AYRDYNE 4.0

Installation, Operation, and Maintenance Manual

Edition notice

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AD-IOM
Revised December 2021

Printed in the USA.

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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.

SAFETY

The installation, maintenance, operation, and care of the AyrDyne® Monitoring System Human Machine Interface (HMI) should only be performed by individuals who are qualified and trained to do so. *A "qualified" person in this context is a person who has skills and knowledge related to the construction and operation of electrical equipment and its installation through both work experience and training. Additionally, a qualified person is one who has received and undergone safety training specific to electrical maintenance. Anyone who has not undergone safety training specific to this system should not operate or perform maintenance on the system.*

In terms of maintenance of this system, "lock out tag out" safety protocol applies. This means that any time maintenance on this system is performed, the machine must be shut down, unplugged, and tagged or labeled, explaining that maintenance is taking place.

DenTech is not liable for any consequences arising from misuse of this system. *If you are unsure of whether you are qualified to use or maintain this system, please contact an electrician or other qualified professional for assistance. Failure to follow safety protocol for this and any other system could result in serious bodily harm or other injury.* ***No responsibility is assumed by DenTech for any consequences arising out of the use of this material.***

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.

2.1 OPERATION OVERVIEW

This section covers the navigation and operation of the standard AyrDyne Monitoring System. The operation and functionality of each screen is covered in detail in later sections. The table below shows the layout of the screens. Available screens depend on system requirements and configuration.

System	Contains system wide monitoring, settings, and controls	
	Overview	An overview of the system and the first screen to display when power is applied
	Metrics	System Metrics
	Alarms	Alarms monitoring and control
	Settings	User settings, IO settings, and analog and digital device settings
Filters	Contains all monitoring, settings, and controls related to the filters	
	Primary Info	Primary filter differential pressure monitoring and cleaning
	Primary Settings	Primary filter cleaning settings
	Primary Solenoids	Primary filter cleaning system monitoring and manual control
	Secondary Info	Secondary filter differential pressure monitoring
Airflow	Contains all monitoring, settings, and controls related to airflow	
	Airflow Control	Airflow monitoring and control settings
	VFD Settings	VFD monitoring and parameter entry
Discharge	Contains all monitoring, settings, and controls related to the discharge system	
Safety	Contains all monitoring, settings, and controls related to safety	

2.1 SYSTEM

2.1.1 STATUS BAR OVERVIEW

The status bar is visible in all screens. This bar displays system information, active alarm description, and corrective action.

1 SYSTEM STATE INDICATOR
This graphic display shows the current system state.

Stopped	System is Stopped
Running	System is Running
Cleaning	System is Cleaning
! FAULT	System is Faulted

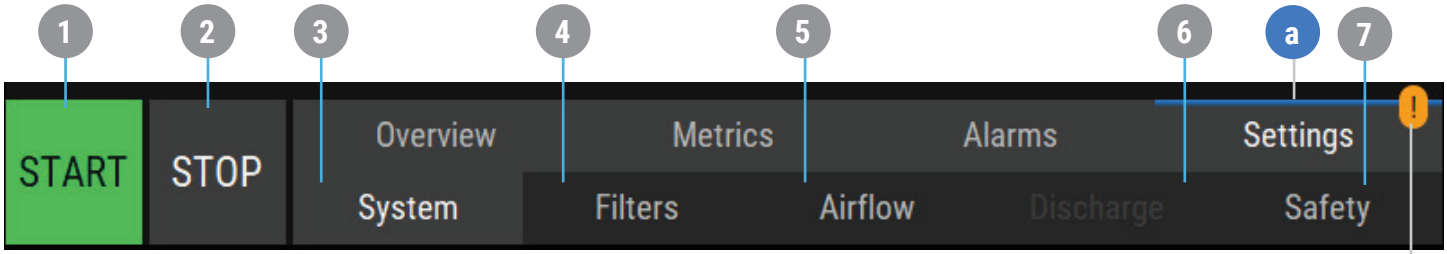
2 SYSTEM FAULTS
This text display shows details of any active faults as well as corrective actions.

3 USER
Shows the user that is currently logged in. Pressing the user icon will logout the current user.

4 TIME AND DATE
This graphic display shows the internal date and time. Pressing the time and will display a pop-up entry page where the date and time can be adjusted.

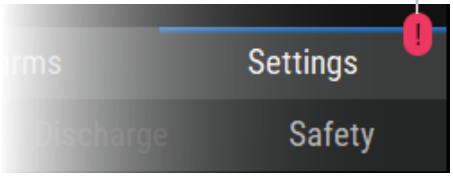
5 LOGO
This graphic display shows the logo of the company that you may contact for information on the system, spare or replacement parts ordering and help with the system. Pressing the logo will display the contact information. Once on the information screen, you may press anywhere on the screen to return to the home screen.

2.1.2 NAVIGATION BAR OVERVIEW



The navigation bar is located at the bottom of each screen.

- **a** The blue line and white font indicate the section currently displayed.
- **b** An orange bubble with an exclamation point denotes a warning.
- **c** A red bubble with an exclamation point denotes an alarm.



1 START
This button starts the system.

2 STOP
On the first press, this button initiates shutdown of blower. On the second press, this button initiates shutdown of components pertaining to downtime cleaning sequence.

Note: When there is an active fault, the Clear Faults button displays instead of the Stop button. After the corresponding fault conditions have been eliminated, press the Clear Faults button to clear all faults.

3 SYSTEM
This button displays system screen.

4 FILTERS
This button displays the filters screen.

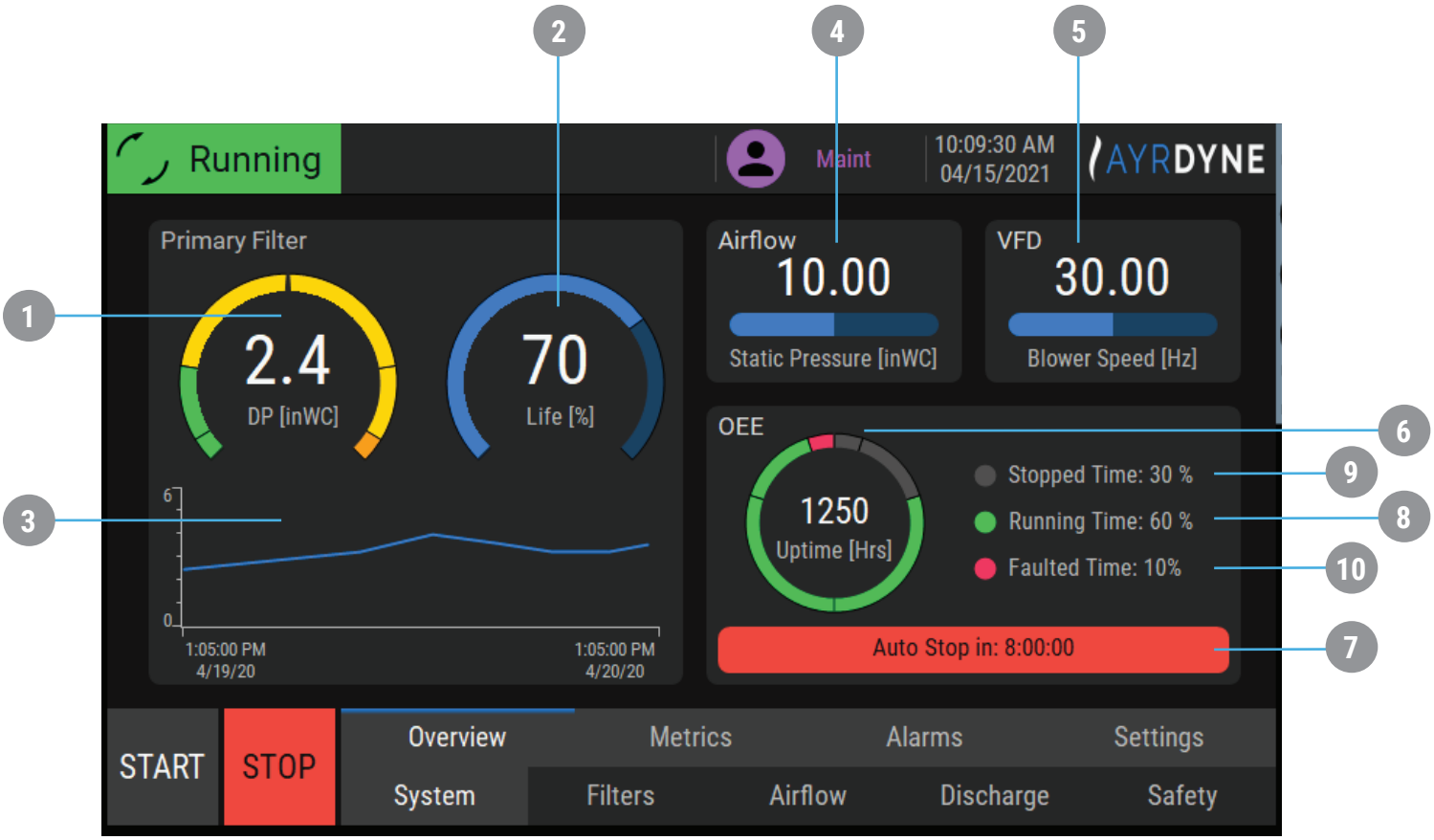
5 AIRFLOW
This button displays the airflow screen.

6 DISCHARGE
This button displays the discharge screen.

7 SAFETY
This button displays the safety screen.

2.1 SYSTEM

2.1.3 MAIN SCREEN OVERVIEW



SYSTEM 2.1

1. **PRIMARY FILTER DP**
   This numeric display and dial display show the filter differential pressure measured between the dirty and clean sides of the filters.

2. **PRIMARY FILTER LIFE**
   This numeric display and dial display show filter status and remaining life.

3. **DATA PLOT**
   This graphical display shows the filter differential pressure over time. The timeline view can be changed from one day to six months.

4. **AIRFLOW**
   This numeric display and bar graph show the system static pressure, velocity, or volume measured.

5. **VFD (Hz)**
   This numeric display shows VFD output frequency (measured in Hertz).

6. **UPTIME (Hrs)**
   This numeric display shows the total time that the collector has been powered on (including time running, stopped, and faulted).

7. **AUTO STOP (Hrs)**
   This shows the status of the auto stop

   - (a) **Auto Stop Disabled by REM run:**
     Auto stop is not available when using the remote run signal.
   - (b) **Schedule Auto Stop:**
     Press and follow on-screen prompts to schedule an auto stop.
   - (c) **Auto Stop in hhh:mm:ss:**
     Shows the remaining hours, minutes, and seconds until the system automatically stops.

