DOD Technologies

ChemLogic® CL96

96-Point Continuous Gas Detector

Operating Manual

675 Industrial Drive Bldg. A.
Cary, IL 60013
Phone: 815.788.5200
DODtec.com

EU DECLARATION OF CONFORMITY

Manufacturer Business Name & Full Address

DOD Technologies
675 Industrial Drive – Bldg. A
Cary, IL 60013
USA

European Authorised Representative

Hold Tech Files, Ltd,
Dun Iseal, Newtown,
Gaulsmills, Ferrybank,
Waterford, X91F638
Republic of Ireland

We confirm that the European Authorised Representative will accept a duly reasonable request to review the Technical Construction File for this equipment, from any authorised European Market Surveillance Authority (*MSA*).

Product Details
Name: ChemLogic Type: Continuous Gas Monitor

Batch or Serial Number: Model: CL96

Equipment Description: Detection and measurement of toxic gases

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of the Declaration.

ChemLogic Continuous Gas Monitor.

The object of the declaration described above is in conformity with the relevant Union harmonization legislation.
The Low Voltage Directive 2014/35/EU, The Electromagnetic Compatibility Directive 2014/30/EU, RoHS Directive 2011/65/EU and amendment EU 2015/863.

Standards Used

EN 61010-1: 2010+A1: 2019; EN 61236-1: 2013; EN IEC 63000: 2018.

Place of Declaration

DOD Technologies Inc.
675 Industrial Drive – Bldg. A
Cary, IL 60013
USA

Date of Declaration: 21st September 2021

Person Empowered to Draw Up Declaration

Name: Danny O'Donnell **Position:** Chief Technical Officer and Co-CEO

Signature: Danny O'Donnell

COMPLIANCE
Produced using Compliance Risk Software
www.complianceriskssoftware.co.uk

CE

A copy of this document can be obtained by clicking the image above or by visiting the following link:
https://dodtec.com/amfile/file/download/file/384/product/342/

Table of Contents

Chapter 1 – Overview

1.1 Introduction

DOD Technologies' ChemLogic® CL96 simultaneously monitors up to ninety-six locations (also called *points*) for toxic and corrosive gases. 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 CL96 triggers outputs for each individual point for 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 be positioned up to 400 feet (121 m) from the instrument. This allows operators to remotely monitor gas concentrations in areas subject to potential gas leaks. The CL96 can monitor and detect a wide range of gases. It is designed for continuous and prolonged operation when routine maintenance is performed (per factory specifications). The CL96 employs DOD Technologies' ChemLogic colorimetric technology, utilizing ChemLogic cassettes with chemically infused tape for fast and accurate gas detection.

See Section 7.7 for important disposal information.

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

1.2 Theory of Operation

The system draws sample flow simultaneously from all installed points. Part of the sample flow is diverted across the ChemLogic cassette tape. The CL96 uses an advanced optical detection system to measure the light level reflected from the tape. As the target gas is detected, the color of the tape changes. This color change results in a loss of reflected light across the tape. This loss of reflected light is detected by the advanced optics system. The CL96 will then report a gas concentration reading and/or a gas alarm.

1.3 Sampling and Monitoring

The system draws sample flow simultaneously from all installed points. Part of the sample flow is diverted across the ChemLogic tape where it is analyzed. Each 16-point analyzer exhausts through a single port.

