- r. **Menu** – Navigation to the Menu screen.

3.12 DOUBLE DUMP

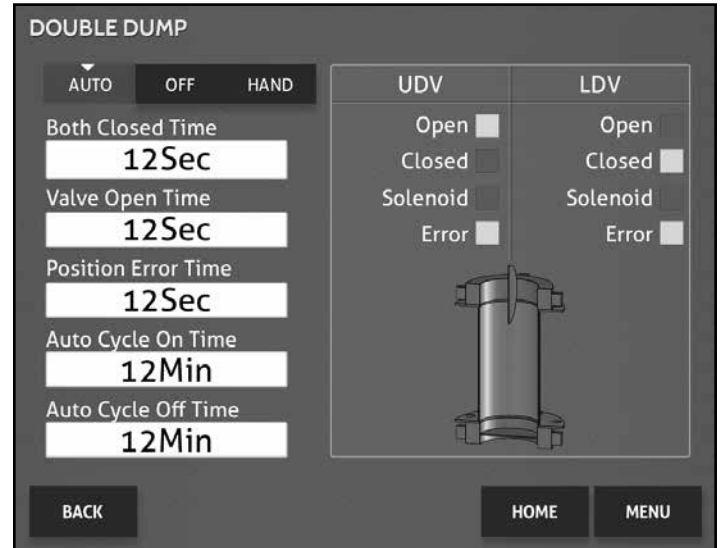


Figure 3.12: Double Dump Screen

This screen allows the user to modify the Double Dump Valve cycle time, as well as monitor the status of the valve.

- a. **Auto-Off-Hand Selector** – This selector allows the user to run the dump valve in one of three modes: Auto, Off, or Hand. In Auto mode, the dump valve will cycle in accordance with the auto cycle on and off time numeric/entry display. Off mode disables the dump valve. Hand mode will continuously cycle the double dump valve.
- b. **Both Closed Time** – This numeric entry/display shows the amount of time both valves must be closed before opening the next valve. This value is adjustable between 0 and 60 seconds.

- c. **Valve Open Time** – This numeric entry/display shows the amount of time that the each valve will remain open. This value is adjustable between 9 and 60 seconds.
- d. **Position Error Time** – This numeric entry/display shows the amount of time the valve is given to attain its commanded position. This value is adjustable between 1 and 10 seconds.
- e. **Auto Cycle On Time** – This numeric entry/display shows the amount of time that the dump valve will cycle in the auto mode. This value is adjustable between 1 and 60 minutes.
- f. **Auto Cycle Off Time** – This numeric entry/display shows the amount of time that the dump valve will remain off between auto cycles in the auto mode. This value is adjustable between 1 and 60 minutes.
- g. **Double Dump Valve Image** – This display contains indicators that display the current status of the dump valve, as well as a dump valve animation. The left column displays the status of the upper dump valve, the right column displays the status of the lower dump valve. The open, closed, and position error boxes show the current position of each valve. The solenoid indicator shows if the solenoid is energized.
- h. **Back** – Back to the previous screen.
- i. **Home** – Navigation to the Home screen.
- j. **Menu** – Navigation to the Menu screen.

3.13 HEPA

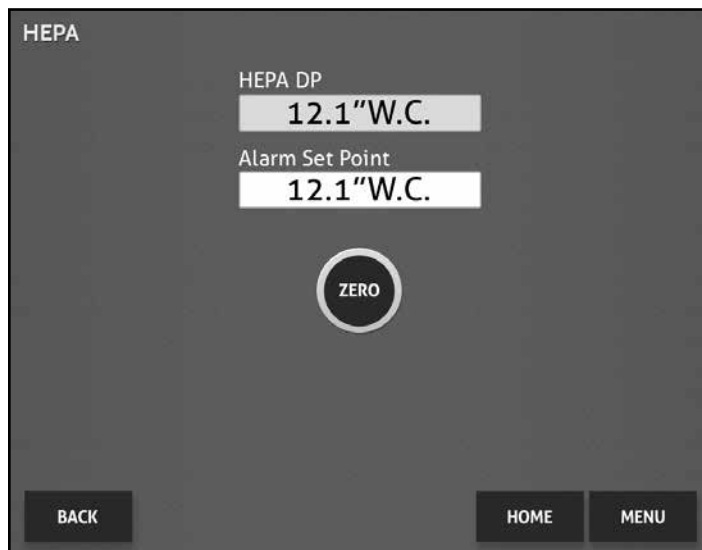


Figure 3.13: HEPA Screen

This screen enables the user to monitor HEPA filter differential pressure.