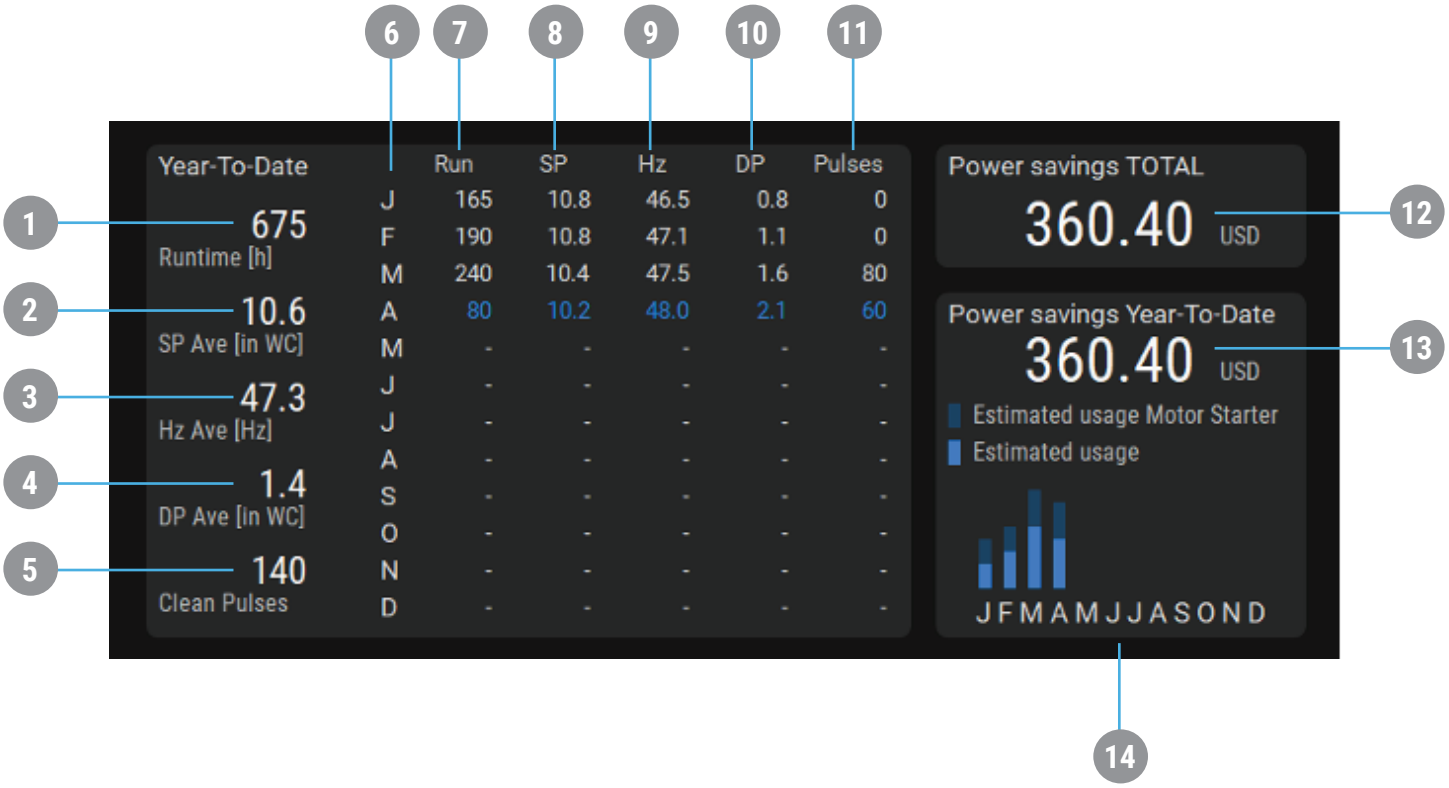
8. **RUNNING TIME (%)**
   This numeric display shows what percentage of the uptime was spent running.

9. **STOPPED TIME (%)**
   This numeric display shows what percentage of the uptime was spent stopped.

10. **FAULTED TIME (%)**
    This numeric display shows what percentage of the uptime was spent in a fault condition.

2.1 SYSTEM

2.1.4 METRICS (STATIC PRESSURE)



SYSTEM 2.1

1. **RUNTIME (h)**
This numeric display shows the total system runtime for the calendar year (measured in hours). This metric is not resettable.

2. **SP AVE (in WC or FPM)**
This numeric display shows the average Static Pressure for the calendar year. This metric is not resettable.

3. **HZ AVE**
This numeric display shows the average blower frequency for the calendar year (measured in Hertz). This metric is not resettable.

4. **DP**
This numeric display shows the average differential pressure for the calendar year. This metric is not resettable.

5. **CLEAN PULSES**
This numeric display shows total cleaning pulses executed by the filter cleaning system for the calendar year (if equipped).

6. **MONTH**
This column shows the month of year for the saved metrics. Blue numbers in the corresponding rows represent the current month.

7. **RUN**
This numeric display shows the total system runtime for the corresponding month (measured in hours). This metric is not resettable.

8. **SP OR FPM**
This numeric display shows the average static pressure (SP) inWC or feet per minute (FPM), depending on system configuration, for the corresponding month. This metric is not resettable.

9. **HZ**
This numeric display shows the average blower frequency for the corresponding month (measured in Hertz). This metric is not resettable.

10. **DP**
This numeric display shows the average differential pressure for the corresponding month. This metric is not resettable.

11. **PULSES**
This numeric display shows the total number of cleaning pulses for the corresponding month. This metric is not resettable.

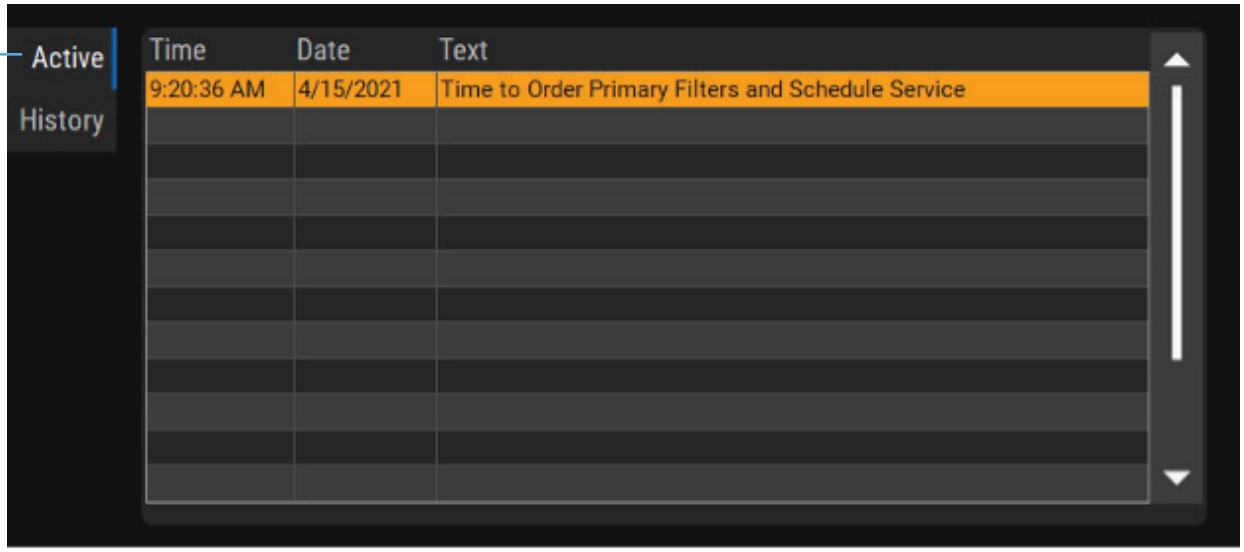
12. **POWER SAVINGS TOTAL (USD)**
This numeric display, visible when equipped with a VFD, shows estimated power usage cost savings in comparison to the usage of a motor starter.

13. **POWER SAVINGS YEAR-TO-DATE (USD)**
This numeric display, visible when equipped with a VFD, shows estimated power usage cost savings on a yearly basis in comparison to the usage of a motor starter.

14. **ESTIMATED POWER USAGE MONTH DISPLAY**
This bar graph shows estimated power usage each month if equipped with a VFD.

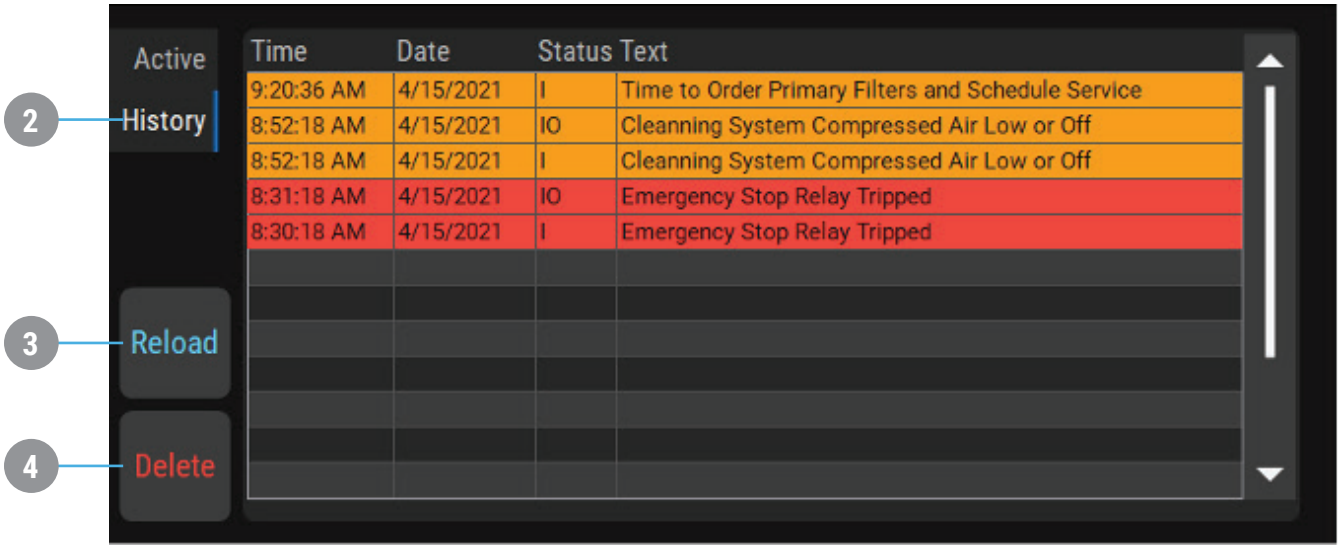
2.1 SYSTEM

2.1.5 ALARMS



1 ACTIVE

This tab shows active alarms with a time stamp of when the alarm occurred and description of that alarm.