1.3.1 Flow Connections

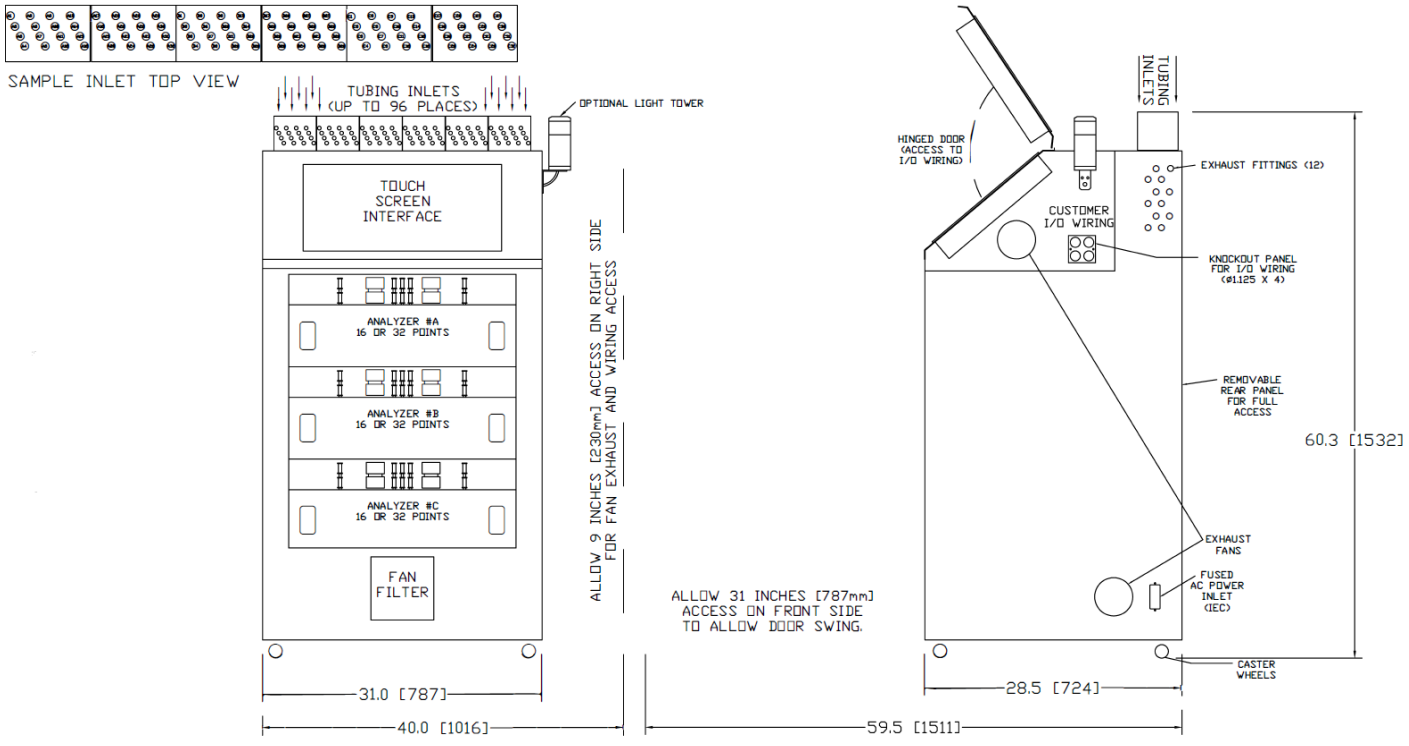
Flow connections consist of “quick-connect” ports on the top and side of the CL96 unit. There are ninety-six inlets, one for each monitored point, and 12 exhaust outlets, one for each analyzer.

1.4 Electrical Connections

“Knockout panels” for external electrical connections are provided on the right side of the CL96.

Chapter 2 – Features

2.1 External Layout & Dimensions



2.1.1 Status Lamp (OPTIONAL)

The optional status lamp consists of 4 colored lights – Red, Orange, Blue, and Green along with an audible alarm. See Appendix A for ordering information.

2.1.2 Output Wiring Knockouts

Knockouts for output wiring are located on the right-side panel near the top.

2.1.3 Touch Screen Display

The CL96 uses a full color 19-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”.

2.1.4 Keyed Service Door Access

The door uses a key lock to restrict internal access. See section 2.3 for detailed information on the service area.