- a. **HEPA Differential Pressure** – This display shows the current HEPA Differential pressure. This display is animated to turn orange at 2.0"W.C. and red at 3.0"W.C.
- b. **Alarm Set Point** – This numeric entry/display shows the set point that the differential pressure must exceed to initiate an alarm. This value is adjustable between 0.1 and 20.0.
- c. **Zero** – The Zero push button will zero any differential pressure reading, should it wander from zero over the lifespan of the differential pressure sensor. This can only be done when the system is not running. Additionally, the pneumatic tubing should be disconnected from the control panel.
- d. **Back** – Back to the previous screen.
- e. **Home** – Navigation to the Home screen.
- f. **Menu** – Navigation to the Menu screen.

4 - MAINTENANCE

Periodic maintenance may be necessary to allow your AyrDyne Monitoring System to perform as intended.

4.1 DISPLAY SCREEN

After the unit has been in use for some time, it may become necessary to clean the display screen.

- Soak a soft cloth in water and a neutral detergent. Wring the cloth out tightly.
- Carefully wipe the display screen.

4.2 PERIODIC INSPECTION

Some components and functions of the HMI are more prone to wear than others and merit periodic inspection.

1. Operating Environment

- a. The operating environment temperature of the HMI should not drop below 32°F (0°C) and should not rise above 122°F (50°C).
- b. The relative humidity of the environment within which the controller will operate should not drop below 10% RH and is not to exceed 90% RH.
- c. The atmosphere surrounding the controller should be free from corrosive gasses.

2. Electrical Specifications

- a. The input voltage should not drop below 19.2vdc and should not exceed 28.8vdc.
- b. Wiring connections and terminations should be periodically inspected.

3. Mounting Specifications

- a. The four (4) installation fasteners should be periodically checked to ensure that the HMI is adequately secured to the control enclosure door.
- b. Periodic inspection of the installation gasket may be necessary to ensure that it is not cracked, worn, or out of place in relation to the installation gasket groove on the controller. If the installation gasket is showing signs of wear, it should be replaced.



WARNING!

**FAILURE TO ADEQUATELY MAINTAIN
INSTALLATION GASKET COULD LEAD TO LOSS OF
PANEL OR CABINET INGRESS PROTECTION RATING.**

**Be sure that the installation gasket is correctly
installed within the installation gasket groove on
the controller. Do not stretch the gasket for any
reason.**

**FAILURE TO FOLLOW THESE INSTRUCTIONS
MAY RESULT IN DEATH, SERIOUS INJURY, OR
EQUIPMENT DAMAGE.**

TROUBLESHOOTING

This section contains some basic troubleshooting guidelines. Only a qualified individual should perform troubleshooting.

Below is an explanation of the various states of the AyrDyne status LED, located at the bottom left corner of the controller.

Table 5.1

Color	Indicator	Operation Mode	Logic Execution Mode
Green	ON	In operation	RUN
	Flashing	In operation	STOP
Red	ON	Power is turned on	
	Flashing	In operation	Functionality severely impaired
Orange	ON	Backlight burnout	
	Flashing	Software loading	