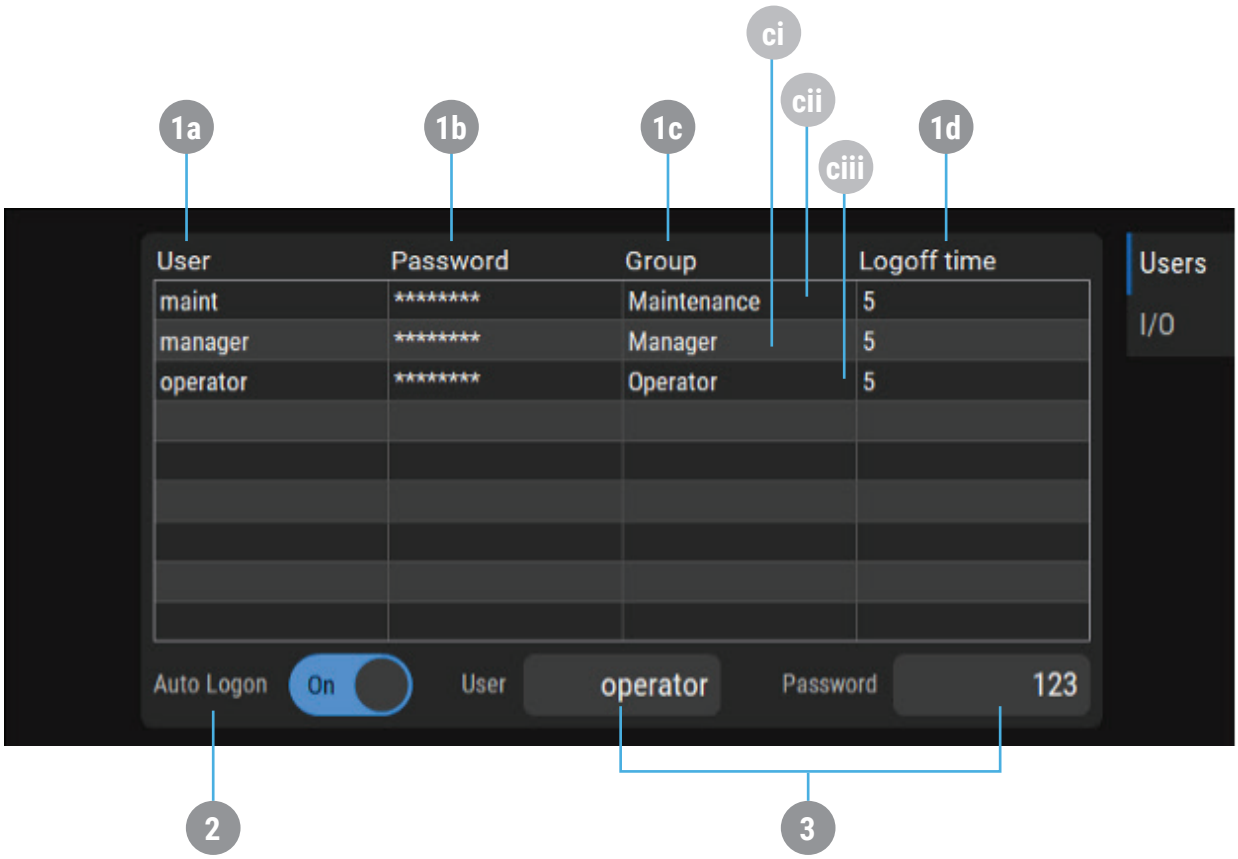
2 HISTORY
This tab shows previously active alarms with a time stamp and description of each alarm.

3 RELOAD
This button reloads the alarm history on the screen.

4 DELETE
This button deletes the alarm history on the screen.

2.1 SYSTEM

2.1.6 SETTINGS - USERS



1

USER ADMINISTRATION TABLE
This table allows administration of users and permissions.

(a) **User:**
Shows the users in the system.

(b) **Password:**
Shows the password for the respective user.

(c) **Group:**
Shows the group for the respective user.

i. **Manager:** Can perform any operation on the system as well as add or remove users, change group assignments, and change passwords for any user.

ii. **Maintenance:** Can perform any operation except for user administration. May change their own password or logoff time.

iii. **Operator:** Can change settings on the system that are not part of the airflow and balancing. May change their own password or logoff time.

(d) **Logoff time:**
Shows the inactivity time in minutes that the respective user has prior to being logged off automatically.

2

AUTO LOGON
Allows the manager to set up Auto Logon. When enabled, the system will attempt to log on the user as specified in the user and password fields. ***Note*** that these fields are NOT linked to the user administration table. Thus changing user names and passwords in the table will break the auto logon feature until the user and password are updated in the auto logon fields.

3

DEFAULT USERS AND PASSWORDS
The system ships with the default users and passwords below. Make sure to make your passwords secure and document them.

(a) **User:** maint
Password: 123

(b) **User:** manager
Password: 123

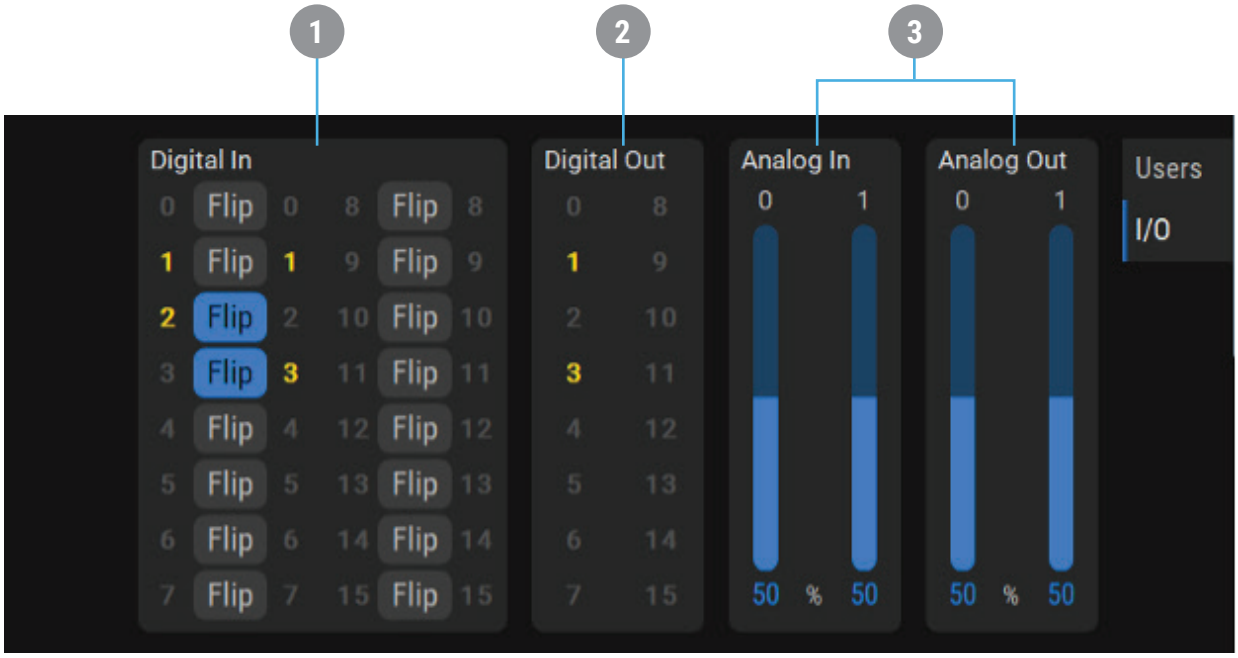
(c) **User:** operator
Password: 123

To create a new user:
1. Log in as a manager
2. Press on an empty row in the table
3. Assign a user, password, group, and logoff time

To change a user's password:
1. Press on "Password"
2. Follow on-screen prompts

2.1 SYSTEM

2.1.7 SETTINGS - I/O



SYSTEM 2.1

1 **DIGITAL IN**
This graphic display shows the status of each input. A gray number indicates that the corresponding input is OFF; a yellow number indicates that the corresponding input is ON. Each input may also be flipped by the “Flip” button immediately to the right. When the “Flip” button is gray, the input remains as wired; when the “Flip” button is blue, the input state is flipped. The number immediately to the right of the “Flip” button shows the status of the input as evaluated in the program.

2 **DIGITAL OUT**
This graphic display shows the status of each output. A gray number indicates that the corresponding output is OFF; a yellow number indicates that the corresponding output is ON.

3 **ANALOG IN / OUT**
This graphic display shows the signal of each analog input / output from 0 – 100%.

2.1 SYSTEM

2.1.8 SETTINGS - DEVICES

SYSTEM 2.1

1 **HOPPER LEVEL**
The following settings will be consistent with any device that provides a digital fault/OK signal and is not limited to level sensors.

2 **SHUTDOWN SYSTEM ON HI LEVEL [On]**
This toggle enables a shutdown fault of the collector when there is a high level. When switched off, the collector will continue to run, but a warning indicator will continue to display the active fault.

3 **SHUTDOWN DELAY [0.0 m]**
This numeric entry/display shows the amount of time a level fault must be active before the collector is shut down.

4 **ANALOG LEVEL 1**
The following settings will be consistent with any device that provides an analog feedback signal and is not limited to temperature sensors.

5 **33 ˚F**
This numeric display shows the analog feedback signal of the device.

6 **WARNING SETPOINT**
This numeric entry/display shows the setpoint that the analog signal must rise above to initiate a warning.

7 **SHUTDOWN SETPOINT**
This numeric entry/display shows the setpoint that the analog signal must rise above to initiate a fault. This will shut down the collector. Shutdown can be disabled by setting the shutdown setpoint lower than the warning setpoint.

2.2 FILTERS

2.2.1 PRIMARY INFO

FILTERS 2.2

1 **PRIMARY FILTER DP**
This numeric display and segmented bar graph show the filter differential pressure measured between the dirty and clean sides of the filters.

2 **ZERO**
The Zero button will zero the differential pressure reading, should it wander from zero over the lifespan of the differential pressure sensor. This can be done only when the system is not running. Additionally, the pneumatic tubing should be disconnected from the control panel.

3 **ALARM SETPOINT**
This numeric entry/display shows the setpoint that the differential pressure must rise above to initiate an alarm. This value is adjustable between the Clean Start Setpoint and max. transmitter output. The factory default setting is 6 inWC.

4 **AUTO CLEAN START**
This numeric entry/display shows the setpoint that the differential pressure must rise above to start On Demand cleaning. This value is adjustable between the Clean Stop Setpoint and Alarm Setpoint. The factory default setting is 2.4 inWC.

5 **AUTO CLEAN STOP**
This numeric entry/display shows the setpoint that the differential pressure must fall below to stop On Demand cleaning. This value is adjustable between min. transmitter output and the Clean Start Setpoint. Recommended setting is 1.2 inWC.

6 **DATA PLOT**
This graphical display shows the filter differential pressure over time. The timeline view can be changed from one day to three months.

7 **PRIMARY FILTER LIFE**
The numeric display and dial display show the estimated remaining life of the filter, based on user-set parameters.. When the filter is nearing end of life, it will remind you to order or schedule the filter change. Once the filter has reached end of life, it will prompt you to change the filter.

8 **RESET**
The Reset button resets the hour meter or date. It should be pressed after filters are replaced.