2.1.5 A/C Power & Switch

A/C power is connected on the right-side panel with a standard cable. The on/off power switch is located adjacent to the power cable connection.

2.1.6 Flow Adjustment

Flow adjustments for all installed points are located on the top of the device. Refer to section 5.2.4 regarding flow adjustment.

2.1.7 ChemLogic Cassette Paper Tape

ChemLogic paper tapes are accessed by opening the maintenance door. Refer to section 6.3 regarding tape installation/replacement.

2.1.8 Maintenance Door

The maintenance door allows easy access to the ChemLogic tape for installation and replacement.

> **IMPORTANT** : The maintenance door should remain closed and latched except when changing the ChemLogic cassette tape. Do not open the door while in Analysis Mode.

2.1.9 Take-Up Reel

Empty take-up reels are inserted at the time of ChemLogic tape installation (see section 6.3). During installation, the previous take-up reel which is full is removed from CL96 and discarded. The previous ChemLogic tape reel which is now empty should then be used as the next take-up reel.

2.1.10 Tubing Connections

Sample tubing and exhaust use a quick connection system for simple installation. The sampling connections are made on the top of the CL96 while the exhaust tubing connects on the right side. See section 3.3 for information on connecting the sample and exhaust tubing. See also Appendix C for important information on transport times for gas from the sampling point to the CL96.

> **IMPORTANT** : End-of-the-Line filters or In-Line filters are required at all times on each channel. See section 6.2

2.2 Maintenance Area

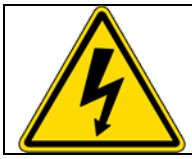
The maintenance area allows easy access for changing ChemLogic tape in the CL96. Figure 2.2 shows the internal layout with the access panel open. See section 3.5 for tape installation.

Figure 2.2

2.3 Internal Layout – Service Area

Internal access to the CL96 for installation and service uses the keyed handle located on the right side of the front panel. Figure 2.3 shows the internal layout of the CL96 with the service door open. The door should be opened by trained service personnel (See section 6.2)

Figure 2.3

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

2.4 Password Security

Access to many of the features is controlled through password protection which is entered through the screen displayed in Figure 2.4.

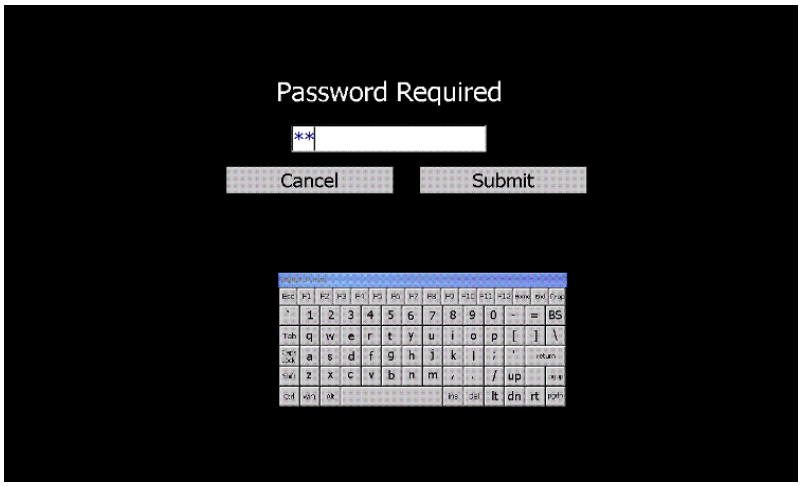


Figure 2.4

When someone attempts to access a screen that is password protected, the screen shown in figure 2.4 will appear (see important note below). Several of the setup & configuration screens of the CL96 require entry of an administrative password. Factory service screens require entry of a service password - see section 7.

IMPORTANT : Once a password is entered it remains active for up to 1 minute from entry so that it does not need to be repeatedly entered when switching between screens. Please remember that anyone using the touch screen may access restricted screen locations during this time if the machine is left unattended.

