DOD Technologies

VISION®8

with SENSE TECHNOLOGY®

8-Point Continuous Gas Detector
Operating Manual

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Chapter 1 – Overview

1.1 Introduction

The VISION® 8 from DOD Technologies simultaneously monitors up to eight locations (or *points*) for targeted toxic and corrosive gases. The system is comprised of an individual 'analyzer' that monitors up to eight points. It responds to gases that exceed a programmed alarm level by:

- Triggering visual alarms that warn of high or low concentrations
- Triggering relays or activating analog outputs to external devices
- Displaying the point number, gas type, and gas concentration
- Recording the alarm information and storing it in memory

The VISION 8 triggers outputs for each individual point at two levels of gas concentrations. These programmable limits are factory-set at 1 TLV and 2 TLV for their respective gases. Each sample point may range up to 500 feet from where the VISION 8 is positioned. This allows operators to monitor gas concentrations in locations away from where gases may be leaking. The VISION 8 provides fast responses to a wide range of gases. It has been designed for maximum uptime, so routine maintenance and service can be performed quickly and easily. The VISION 8 incorporates a patented EλE Sense Technology® optic system, with the ability to speciate and identify gases within the same gas family. Combined with our exclusive ChemLogic® technology, fast and accurate gas detection is achieved utilizing a chemically treated cassette to capture and record each gas stain.

See Section 6.9 for important disposal information.

WARNING: If the VISION 8 is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

1.2 Sampling and Monitoring

The system draws sample flow simultaneously from all eight sample locations to the top of the VISION 8. Flow setup can also be established to draw to the side of the unit (see Section 3.4, Tubing Relocation). Part of the sample flow is diverted across the ChemLogic cassette where it is analyzed. The eight sample locations exhaust through a single port located at the top or side of the VISION 8 (see Section 2.2.5).

1.3 Theory of Operation

The system simultaneously extracts ambient samples from up to eight locations (or points). The sample drawn is diverted across the ChemLogic cassette. The VISION 8 uses an advanced optical detection system to measure the color change occurring on the ChemLogic cassette. As the target gas is detected, the color from the of the ChemLogic cassette changes. This color change on the ChemLogic cassette allows the EλE Sense Technology optic system to qualify and quantify the toxic gas reaction. The VISION 8 will then report an appropriate gas concentration reading and a speciation of the gas detected.

Chapter 2 – Features & Layout

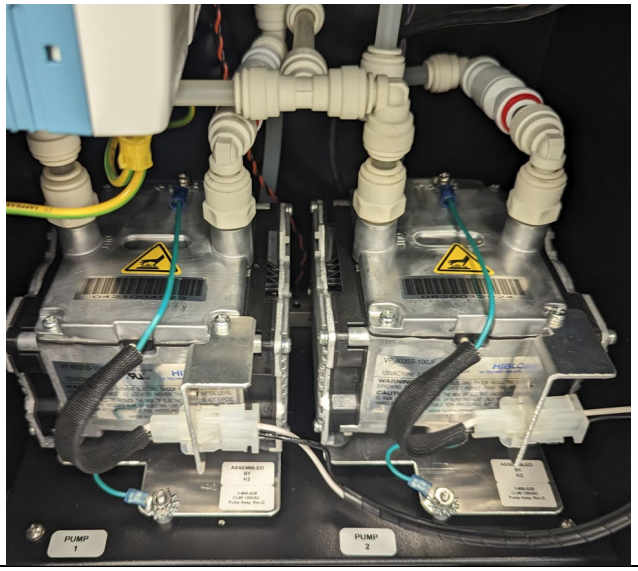
2.1 – Features

2.1.1 Warning Labels, Descriptions, & Danger Zones

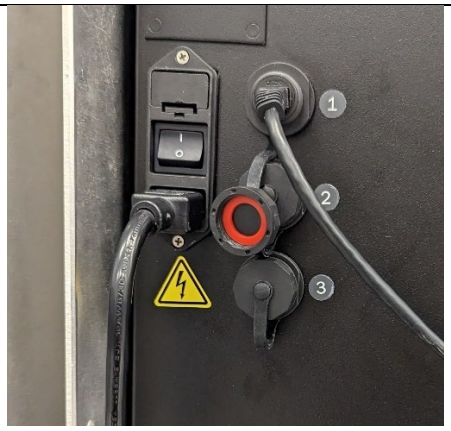
The below table references all warning labels and their meanings that may be encountered while operating and servicing the VISION® 8 continuous gas detection system.

	WARNING: Hot Surface. This surface will be hot to touch and may cause injury. Please avoid or take caution when working near this zone.
	WARNING: Protective Earth Ground. Terminal intended for connection to external conductor for protection against electric shock in case of fault.
	ATTENTION: Please refer to the operation manual for instructions for this system. If the manual is not in your desired language, request an updated manual before using the equipment.
	WARNING: Electric Shock is possible, please use caution when accessing this zone.
	WARNING: Moving Parts and Hand Crushing possible when accessing the cassette drawer. Please watch hand placement when working near this zone.

Please be aware of the following danger zones on the VISION 8 continuous gas detection system. Each zone contains warning labels for operator safety.

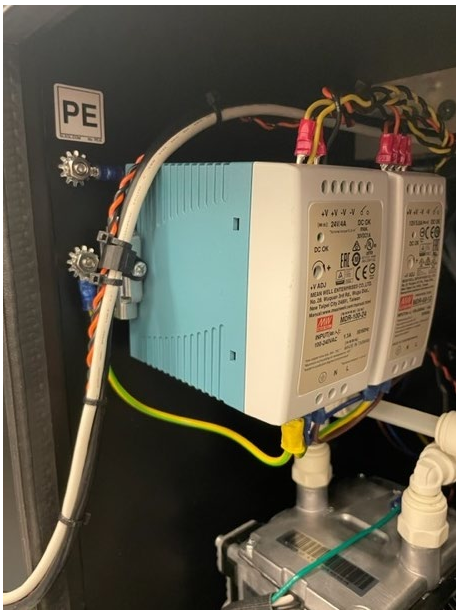
A 	This danger zone is in the service access point of the unit. Users should be aware of hot surfaces and electrical shock.
B 	The danger zone label found on the front of the unit notifies to taking caution while manually opening and closing the cassette drawer. Be aware of hand placement to avoid fingers getting caught while accessing.

C



These danger zones warn of the potential of electrical shock by the exterior electrical inputs and AC voltages inside the instrument.

D



The Protective Earth (PE) label is located inside the cabinet. It signals the location of the ground terminal for protection against electric shock in case of fault.

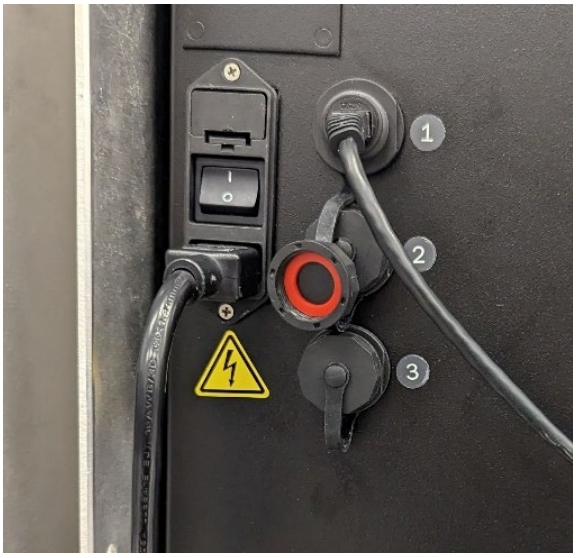
E 	This label, noted on the inner door, advises to refer to the operations manual for guidance on proper use of the system. A QR code label is also adjacent to the latest version of the operations manual.

2.1.2 Touch Screen Display

The VISION® 8 uses a full color 15-inch touch panel LCD display. All menus and data entry are accomplished by touching the appropriate area of the screen – see Chapter 5 “Basic Operation”.

2.1.3 A/C Power & Switch

A/C power is connected, on the left (front-facing) side panel of the VISION 8, with a standard IEC power cord. The on/off power switch is located adjacent to the power cable connection.



2.1.4 Flow Connections & Adjustments

Flow connections consist of “quick-connect” ports on the top or side of the VISION® 8 unit. There are 8-sample locations, one for each monitored point, and one exhaust outlet.

Flow adjustment valves for all points are located on the front of the device. Sample points 1 through 4 are on the left side, while sample points 5 through 8 are located on the right. Refer to Section 5.2.3 regarding flow adjustment.

2.1.5 ChemLogic Cassette

The VISION 8 system utilizes DOD Technologies’ exclusive ChemLogic colorimetric technology. Only use ChemLogic cassettes specifically offered for the VISION 8 system. Refer to Section 6.5 for additional details regarding cassette installation and replacement.

2.1.6 Tubing Connections

Sample tubing and exhaust use a quick connection system for easy installation. The sampling and exhaust connections are made on the top of the VISION 8. See Sections 3.3 & 3.6 for information on connecting the sample and exhaust tubing. Also see Appendix B for important information on transport times for gas from sampling point to the VISION 8.

> **IMPORTANT:** End-of-the-Line filters or In-Line filters are required at all times on each channel. See Section 6.5.

2.2 – External & Internal Layout

2.2.1 VISION 8 Front Components

No.	Part Description
1	Touchscreen HMI
2	Flow Adjust Valves (8)
3	Analyzer Door / Cassette Tray
4	Wall-Mount Tabs (2)
5	Door Latch (2)

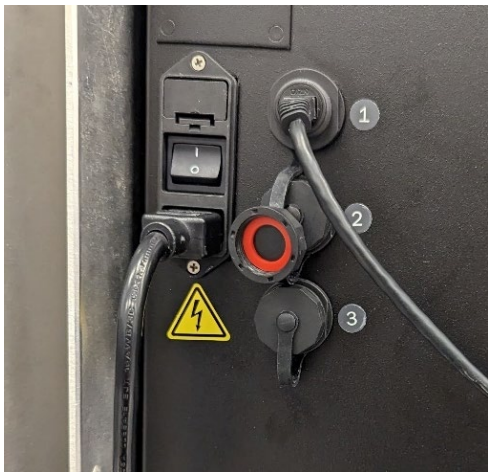
2.2.2 VISION® 8 Side Components

No.	Part Description
1	ON/OFF Switch
2	Power Supply Outlet
3	Communication Ports (3)
4	Port Covers (3)

Port 1: ModbusTCP communications, Webserver/TightVNC remote access

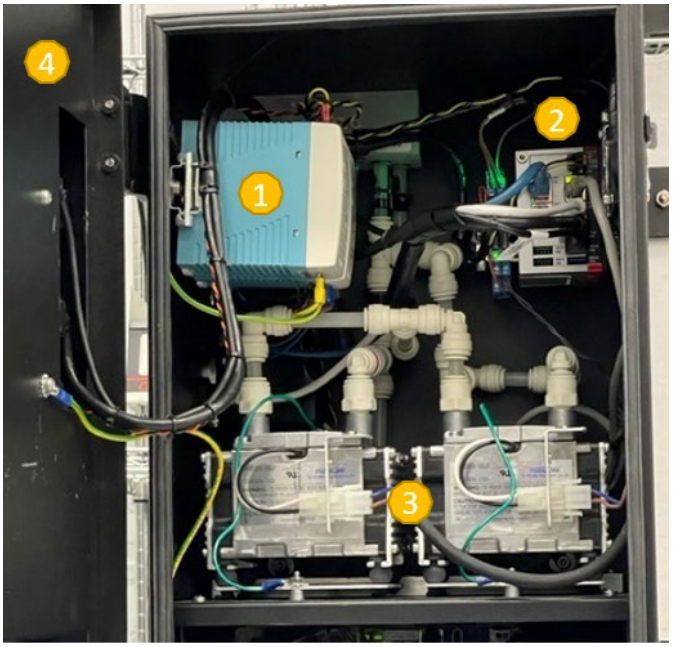
Port 2: Remote IO Options (relay outputs, analog outputs)

Port 3: Unused Spare



2.2.3 VISION 8 Internal Components

No.	Part Description
1	Power Supply
2	Data Acquisition Computer
3	Dual Pump Configuration
4	Service Door



2.2.4 VISION® 8 Analyzer Components

No.	Part Description
1	Cassette Tray
2	ChemLogic® Cassette
3	Analyzer / Cassette Tray Door

2.2.5 VISION 8 Top Components

The top of the unit is the default location (Figure 2.2.5a) for feeding and connecting the sample and exhaust tubing (Figure 2.2.5b). Each sample tubing slot is marked by a numbered location and they all exhaust through a single port located adjacent to the sample tube ports (Figure 2.2.5c). If tubing is preferred from the side of the system, see Section 3.4 for re-location instructions.

Figure 2.2.5a

Figure 2.2.5b

Figure 2.2.5c

2.2.6 Service Area

The contents located behind the Service Door is primarily defined as the Service Area (Figure 2.2.6). It is highly recommended that this area be serviced by a DOD Service Technician. Contact us for details on available routine maintenance and technical service options.

Figure 2.2.6

IMPORTANT: The Service door should remain closed and latched except when replacing internal components. Do not open the door while in Analysis Mode.

WARNING: Electric shock possible. Turn off the unit and disconnect A/C power to the unit before opening the service door

2.3 – Password Security

Access to many of the features is controlled through password protection which is entered through the screen displayed in Figure 2.7.

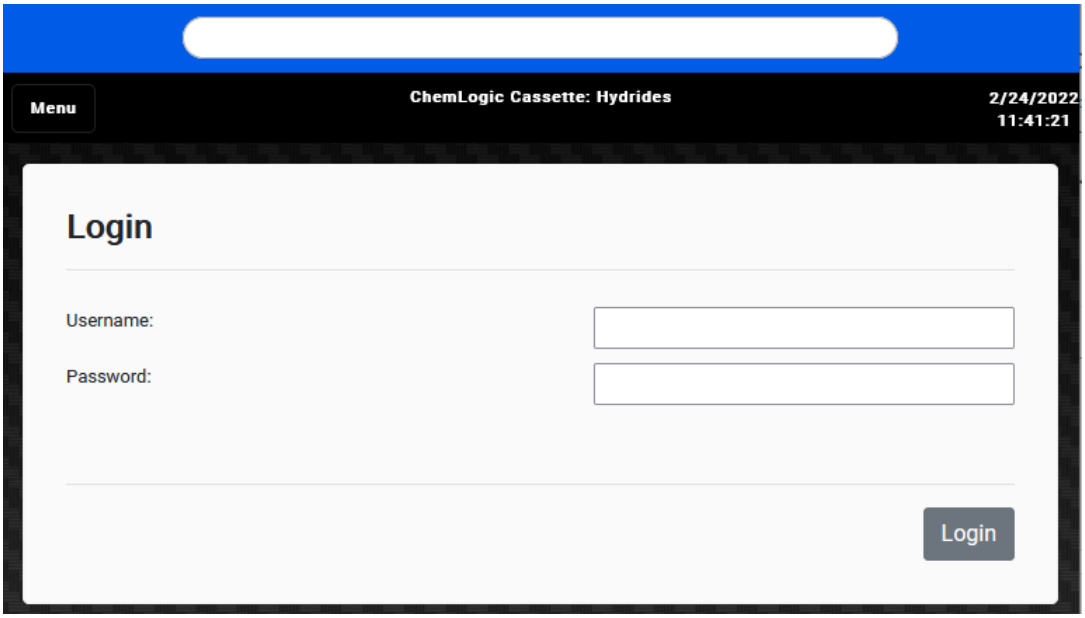


Figure 2.7

When someone attempts to access a screen that is password protected, the Login screen shown in Figure 2.7 will appear. Several of the VISION® 8 setup & configuration screens require an administrative password. Factory service screens require entry of a service level password.

2.4 – Data History Storage

The VISION 8 uses internal memory to store historical information including concentration logging, event history, configuration information, and TWA data. USB storage drives may be used to collect data at the unit using the *Setup->Configuration->Logging* option (see Section 5.2.6.d).

Chapter 3 – Installation

3.1 Selecting a Location

The VISION® 8 is designed for safe use under the following conditions:

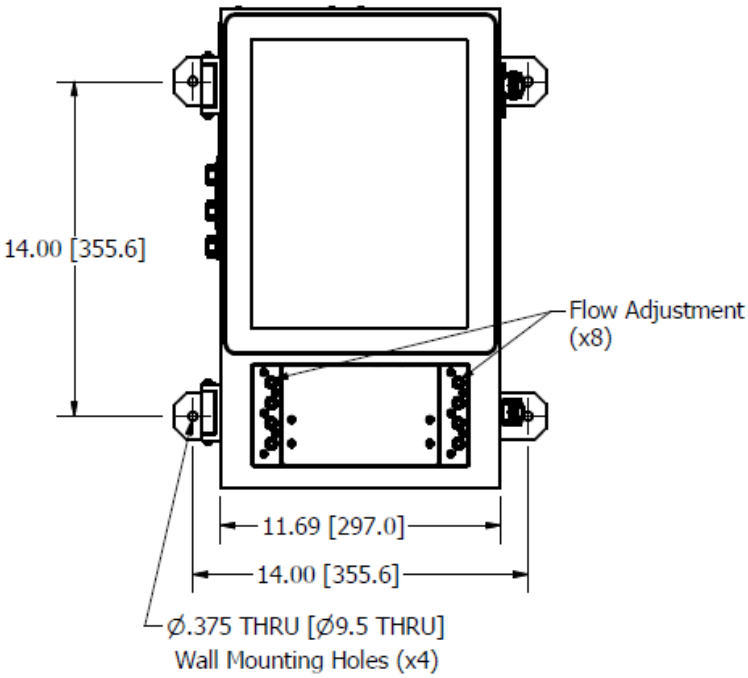
- Indoor use only
- Altitude up to 2,000 m
- Temperatures 5°C - 40°C
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40 °C
- 110/220 VAC supply voltage fluctuations up to +/- 10% of the nominal voltage
- Transient Levels: Impulse withstand (overvoltage) category II of IEC 60364-4-443

The VISION 8 should be placed in a location as central as possible to the locations being monitored while considering the following restrictions:

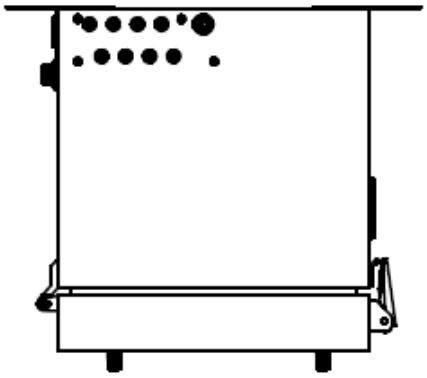
- The maximum sample line length is 500 ft. Using the shortest possible sample line length will reduce transport times and increase the response time of the VISION 8 (see Appendix C)
- A/C power is required to the unit.
- Locate near proper ventilation keeping in mind the maximum length of the exhaust tubing is 25ft.
- The VISION 8 requires stable temperature and humidity levels within range to operate properly.

Do not place the VISION 8 in a location which will expose it to moisture, dust, corrosive gas, or any unusual environmental conditions which could damage the unit and/or cause it to operate inaccurately.

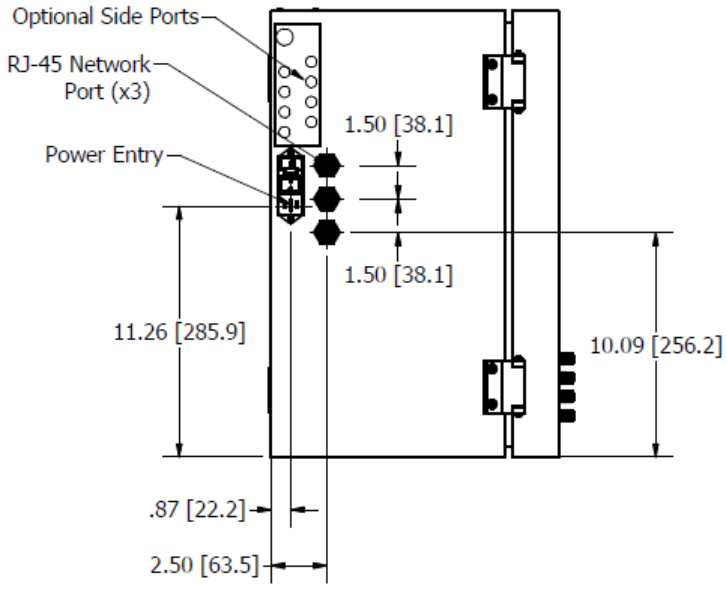
3.2 Mounting Dimensions



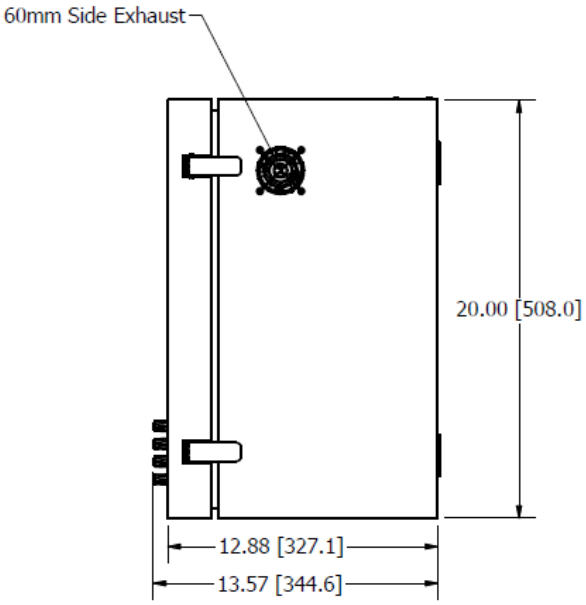
Front View



Top View



Side View (Left-Front Facing)



Side View (Right-Front Facing)

3.3 Sample Tubing

Sample tubing may be connected to the VISION® 8 from the top (standard – see Figure 3.3) or left side of the enclosure. Sample tubing must meet published specifications or be purchased separately from DOD Technologies (see Parts & Accessories in Appendix A). Fully depress each sample tube into the proper hole when attaching. To detach the tube, push on the collet and pull the tubing out. For details on exhaust tubing, see Section 3.6.