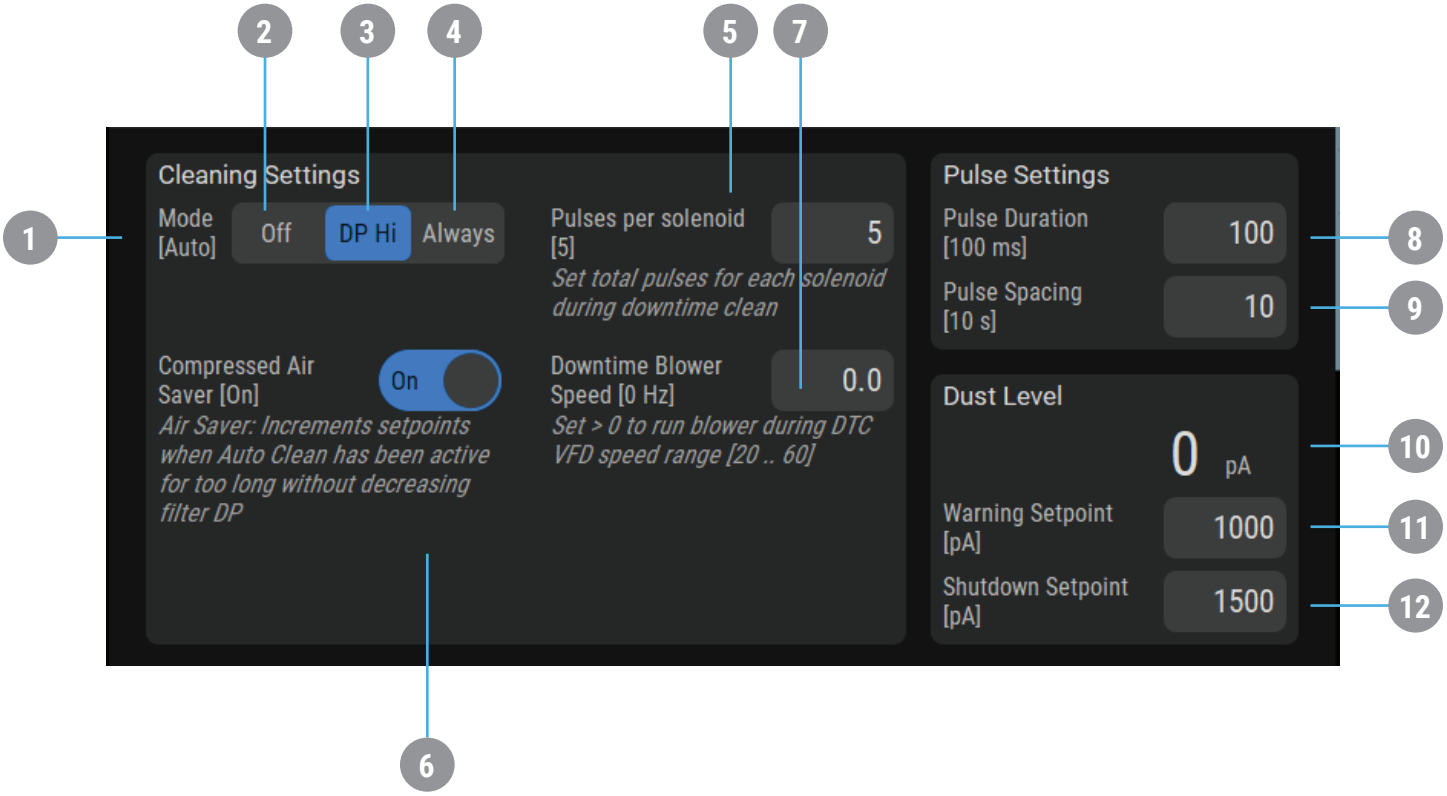
9 **FILTER LIFE SETTINGS**
This selection sets when the system will remind the user to change filters.

When Hours is set, there will be a reminder after a certain number of hours, which can be set by the user.

When Date is set, there will be a reminder on the day that is set.

2.2 FILTERS

2.2.2 PRIMARY SETTINGS



FILTERS 2.2

1 MODE
These toggles select the mode of cleaning

2 OFF
This switch turns the cleaning system off.

3 DP Hi
This toggle switch turns the cleaning system to automatic mode. In this mode, the cleaning sequence is activated anytime the differential pressure reaches Auto Clean Start setpoint and stops when it reaches the Auto Clean Stop setpoint.

4 ALWAYS
This toggle turns the cleaning system on to clean constantly while the blower is running.

5 PULSES PER SOLENOID
This numeric entry/display shows how many times each solenoid will be pulsed during downtime cleaning.

6 COMPRESSED AIR SAVER
This toggle turns the Compressed Air saver on and off. When enabled, the Auto Clean Start and Auto Clean Stop setpoints will be increased if the Auto Clean is active for 8 consecutive hours.

7 DOWNTIME BLOWER SPEED (Hz)
This numeric entry/display shows the speed the blower will run at during downtime cleaning.

8 PULSE DURATION (ms)
This numeric entry/display shows the duration of each cleaning pulse. This value is adjustable between 50 and 500 milliseconds. The factory default setting is 100 ms.

9 PULSE SPACING (s)
This numeric entry/display shows the delay between each cleaning pulse. The elapsed time display (xx /) shows how long until the next pulse. This value is adjustable between 1 and 20 seconds. The factory default setting is 10 s.

10 DUST LEVEL
This feature is present when a system has a broken bag detector.

Fault Header -
DUST EMISSION DETECTED
Fault Info -
Dust Emission Sensor Level High
- Inspect system for bag ruptures
- Adjust Shutdown Setpoint as needed

To disable shutdown, set shutdown setpoint lower than the warning setpoint

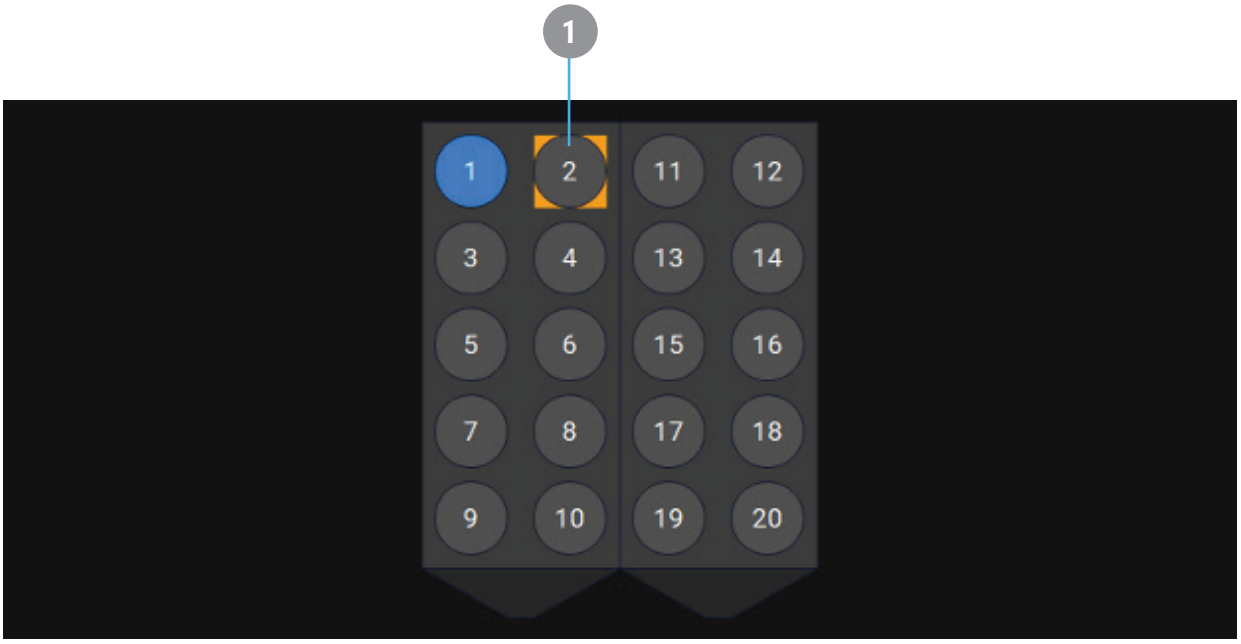
11 WARNING SETPOINT
This numeric entry/display shows the setpoint that the analog signal must rise above to initiate a warning.

12 SHUTDOWN SETPOINT
This numeric entry/display shows the setpoint that the analog signal must rise above to initiate a fault. This will shut down the collector. Shutdown can be disabled by setting the shutdown setpoint lower than the warning setpoint.

2.2 FILTERS

2.2.3 PRIMARY SOLENOIDS

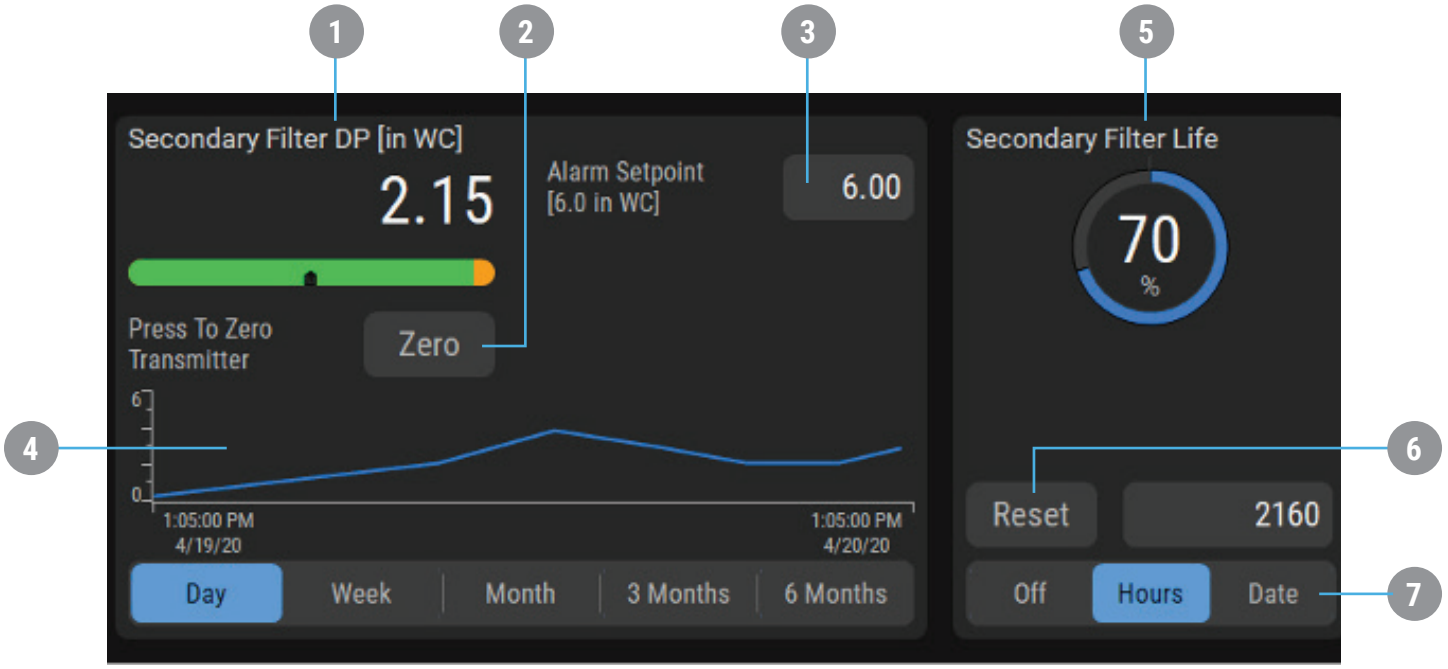
This screen enables the user to manually pulse each solenoid valve on the selected Module. Each solenoid is numbered and may be pressed to manually fire the solenoid valve.