NOTE : The administrative password is included on a separate page shipped with your unit. It is suggested that you remove the page and keep it in a safe and secure place. If you forget or lose your password, please contact DOD Technologies, Inc. You can change the passwords on the menu in the "Setup" area – see chapter 6. See Chapter 8 for contact information.

2.5 USB Storage

The CL96 uses a removable USB drive to store historical information including concentration logging, event history, configuration information, and TWA data. USB storage drives may be purchased through DOD Technologies – see Appendix A.

Chapter 3 – Installation

	WARNING: Electric shock possible. Turn off the unit and disconnect A/C power to the unit before servicing.
	WARNING: If the CL96 is used in a manner not specified by the manufacturer, the protection provided by the equipment may become impaired.

3.1 Selecting a Location

The CL96 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 VAC supply voltage fluctuations up to +/- 10% of the nominal voltage
- Transient Levels : Impulse withstand (overvoltage) category II of IEC 60364-4-443
- IP Rating IP2x

The CL96 should be placed in a location as central as possible to the locations being monitored while considering the following restrictions:

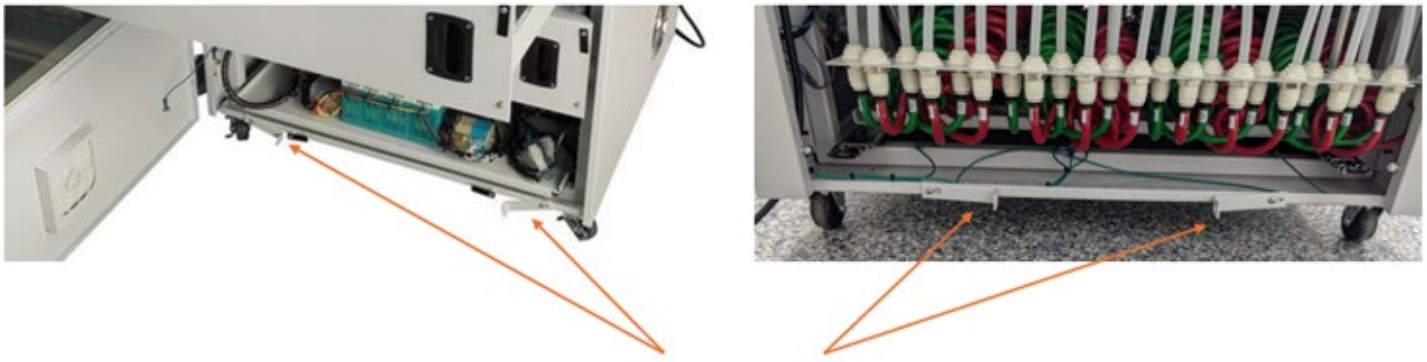
- The maximum sample line length is 400 ft (121 m). Using the shortest possible sample line length will reduce transport times and increase the response time of the CL96. (see Appendix C)
- A/C power is required to the unit.
- Locate near proper ventilation keeping in mind the maximum length of the exhaust tubing is 25ft.
- The CL96 requires stable temperature and humidity levels within range to operate properly.

Do not place in a location which will expose the CL96 to moisture, dust, corrosive gas, or any unusual environmental conditions which could damage the unit and/or cause it to operate inaccurately.

3.2 Unloading / Loading & Installation

The CL96 rests on four rollers which can be locked in place and bolted to the floor if necessary. Floor mounts are included at the bottom of the unit (see Figure 3.2) to anchor the system.

	CAUTION: Care must be taken when loading, unloading, and moving the CL96. The CL96 is a heavy piece of equipment which could cause injury or death if not handled properly. Make sure the rollers are operating properly and only move the CL96 on a level surface.