IMPORTANT: All sample tubing used with the VISION 8 must be ¼" OD x 3/16" ID FEP Teflon (500 ft max length). Use of any other tubing may damage the VISION 8 and/or cause inaccurate gas concentration readings.

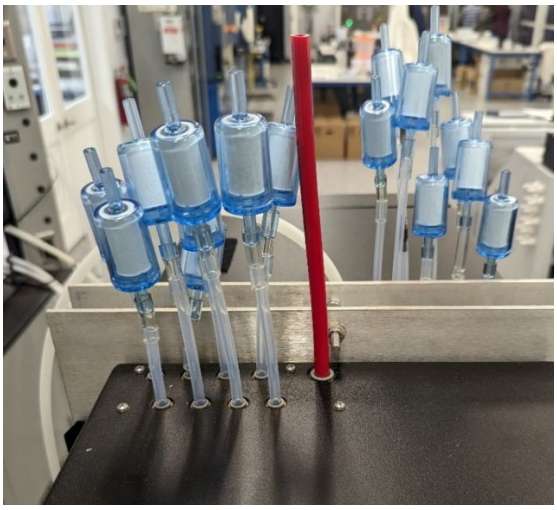


Figure 3.3

IMPORTANT: Sample line tubing should not be disconnected or removed while the unit is active in analysis mode.

3.4 Tubing Relocation

The quick connect system used to attach sample tubing and exhaust may be located on the top or left side of the machine. To move the manifold, follow these procedures:

1. Remove the four (4) mounting screws shown in Figure 3.4.1
2. Remove the four lock nuts holding the cover plate over the manifold opening
3. Remove the cover plate. The section will appear in likeness to Figure 3.4.2
4. Position and align the cover plate over the alternate tubing location
5. Replace the screws holding the cover plate in place and tighten accordingly
6. Place the cover plate over the unused opening and secure with the four replaced lock nuts

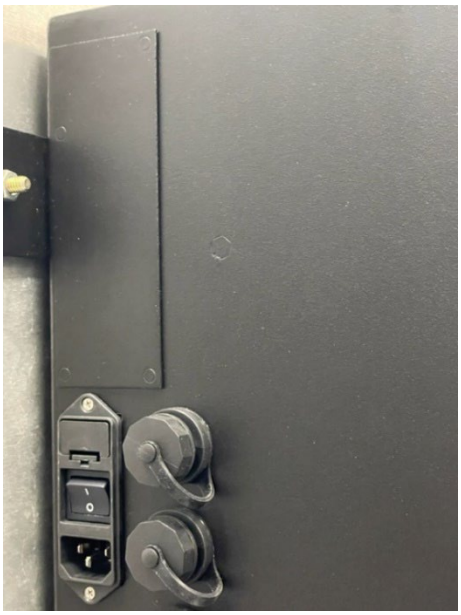


Figure 3.4.1

Figure 3.4.2

3.5 Required Filters

Particulate filters must be installed at the end of each sample line to prevent damage to the optic system. Unused lines must also have a filter installed. Filters require regular maintenance – see Section 6.5. End-of-line particulate filters must be ordered separately and are available from DOD Technologies (see Appendix A).

IMPORTANT: All points require filtration to prevent dust accumulation in tubing and internal damage to the VISION® 8. Dust that collects in the tubing or the internal system may cause sample loss and inaccurate concentration readings along with optic issues.

3.6 Exhaust Tubing

The exhaust line must be 3/8” OD x 1/4” ID tubing with a maximum length of 25 feet. Polyethylene is recommended, although polypropylene or Teflon may also be used. Exhaust tubing is available from DOD Technologies (see Appendix A).

3.7 A/C Power

Before connecting A/C power to the VISION 8, review the power requirements under System Specifications in Appendix C.

WARNING: The detachable power cord or the supply line wiring must meet the ratings specified in Appendix B under System Specifications.

3.8 Pump Installation

Introduction

VISION 8 pumps are shipped separately from the main system to prevent damage in transit. This requires the pump(s) to be installed upon arrival. The following information includes instructions on how to install the pump(s) into the system. The installation should be performed by a knowledgeable support technician.

Prior to installation:

1) The required power, equipment and tubing should be in place and ready to use on the VISION 8 unit.
2) Carefully remove the pump(s) from the packaging materials.
3) Ensure the VISION 8 is not connected to the power source.

Required Equipment

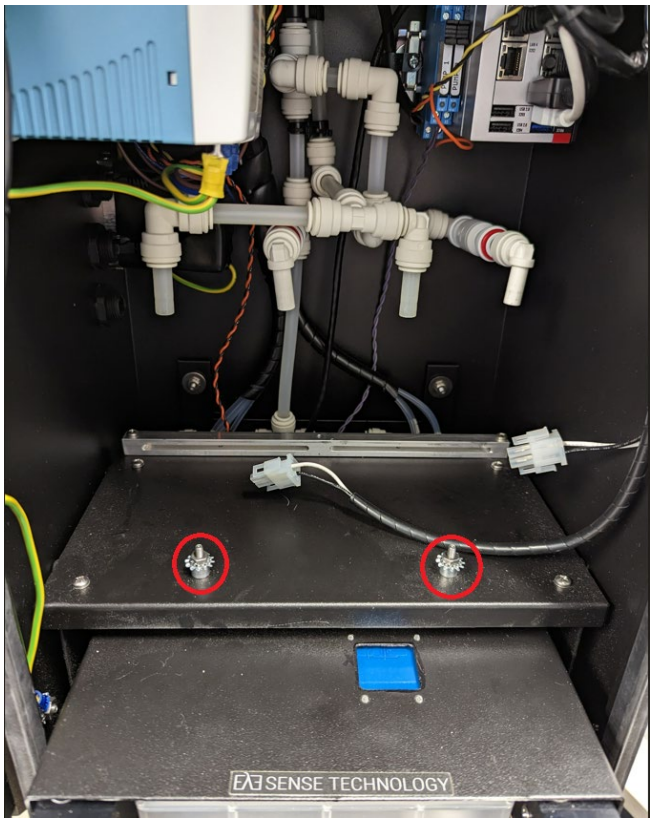
#2 Phillips head screwdriver
SAE 11/32 nut driver (9mm nut driver)

Pump Installation Procedure

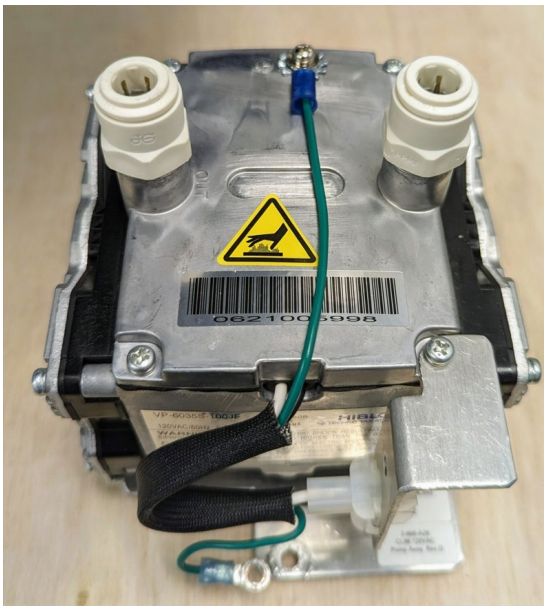
Ensure all pre-requisites have been performed and verify that the power has been disconnected.

With the Vision 8 mounted in the location it is to be utilized, open the front door of the enclosure by releasing the two side latches.

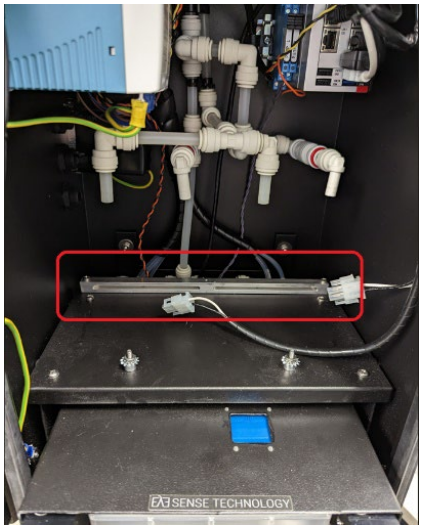
Using a 11/32 (9mm) nut driver, remove the two nuts and Internal-/External-Tooth Lock Washers from the PEM studs - located near the front edge of the shelf (see image below). Place the nuts and washers aside as they will be needed to re-install the pumps into the enclosure.



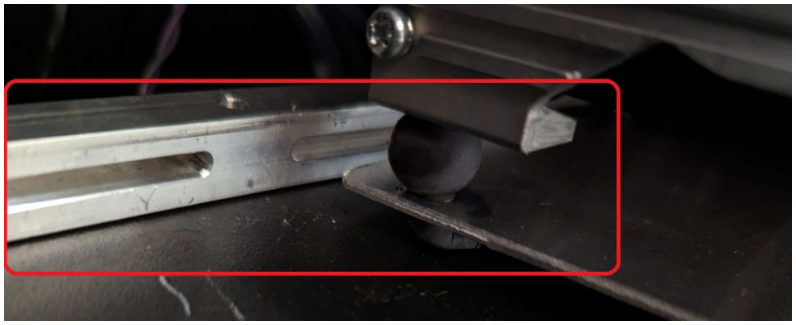
The system is now prepared for installation of the pumps.

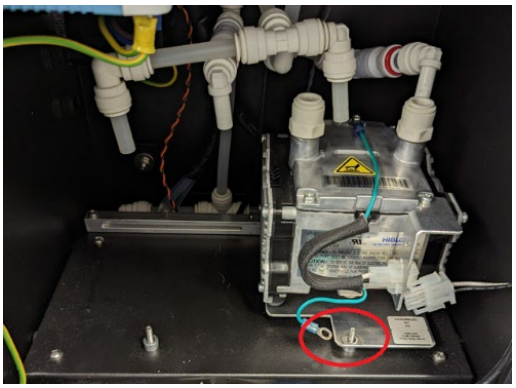


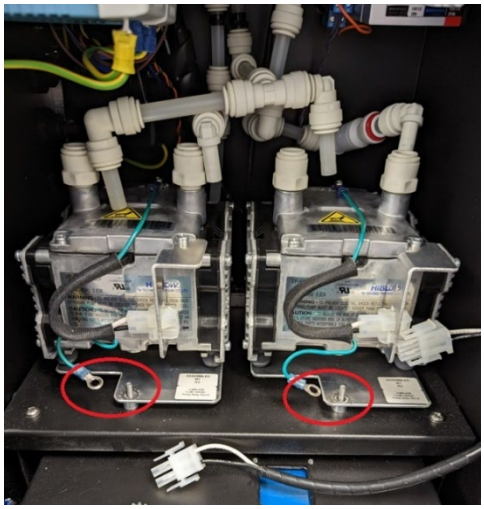
The enclosure has a retaining bar to secure the pumps. The retaining bar is located on the rear of the shelf, as shown in the following images.



Ensure the pump wiring is placed to the side and insert one pump at a time. Align the pump lower plate into the retaining bar as shown in images below. Verify that the pump plate inserts into the retaining bar and the PEM stud aligns and passes through the hole in the front of the pump plate.

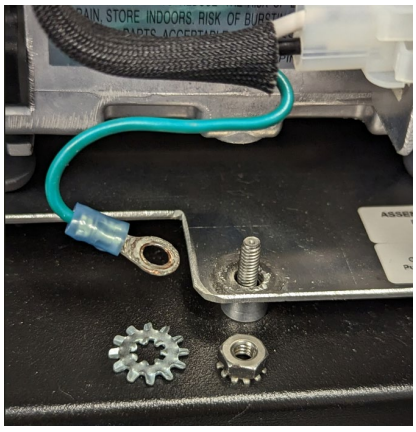
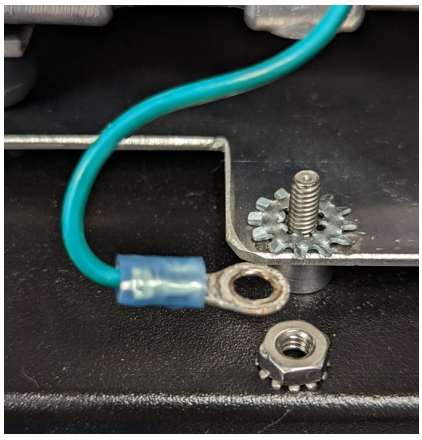
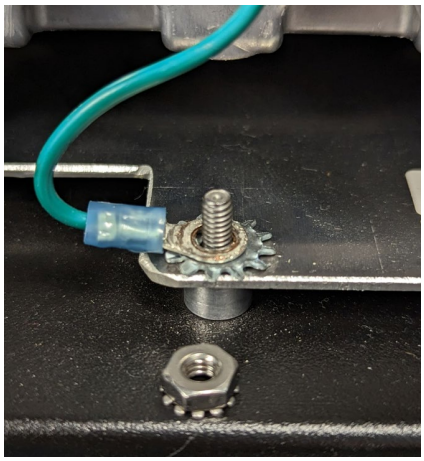
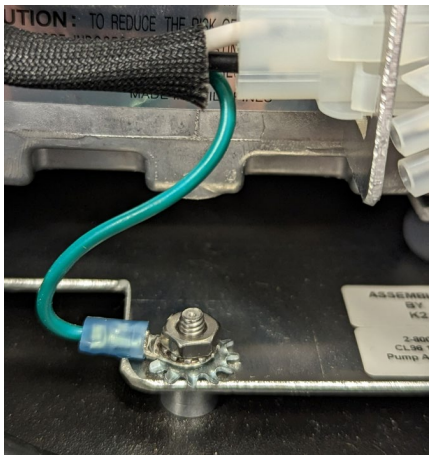




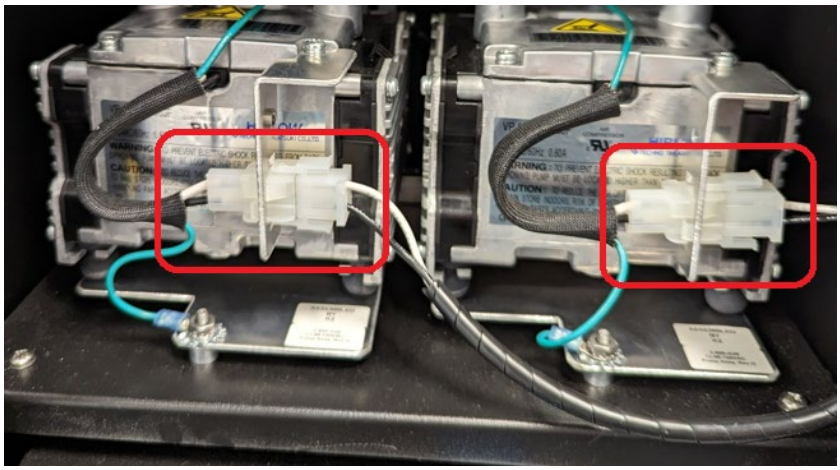


Install the following parts in the order listed. Place the Internal-/External-Tooth Lock Washer over the PEM stud.

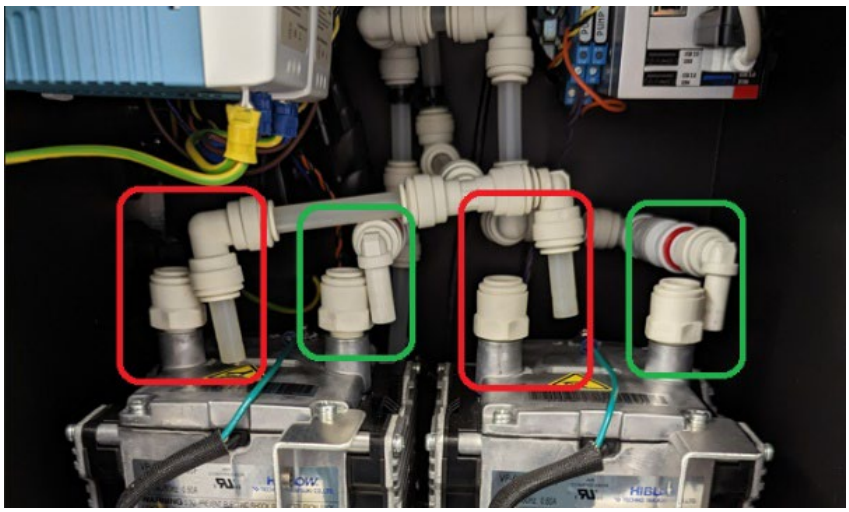
Next, place the terminal ring from the pump green wire over the PEM stud. Last, tighten the nut on the enclosure pump PEM stud using a 11/32 (9mm) nut driver. Verify the nut is tightened to the proper torque (20 lb-in).

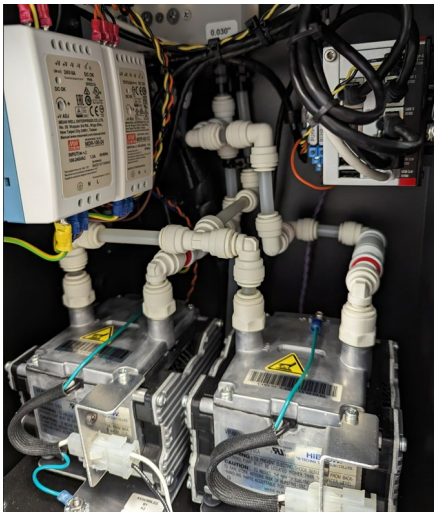





Connect the pump power connectors. Observe the proper orientation for the keyed connectors as shown in the photos. Verify the connectors are fully seated and latched.



Connect the tubing to the pumps as shown in the photo. Verify the tubing connections are fully seated.





Close the front door of the enclouse by locking the two side latches.

When ready re-connect the system power.

Verify Flow Integrity

1. Fully inspect the system for proper wiring and tubing connections.
2. Verify all wiring and tubing has been properly connected.
3. Retest to verify pump installation was performed correctly.
    a. Refer to the Flow Adjustment section to flow balance the system.
    b. Verify inlet flow integrity for each individual sample inlet point.
        i. Verify no cassette is installed. If a cassette is installed, remove it prior to proceeding to the next step. Ensure analyzer gate is closed (see Chapter 6 for details).
        ii. Navigate to the system menu option for Flow Adjustment (see Flow Adjustment section for instructions).
        iii. Plug each sample inlet point individually and verify the appropriate digital flowmeter drops to zero. Verify the point digital flowmeter returns to the previous value the point was at when the point was not plugged.
    c. Verify exhaust flow integrity.
        i. Plug the exhaust and verify each point digital flowmeter drops to zero. Verify all point digital flowmeters returns to the previous value the points were at when the exhaust was not plugged.
4. Install Vision 8 cassette per the instructions in this manual.
5. Re-connect the system sample inlet tubing, and exhaust tubing. Verify tubing is fully seated.
6. After attaching sample and exhaust tubing, plug each point individually at the end of each line to ensure tubing integrity. Flow should drop to near zero and if the instrument is analyzing, a low flow should be reported within one minute. When plugging end of exhaust line, all points should drop near zero.
7. The VISION 8 is now ready to use. Follow the sections in this manual for further instruction and system operation.

Chapter 4 – Basic Operation

4.1 Introduction

The touch screen on the VISION® 8 is used for all configuration and control of the unit. Analysis mode is active by default after power on unless an operator intervenes. The system is designed to continually monitor and detect target gases. Various tasks can be completed while remaining in Analysis mode, including viewing faults and events, viewing concentration history & TWA logs, checking point configuration and flow limits.

Analysis is started either by:

1. Power on timeout without user intervention.
2. Touching the Start Analysis after power on.
3. Touching the 'Start Analysis' button on the Menu.

Analysis will continue until one of the following occur:

1. Power loss.
2. Entering Setup by touching the Setup button on the Menu and entering an appropriate password which will halt analysis on all points.
3. A critical machine fault which may stop an individual point or the entire VISION 8.