The Compressed Air Monitoring Device detects solenoid failures and leaks, if equipped with the airflow monitoring device. When the same solenoid fails to pulse three times, it is highlighted orange and an alarm is produced. In addition, the monitoring system will detect air leaks on the solenoid manifold, at which time it will alarm. The leak can also be pointed to a solenoid if it started after a specific solenoid was pulsed.

1 **COMPRESSED AIR MONITORING**
When equipped with a *Compressed Air Monitoring Device*, the solenoids will appear with an orange highlight if a fault is detected. The number of modules and valves per module is dependent upon the user's system. Modules not displayed on the screen may be selected from the navigation buttons on the left of the screen.

2.2.4 SECONDARY INFORMATION



1 SECONDARY FILTER DP
This numeric display and segmented bar graph show the filter differential pressure measured between the dirty and clean sides of the filters.

2 ZERO METER
The Zero button will zero any differential pressure reading, should it wander from zero over the lifespan of the differential pressure sensor. This can be done only when the system is not running. Additionally, the pneumatic tubing should be disconnected from the control panel.

3 ALARM SETPOINT
This numeric entry/display shows the setpoint that the differential pressure must rise above to initiate an alarm. This value is adjustable between the min. and max. transmitter outputs. The factory default setting is 6 inWC.

4 DATA PLOT
This line graph display shows the filter differential pressure over time. The timeline view can be changed from one day to six months.

5 SECONDARY FILTER LIFE
This dial display shows the estimated remaining life of the secondary filter. When the filter is nearing end of life, it will remind you to order or schedule the filter change. Once the filter has reached end of life, it will prompt you to change the filter.

6 RESET
This button resets the hour meter or date, after the filters have been replaced.

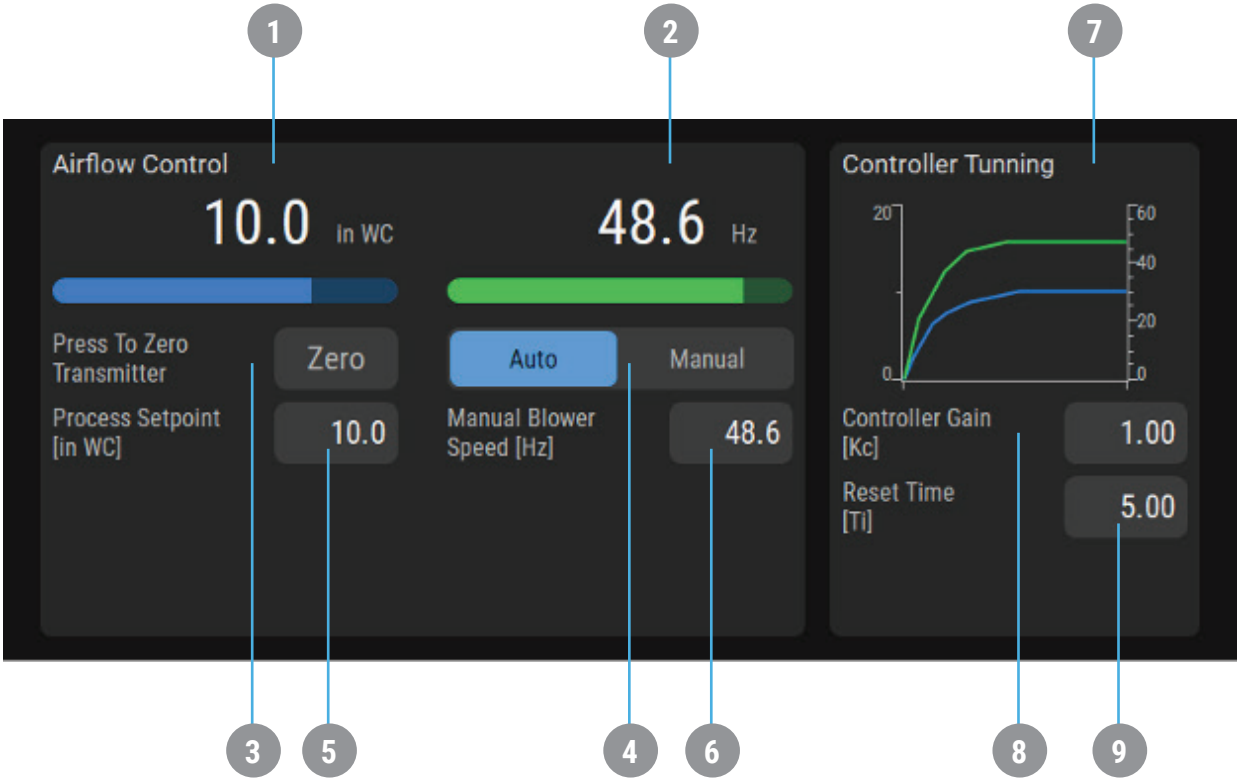
7 FILTER LIFE SETTINGS
This selection sets when the system will remind the user to change filters.

When Hours is set, there will be a reminder after a certain number of hours, which can be set by the user.

When Date is set, there will be a reminder on the day that is set.

2.3 AIRFLOW

2.3.1 STATIC PRESSURE *(If equipped) (3.5)*



AIRFLOW 2.3

1 AIRFLOW DISPLAY
This numeric display and bar graph show the system static pressure between the clean side of the filter and atmosphere

2 BLOWER SPEED (Hz)
This numeric display and bar graph show blower speed in Hertz.

3 ZERO METER
The Zero button will zero any reading, should it wander from zero over the lifespan of sensor. This can be done only when the system is not running. Additionally, the pneumatic tubing should be disconnected from the control panel.

4 MODE SELECTION
The mode selection allows the user to choose between Auto or Hand control of the Airflow Controller system.

ⓐ **Auto**
Default and recommended mode of operation. The controller adjusts the blower speed in order to maintain a constant airflow.

ⓑ **Manual**
Blower speed set according to Blower Speed numeric entry/ display.

5 PROCESS SETPOINT
This numeric entry/display is visible in Auto mode and shows the desired setpoint for the static pressure. The Airflow Controller will automatically adjust the blower speed to best meet this setpoint. Factory default setting is 4 inWC.

6 MANUAL BLOWER SPEED (Hz)
This numeric entry/display is visible in Manual mode and shows the desired setpoint for the Blower Speed.

7 CONTROLLER TUNING DISPLAY
This graphical display shows the relationship between the blower frequency (in green) and the static pressure (in blue).

8 CONTROLLER GAIN (Kc)
This numeric entry/display allows for advance tuning of the airflow controllers PID loop.

9 RESET TIME (Ti)
This numeric entry/display allows for advance tuning of the airflow controllers PID loop.

2.3 AIRFLOW

2.3.2 VELOCITY *(If equipped) (3.5)*

AIRFLOW 2.3

1. **AIRFLOW DISPLAY**
   This numeric display and bar graph show the system air velocity (measured in FPM) inside the duct.

2. **BLOWER SPEED (Hz)**
   This numeric display, display and bar graph show blower speed in Hertz.

3. **ZERO METER**
   The Zero button will zero any reading, should it wander from zero over the lifespan of sensor. This can be done only when the system is not running. Additionally, the pneumatic tubing should be disconnected from the control panel.

4. **MODE SELECTION**
   The mode selection allows the user to choose between Auto or Hand control of the Airflow Controller system.

   (a) **Auto**
   Default and recommended mode of operation. The controller adjusts the blower speed to maintain a constant airflow.

   (b) **Manual**
   Blower speed set according to Blower Speed numeric entry/ display.

5. **PROCESS SETPOINT**
   This numeric entry/display is visible in Auto mode and shows the desired setpoint for the air velocity. The Airflow Controller will automatically adjust the blower speed to best meet this setpoint. Factory default setting is 2500 FPM.

6. **MANUAL BLOWER SPEED (Hz)**
   This numeric entry/display is visible in Manual mode shows the desired setpoint for the Blower Speed.

7. **DUCT DIAMETER (IN)**
   This numeric entry/display is used to enter the duct size at the point where the airflow measuring device is installed for the purpose of calculating CFM.

8. **CFM**
   This numeric text display shows the calculated Cubic Feet per Minute (CFM) based on air velocity and duct size.

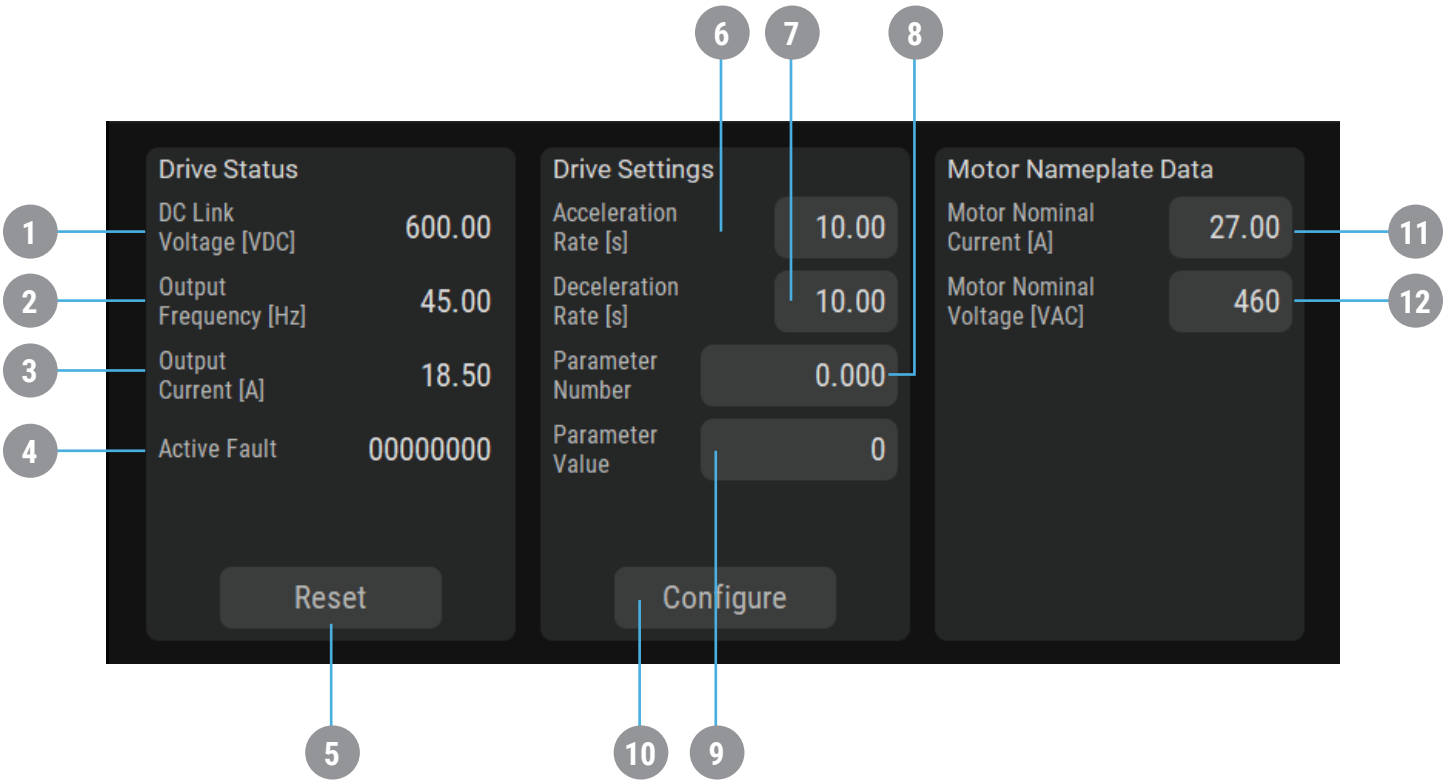
9. **TUNING DISPLAY**
   This graphical display shows the relationship between the blower frequency (In green) and the process setpoint (In blue).