Table 5.2: System Troubleshooting

Alarm	Potential Cause	Corrective Action
Emergency Stop Circuit Tripped	• LOTO • Power outage • Emergency Stop • Suppression system activation	• Verify all devices in the E-Stop loop are closed • Verify E-Stop is twisted out • Press the E-Stop Reset
Blower Fault	• Blower fault	• If supplied with a VFD, reference the Last Fault Code on the VFD Setup Screen. Once the Last Fault Code is identified, reference the VFD manual • If supplied without a VFD, verify the motor spins freely. If so, reset the overload and check the motor current against the motor data plate.
Stop Command Present	• Control panel has provisions for a remote stop which hasn't been installed • Stop button is being pressed while a start button was pressed	• Install remote stop • Release stop button before attempting to start the system
Isolation Valve General Trouble	• Any Isolation Valve Trouble	• Reference the Alarm Banner and Isolation Valve Screen for more information
Isolation Valve Material Accumulation Detected	• Isolation Valve detects Material Accumulation • Sensor needs adjusted	• Clear material and cycle power. • Adjust sensor per manufacturer's guidelines and cycle power.
Isolation Valve Material BuildUp Detected	• Material Buildup • Deposit sensor needs adjusted	• Clear material • Adjust sensor per manufacturer's guidelines
Isolation Valve Explosion Detected	• Potential Explosion	• Reference Alarm Banner and Isolation Valve Screen for more information. Inspect pertinent explosion protection components and cycle power.

Table 5.2: System Troubleshooting (Cont'd)

Alarm	Potential Cause	Corrective Action
Isolation Valve Wear and Tear Detected	Isolation Valve has substantial wear	Inspect the Isolation Valve per manufacturer's guidelines and replace/repair necessary components
High Differential Pressure Alarm	- High Differential Pressure - Clogged pressure tap or tubing	- Replace filters - Unclog pressure tap and/or tubing
HEPA Differential Pressure Alarm	- High HEPA Differential Pressure - Clogged pressure tap or tubing	- Replace filters - Unclog pressure tap and/or tubing
Rotary Valve 1 Fault	Rotary Valve Fault	- Clear any material from valve - Verify proper chain tension - Reset overload and check motor current against the motor data plate.
Rotary Valve 1 Zero Speed Fault	- Valve is not turning - Sensor is not adjusted	- Clear any material from valve, verify proper chain tension, and ensure overload is not tripped. - Adjust sensor
Rotary Valve 2 Fault	Rotary Valve Fault	- Clear any material from valve - Verify proper chain tension - Reset overload and check motor current against the motor data plate.
Rotary Valve 2 Zero Speed Fault	- Valve is not turning - Sensor is not adjusted	- Clear any material from valve, verify proper chain tension, and ensure overload is not tripped. - Adjust sensor
Rotary Valve 3 Fault	Rotary Valve Fault	- Clear any material from valve - Verify proper chain tension - Reset overload and check motor current against the motor data plate.
Rotary Valve 3 Zero Speed Fault	- Valve is not turning - Sensor is not adjusted	- Clear any material from valve, verify proper chain tension, and ensure overload is not tripped. - Adjust sensor
Rotary Valve 4 Fault	Rotary Valve Fault	- Clear any material from valve - Verify proper chain tension - Reset overload and check motor current against the motor data plate.
Rotary Valve 4 Zero Speed Fault	- Valve is not turning - Sensor is not adjusted	- Clear any material from valve, verify proper chain tension, and ensure overload is not tripped. - Adjust sensor
Upper Dump Valve Position Error	- Compressed air is off - Compressed air regulator is not properly adjusted	- Turn compressed air on - Adjust compressed air regulator per manufacturer's guidelines
Lower Dump Valve Position Error	- Compressed air is off - Compressed air regulator is not properly adjusted	- Turn compressed air on - Adjust compressed air regulator per manufacturer's guidelines

GLOSSARY

Differential Pressure – Differential pressure is the difference in pressure, measured at two points in the system. This is an indication of filter loading and is measured in inches of water column.

Static Pressure – Static pressure is the pressure that is exerted by a still liquid or gas.

Human Machine Interface (HMI) – The user interface in a manufacturing or process control system. It provides a graphics-based visualization of an industrial control and monitoring system.

Programmable Logic Controller (PLC) – A programmable logic controller is an industrial computer control system that continuously monitors the state of input devices and makes decisions based upon a custom program to control the state of output devices.

Telefast – A pre-wired system enabling connection and adaptation of control signals of PLC cards equipped with HE10 connectors.

Variable Frequency Drive (VFD) – A variable-frequency drive is a type of adjustable-speed drive used in electro-mechanical drive systems to control AC motor speed and torque by varying motor input frequency and voltage.



Installation, Operation, and Maintenance Manual



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