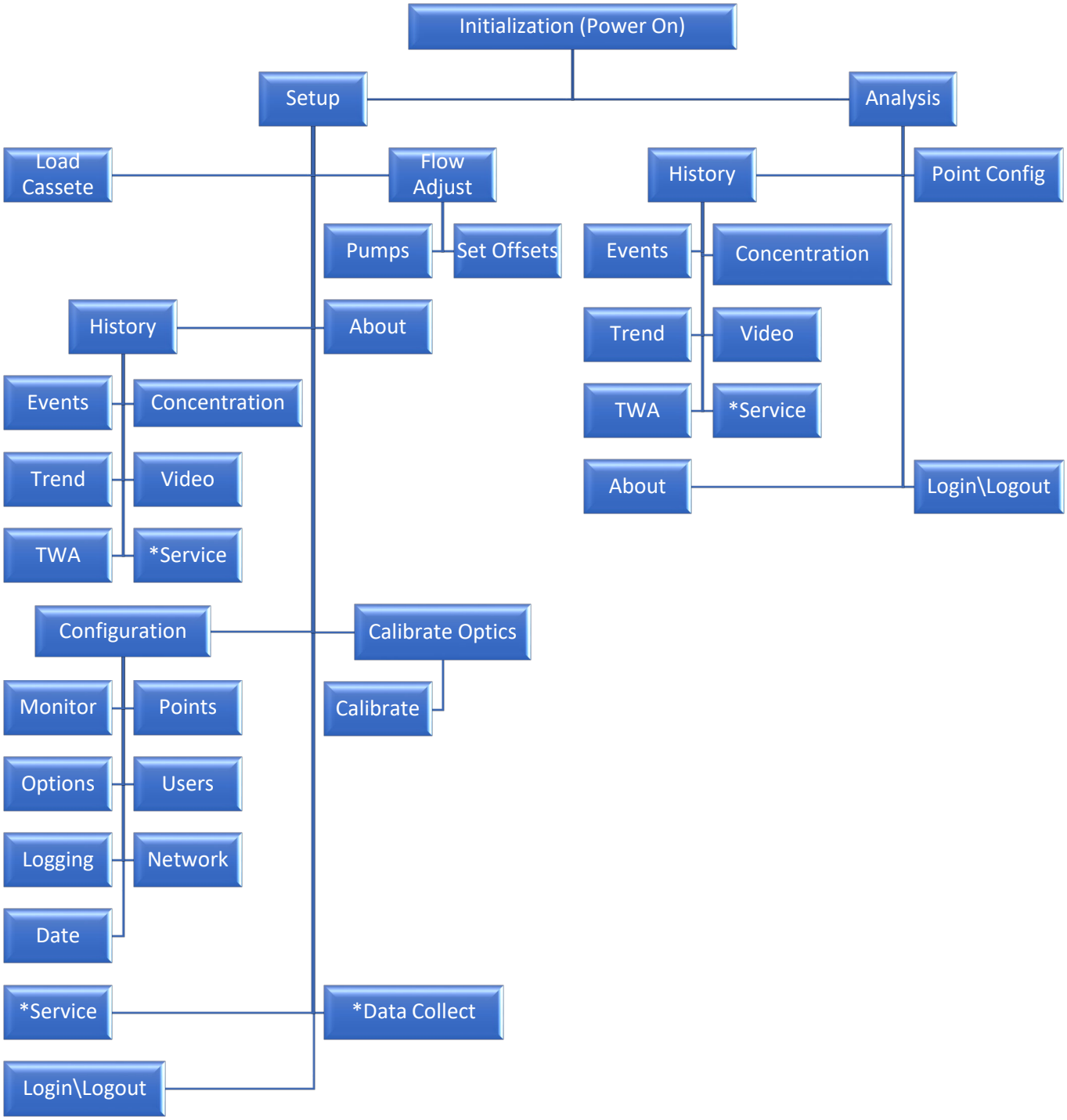
4.2 Initialization

When powered on, the VISION 8 will begin with an initialization screen, followed by the automatic restart screen.

NOTE: If another menu button is touched before the timer reaches '0', the system will revert to that screen and **WILL NOT** enter Analysis mode (unless the Analysis option was selected). If the machine loses power at any time, it will return to this screen when power is restored and automatically re-enter Analysis when the timeout is reached.

4.3 VISION® 8 Menu Tree

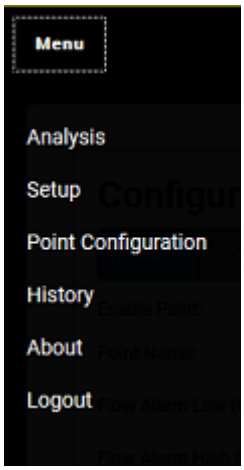
The following Menu Tree provides an overview of the VISION 8 software menu structure:

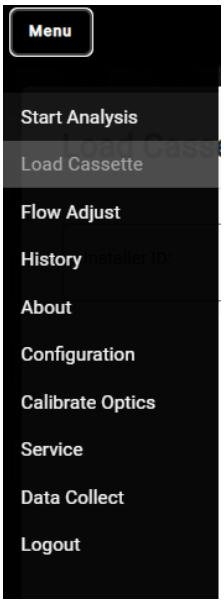


Note: Menu Items with the an asterisk require DOD Service login credentials for access.

4.4 Setup / Main Menu

The Setup menu is accessed either by selecting the 'SETUP' button on power up or by touching 'Menu→Setup' from the Main Menu screen (see Figure 4.4.1). Once 'Setup' has been selected, a new list of menu options will appear (see Figure 4.4.2) as you enter setup mode.





Main Menu – Figure 4.4.1 **Setup Menu – Figure 4.4.2**

See Section 5.1 for further information on Main Menu screen options and Section 5.2 for additional Setup Menu information.

4.5 General Screen Navigation

Figure 4.5.1 shows a portion of the main menu that appears at the top when the machine is powered on. The menu system on the VISION® 8 allows access to all the functionality of the system with a simple touchscreen interface. The selected item on the menu ("Analysis" on Figure 4.5.1) will appear in slightly larger, **BOLD** text with a lighter shade of gray as the background.

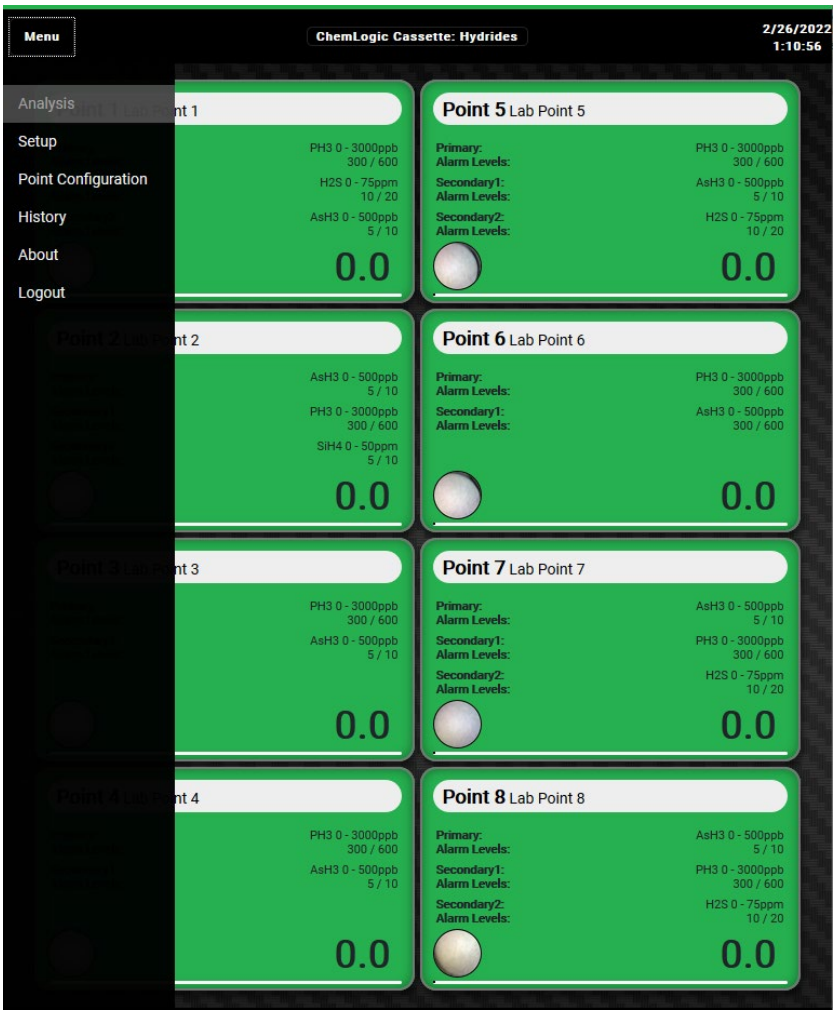


Figure 4.5.1

4.6 System Status

A few things to know about all the menus on the VISION® 8:

- The background color of the top menu area always indicates the status of the machine and will match the color of the optional light attachment. Table 4.6 defines the colors:

Not installed
Idle (Not analyzing)
Analysis Active
Maintenance Fault
Critical fault
Gas Alarm

Table 4.6

- Table 4.6 lists the colors in priority from lowest to highest since only one color will be displayed at a time. For example, if any channel indicates a Gas Alarm the menu will appear red until the gas is no longer detected or the alarm is cleared. If any point has a low flow, the menu will appear yellow, etc.
- On the Main Menu, you can access any of the screens on the menu without exiting analysis except the 'Setup' button which will exit analysis and bring up the Setup sub-menu. Note that the 'Setup' button may require a password depending on the configuration of the VISION® 8.
- When a sub-menu is selected, it will replace the previous menu.
- Note: In Figure 4.6.1, the background color is green indicating the system is in active analysis mode.

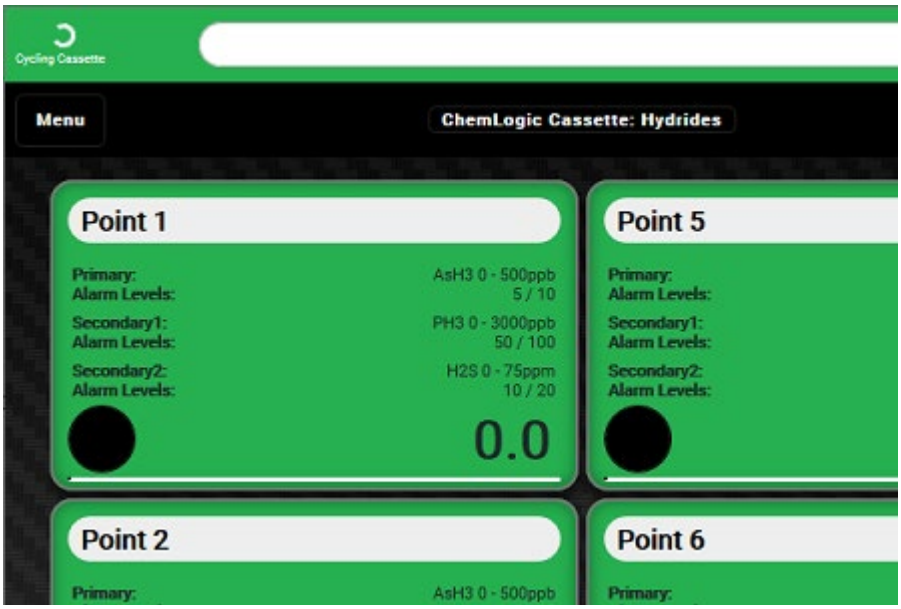


Figure 4.6.1

4.7 Initial Setup & Configuration

When configuring your VISION 8 system for the first time, an internal review and adjustment of the following items is highly recommended:

1. Set System Date/Time
2. Gas Selection
3. Alarm Settings
4. Output Configuration
5. Data Logging
6. Cassette Installation
7. Filter Type
8. Exhaust Connections
9. Balance Flow

Refer to the following sections for setup to ensure the VISION 8 is ready for gas detection and analysis.

Chapter 5 – Software Navigation

5.1 Main Menu

The Main Menu allows the operator to start/stop analysis and access to all information available while remaining in Analysis mode.

Figure 5.1

5.1.1 Analysis Mode

The 'Analysis' screen (see Figure 5.1.1) is entered either automatically during power on or by selecting the 'Analysis' option from the Main Menu. General status of all eight points can be viewed here.

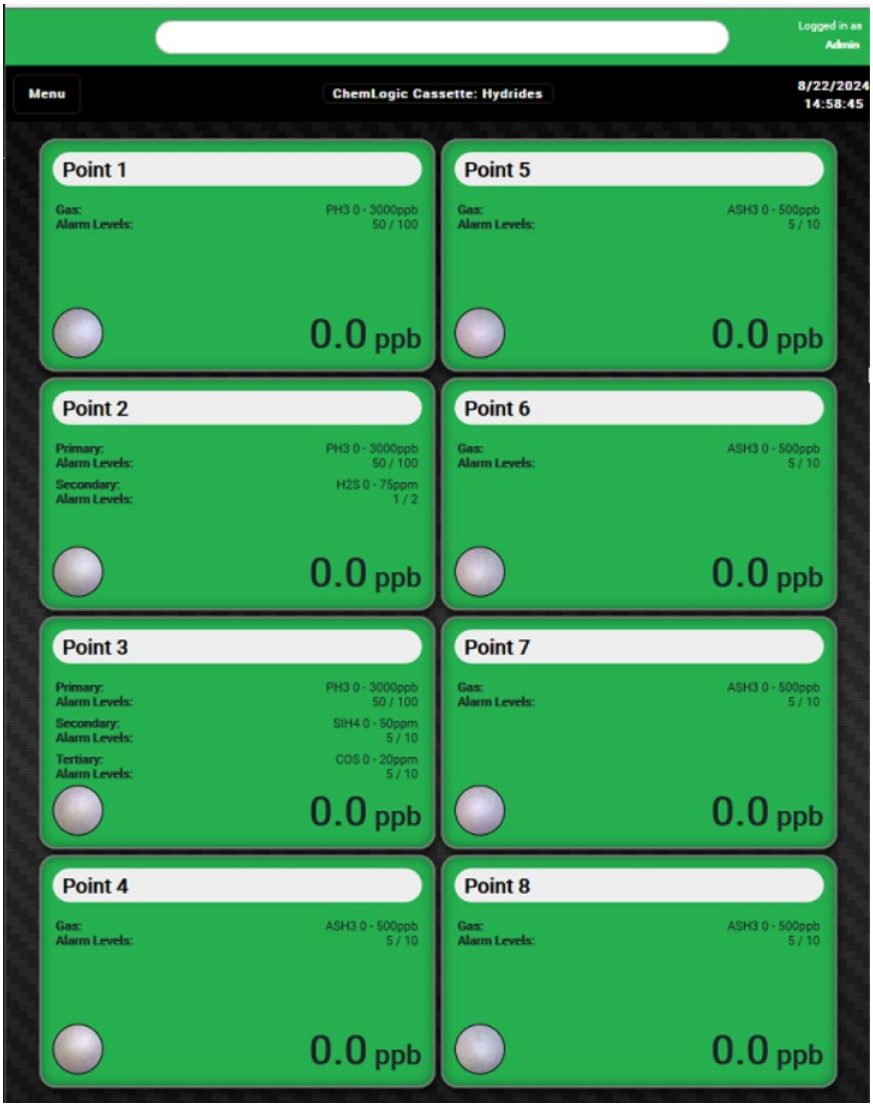


Figure 5.1.1.a

Upon entering Analysis Mode, the VISION® 8 will begin analyzing all active points (as established via Setup procedures in Section 5.2.1). Figure 5.1.1.a illustrates an 8-point system in Analysis Mode. Note, the menu background is green indicating analysis is active. When all points are green, there are no reported flow issues or active gas alarms. Points that are black indicate they are not installed or inactive. The color of each point on the analysis screen will change according to the current state of the point (see System Status chart in Section 4.6).

The following example (Figure 6.1.1.b) demonstrates how the Analysis screen will appear when an alarm level is reached for a targeted gas on a specific point. The indicated target gas symbol will flash adjacent to the cassette stain preview image and a flashing light will accompany it from the dialog box banner at the top of the screen.

Figure 5.1.1.b

The white message box located at the top of the screen provides system status updates as they occur. The logged in username is displayed in the top right corner. The current date & time can be found on the top right, just below the username. The Cassette type inserted will be noted at the top-middle, below the dialog box.

5.1.1.a Point Trend Details

Touching the any point from the Analysis screen will display point-specific detailed information as shown in Figure 5.1.1.a. The screen details the point #, name, location, range, alarm levels, flow level, current concentration, and a timeline graph of the concentration detected.

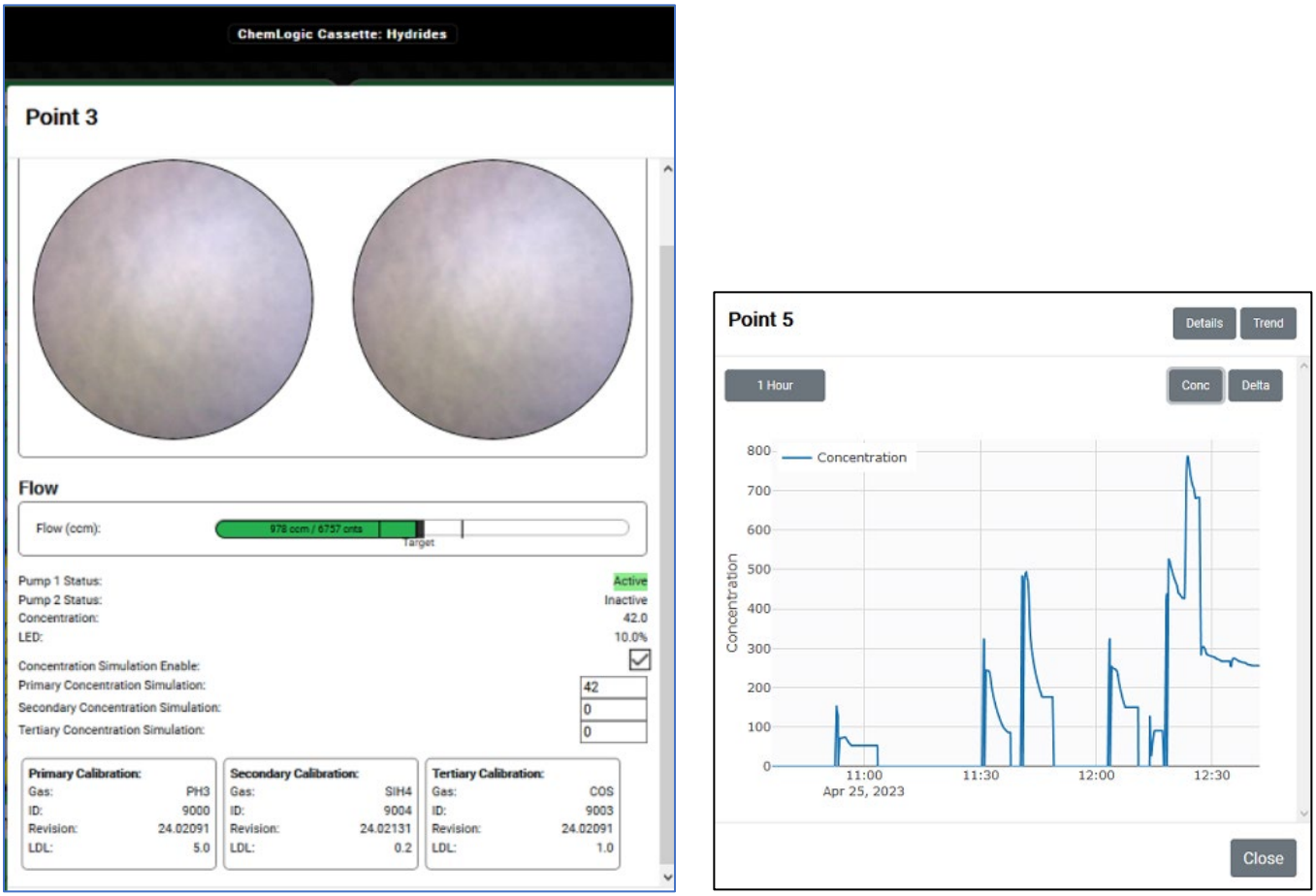


Figure 5.1.1.a

*Active: any point installed and enabled on the VISION® 8.

The information on the point detail screen is updated in real time while in analysis mode. Alarm levels may be changed by touching the numeric display area for the appropriate alarm. Similarly, the comments related to this point may be edited by touching anywhere in the box displayed for comments.

> **NOTE:** The display of the current flow may not be immediately displayed on this screen. It is recommended that the flow adjustment screen (Section 5.2.3) be used for all flow calibration.

5.1.2 Setup

Selecting *Setup* while in Analysis mode will end the analysis cycle on all active points, following user sign-in. Touching *Setup* on the main menu will bring up the Setup sub-menu – see Section 5.2.

5.1.3 Point Configuration

Each point on the VISION® 8 must be individually configured from the Setup menu for the appropriate gas. See Section 5.2.6.b for information on selecting the gas for each point.