10. **CONTROLLER GAIN (Kc)**
    This numeric entry/display allows for advance tuning of the airflow controllers PID loop.

11. **RESET TIME (Ti)**
    This numeric entry/display allows for advance tuning of the airflow controllers PID loop.

2.3 AIRFLOW

2.3.3 VFD SETTINGS



1. **DC LINK VOLTS (VDC)**
This numeric display shows the VFD DC Bus voltage.

2. **OUTPUT FREQUENCY (Hertz)**
This numeric display shows VFD output frequency.

3. **OUTPUT CURRENT (A)**
This numeric display shows VFD output current in amps.

4. **ACTIVE FAULT**
This text display shows the current status of the VFD. If faulted, a fault code will be shown.

5. **RESET**
This button will reset VFD faults.

6. **ACCELERATION RATE (s)**
This numeric entry/display shows the acceleration time in seconds. This value is adjustable between 1s and 500s. Factory default setting will vary with size of motor.

7. **DECELERATION RATE (s)**
This numeric entry/display shows the deceleration time in seconds. This value is adjustable between 1s and 500s. Factory default setting will vary with size of motor.

8. **PARAMETER NUMBER**
This numeric entry/display shows which parameter to view or edit.

9. **PARAMETER VALUE**
This numeric entry/display shows the value of the parameter selected to view or edit. Use caution when modifying parameters as it may render the drive unusable.

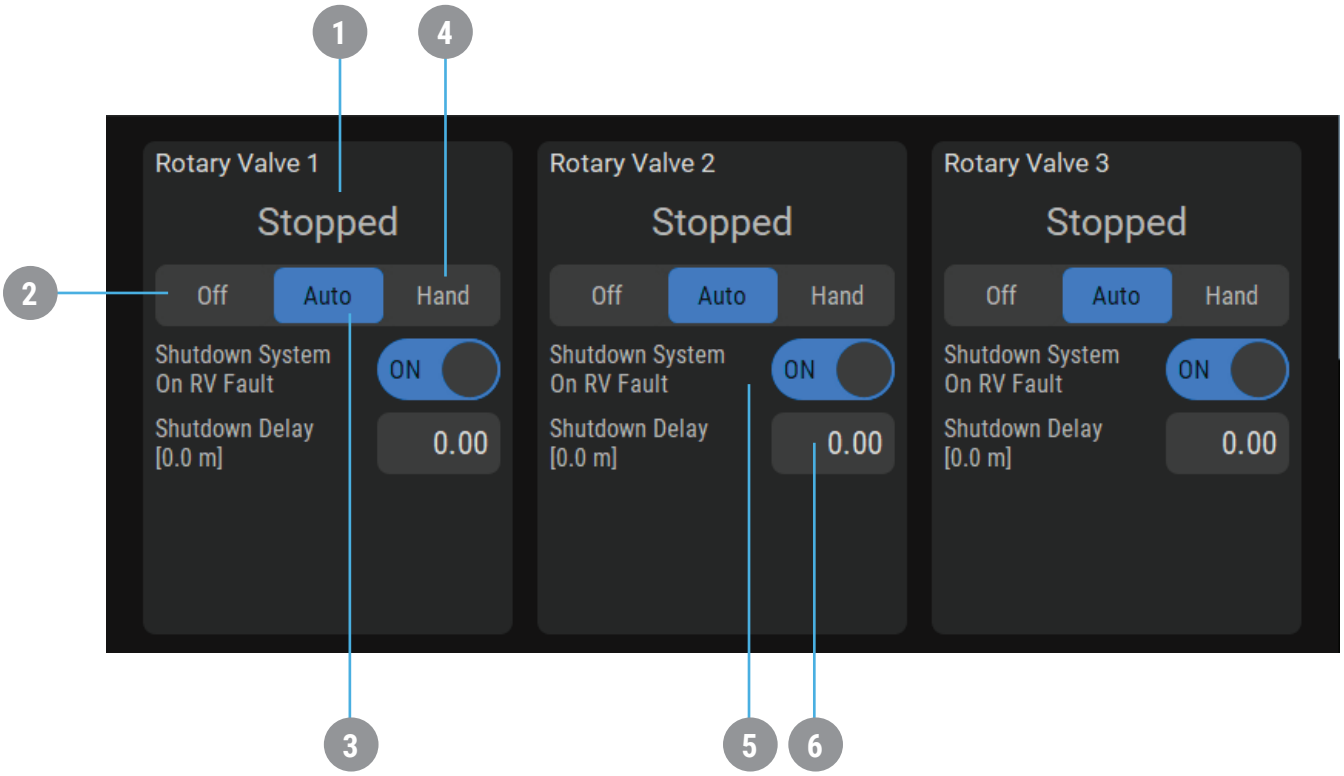
10. **CONFIGURE**
This button will re-download configuration. This does not reset all parameters to factory default. Consult the VFD manual for instructions on how to reset all parameters to factory default. After resetting to factory default, make sure to press configure button to download parameters needed for operation of the drive. Button must be held for 3 seconds. Indicators on the button will turn blue once operation is complete.

11. **MOTOR NOMINAL CURRENT (A)**
This numeric entry/display shows the motor full load amperage. Set to the motor nameplate rated full load amps.

12. **MOTOR NOMINAL VOLTS (VAC)**
This numeric entry/display shows the motor voltage. Set to the motor nameplate rated volts.

2.4 DISCHARGE

2.4.1 ROTARY VALVE (IF EQUIPPED)



DISCHARGE 2.4

1 STATUS
This text display shows the following conditions:

- (a) **Stopped**
  Rotary valve is stopped
- (b) **Running**
  Rotary valve is running
- (c) **Over Load Tripped**
  Rotary valve is faulted on overload condition
- (d) **Zero Speed Tripped**
  Rotary valve is told to run but the Zero speed switch does not detect motion (if equipped)
- (e) **Field Disconnect Open**
  Field Disconnect is open and rotary valve will not operate (if equipped)

2 OFF
This button places the rotary valve in Off mode and prevents the rotary valve from running. This is not intended for servicing the rotary valve. Follow LOTO rules when servicing. rotary

3 AUTO
This button places the rotary valve in Auto mode. When engaged, the rotary valve will run if the blower is running or during downtime cleaning.

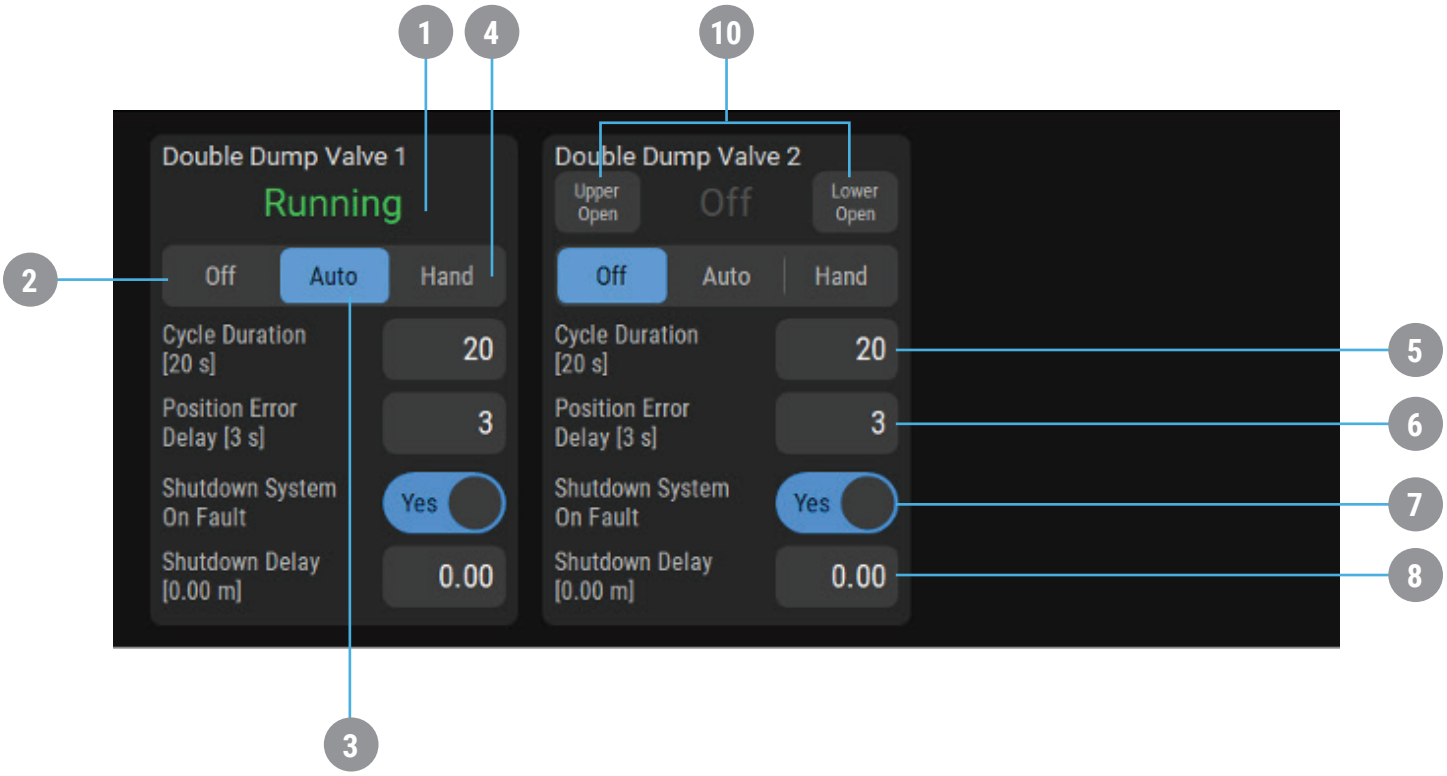
4 HAND
This button places the rotary valve in Hand mode. When engaged and all interlocks are met, the rotary valve will run continuously.

5 SHUTDOWN SYSTEM ON ROTARY VALVE FAULT
This toggle enables a shutdown fault of the collector when the rotary valve has a fault condition. When switched off, the collector will continue to run, but a warning indicator will continue to display the active fault.

6 SHUTDOWN DELAY (m)
This numeric entry/display shows the amount of time (in minutes) a rotary valve fault must be active before generating a fault.

2.4 DISCHARGE

2.4.2 DOUBLE DUMP VALVE (IF EQUIPPED)



DISCHARGE 3.4

1 VALVE STATUS
This text display shows the status of the valve. Some of the following conditions rely on the position sensor.

- (a) **Open**
  Valve is in the open position (if equipped with position sensor),
- (b) **Closed**
  Valves is in the closed position (if equipped with position sensor),
- (c) **Opening**
  Valve is being told to open but has not reached the open position,
- (d) **Closing**
  Valve is being told to close but has not reached the closed position,
- (e) **Position Error**
  Valve has not reached position in time
  Note: Clear Faults – Turning the valve off and back to auto will clear any faults if the condition is not present.

2 OFF
This button places the double dump valve in Off mode and prevents the valve from running. This is not intended for servicing the valve. Follow LOTO rules when servicing.

3 AUTO
This button places the double dump valve in Auto mode. When engaged, the valve will run if the blower is running or if the system is in downtime cleaning.

4 HAND
This button places the double dump valve in Hand mode. When engaged and all interlocks are met, the valve will run continuously.

5 CYCLE DURATION (s)
This numeric entry/display shows how long the valves will take to complete a full cycle. This value is adjustable between 0 and 60 seconds. Factory default setting is 20 seconds.

6 POSITION ERROR DELAY (s)
This numeric entry/display shows how long the valves have to open or close before a position fault is produced. This value is adjustable between 0 and 10 seconds. Factory default setting is 3 s. If set to 0, position fault is disabled.

7 SHUTDOWN SYSTEM ON FAULT
This toggle enables a shutdown fault of the collector when the double dump valve has a fault condition. When switched off, the collector will continue to run, but a warning indicator will continue to display the active fault.

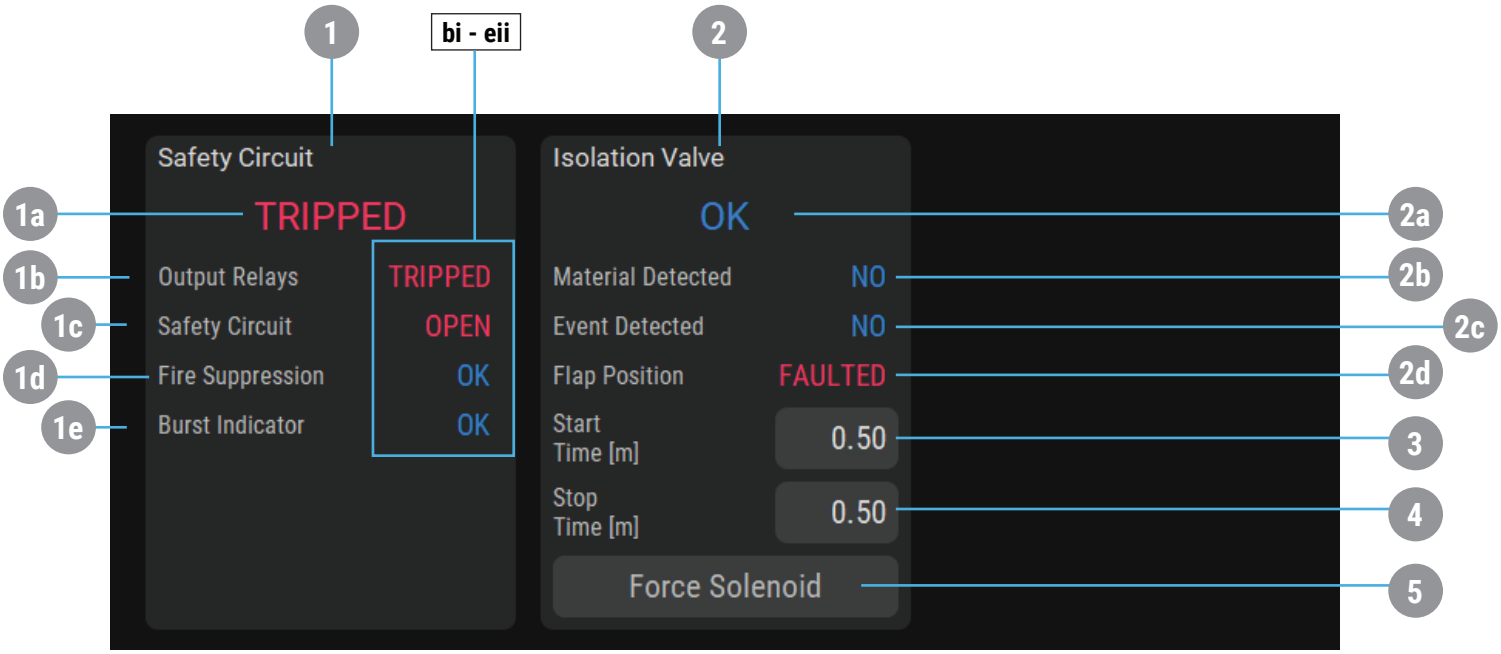
8 SHUTDOWN DELAY (Min)
This numeric entry/display shows the amount of time (in minutes) a double dump valve fault must be active before.

9 POSITION ERROR TIME (s)
This numeric entry/display shows how long the valves have to open or close before a position fault is produced. This value is adjustable between 0 and 10 seconds. Factory default setting is 10 s. If set to 0, position fault is disabled.

10 FORCE OPEN / FORCE CLOSE
These buttons are intended for service and are only visible when the Double Dump Valve is set to OFF. The buttons will force the valve open or close. The upper and lower dump are interlocked so that they can never both be open at the same time.

2.5 SAFETY

2.5.1 SAFETY CIRCUIT - ISOLATION VALVE



SAFETY 3.5

Note: The following settings are available only when a Proflap isolation valve is installed.

1 SAFETY CIRCUIT

- (a) **Status**
  This text display shows the status of the safety relay.
- (b) **Output Relays**
  Safety relay condition
  - i. **OK**
    Safety Relay is set
  - ii. **TRIPPED**
    Safety Relay is tripped
- (c) **Safety Circuit**
  - i. **OK**
    All devices in safety circuit are set
  - ii. **OPEN**
    At least one device in the safety circuit is not set
- (d) **Fire Suppression**
  - **i. OK**
    All devices in safety circuit are set
  - **ii. OPEN**
    At least one device in the safety circuit is not set
- (e) **Burst Indicator**
  - **i. OK**
    All devices in safety circuit are set
  - **ii. OPEN**
    At least one device in the safety circuit is not set

2 ISOLATION VALVE

- (a) **Status**
  This text display shows the status of the isolation valve.
- (b) **Excessive Material Accumulation Detected**
  YES or NO
- (c) **Event Detected**
  YES or NO
- (d) **Flap Position**
  Closed, Open, Faulted

3 START TIME (m)
This numeric entry/display shows the time allowed for the flap to open after starting the collector. If the flap has not opened in the allotted time, a fault will be initiated, and the collector will shut down.

4 STOP TIME (m)
This numeric entry/display shows the time allowed for the flap to close after stopping the collector. If the flap has not closed in the allotted time, a fault will be initiated.

5 FORCE SOLENOID
This button will force solenoid to lock for one minute.

3.1 ALARMS

This section contains basic troubleshooting guidelines. Only a qualified individual should troubleshoot the system. For maintenance of the system, "lock out tag out" (LOTO) safety protocol applies. This means that any time maintenance on this system is performed, the machine must be shut down, unplugged, and tagged or labeled, explaining that maintenance is taking place.

The alarms list below is to be used as a method of troubleshooting. Alarms may differ based on system configuration and features.

ALARM TEXT	POTENTIAL CAUSE	CORRECTIVE ACTION
Remote Stop Button Missing or Pressed	• Remote stop button missing or pressed	• Install Remote Stop • Release Remote Stop
Schedule System Maintenance	• System is nearing maintenance due set point	• Schedule System Maintenance
Perform System Maintenance	• System has reached maintenance due set point	• Perform System Maintenance
Primary Filters Clogged	• Filters are dirty or clogged • Clogged or damaged tubing	• Inspect filters and replace as needed • Unclog or repair tubing
Time to Order Primary Filters and Schedule Service	• Filters are nearing end of life	• Order and Schedule Primary Filters Service
Time to Replace Primary Filters	• Filters have reached end of life	• Replace Primary Filters
Cleaning System Pulse Solenoid Failure	• Cleaning solenoid failed • Compressed air low or off	• Inspect solenoid and replace as needed • Adjust or turn on compressed air
Cleaning System Compressed Air Leak Detected	• Compressed air leak detected • Compressed air flow switch stuck ON	• Inspect cleaning system for compressed air leaks • Inspect compressed air flow switch for proper operation
Cleaning System Compressed Air Low or Off	• Compressed air low or off • All cleaning solenoids failed • Compressed air flow switch stuck OFF	• Adjust or turn on compressed air • Inspect solenoids and replace as needed • Inspect compressed air flow switch for proper operation
Secondary Filter Clogged	• Filter Dirty or Clogged • Clogged and/or damaged tubing	• Inspect filters and replace as needed • Unclog or repair tubing
Blower Running at Limit	• System not balanced	• Schedule System Balancing
Blower VFD Faulted. Check VFD screen for fault code.	• VFD Fault	• Obtain fault codes from the VFD Settings screen • Reference VFD manual for detailed corrective actions
Blower Motor Overload Tripped	• Overload tripped	• Inspect motor for proper operation • Reset the overload • Verify motor current draw is within nameplate parameters
Rotary Valve Motor Overload Tripped	• Overload tripped	• Lock-out tag-out • Clear any material from valve • Verify proper chain tension • Reset the overload • Verify motor current draw is within nameplate parameters
Rotary Valve Bypassed	• Rotary Valve OFF while the system is running	• Place the Rotary Valve in either AUTO or HAND mode
Rotary Valve Not Turning	• Valve not turning • Sensor needs adjustment	• Lock-out tag-out • Clear any material from valve • Verify proper chain tension

ALARMS 3.1

ALARM TEXT	POTENTIAL CAUSE	CORRECTIVE ACTION
Double Dump Valve Bypassed	• Double Dump Valve OFF while the system is running	• Place the Double Dump Valve in either AUTO or HAND mode
Double Dump Valve Upper Dump Valve Position Fault	• Compressed air low or off • Error delay time low • Solenoid malfunction • Sensor malfunction	• Adjust or turn on compressed air • Adjust error delay time • Inspect solenoid for proper operation and replace if needed • Inspect sensor for proper operation and replace if needed
Double Dump Valve Lower Dump Valve Position Fault	• Compressed air low or off • Error delay time low • Solenoid malfunction • Sensor malfunction	• Adjust or turn on compressed air • Adjust error delay time • Inspect solenoid for proper operation and replace if needed • Inspect sensor for proper operation and replace if needed
Emergency Stop Circuit Tripped	• LOTO (lock-out tag-out) • Power outage • Emergency Stop	• Verify that all devices in the E-Stop circuit are ready • Verify that all E-Stop buttons are twisted out • Press the E-Stop Reset button
Fire Suppression System Activated	• Fire suppression system activated or malfunctioned	• Reset fire suppression system as per manufacturer's guidelines
Isolation Valve Excessive Material Accumulation Detected	• Material accumulation detected • Sensor needs adjusted	• Clear water or debris from sensor • Adjust sensor as per manufacturer's guidelines
Isolation Valve Flap Failed to Open	• Material build up • Start delay time too low • Sensor needs adjusted	• Clear debris • Increase start delay time • Adjust sensor as per manufacturer's guidelines
Isolation Valve Flap Failed to Close	• Material build up • Stop delay time too low • Sensor needs adjusted	• Clear debris • Increase stop delay time • Adjust sensor as per manufacturer's guidelines
Isolation Valve Event Detected	• Potential explosion	• Inspect pertinent explosion protection components
Isolation Valve Excessive Wear Detected	• Isolation valve has excessive wear	• Inspect the Isolation Valve per manufacturer's guidelines • Repair or replace worn out components
Isolation Valve Wiring or Sensor Problem	• Wiring problem • Sensor problem	• Inspect and correct position sensor wiring • Inspect position sensor and replace if needed

The installation, maintenance, operation, and care of the AyrDyne® Monitoring System Human Machine Interface (HMI) should only be performed by individuals who are qualified and trained to do so.