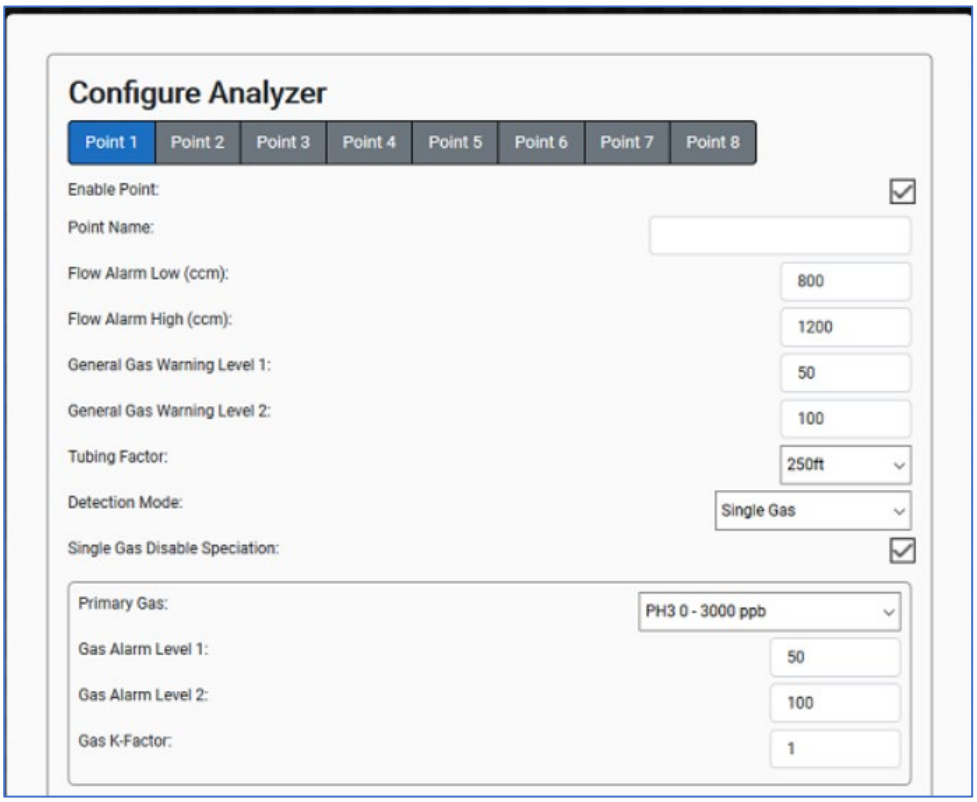


Figure 6.1.c

5.1.4 History

Selecting the History button from the Main Menu will present a screen with tabbed options (Figure 5.1.4) for Events, Concentration, Trend, Video, TWA and Service. These sections provide access to the historical data stored on the VISION 8. Continue to review the following sub sections for additional details on each.

IMPORTANT: The VISION 8 stores a limited amount of historical data to an internal hard drive. Review the Logging setup procedures and details (Section 5.2.6.d) for more information.

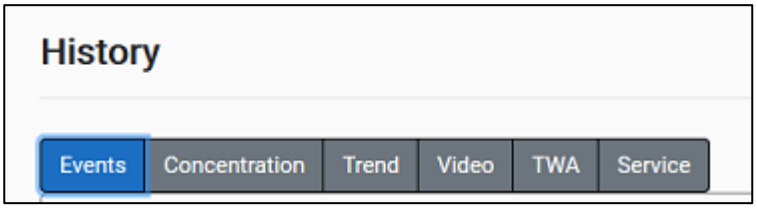


Figure 5.1.4

5.1.4.a History -> Events

Selecting the Events option, on the History sub-menu, will pull up a screen in likeness to the one shown in Figure 5.1.4.a. This screen retains a list of the most recent events that occurred. A specifically selected date can be selected using the calendar in the Date field.

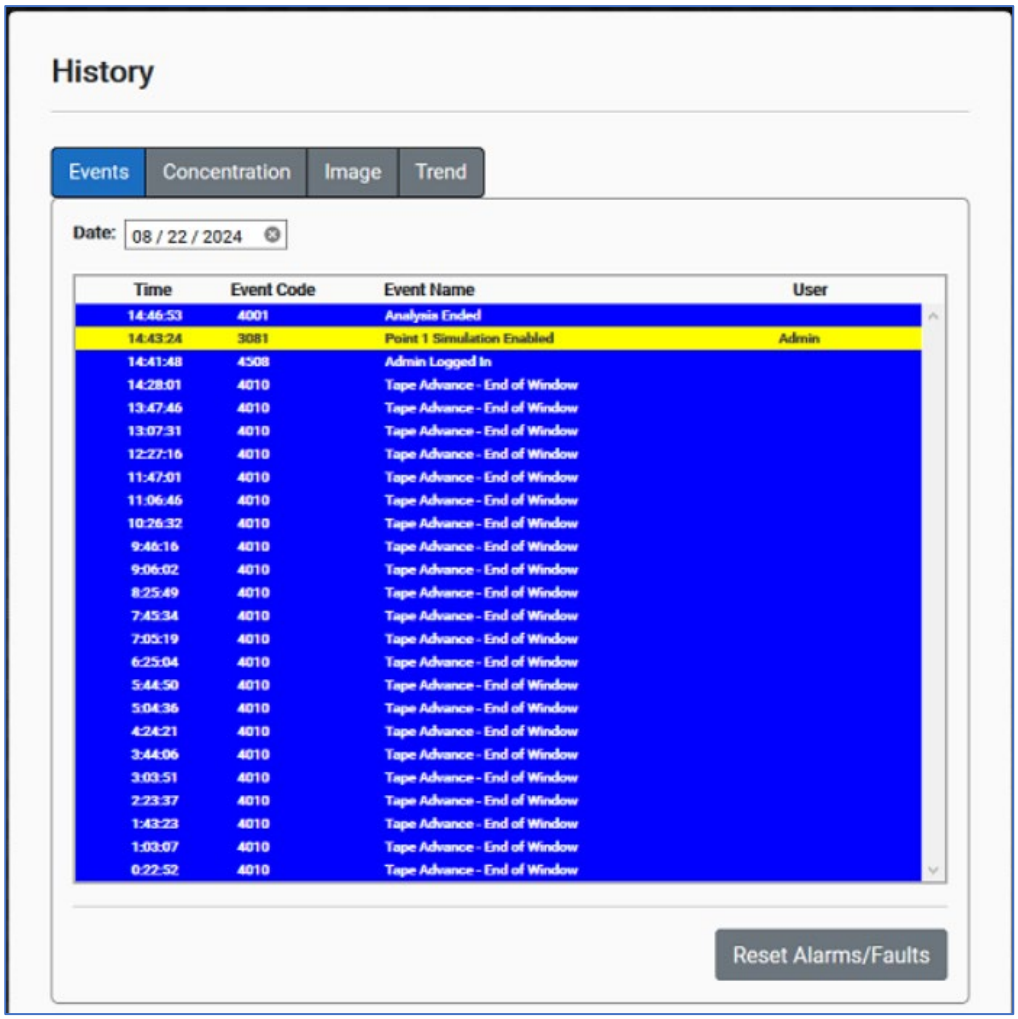


Figure 5.1.4.a

Select the 'Fault/Alarm Reset' button to reset clear all active faults & alarms.

NOTE : New events may not immediately appear on the list while the screen is active. Each time the menu item is selected (from another menu) the current list is activated.

5.1.4.b History -> Concentration

Touching the Concentration button on the History Menu will bring up the screen similar to Figure 6.1.d.2. This screen displays the concentrations recorded for each point for the data selected on the calendar.

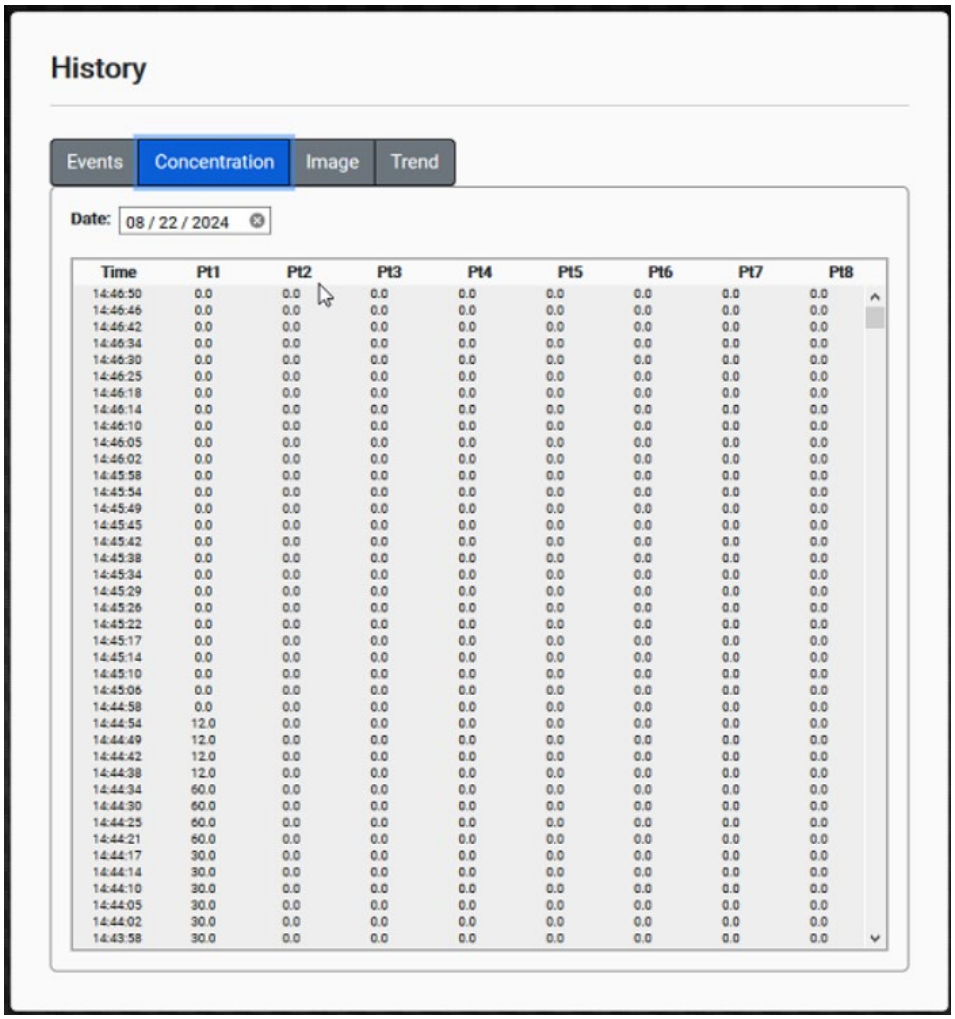


Figure 6.1.d.2

5.1.4.c History -> Trend

Selecting the Trend tab under History will produce a graphical view of either Concentration ('Conc' button) or Delta ('Delta' button) trends. Trends are displayed based on the specific Date and Point selected.

Figure 5.1.4.c

5.1.4.d History -> Video

Select the Video tab under History to view live video of a gas stain captured on the ChemLogic cassette. Footage is display based on the specific Date and Point selected. The timeline and other supporting analytical data are displayed below the video capture (Figure 5.1.4.d).

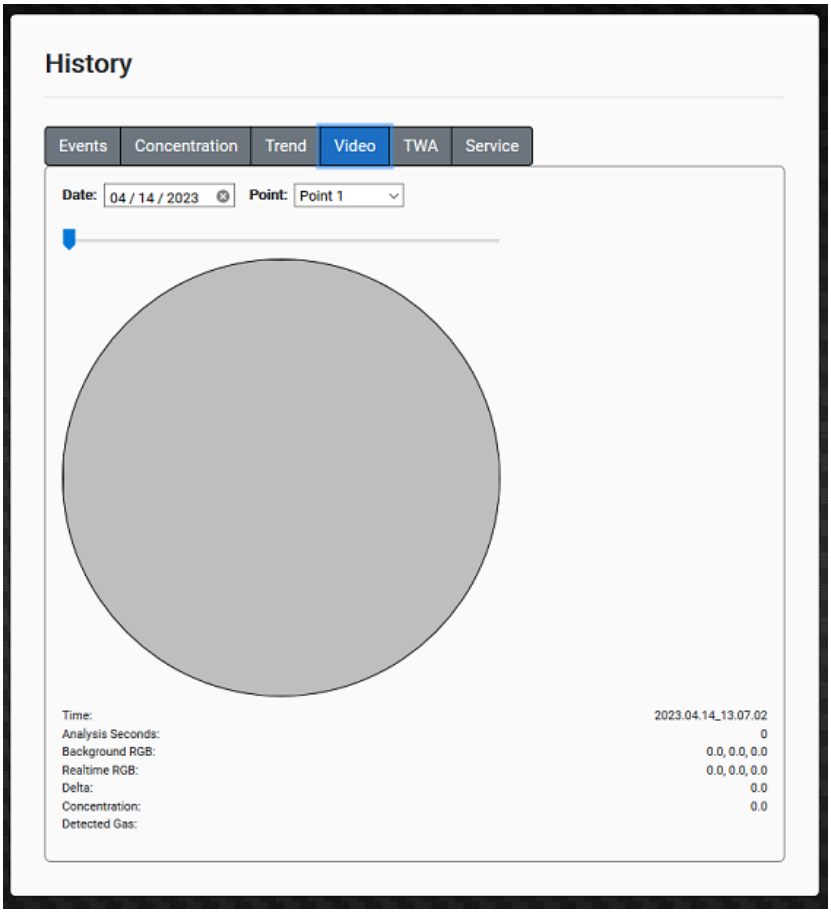


Figure 5.1.4.d

5.1.4.e History -> TWA

Selecting the TWA tab under the History menu produces screen details in likeness to Figure 5.1.4.e. Data will populate based on 'Date' and selected 'Point' from the available options.

Metrics include 'Time', 'Primary TWA', 'Secondary1 TWA' and 'Secondary2 TWA' – with TWA data displayed in minutes and seconds elapsed since the cycle started. A 'Restart TWA' button is included to reset the data upon request.

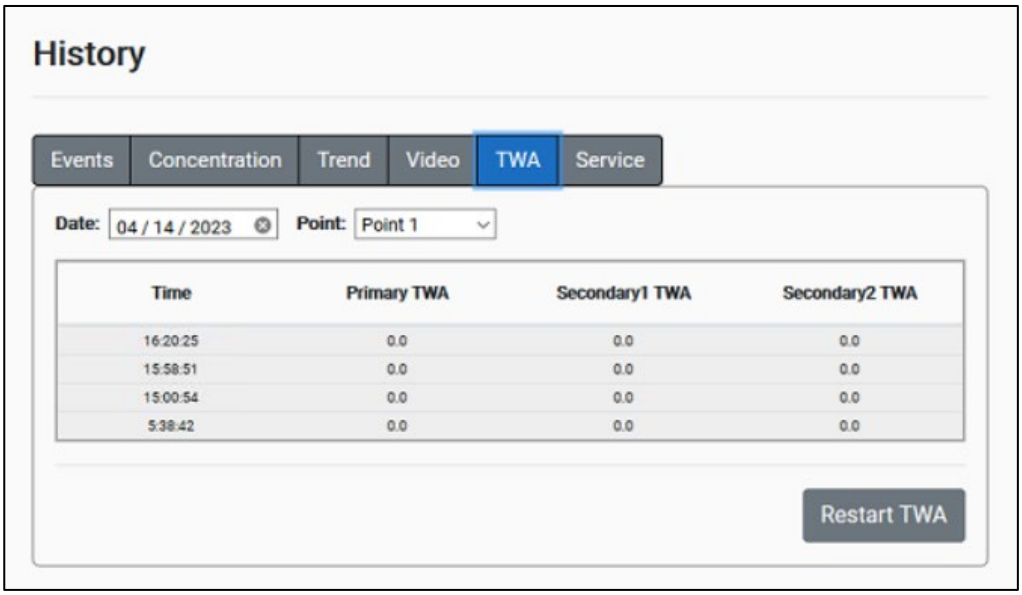


Figure 5.1.4.e

During analysis the VISION® 8 stores the TWA information every 8 hours* (referred to as a 'cycle') for each installed point. The information is stored on the system's internal storage device for easy transfer to other systems.

> NOTE : If analysis is stopped by the operator or due to any other factor (critical service fault, power interruption, etc.), the TWA information is saved as a separate cycle regardless of how much time has elapsed since the cycle started.

5.1.5 About

Touching the 'About' button on the help menu displays a screen like that of Figure 5.1.4.f. The screen contains the serial number, versions & license information for the system.

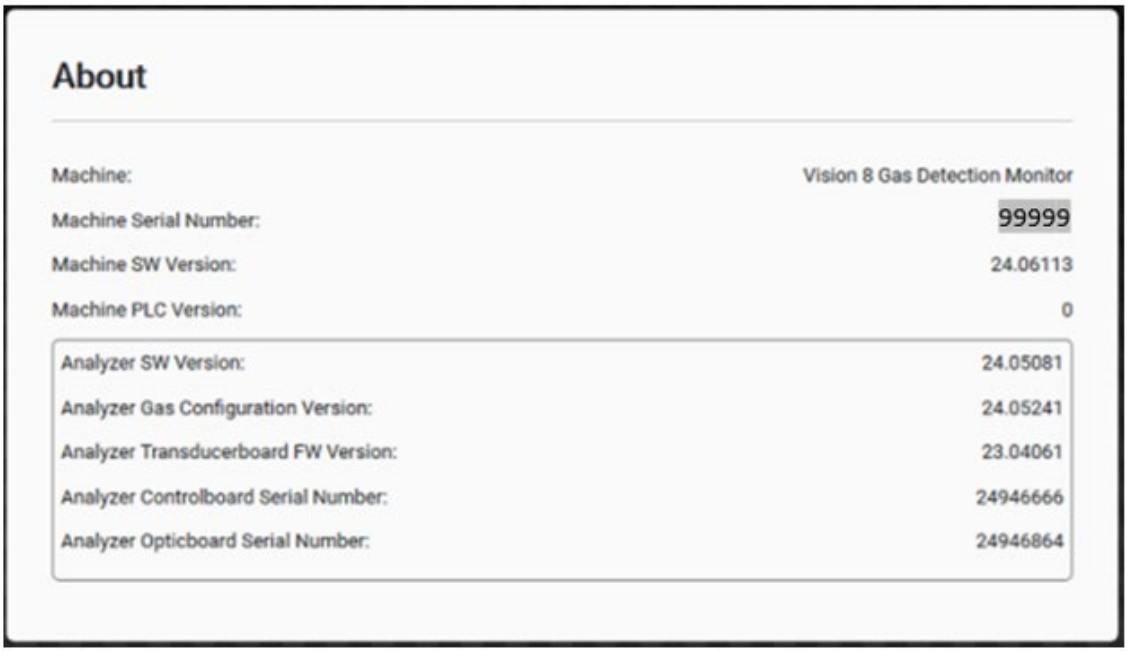


Figure 5.1.4.g

5.2 Setup Sub-Menu

The setup sub-menu contains the configuration screen for the VISION® 8 necessary for normal operation. Access to the Setup sub-menu is password protected (see Section 2.2.7).

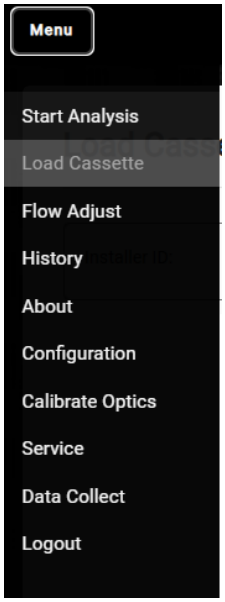


Figure 6.2

5.2.1 Setup -> Start Analysis

When selecting 'Start Analysis' under the Setup sub-menu, a pop-up 'Confirm Analysis' screen will appear, requesting confirmation that the correct cassette type and item number have been inserted. If correct, select 'Start Analysis' to proceed to the Analysis screen.

For further details on operating the VISION 8 in Analysis Mode, refer to Section 5.1.1.

5.2.2 Setup -> Load Cassette

When installing or replacing a new VISION 8 cassette, follow the procedure described in Section 6.5.

5.2.3 Setup -> Flow Adjust

There are a total of eight flow adjustment valves (two columns of four, numbered 1 thru 8 – see Figure 5.2.3.a) located on the front panel of the VISION 8. They provide the ability to manually adjust the flow for each Point. Valves will be disabled on Points that are not installed.

Figure 5.2.3.a

When Flow Adjust is selected under the Setup menu, a screen in likeness to Figure 5.2.3.b appears. Touch the 'Pumps' button to turn the pumps on. Press the button again to turn the pumps off. When the button is touched, the flow levels for each installed point are displayed. Use the corresponding valves to adjust the flow so that each level is as close to the center *Target* line as possible.