A "qualified" person in this context is a person who has skills and knowledge related to the construction and operation of electrical equipment and its installation through both work experience and training. Additionally, a qualified person is one who has received and undergone safety training specific to electrical maintenance. Anyone who has not undergone safety training specific to this system should not operate or perform maintenance on the system.

In terms of maintenance of this system, "lock out tag out" safety protocol applies. This means that any time maintenance on this system is performed, the machine must be shut down, unplugged and tagged or labeled, explaining that maintenance is taking place.

DenTech is not liable for any consequences arising from misuse of this system. *If you are unsure of whether you are qualified to use or maintain this system, please contact an electrician or other qualified professional for assistance. Failure to follow safety protocol for this and any other system could result in serious bodily harm or other injury.*
No responsibility is assumed by DenTech for any consequences arising out of the use of this material.

4.1 REMOVAL OF HMI

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.

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.

Front view of HMI.

Rear view of HMI.

Figure 1
Power connection removed from HMI.

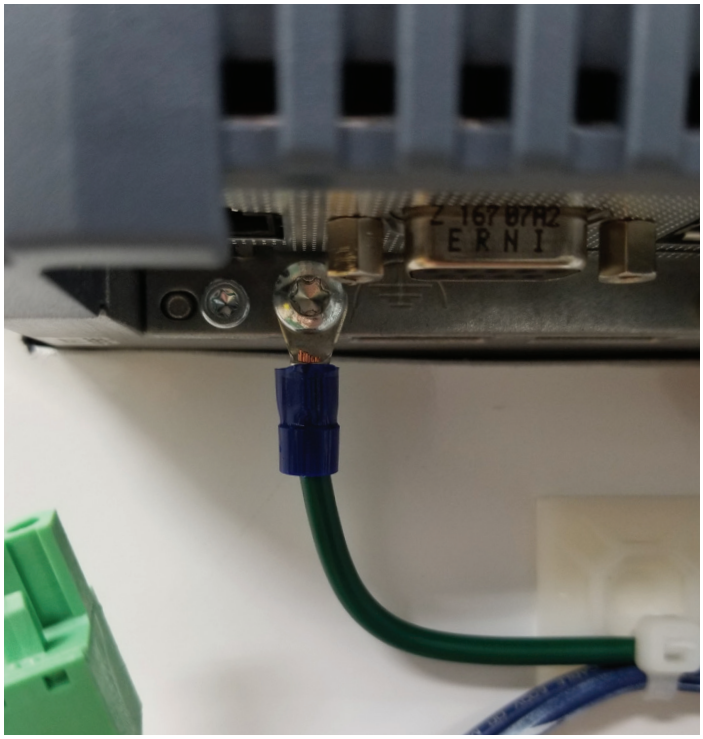


Figure 2
Ground wire with T-20 Torx screw.

4.1 REMOVAL OF HMI

1. Pull green connector downward to remove power connection from HMI. (Figure 1)

2. Use a T-20 Torx screwdriver to remove the ground wire. (Figure 2)

4.1 REMOVAL OF HMI

3. With the HMI free from all electrical wiring, use a small flat head screwdriver to begin loosening the 10 installation fasteners that secure the HMI to the control enclosure door. Make sure to support the HMI with the other hand.

4. Continue to loosen fasteners until they can be removed from the HMI.

Figure 3
Loosening HMI fasteners.

Figure 4
Installation fasteners removed.

INSTALLATION OF HMI 4.1

Figure 5
Removal of the HMI from the front of the enclosure.

Figure 6
HMI completely removed.

5. Once the installation fasteners have been removed, gently remove the AyrDyne HMI from the front of the enclosure door, taking care not to damage or displace the installation gasket.

4.2 INSTALLATION OF HMI

1. To install the HMI, follow the steps in section 4.1, in reverse order.

4.3 INSTALLATION & REMOVAL OF PLC

For the removal of the PLC portion of the AyrDyne Monitoring System, please visit the AyrDyne website for a link to the Siemens installation manual.

Siemens S7-1200 Manual System Manual, 04/2012, A5E02486680-06
Pages 50-55

INSTALLING OR REPLACING THE BATTERY IN BB 1297 BATTERY BOARD

The BB 1297 requires battery type CR1025. The battery is not included with the BB 1297 and must be purchased by the user.

TO INSTALL A NEW BATTERY, FOLLOW THESE STEPS:

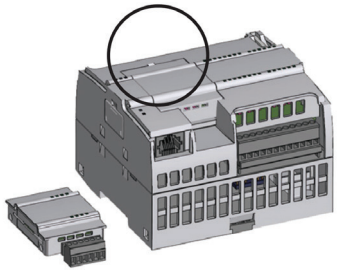
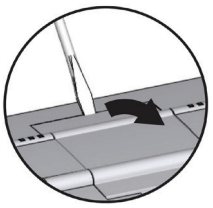
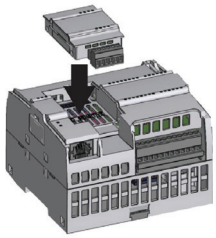
1. In the BB 1297, install a new battery with the positive side of the battery on top, and the negative side next to the printed wiring board.
2. The BB 1297 is ready to be installed in the CPU. Follow the installation directions below to install the BB 1297.

TO REPLACE THE BATTERY IN THE BB 1297:

1. Remove the BB 1297 from the CPU following the removal directions below.
2. Carefully remove the old battery using a small screwdriver. Push the battery out from under the clip.
3. Install a new CR1025 replacement battery with the positive side of the battery on top and the negative side next to the printed wiring board.
4. Re-install the BB 1297 battery board following the installation directions on below.

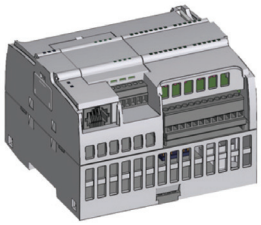
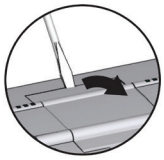
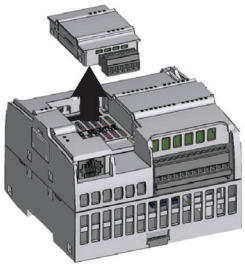
4.4 INSTALLATION AND REPLACEMENT OF THE BATTERY

// A) INSTALLING THE BATTERY BOARD

TASK	PROCEDURE
	1. Ensure that the CPU and all S7-1200 equipment are disconnected from electrical power. 2. Remove the top and bottom terminal block covers from the CPU. 3. Place a screwdriver into the slot on top of the CPU at the rear of the cover. 4. Gently pry the cover up and remove it from the CPU. 5. Place the module straight down into its mounting position in the top of the CPU. 6. Firmly press the module into position until it snaps into place. 7. Replace the terminal block covers.
	
	

INSTALLATION & REPLACEMENT OF THE BATTERY 4.4

// A) REMOVING THE BATTERY BOARD

TASK	PROCEDURE
  	1. Ensure that the CPU and all S7-1200 equipment are disconnected from electrical power. 2. Remove the top and bottom terminal block covers from the CPU. 3. Place a screwdriver into the slot on top of the module. 4. Gently pry the module up to disengage it from the CPU. 5. Remove the module straight up from its mounting position in the top of the CPU. 6. Replace the cover onto the CPU. 7. Replace the terminal block covers.

GLOSSARY

AMP (A)
The base unit of electric current in the International System of Units.

DIFFERENTIAL PRESSURE (DP)
The difference in pressure measured between two points. In AyrDyne systems, DP is measured between the clean and dirty sides of the filter. The higher the number, the more restriction across the filter.

FEET PER MINUTE (FPM)
A unit of speed that represents the number of feet traveled in one minute.

HERTZ (HZ)
The unit of frequency in the International System of Units. One hertz is equal to one cycle per second.

HORSEPOWER (HP)
A unit of power or the rate at which work is done (in reference to the output of engines or motors).

HUMAN-MACHINE INTERFACE (HMI)
A mechanism, often a visual display with graphs, used for monitoring and controlling a machine or process.

INCHES OF WATER COLUMN (INWC)
A non-SI unit for pressure conventionally used for measurement of certain pressure differentials such as small pressure differences across an orifice, in a pipeline, or in a shaft.

LOCK OUT, TAG OUT (LOTO)
A safety protocol that applies when maintenance or repairs are performed on a system. Prior to working on the system, machines must be shut down, unplugged, and tagged or labeled to explain that maintenance is taking place.

PROGRAMMABLE LOGIC CONTROLLER (PLC)
A modular computer which performs various tasks based on customized instructions.

QUALIFIED INDIVIDUAL
A person who meets the skill level and experience to perform the essential functions of the activity.

REVOLUTIONS PER MINUTE (RPM)
A unit of rotational speed or the frequency of rotation around a fixed axis.

STATIC PRESSURE (SP)
The pressure exerted by a still liquid or gas. In AyrDyne systems, SP is measured between the dirty side of the filter and the atmosphere. The higher the number, the more suction capacity.

VARIABLE FREQUENCY DRIVE (VFD)
A motor control system that manipulates output frequency to run an electrical motor at any desired speed.

VAC
Voltage measured in AC.

VDC
Voltage measured in DC.

WATER COLUMN (WC)
A measurement of pressure defined by the pressure produced by a 1-inch by 1-inch column of water with a specified height.

TIME ABBREVIATIONS
Hours – h or hrs
Millisecond – ms
Minutes – min
Seconds – s

AYRDYNE

Installation, Operation, and Maintenance Manual

For customer support, please contact our service technicians.
Phone: (717) 335-4899
Email: service@dentechindustrial.com
Or visit dentechindustrial.com/customer-support

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AD-IOM