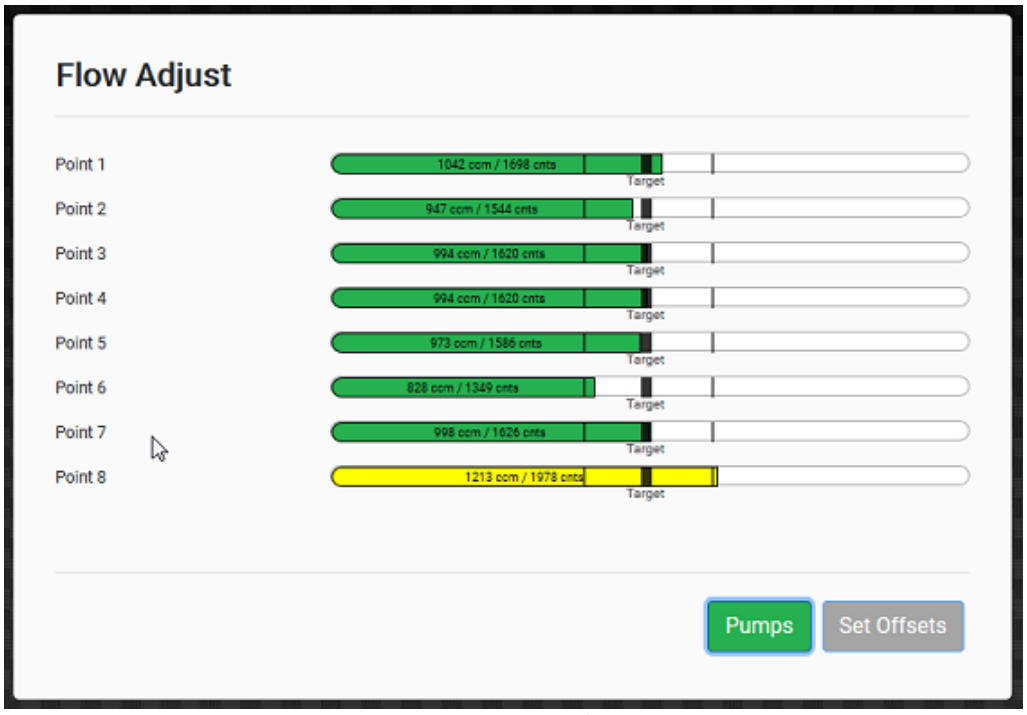


Figure 5.2.3.b

NOTE : There may be a slight delay between the time the control valve is turned on and the update reading on the VISION® 8. Adjust the valve slowly and wait a few seconds to verify the level indicated on the unit is accurate.

5.2.4 Setup -> History

This information is also accessible via the Main Menu. Additional information can be obtained by referring to Section 5.1.4.

5.2.5 Setup -> About

This information is also accessible via the Main Menu. Additional information can be obtained by referring to Section 5.1.5.

5.2.6 Setup -> Configuration

The Configuration section includes multiple tabs (Figure 5.2.6) to customize set up for the VISION® 8 system.

Figure 5.2.6

5.2.6.a Setup -> Configuration -> Machine

The VISION 8 supports both energized and de-energized outputs and may be configured for either latching or non-latching faults and Alarms.

When configured for energized relays, the outputs are normally in a high state and change to a low state when the corresponding fault/alarm occurs. De-energized relays work in the opposite manner. When the power is ON, the Power Loss relay is always in the normally high state.

When latched outputs are selected any fault or alarm that occurs will remain until the 'fault reset' button is touched. If non-latching outputs are selected the output will reset automatically when the condition that caused the fault/alarm goes away.

Touching the 'Configuration' button on the Main Menu brings up a screen in likeness to Figure 5.2.6.a, which displays general configuration options for the system.

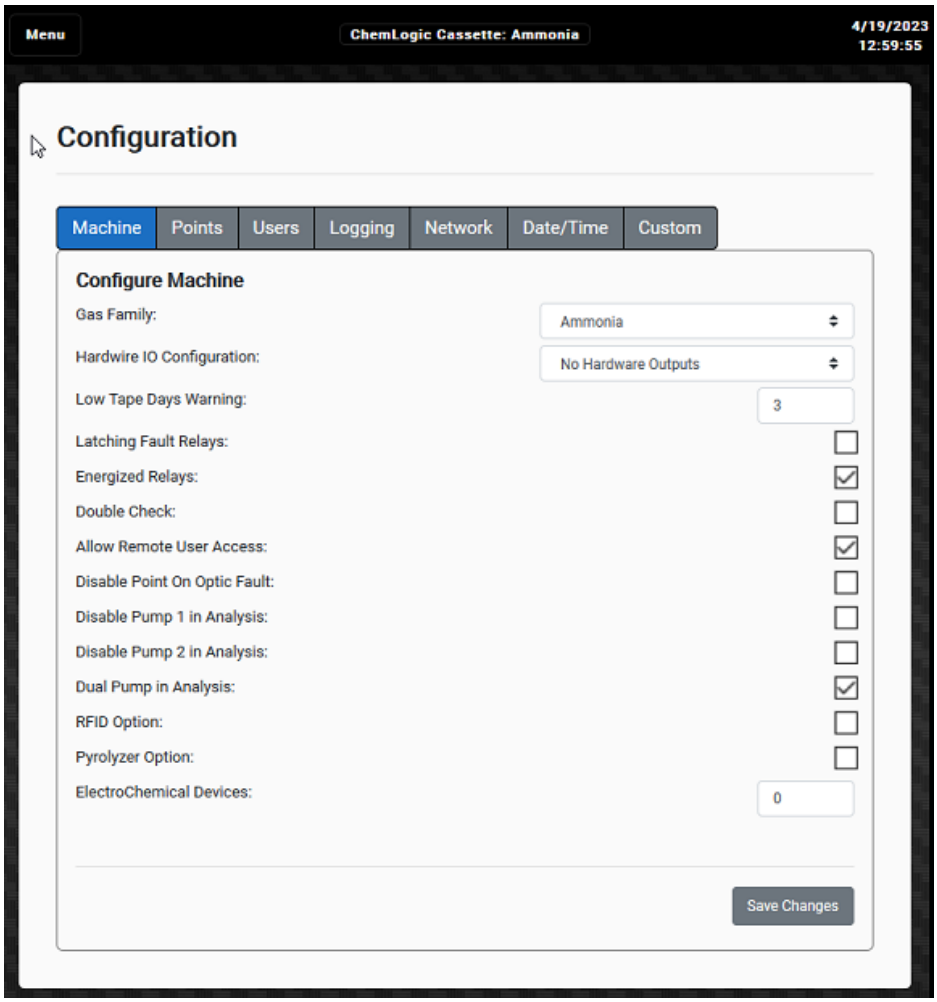


Figure 5.2.6.a

Touching the ‘Gas Family’ button brings up the gas family drop down menu from which you may select the gas family. Touching any of the alarm level numeric displays will bring up the keypad to change the alarm level. The valid alarm levels are listed in Appendix C for each gas. An invalid alarm level entry will bring up an error message.

The check box to the right of each point allows the individual points to be disabled when not in use. The word ‘DISABLED’ will then appear on the analysis screen for that point and no calculations will be made.

5.2.6.b Setup -> Configuration -> Points

Selecting ‘Point Configuration’ under the Main Menu or Configuration->Points under the Setup menu, will produce a screen in likeness to Figure 5.2.6.b. This is where each Point can be individually configured by selecting the tab representing a numbered “active” point. Tabs will be disabled if not installed.

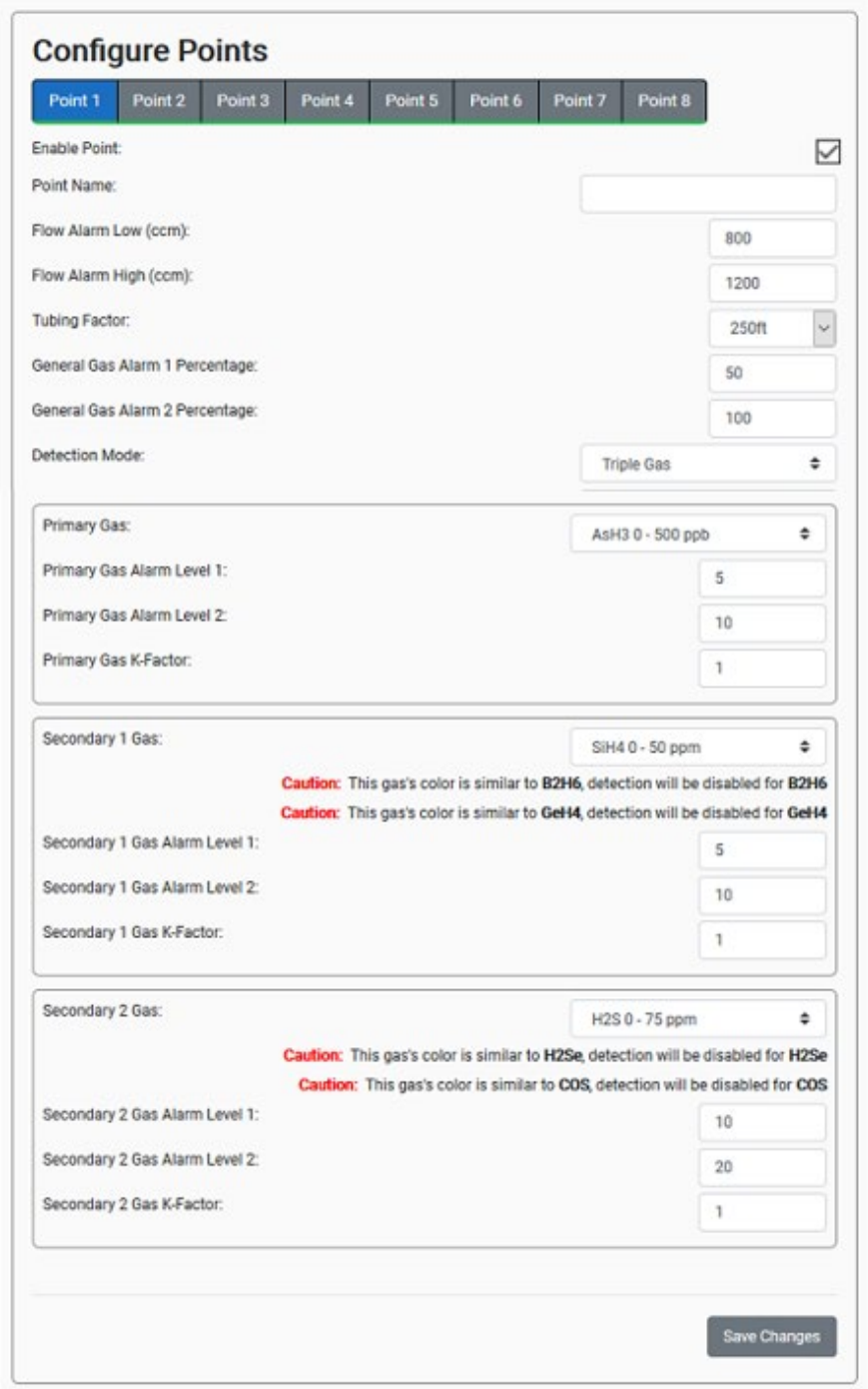


Figure 5.2.6.b

Select a desired tab to verify or adjust settings. Once the settings are adjusted, be sure to select the 'Save Changes' button. A temporary 'Point Configuration Changed' note will appear at the top of the screen to signal the changes were implemented.

The 'Point Name' field includes a text box for manually entering a name of your choosing. This field serves as an optional descriptor that will display on the Analysis screen alongside the point number.

For each point the Gas type, alarm levels, name, location, description, K Factor, and enabled/disabled may be adjusted. Note that changing the K Factor requires a high level password.

The alarm levels will automatically be adjusted to the default levels when the gas time is changed from the drop-down menu. Alarm Level 1 must be >= LAL for the selected gas, <= Alarm Level 2, AND <=Full Scale for the selected gas. Alarm Level 2 must be >= LAL for the selected gas, >=Alarm Level 1, AND <= Full Scale for the selected gas.

IMPORTANT : When a point is disabled no gas analysis is performed.

5.2.6.c Setup -> Configuration -> Users

When the User tab is selected, a list of configured users for your specific system will appear (Figure 5.2.6.c.1). If a user is to be added, choose the 'Add User' button to begin the process. Note, an Administrator (Admin role) password is required to access this screen. Admins also have the option of logging off all users by selecting the 'Logoff All Users' button.

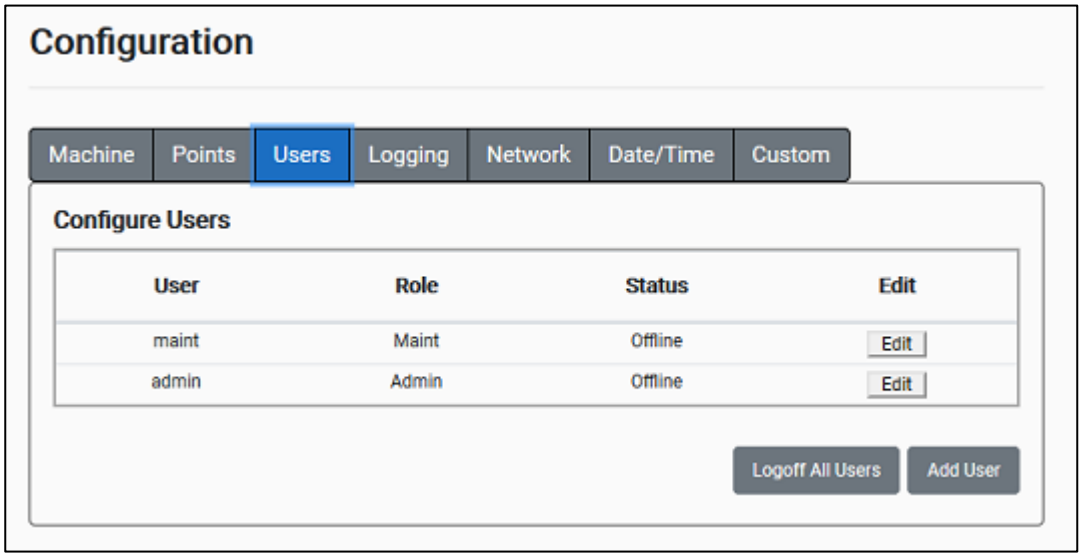


Figure 5.2.6.c.1

Admins are able to edit or remove an individual's access. From the Configure Users screen, select the Edit button listed under the desired User. A pop up screen will appear in likeness to Figure 5.2.6.c.2. Here you are able to edit the user's role, password and idle time – or remove the user entirely. Select 'Save Changes' to ensure the edits are applied to 'Close' to exit without applying the changes.

Figure 5.2.6.c.2

IMPORTANT : Default factory passwords from the factory are as follows:
Administrator: admin
Maintenance: maint

5.2.6.d Setup -> Configuration -> Logging

Three components make up the logging configuration of the system: Where to log, What to log, and how often to log. The drop down list under 'Logging Drive' contains the list of available storage drives. Below the selected drive is the information on the space available for logging. The Logging Drive Low Space Warning includes a list of storage capacities which will trigger a system alert once that selected capacity is reached.

IMPORTANT : The "C:\" drive is the default hard drive for the VISION™ 8 and contains approximately 120GB capacity for logging purposes.

To store logs to a USB drive, insert a USB flash drive into one of the available slots on the module found in the upper right corner of the Service Area. Once recognized by the system, the USB will appear as an available option under the 'Logging Drive' drop down menu.

The drop-down list for Concentration Logging Mode gives the operator the three available choices for what concentration data should be logged: ***None*** = No concentrations; ***Above LDL*** = Those above LDL alarm level; ***Any*** = All concentrations. Only points where gas is detected are logged to the disk. An appropriate event message is always written to the event log when gas exceeds alarm level 1 or 2 on a per point basis.

Video Logging Mode provides a choice of which video captures will be logged. The choices include ***None***, ***Above LDL***, ***Above Alarm 1***, ***Above Alarm 2*** or ***Gas Detected***. Keep in mind, video footage utilizes significant storage space. Select carefully while being mindful of your logging needs.

Transfer Logs offer the option to transfer stored data from one drive to another. Select the desired "From" and "To" drives prior to selecting the "Transfer" button.

The Enable Automatic Log Purge option includes the specified number of days (or days "Beyond" when checked) to purge historical records. The Purge All Logs section allows you to individually select the specific logging categories to be purged.

IMPORTANT : For any changes to take effect, ensure the 'Save Changes' button is selected.

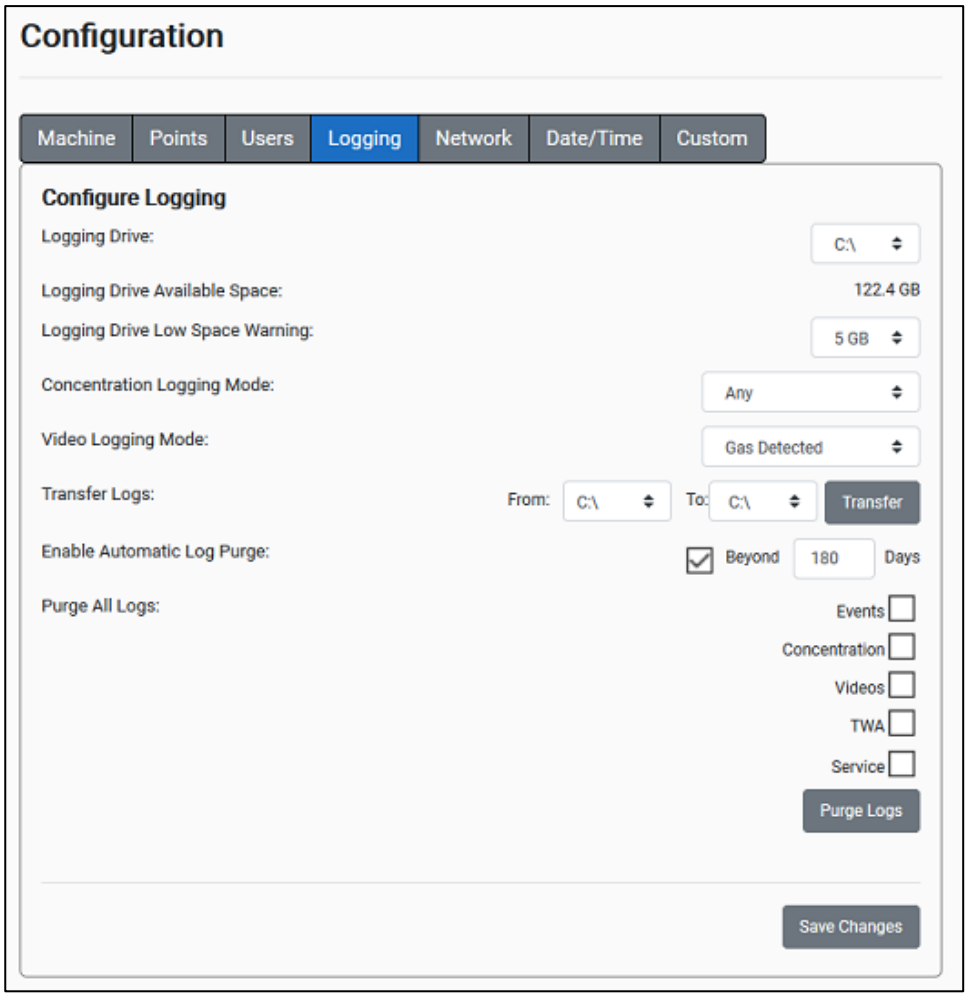


Figure 5.2.6.d.2

5.2.6.e Setup -> Configuration -> Network

Selecting the 'Network' tab will produce a screen in likeness to Figure 5.2.6.e. Ensure the network is configured to the correct address and consult your IT Department for assistance as needed. Select the 'Edit' button for a specific adapter to manually update the configuration.

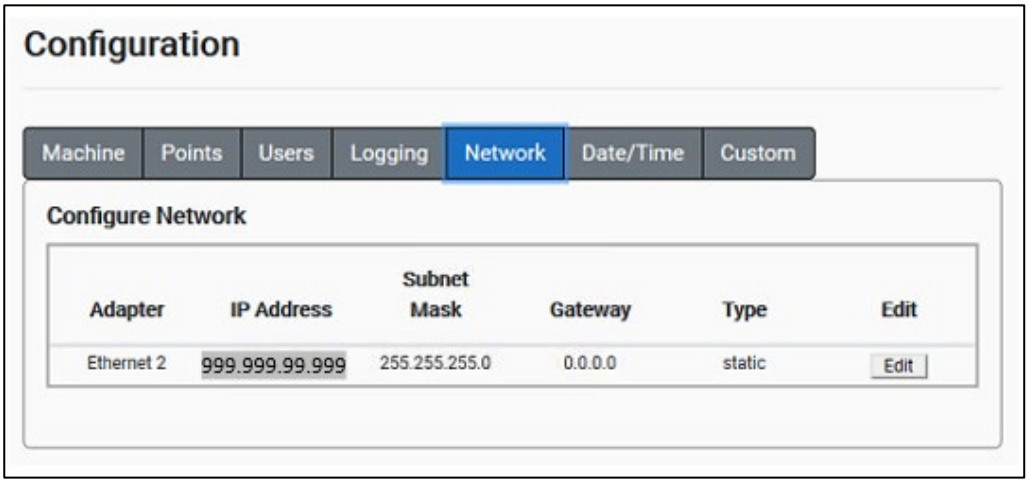


Figure 5.2.6.e

5.2.6.f Setup -> Configuration -> Date/Time

Selecting the 'Date/Time' tab (Figure 5.2.6.f) to view or edit the system configured Time Zone, Year, Month, Day, Hour and Minute. Ensure the 'Save Changes' button is selected to apply your changes.

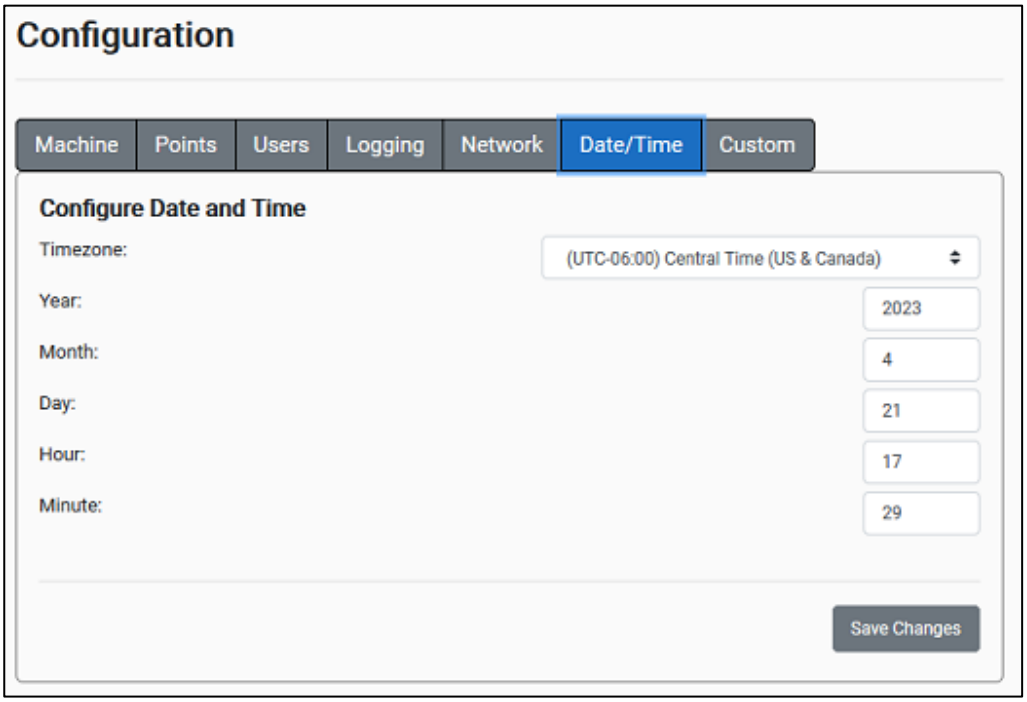


Figure 5.2.6.f

IMPORTANT : After configuring, the ”Save Changes” button must be selected in order to update the system.

5.2.6.g Setup -> Configuration -> Custom

To establish a custom configuration, select the ‘Custom’ tab from the Configuration screen (Figure 5.2.6.g). Available options include:

- Restart Analyzer Service
- Reset Factory Defaults
- Minimize UI
- Load Configuration
- Update Software

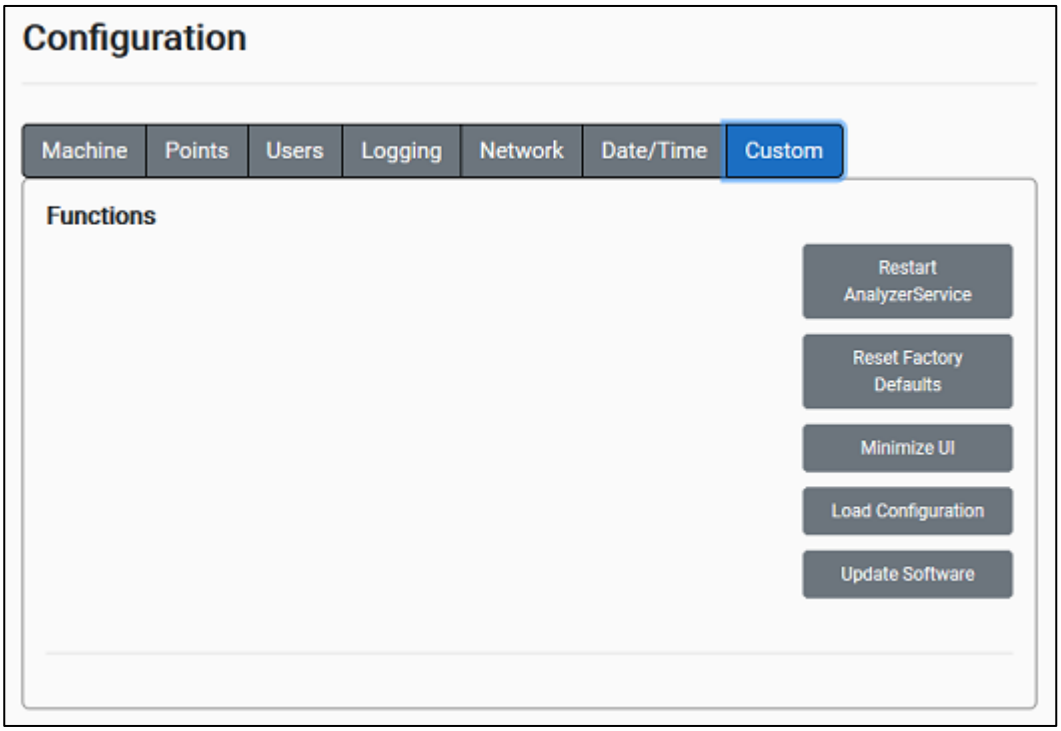


Figure 5.2.6.g

5.2.7 Setup -> Calibrate Optics

Selecting the ‘Calibrate Optics’ menu option from the Setup menu brings up a screen like the one shown in Figure 5.2.7. This screen requires administrator password access. Touching any of the numeric displays for any of the channels will bring up the numeric entry keypad. The value entered must be between 0.5 and 2.000 for each channel.

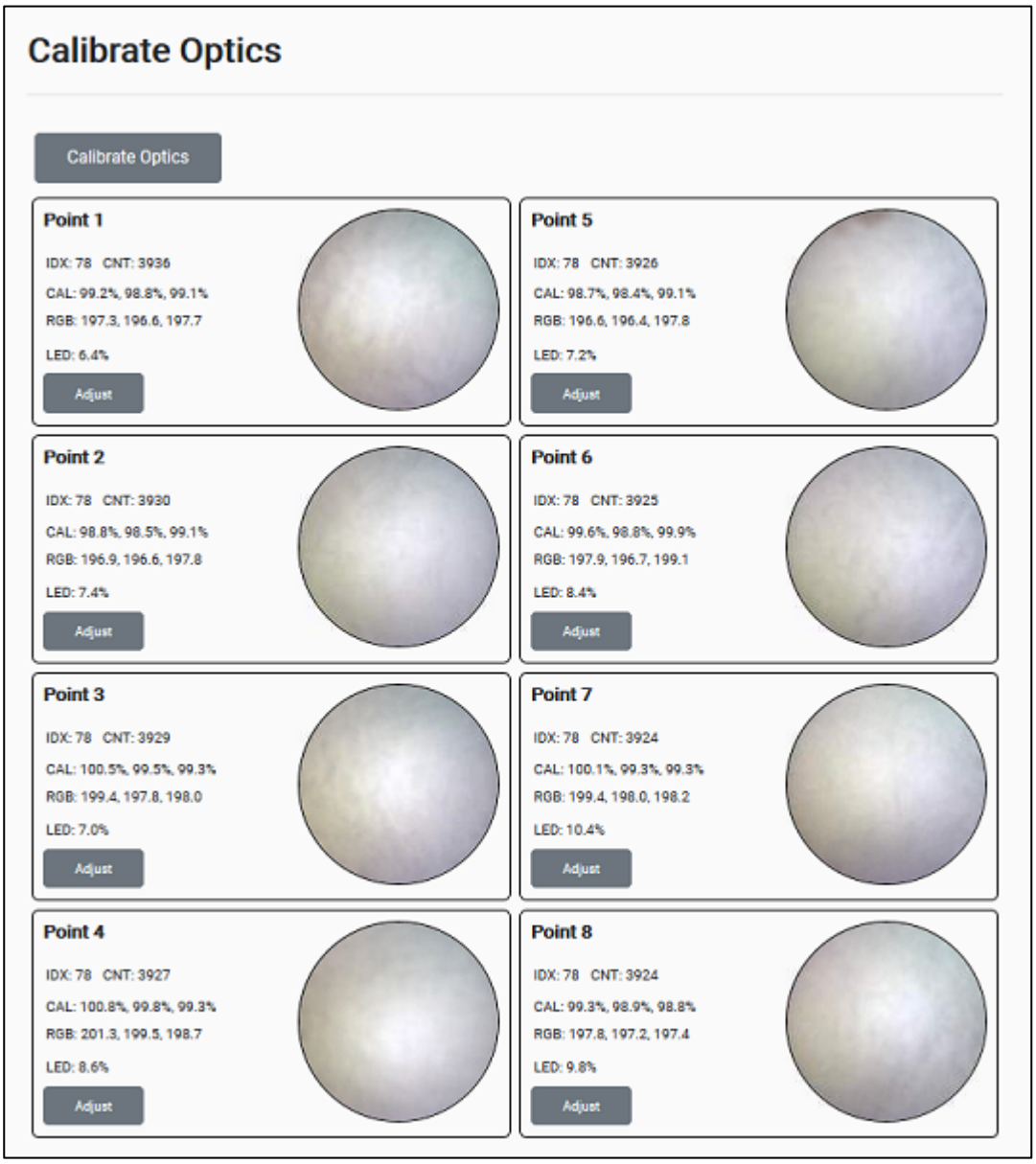


Figure 5.2.7

NOTE: This screen requires the Administrator password for access.

Chapter 6 – Maintenance and Disposal

DANGER : Disconnect power before servicing

6.1 Returning To A Safe State After Service

Before returning the VISION® 8 to service after maintenance or perform verify the following checks:

- Verify all A/C power connections are secured properly
- Check all ground wire connections are secured properly to each panel on the unit
- Verify each analyzer tray is installed on the rails and connected properly
- Check tubing connections on both sides of each pump
- Verify all sample tubing and exhaust tubing connections on the unit
- Verify analyzer gate is closed and cassette is properly installed (see Section 6.5)

6.2 Analyzer/Cassette Tray Access

The analyzer/cassette tray is used to access the ChemLogic® cassette. Follow the software prompts (Section 5.2.2 Setup -> Load Cassette) and ChemLogic cassette installation procedures (Section 6.5) for further details.

6.3 Service Door Access

WARNING : Turn off and remove power from the system prior to opening the control panel door.

To open the Service Door:

- Pull to release each of the two latches that secure the door
- Unlatch the catch on each latch to further release
- Use caution as the door may suddenly swing toward you once released

When service is completed be sure to close the service door and secure each latch to the closed position. Then, verify that the service door is secure and cannot be manually pulled open.

IMPORTANT : The Service Door should remain closed and latched at all times, except while servicing the system.

6.4 ChemLogic® Colorimetric Cassettes

The VISION 8® ChemLogic® Cassette – contains chemically treated colorimetric tape – with an expiration date printed on the label. Expired cassettes should be disposed of and replaced with a new cassette to ensure proper gas concentration readings. Each VISION® 8 ChemLogic® Cassette is designed to last up to the specified number of days listed under normal usage (no gas conditions). See Appendix A for ordering information or contact DOD Technologies for assistance.

6.4a VISION 8® Cassette Installation & Replacement

Figure 6.4a.1

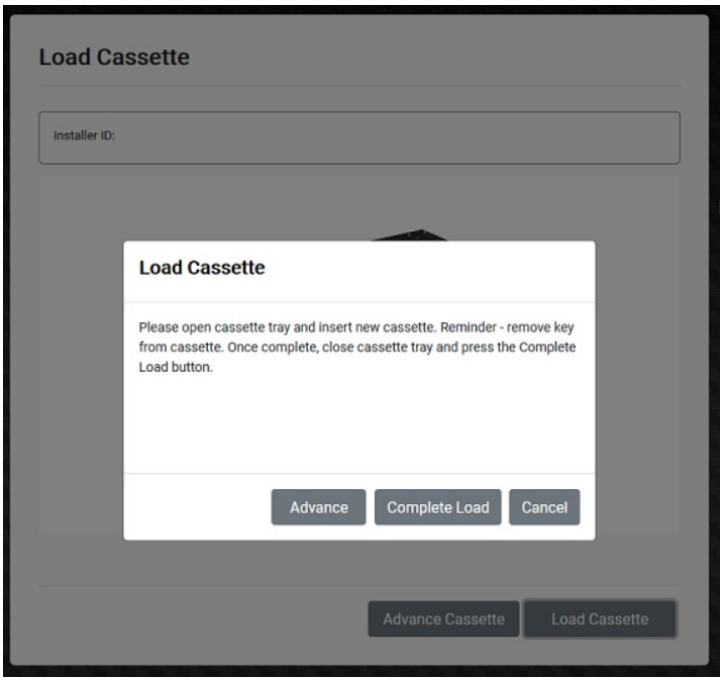


Figure 6.4a.2

1. From the Setup menu choose the 'Load Cassette' option (Figure 6.4a.1).
2. This will prompt release of the gate that holds the cassette in place. Await notification that this has occurred before moving onto the next step. Forcing the tray open prior to completion can cause damage to the tray and other vital internal components.
3. When prompted, manually pull the cassette tray open.
4. Ensure the correct ChemLogic cassette (system and target gas) is selected the cassette key is removed prior to installation.
5. Secure the ChemLogic® cassette in place on the cassette guide and close the tray.
6. From the screen prompt, select 'Complete Load' button (Figure 6.4a.2)
7. A verification prompt should appear noting the gate has been secured and cassette has been successfully loaded.
8. An 'Advance' button is available to manually request advancement of the tape (Figure 6.4a.2). An option to 'Advance Cassette' is also provided on the initial 'Load Cassette' menu screen (Figure 6.4a.1).
9. Promptly dispose of fully used or expired ChemLogic cassettes. The system warranty will be voided if off-brand cassettes or other non-conforming items are inserted into the cassette tray – in lieu of VISION® 8 ChemLogic® branded cassettes. Contact DOD Technologies for available replacement options.

IMPORTANT : The analyzer/cassette door should remain closed and gated, except when servicing or replacing the ChemLogic® cassette.

WARNING : Keep fingers clear of the gate system while touching the open/close gate button.

6.4b VISION 8® Cassette Features & Stain Visualization

The following top-down view of the VISION® 8 ChemLogic® Cassette (Figure 6.4b.1) details the mechanical features and directional flow of the tape.

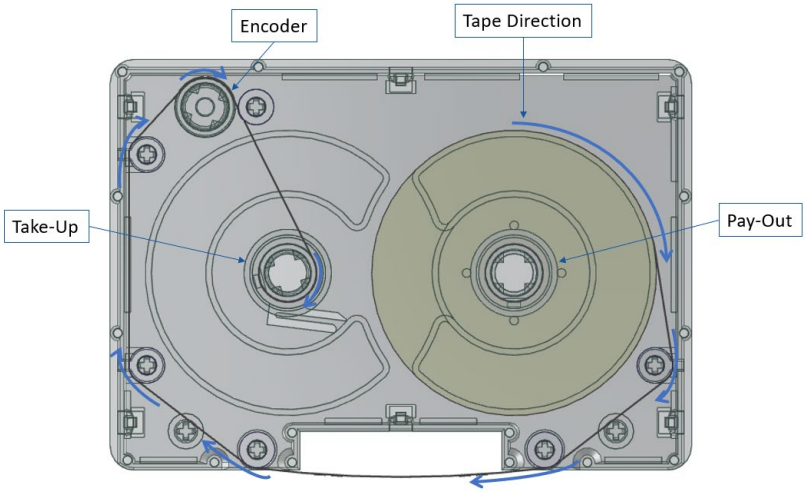


Figure 6.4b.1

Stains recorded on the tape will appear in different locations (see Figure 6.4b.2) based on the originating point. Note, Point 5 is the highest point and Point 4 is the lowest.

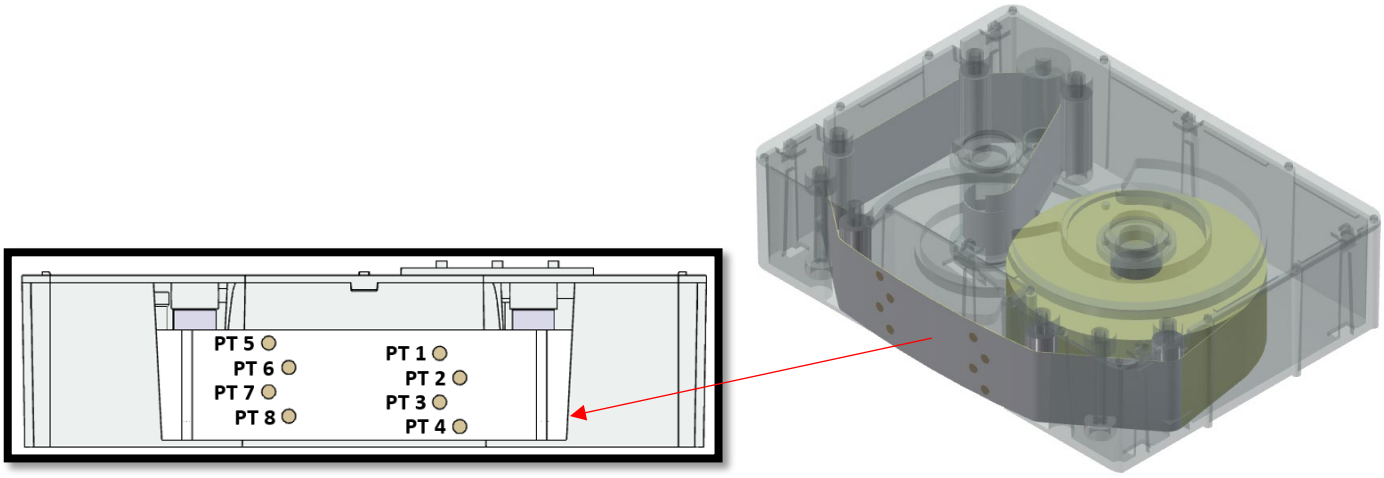


Figure 6.4b.2

6.5 End-Of-Line Particulate Filters

End-Of-Line Particulate Filters – which protect the system and sample tubing from particulates – are required on all points, including points not being monitored. **Dirty sample tubing and/or dirty end-of-line filters can inhibit and/or slow gas response.** The following figure details the type of filter required for each gas. Filters must be replaced regularly as indicated. Filter orientation is not critical in either application.

> **IMPORTANT** : All points require filtration to prevent dust accumulation in tubing and internal damage to the system. Dust that collects in the tubing or the internal system may cause sample loss and inaccurate gas concentration readings.

		
A - Filter For Corrosive Gases Recommended membrane replacement every 30 days, depending on conditions. The internal housing body should be cleaned annually. Part Numbers: Blue Housing: **60009** Filter Membrane: **60010**	**B** - Disposable Filter For Corrosive Gases Recommended replacement every 3-6 months, depending on conditions. Part Number: **2-800-013** (Filter can be interchanged with 60009 / 600010)	**C** – Disposable Filter For Non-Corrosive Gases Part Number: **780248** (Replacement recommended every 6 months)
Target gases include: **Mineral Acids** **Oxidizers (excluding NO2)** **Ammonia (NH3)/Amines** **Hyrdazine (N2H4)** **Nitrogen Fluoride (NF3)** Please contact us if you have questions concerning which filter(s) to specify for a specific target gas.		Target gases include: **Hydrides** **Phosgene (COCL2)** **Nitrogen Dioxide (NO2)** Please contact us if you have questions concerning which filter(s) to specify for a specific target gas.

Figure 6.5

6.6 Flow Adjustment

Each channel should be adjusted whenever a new ChemLogic® cassette or particulate filter is installed. See Section 5.2.3.

6.7 Fuse Replacement

The system is protected with a 6 amp fast acting (5X20mm) fuse.

	DANGER: Warning : Turn off and remove power from the system prior to servicing the fuse.

6.8 Equipment Disposal

RECYCLING WASTE ELECTRICAL & ELECTRONIC EQUIPMENT (WEEE)

European Models with Option Part#2-800-002 must be disposed of at a designated collection point. Contact our European Representative for WEEE Directive disposal arrangements.

Chapter 7 – Service & Support

For information on service and support contact DOD Technologies via the means below.

For Permanent Discontinuation:
Discontinued units can be returned for recycling. Please contact DOD Technologies to discuss and arrange the safe return of your equipment.

Phone Support

M-F 8:30am – 5pm (Central Time Zone)
815.788.5200

Service Center

675 Industrial Drive Bldg. A.
Cary, IL 60013

Visit Our Website

DODtec.com

Appendix A – Options, Parts & Accessories

Communication Protocols

Part #	Description
3-100-505	Modbus/TCP Option
3-100-504	Ethernet I/P Option
3-100-510	Profinet Option

Replacement ChemLogic® Cassettes

Part #	Description
120-Day Cassettes	
1-700-100	VISION 8 Ammonia 120-Day ChemLogic Cassette Gas Detected: NH3
1-560-100	VISION 8 Chlorine SG 120-Day ChemLogic Cassette Gas Detected: Cl2
1-300-100	VISION 8 Hydrides 120-Day ChemLogic Cassette Gas Detected: AsH3, B2H6, GeH4, H2S, H2Se, PH3, SiH4
1-420-100	VISION 8 Mineral Acids SG 120-Day ChemLogic Cassette Gas Detected: BF3, C4F6, CH2F2, CH3F, HBr, HCl, HF, HNO3, NF3, SF6
1-200-100	VISION 8 Phosgene 120-Day ChemLogic Cassette Gas Detected: COCl2
60-Day Cassettes	
1-550-100	VISION 8 Oxidizers 60-Day ChemLogic Cassette Gas Detected: Cl2, F2, NO2

Filters & Tubing

Part #	Description
780248	Particulate Filter for Non-Corrosives (Phosgene & Hydrides)
2-800-007	Duct Mounting Kit for 1/4" Sample Line Tubing
2-800-013	Particulate Filter for Corrosive Gases (Mineral Acids)
2-800-008	KIT Duct Mounting Kit for 3/8" Tubing
2-500-502	47mm Teflon Membranes (Pack of 10) - use with P/N 60009
60009	Filter Housing for Teflon Membranes (Mineral Acids)
2-100-503	Filter for H2S Scrubber
60010	47mm Teflon Membranes (Pack of 100) - use with P/N 60009
14249	250 ft. FEP Teflon Tubing (3/16 ID x 1/4 OD)
77347	500 ft. FEP Teflon Tubing (3/16 ID x 1/4 OD)
48423	Tubing FEP 1/4 OD x 3/16 ID x 1000'
2-400-004	Tubing Exhaust 3/8 x 1/4 Polypropylene, 25' max

Relay & Analog Output Options

Option Part Number: **3-100-628**
Description: **24 FORMC Relay Output Option (Default signals shown, all output signals configurable)**

Tag	Module	Signal Type	Point	Description	Count
1RIO0	EK1101			Hotconnect Coupler - Code 1 0 1	
1RIO1	EL4014	Analog Output	1	Primary Concentration Pt1	1
			2	Primary Concentration Pt2	2
			3	Primary Concentration Pt3	3
			4	Primary Concentration Pt4	4
1RIO2	EL4014	Analog Output	1	Primary Concentration Pt5	5
			2	Primary Concentration Pt6	6
			3	Primary Concentration Pt7	7
			4	Primary Concentration Pt8	8
1RIO3	EL4014	Analog Output	1	Secondary Concentration Pt1	9
			2	Secondary Concentration Pt2	10
			3	Secondary Concentration Pt3	11
			4	Secondary Concentration Pt4	12
1RIO4	EL4014	Analog Output	1	Secondary Concentration Pt5	13
			2	Secondary Concentration Pt6	14
			3	Secondary Concentration Pt7	15
			4	Secondary Concentration Pt8	16
1RIO5	EL4014	Analog Output	1	Tertiary Concentration Pt1	17
			2	Tertiary Concentration Pt2	18
			3	Tertiary Concentration Pt3	19
			4	Tertiary Concentration Pt4	20
1RIO6	EL4014	Analog Output	1	Tertiary Concentration Pt5	21
			2	Tertiary Concentration Pt6	22
			3	Tertiary Concentration Pt7	23
			4	Tertiary Concentration Pt8	24
1RIO7	EL9011			End Terminal	

Option Part Number: **3-100-608**
Description: **56 FORMC Relay Output Option (Default signals shown, all output signals configurable)**

Tag	Module	Signal Type	Point	Description	Count
1RIO0	EK1101			Hotconnect Coupler - Code 1 0 0	
1RIO1	EL2088	Digital Output	1	Machine General Fault	1
			2	Machine Critical Fault	2
			3	Machine Alarm Level 1 (Any point)	3
			4	Machine Alarm Level 2 (Any point)	4
			5	Machine Analysis Active	5
			6	Machine Watchdog	6
			7	Wired Spare	7
			8	Machine Power On	8
1RIO2	EL2088	Digital Output	1	Primary Gas Alarm Level 1 Pt1	9
			2	Primary Gas Alarm Level 1 Pt2	10
			3	Primary Gas Alarm Level 1 Pt3	11
			4	Primary Gas Alarm Level 1 Pt4	12
			5	Primary Gas Alarm Level 1 Pt5	13
			6	Primary Gas Alarm Level 1 Pt6	14
			7	Primary Gas Alarm Level 1 Pt7	15
			8	Primary Gas Alarm Level 1 Pt8	16
1RIO3	EL2088	Digital Output	1	Primary Gas Alarm Level 2 Pt1	17
			2	Primary Gas Alarm Level 2 Pt2	18
			3	Primary Gas Alarm Level 2 Pt3	19
			4	Primary Gas Alarm Level 2 Pt4	20
			5	Primary Gas Alarm Level 2 Pt5	21
			6	Primary Gas Alarm Level 2 Pt6	22
			7	Primary Gas Alarm Level 2 Pt7	23
			8	Primary Gas Alarm Level 2 Pt8	24
1RIO4	EL2088	Digital Output	1	Secondary Gas Alarm Level 1 Pt1	25
			2	Secondary Gas Alarm Level 1 Pt2	26
			3	Secondary Gas Alarm Level 1 Pt3	27
			4	Secondary Gas Alarm Level 1 Pt4	28
			5	Secondary Gas Alarm Level 1 Pt5	29
			6	Secondary Gas Alarm Level 1 Pt6	30
			7	Secondary Gas Alarm Level 1 Pt7	31
			8	Secondary Gas Alarm Level 1 Pt8	32
1RIO5	EL2088		1	Secondary Gas Alarm Level 2 Pt1	33

Tag	Module	Signal Type	Point	Description	Count
		Digital Output	2	Secondary Gas Alarm Level 2 Pt2	34
			3	Secondary Gas Alarm Level 2 Pt3	35
			4	Secondary Gas Alarm Level 2 Pt4	36
			5	Secondary Gas Alarm Level 2 Pt5	37
			6	Secondary Gas Alarm Level 2 Pt6	38
			7	Secondary Gas Alarm Level 2 Pt7	39
			8	Secondary Gas Alarm Level 2 Pt8	40
1RIO6	EL2088	Digital Output	1	Tertiary Gas Alarm Level 1 Pt1	41
			2	Tertiary Gas Alarm Level 1 Pt2	42
			3	Tertiary Gas Alarm Level 1 Pt3	43
			4	Tertiary Gas Alarm Level 1 Pt4	44
			5	Tertiary Gas Alarm Level 1 Pt5	45
			6	Tertiary Gas Alarm Level 1 Pt6	46
			7	Tertiary Gas Alarm Level 1 Pt7	47
			8	Tertiary Gas Alarm Level 1 Pt8	48
1RIO7	EL2088	Digital Output	1	Tertiary Gas Alarm Level 2 Pt1	49
			2	Tertiary Gas Alarm Level 2 Pt2	50
			3	Tertiary Gas Alarm Level 2 Pt3	51
			4	Tertiary Gas Alarm Level 2 Pt4	52
			5	Tertiary Gas Alarm Level 2 Pt5	53
			6	Tertiary Gas Alarm Level 2 Pt6	54
			7	Tertiary Gas Alarm Level 2 Pt7	55
			8	Tertiary Gas Alarm Level 2 Pt8	56
1RIO8	EL9011			End Terminal	

Option Part Number: **3-100-638**
Description: **56 FORMC Relay Outputs, 24 4-20mA Analog Outputs**

Tag	Module	Signal Type	Point	Description	Count
1RIO0	EK1101			Hotconnect Coupler - Code 1 0 2	
1RIO1	EL2088	Digital Output	1	Machine General Fault	1
			2	Machine Critical Fault	2
			3	Machine Alarm Level 1 (Any point)	3
			4	Machine Alarm Level 2 (Any point)	4
			5	Machine Analysis Active	5
			6	Machine Watchdog	6
			7	Wired Spare	7
			8	Machine Power On	8
1RIO2	EL2088	Digital Output	1	Primary Gas Alarm Level 1 Pt1	9
			2	Primary Gas Alarm Level 1 Pt2	10
			3	Primary Gas Alarm Level 1 Pt3	11
			4	Primary Gas Alarm Level 1 Pt4	12
			5	Primary Gas Alarm Level 1 Pt5	13
			6	Primary Gas Alarm Level 1 Pt6	14
			7	Primary Gas Alarm Level 1 Pt7	15
			8	Primary Gas Alarm Level 1 Pt8	16
1RIO3	EL2088	Digital Output	1	Primary Gas Alarm Level 2 Pt1	17
			2	Primary Gas Alarm Level 2 Pt2	18
			3	Primary Gas Alarm Level 2 Pt3	19
			4	Primary Gas Alarm Level 2 Pt4	20
			5	Primary Gas Alarm Level 2 Pt5	21
			6	Primary Gas Alarm Level 2 Pt6	22
			7	Primary Gas Alarm Level 2 Pt7	23
			8	Primary Gas Alarm Level 2 Pt8	24
1RIO4	EL2088	Digital Output	1	Secondary Gas Alarm Level 1 Pt1	25
			2	Secondary Gas Alarm Level 1 Pt2	26
			3	Secondary Gas Alarm Level 1 Pt3	27
			4	Secondary Gas Alarm Level 1 Pt4	28
			5	Secondary Gas Alarm Level 1 Pt5	29
			6	Secondary Gas Alarm Level 1 Pt6	30
			7	Secondary Gas Alarm Level 1 Pt7	31

Tag	Module	Signal Type	Point	Description	Count
			8	Secondary Gas Alarm Level 1 Pt8	32
1RIO5	EL2088	Digital Output	1	Secondary Gas Alarm Level 2 Pt1	33
			2	Secondary Gas Alarm Level 2 Pt2	34
			3	Secondary Gas Alarm Level 2 Pt3	35
			4	Secondary Gas Alarm Level 2 Pt4	36
			5	Secondary Gas Alarm Level 2 Pt5	37
			6	Secondary Gas Alarm Level 2 Pt6	38
			7	Secondary Gas Alarm Level 2 Pt7	39
			8	Secondary Gas Alarm Level 2 Pt8	40
1RIO6	EL2088	Digital Output	1	Tertiary Gas Alarm Level 1 Pt1	41
			2	Tertiary Gas Alarm Level 1 Pt2	42
			3	Tertiary Gas Alarm Level 1 Pt3	43
			4	Tertiary Gas Alarm Level 1 Pt4	44
			5	Tertiary Gas Alarm Level 1 Pt5	45
			6	Tertiary Gas Alarm Level 1 Pt6	46
			7	Tertiary Gas Alarm Level 1 Pt7	47
			8	Tertiary Gas Alarm Level 1 Pt8	48
1RIO7	EL2088	Digital Output	1	Tertiary Gas Alarm Level 2 Pt1	49
			2	Tertiary Gas Alarm Level 2 Pt2	50
			3	Tertiary Gas Alarm Level 2 Pt3	51
			4	Tertiary Gas Alarm Level 2 Pt4	52
			5	Tertiary Gas Alarm Level 2 Pt5	53
			6	Tertiary Gas Alarm Level 2 Pt6	54
			7	Tertiary Gas Alarm Level 2 Pt7	55
			8	Tertiary Gas Alarm Level 2 Pt8	56
1RIO8	EL4014	Analog Output	1	Primary Concentration Pt1	1
			2	Primary Concentration Pt2	2
			3	Primary Concentration Pt3	3
			4	Primary Concentration Pt4	4
1RIO9	EL4014	Analog Output	1	Primary Concentration Pt5	5
			2	Primary Concentration Pt6	6
			3	Primary Concentration Pt7	7
			4	Primary Concentration Pt8	8
1RIO10	EL4014	Analog Output	1	Secondary Concentration Pt1	9
			2	Secondary Concentration Pt2	10

Tag	Module	Signal Type	Point	Description	Count
			3	Secondary Concentration Pt3	11
			4	Secondary Concentration Pt4	12
1RIO11	EL4014	Analog Output	1	Secondary Concentration Pt5	13
			2	Secondary Concentration Pt6	14
			3	Secondary Concentration Pt7	15
			4	Secondary Concentration Pt8	16
1RIO12	EL4014	Analog Output	1	Tertiary Concentration Pt1	17
			2	Tertiary Concentration Pt2	18
			3	Tertiary Concentration Pt3	19
			4	Tertiary Concentration Pt4	20
1RIO13	EL4014	Analog Output	1	Tertiary Concentration Pt5	21
			2	Tertiary Concentration Pt6	22
			3	Tertiary Concentration Pt7	23
			4	Tertiary Concentration Pt8	24
1RIO14	EL9011			End Terminal	

Stack Light Option

Option Part Number: **3-100-648 – Option Vision 8 Light Tower, 3 Lens (Red, Yellow, Green) with Buzzer**
Description: **8 Digital Outputs reserved for Stack Light signals**

Tag	Module	Signal Type	Point	Description	Count
1RIO0	EK1101			Hotconnect Coupler - Code 1 1 1	
1RIO1	EL2088	Digital Output	1	Stack Light Buzzer	1
			2	Stack Light Red LED	2
			3	Stack Light Yellow LED	3
			4	Stack Light Green LED	4
			5	Stack Light Blue LED	5
			6	Spare	6
			7	Spare	7
			8	Spare	8
1RIO2	EL9011			End Terminal	

//Mode PRIORITY:
//1: Gas Alarm 2 (RED LED, FLASHING, BUZZER ON)
//2: Gas Alarm 1 (RED LED, BUZZER ON)
//3: Fault/Warning (YELLOW LED)
//4: Analysis (GREEN LED)

Appendix B – System Specifications

The VISION® 8 is designed for safe use under the following conditions:

- Indoor use only
- Altitude up to 2,000 m
- Temperature 5ºC - 40 ºC
- Maximum relative humidity 80% for temperatures up to 31 ºC decreasing linearly to 50% relative humidity at 40 ºC.
- A/C power as specified below with +/- 10% of the nominal voltage
- Transient Levels: Impulse withstand (overvoltage) category II of IEC 60364-4-443

WARNING :The detachable power cord or the supply line wiring must meet the rating specified below.

Specifications	
Model / Detection Principle	V8 / ΕλΕ Sense Technology® optics
Monitoring Points	8
Sample Distance	500 ft. (182m) – 0.25 OD, 0.187 ID Teflon FEB tubing
Transport Flow Rate	5.0 LPM
Exhaust Tubing	25 ft. (7.62m) – 0.375” OD, 0.25” ID Poly-E (included)
Display	15” PCAP Multi-touch display / 3:4 aspect ratio
Local Alarm Indication	Visual on display
Relay Outputs	Programmable low and high-level faults (up to 72)
Operating Temperature	40˚F to 104˚F / 4˚C to 40˚C
Operating Voltage	100 – 110VAC (50/60Hz), 230VAC (50Hz)
Power Consumption	Less than 1 Amp
Enclosure	Powder coated steel
Dimensions	20“H x 14“W x 13.57"D (508mm x 355mm x 345mm)
Weight	65 lb. (29.48 kg)

Appendix C - System Event Message

Color Coding

Gas Alarm
Critical Fault
Warning
Information Message
Analysis Status (Good)

Machine Events

Event Level	Event Code	Event Message	Corrective Action
2 - Fault	2501	Analyzer # Communications Fault	Check network connections
2 - Fault	2502	PLC Communications Fault	Check network connections
2 - Fault	2504	Idle Timeout Fault	Resume analysis
2 - Fault	2505	Storage Low Fault	Purge logs
2 - Fault	2507	56 Relay Module Comm Fault	Check network connections
2 - Fault	2508	24 Analog Module Comm Fault	Check network connections
2 - Fault	2509	56 Relay 24 Analog Module Comm Fault	Check network connections
2 - Fault	2511	Stacklight Module Comm Fault	Check network connections
2 - Fault	2512	Profibus Module Comm Fault	Check network connections
4 - Information	4501	Machine Power On	
4 - Information	4502	Alarms/Faults Reset	
4 - Information	4503	Machine Configuration Changed	
4 - Information	4504	Machine Defaults Restored	
4 - Information	4505	Analyzer # Communications Restored	
4 - Information	4506	User Logged In	
4 - Information	4507	User Logged Out	
4 - Information	4508	User Added	
4 - Information	4509	User Removed	
4 - Information	4510	Network Configuration Changed	
4 - Information	4511	Time Changed	
4 - Information	4512	Logs Transferred	
4 - Information	4513	Logs Purged	
4 - Information	4514	Remote IO Configuration Changed	
4 - Information	4515	Remote IO Defaults Restored	

Analyzer Events

Event Level	Event Code	Event Message	Corrective Action
1 - Alarm	1001 - 1008	Primary Gas Alarm 1 (Points 1-8)	
1 - Alarm	1011 - 1018	Primary Gas Alarm 2 (Points 1-8)	
1 - Alarm	1021 - 1028	Secondary Gas Alarm 1 (Points 1-8)	

Event Level	Event Code	Event Message	Corrective Action
1 - Alarm	1031 - 1038	Secondary Gas Alarm 2 (Points 1-8)	
1 - Alarm	1041 - 1048	Tertiary Gas Alarm 1 (Points 1-8)	
1 - Alarm	1051 - 1058	Tertiary Gas Alarm 2 (Points 1-8)	
2 - Fault	2001	Communications Fault	
2 - Fault	2002	Gate Open Fault	Fix physical issue then Clear Faults to reenter analysis
2 - Fault	2003	Low Flow All Points Fault	Fix physical issue then Clear Faults to reenter analysis
2 - Fault	2004	Gas File Load Fault	
2 - Fault	2005	All Points Optic Background Fault	
2 - Fault	2006	Tape Advance Open Gate Fault	Fix physical issue then Clear Faults to reenter analysis
2 - Fault	2007	Tape Advance Encoder Fault	Fix physical issue then Clear Faults to reenter analysis
2 - Fault	2008	Tape Advance Close Gate Fault	Fix physical issue then Clear Faults to reenter analysis
2 - Fault	2011 - 2018	Optic Background Fault (Points 1-8)	
3 - Warning	3001	ChemLogic Cassette Tape Near Expiration	
3 - Warning	3002	ChemLogic Cassette Not Found Warning	
3 - Warning	3003	ChemLogic Cassette Data Corrupt Warning	
3 - Warning	3004	ChemLogic Cassette Invalid Warning	
3 - Warning	3005	ChemLogic Cassette Expired Warning	
3 - Warning	3006	Low Flow Pump 1 Warning	
3 - Warning	3011 - 3018	Low Flow Warning (Points 1-8)	Flow balance the machine
3 - Warning	3021 - 3028	High Flow Warning (Points 1-8)	Flow balance the machine
3 - Warning	3031 - 3038	LED Dim Warning (Points 1-8)	Clean optic channel
3 - Warning	3041 - 3048	Optic Calibration Warning (Points 1-8)	Clean optic channel
3 - Warning	3051 - 3058	Above TWA Warning (Points 1-8)	
3 - Warning	3081 - 3088	Simulation Enabled (Points 1-8)	
4 - Information	4001	Analysis Ended	
4 - Information	4002	Optics Calibrated	
4 - Information	4003	Flow Offsets Configured	
4 - Information	4004	Configuration Updated	
4 - Information	4005	Analyzer Software Updated	
4 - Information	4006	Logs Purged	
4 - Information	4009	Tape Advance - Manual Advance	
4 - Information	4010	Tape Advance - End of Window	
4 - Information	4011 - 4018	Tape Advance - Background Invalid (Points 1-8)	
4 - Information	4021 - 4028	Gas Detected (Points 1-8)	
4 - Information	4031 - 4038	Tape Advance - End of Formula (Points 1-8)	End of Calibration Formula
4 - Information	4041 - 4048	Tape Advance - Tape Saturated (Points 1-8)	Heavy stain or Full Scale present
4 - Information	4051 - 4058	Tape Advance - Gas No Longer Detected (Points 1-8)	
4 - Information	4061 - 4068	Tape Advance - Below LDL Gas Present (Points 1-8)	Tape stain present but below LDL to detect
4 - Information	4071 - 4078	Tape Advance - End of Estimate (Points 1-8)	End of Concentration Estimation - Begin Calibration Calc
5 - Analysis Status	5001	Analysis Started	

Appendix D – Gas Specifications

Click the following link to review a list of detectable gases and available system calibrations:

VISION 8 Detectable Gas List

This list can also be accessed and downloaded at DODtec.com by visiting the 'Detectable Gases' section in the corresponding product page(s). Please contact us to inquire into additional target gases or ranges not found on the list.

Appendix E – Data Communication

The VISION® 8 is capable of supporting Modbus/TCP, Ethernet/IP, ControlNet, Profibus, ProfiNet and OPC communications. For additional information or assistance, please contact DOD Technologies.

E.1 – Modbus/TCP

Network Settings: Default IP address 192.168.16.213 from factory. IP address is configurable on the configuration page. External customer connection is topmost Ethernet port on the side of the VISION.

Address	# Words	Type	Data Description	Notes
40001	1	Word	Machine Serial	
40002	1	Word	Machine Year	
40003	1	Word	Machine Month	
40004	1	Word	Machine Day	
40005	1	Word	Machine Hour	
40006	1	Word	Machine Minute	
40007	1	Word	Machine Second	
40008	1	Word	Spare	
40009	2	Float	Machine Webserver Version	IEEE 754 Single-Precision Float
40011	2	Float	Machine PLC Version	IEEE 754 Single-Precision Float
40013	1	Word	Machine Status Bits	0: Machine General Fault (Any Az) 1: Machine Critical Fault (Any Az) 2: Machine Alarm Level 1 (Any Az/Any point, Primary, Secondary, Tertiary Alarms only) 3: Machine Alarm Level 2 (Any Az/Any point, Primary, Secondary, Tertiary Alarms only) 4: Machine Analysis Active (Any Az) 5: Machine Watchdog Toggle 6: Reserved 7: Machine Power On
40014	1	Word	Machine Analyzer Status	Bits 0-15: 0:Off, 1:Enabled
…				
40100	2	Float	Analyzer Serial	
40102	2	Float	Analyzer Controlboard Serial	
40104	2	Float	Analyzer Opticboard Serial	
40106	2	Float	Analyzer Version	
40108	2	Float	Analyzer Transducerboard Version	

Address	# Words	Type	Data Description	Notes
40110	2	Float	Analyzer Gas Configuration Version	
40112	1	Word	Cassette Gas Family Code	
40113	1	Word	Cassette Tape Days Remaining	
40114	1	Word	Primary Alarm Level 1 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
40115	1	Word	Primary Alarm Level 2 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
40116	1	Word	Secondary Alarm Level 1 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
40117	1	Word	Secondary Alarm Level 2 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
40118	1	Word	Tertiary Alarm Level 1 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
40119	1	Word	Tertiary Alarm Level 2 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
40120	1	Word	Spare	
40121	1	Word	Spare	
40122	8	Word[8]	Primary Alarm Level 1	Points 1-8
40130	8	Word[8]	Primary Alarm Level 2	Points 1-8
40138	8	Word[8]	Secondary Alarm Level 1	Points 1-8
40146	8	Word[8]	Secondary Alarm Level 2	Points 1-8
40154	8	Word[8]	Tertiary Alarm Level 1	Points 1-8
40162	8	Word[8]	Tertiary Alarm Level 2	Points 1-8
40170	8	Word[8]	Spare	
40178	8	Word[8]	Spare	
40186	8	Word[8]	Primary Gas ID*	Points 1-8
40194	8	Word[8]	Secondary Gas ID*	Points 1-8
40202	8	Word[8]	Tertiary Gas ID*	Points 1-8
40210	8	Word[8]	Spare	
40218	8	Word[8]	Detection Mode	Points 1-8: 0=Single Gas Detection 1=Double Gas Detection 2=Triple Gas Detection
40226	8	Word[8]	Full Scale Primary	Points 1-8
40234	8	Word[8]	Full Scale Secondary	Points 1-8
40242	8	Word[8]	Full Scale Tertiary	Points 1-8
40250	8	Word[8]	Full Scale General	Points 1-8
40258	8	Word[8]	Units Primary	Points 1-8, 0=ppb, 1=ppm
40266	8	Word[8]	Units Secondary	Points 1-8, 0=ppb, 1=ppm

Address	# Words	Type	Data Description	Notes
40274	8	Word[8]	Units Tertiary	Points 1-8, 0=ppb, 1=ppm
40282	8	Word[8]	Spare	
40290	16	Float[8]	Primary Gas Concentration	
40306	16	Float[8]	Secondary Gas Concentration	
40322	16	Float[8]	Tertiary Gas Concentration	
40338	16	Float[8]	Spare	
40354	8	Word[8]	Speciated Index	0:Primary,1:Secondary,2Tertiary
40362	1	Word	Analyzer Fault Status	0: Analyzer Communications Fault 1: Gate Open Fault 2: All Points Low Flow Fault 3: Gas File Load Fault 4: All Points Optic Background Fault 5: Tape Advance Open Gate Fault 6: Tape Advance Encoder Fault 7: Tape Advance Close Gate Fault
40363	1	Word	Analyzer Warning Status	0: ChemLogic Cassette Tape Near Expiration 1: ChemLogic Cassette Not Found Warning 2: ChemLogic Cassette Data Corrupt Warning 3: ChemLogic Cassette Invalid Warning 4: ChemLogic Cassette Expired Warning 5: Low Flow Any Points 6: High Flow Any Points 7: LED Dim Any Points 8: Optic Calibration Warning Any Points 9: Above TWA Warning Any Points
40364	1	Word	Analyzer Analysis State	1 = Active
40365	1	Word	Point Enabled	Bits 0-7 = Points 1-8... 0=Disabled, 1=Enabled
…				
40400	2	Float	Analyzer 2 Serial (If Installed)	
…etc				

Gas IDs

Gas ID	Gas	Range	Units	Gas Family
9000	PH3	3000	ppb	Hydrides
9001	H2S	75	ppm	Hydrides
9002	H2SE	500	ppb	Hydrides
9003	COS	20	ppm	Hydrides
9004	SIH4	50	ppm	Hydrides
9005	B2H6	1000	ppb	Hydrides
9006	ASH3	500	ppb	Hydrides
9007	GEH4	2000	ppb	Hydrides
9008	HCL	20	ppm	Mineral Acids
9009	HF	20	ppm	Mineral Acids
9010	HBR	20	ppm	Mineral Acids
9012	CL2	2000	ppb	Oxidizers
9013	F2	10000	ppb	Oxidizers
9014	CL2	5000	ppb	Chlorine
9015	CL2	5000	ppb	Organic Acids
9016	HBR	3500	ppb	Organic Acids

E.2 – Profibus

Default Slave ID: 2 **Size: 119 Words (238 Bytes)**

Word #	Size (Words)	Type	Data Description	Notes
1	2	WORD	Connection Status	Reserved - Internal Use
3	1	WORD	Machine Watchdog	Increments every second
4	1	WORD	Machine Status Bits	0: Machine General Fault (Any Az) 1: Machine Critical Fault (Any Az) 2: Machine Alarm Level 1 (Any Az/Any point, Primary, Secondary, Tertiary Alarms only) 3: Machine Alarm Level 2 (Any Az/Any point, Primary, Secondary, Tertiary Alarms only) 4: Machine Analysis Active (Any Az) 5: Machine Watchdog Toggle 6: Reserved 7: Machine Power On

Word #	Size (Words)	Type	Data Description	Notes
5	1	WORD	Primary Alarm Level 1 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
6	1	WORD	Primary Alarm Level 2 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
7	1	WORD	Secondary Alarm Level 1 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
8	1	WORD	Secondary Alarm Level 2 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
9	1	WORD	Tertiary Alarm Level 1 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
10	1	WORD	Tertiary Alarm Level 2 Status	Bits 0-7 = Points 1-8... 0=Inactive, 1=Active
11	1	WORD	Spare	
12	1	WORD	Spare	
13	8	WORD[8]	Detection Mode	Points 1-8: 0=Single Gas Detection 1=Double Gas Detection 2=Triple Gas Detection
21	16	REAL[8]	Primary Gas Concentration	Points 1-8: IEEE 754 Single Precision Float
37	16	REAL[8]	Secondary Gas Concentration	Points 1-8: IEEE 754 Single Precision Float
53	16	REAL[8]	Tertiary Gas Concentration	Points 1-8: IEEE 754 Single Precision Float
69	16	REAL[8]	Spare	
85	8	WORD[8]	Speciated Index	0:Primary,1:Secondary,2Tertiary
93	1	WORD	Analyzer Fault Status	0: Analyzer Communications Fault 1: Gate Open Fault 2: All Points Low Flow Fault 3: Gas File Load Fault 4: All Points Optic Background Fault 5: Tape Advance Open Gate Fault 6: Tape Advance Encoder Fault 7: Tape Advance Close Gate Fault

Word #	Size (Words)	Type	Data Description	Notes
94	1	WORD	Analyzer Warning Status	0: ChemLogic Cassette Tape Near Expiration 1: ChemLogic Cassette Not Found Warning 2: ChemLogic Cassette Data Corrupt Warning 3: ChemLogic Cassette Invalid Warning 4: ChemLogic Cassette Expired Warning 5: Low Flow Any Points 6: High Flow Any Points 7: LED Dim Any Points 8: Optic Calibration Warning Any Points 9: Above TWA Warning Any Points
95	1	WORD	Analyzer Analyzing Status	0:Not Analyzing, 1:Analyzing
96	8	WORD[8]	Primary/General Gas ID*	Points 1-8
104	8	WORD[8]	Secondary Gas ID*	Points 1-8
112	8	WORD[8]	Tertiary Gas ID*	Points 1-8

Gas IDs

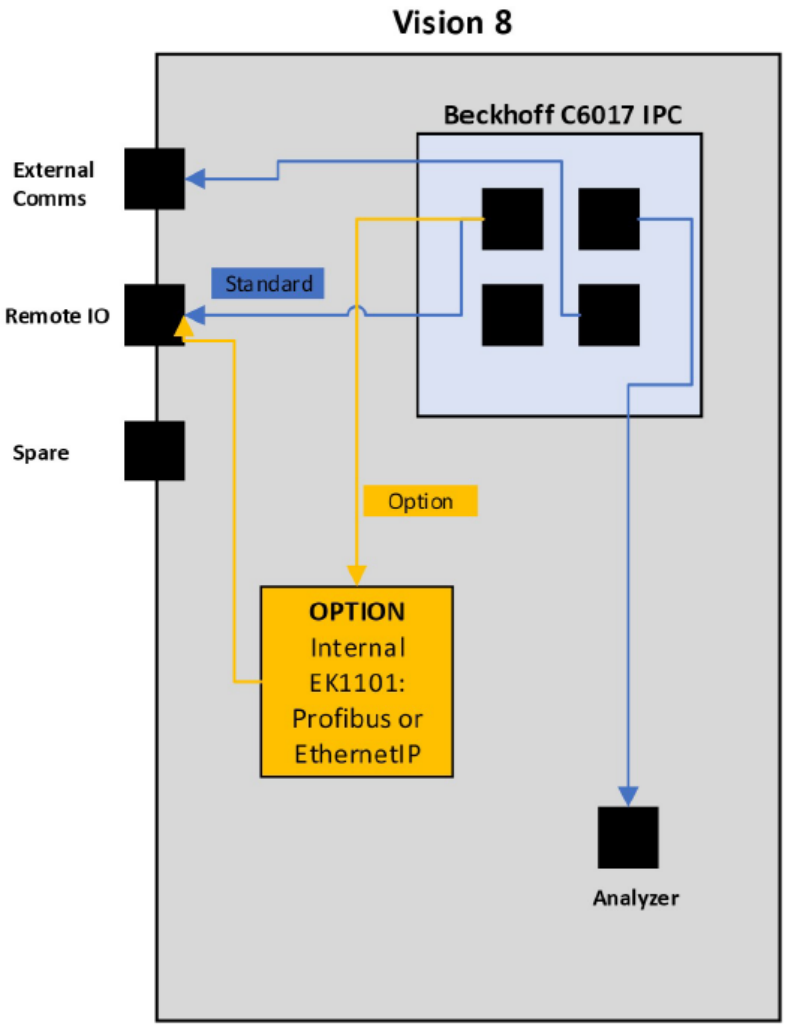
Gas ID	Gas	Range	Units	Gas Family
9000	PH3	3000	ppb	Hydrides
9001	H2S	75	ppm	Hydrides
9002	H2SE	500	ppb	Hydrides
9003	COS	20	ppm	Hydrides
9004	SIH4	50	ppm	Hydrides
9005	B2H6	1000	ppb	Hydrides
9006	ASH3	500	ppb	Hydrides
9007	GEH4	2000	ppb	Hydrides
9008	HCL	20	ppm	Mineral Acids
9009	HF	20	ppm	Mineral Acids
9010	HBR	20	ppm	Mineral Acids
9012	CL2	2000	ppb	Oxidizers
9013	F2	10000	ppb	Oxidizers
9014	CL2	5000	ppb	Chlorine
9015	CL2	5000	ppb	Organic Acids
9016	HBR	3500	ppb	Organic Acids

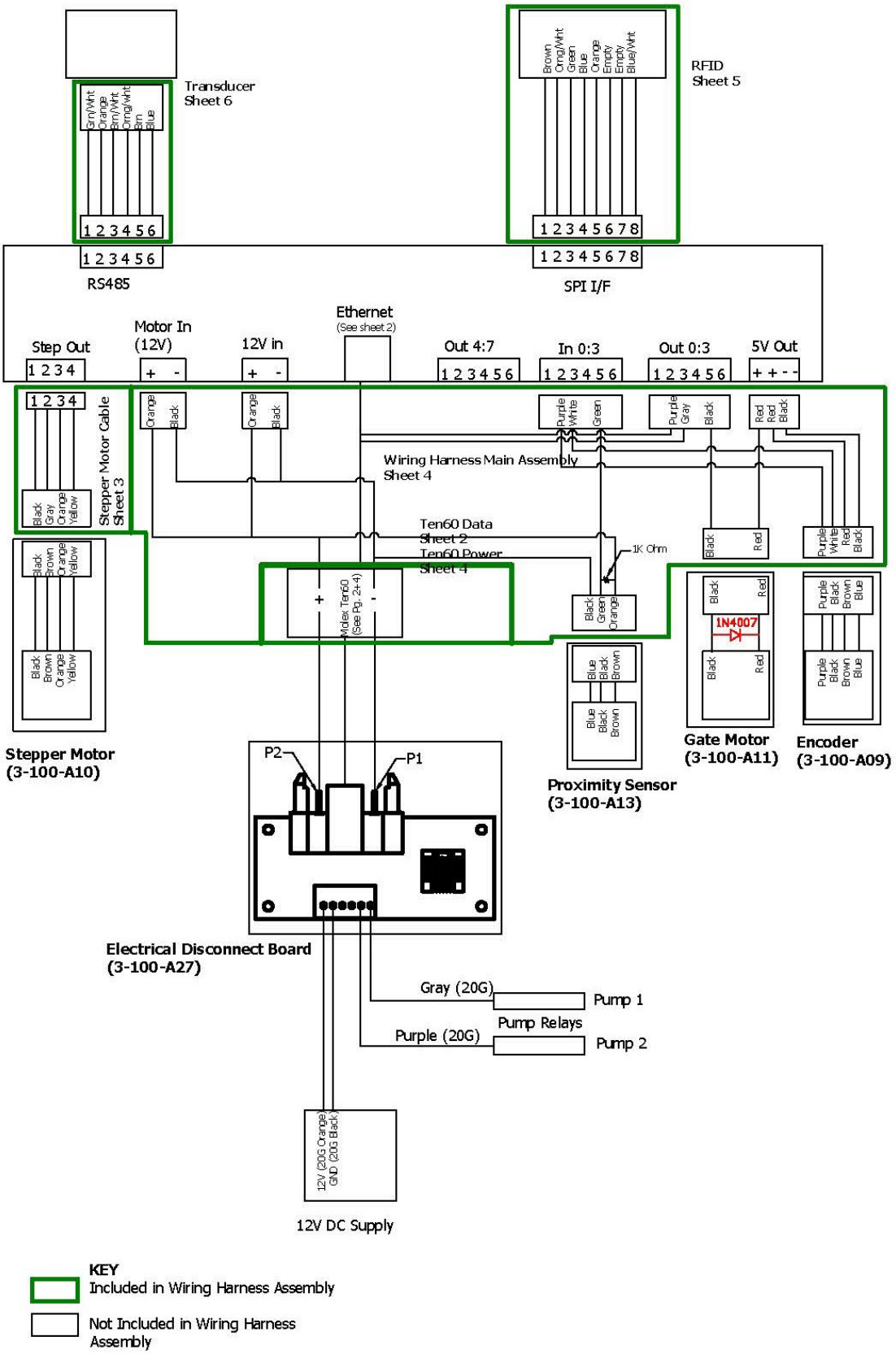
Appendix F – Wiring Diagrams

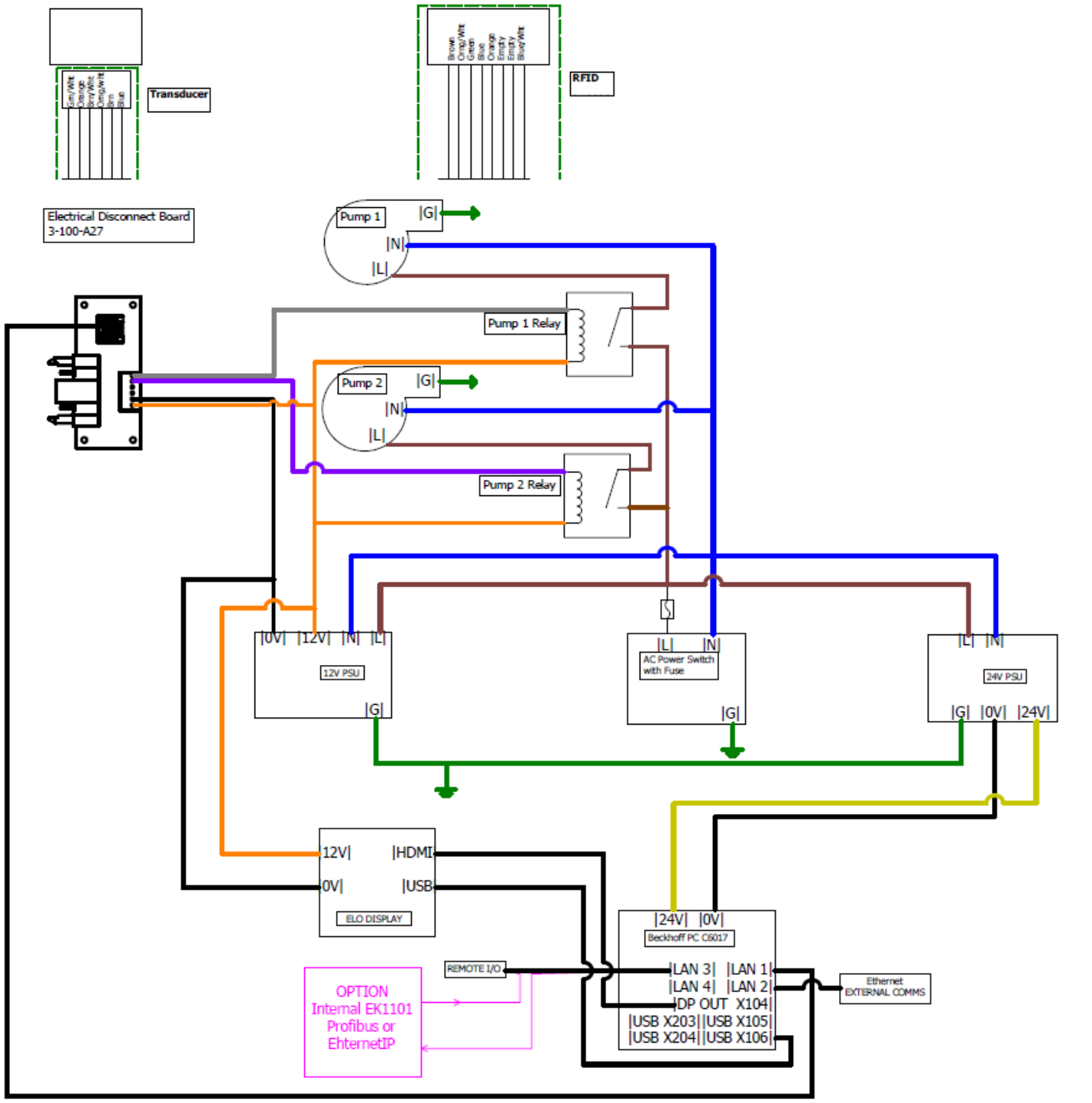
Port 1: ModbusTCP communications, Webserver/TightVNC remote access

Port 2: Remote IO Options (relay outputs, analog outputs)

Port 3: Unused Spare




Transducer
Sheet 6
Grn/Wht
Orange
Brn/Wht
Org/Wht
Brn
Blue
1 2 3 4 5 6
RFID
Sheet 5
Brown
Org/Wht
Green
Blue
Orange
Empty
Empty
Blue/Wht
1 2 3 4 5 6 7 8
RS485
SPI I/F
Ethernet
(See sheet 2)
Step Out
Motor In
(12V)
12V in
Out 4:7
In 0:3
Out 0:3
5V Out
1 2 3 4
+ -
1 2 3 4 5 6
+ + - -
Stepper Motor Cable
Sheet 3
Black
Gray
Orange
Yellow
Wiring Harness Main Assembly
Sheet 4
Purple
White
Green
Purple
Gray
Red
Red
Black
Ten60 Data
Sheet 2
Ten60 Power
Sheet 4
1K Ohm
Molex Ten60
(See Pg. 2+4)
Black
Green
Orange
Blue
Black
Brown
1N4007
Red
Purple
Black
Brown
Blue
Stepper Motor
(3-100-A10)
Proximity Sensor
(3-100-A13)
Gate Motor
(3-100-A11)
Encoder
(3-100-A09)
P2
P1
Electrical Disconnect Board
(3-100-A27)
Gray (20G)
Pump 1
Pump Relays
Purple (20G)
Pump 2
12V (20G Orange)
GND (20G Black)
12V DC Supply
KEY
Included in Wiring Harness Assembly
Not Included in Wiring Harness Assembly



Vision 8 Enclosure wiring diagram

Appendix G – Flow Diagram