Floor Mounts – Front & Rear View

Figure 3.2

3.3 Sample Tubing

Sample tubing is connected to the CL96 on the top the unit. All sample tubes are 1/4" OD x 3/16" ID Teflon FEP (400 ft max length) which may be purchased from DOD Technologies, INC (See Appendix A). Fully

> **IMPORTANT** : All sample tubing used with the CL96 must be ¼" OD x 3/16" ID FEP Teflon. Use of any other tubing may damage the CL96 and/or cause inaccurate gas concentration readings.

depress each sample tube into the proper hole when attaching. To detach the tube, push on the collet and pull the tubing out.

3.3.1 End-of-Line Particulate Filters

End of line particulate filters must be installed on all sample lines at all times to prevent damage to the unit. Unused lines must either be plugged or have a filter installed. Filters require regular maintenance – see chapter 6.

> **IMPORTANT** : All points require filtration to prevent dust accumulation in tubing and internal damage to the CL96. Dust that collects in the tubing or the internal system may cause sample loss and inaccurate concentration readings.

End of line particulate filters may be purchased from DOD technologies (see appendix A).

3.4 Exhaust Tubing

The exhaust line must be 3/8" OD x 1/4" ID tubing with a maximum length of 25ft. Polyethylene is recommended although polypropylene or Teflon may also be used. Exhaust tubing may be purchased from DOD technologies (see appendix A)

3.5 A/C Power

When connecting the A/C power to the CL96, ensure that all of the following requirements are met:

- A building circuit breaker is required.
- The circuit breaker must be installed in a suitable location that is easily reached.
- The circuit breaker must be labeled as the disconnect device for the CL96.
- The circuit break must break both poles.

See system specifications in Appendix C for power requirements.

	WARNING: The detachable power cord or the supply line wiring must meet the ratings specified in Appendix C under system specifications.

3.6 Output Wiring

See Appendix B for a listing of various output module connections available on the CL96.

3.6.1 Standard Output Wiring

The standard output modules included with the system require an external 24V supply connected to the CL96 to supply power for the outputs.

Use only AWG22 to AWG18 twisted wire (wire sizes UL1015 and UL1007)
Strip from .26” to .31”(6.5mm to 8.0mm) from each wire to insert into the connector.
To connect the wires to the spring-loaded output connector:

- Insert the screwdriver into the square shaped hole which will open the round hole for the wire.
- Continue to hold the screwdriver while inserting the wire into the round shaped hole.
- While holding the wire in place remove the screwdriver which closes the clamp onto the wire.
- IMPORTANT : Be sure the wire is inserted completely into the hole. Failure to do so could result in system failure, electrical shock.
- To remove a wire, re-insert the screwdriver in the hole as described in step 1 and gently pull the wire out while the spring is compressed.

Chapter 4 – Setup & Configuration

4.1 Set System Date and Time

See section 6.2.e

4.2 Gas Selection

Each point on the CL96 must be set for the appropriate gas and configured accordingly. See Section 6.2.a for information on selecting the gas for each point.

4.3 Alarm Settings

See Section 6.2.a for information on how to adjust the alarm settings after the gas has been selected for each point.

4.4 Output Contacts

The CL96 supports both energized and de-energized outputs and may be configured for either latching or non-latching faults/events.

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 if and when the condition that caused the fault/alarm goes away.

> **NOTE** : A message is added to the event log each time the 'fault reset' button is touched.

4.5 Concentration Logging

Three levels of concentration logging can be configured in the CL96

- >0 – All concentration detected > = LDL are added to the concentration log.
- AP1 – Anytime alarm level 1 is reached, the concentration is added to the log.
- AP2 – Anytime alarm level 1 is reached, the concentration is added to the log.

For AP1 or AP2 logging the system will continue to log concentrations as long as the alarm level is active. If latching faults are enabled the system will continue to log until the 'fault reset' button is touched.

4.6 Configuration Settings

See Section 6.2 for more comprehensive instructions on system configurations.

4.7 Install New Tape

See section 7.3 for installation instructions.

4.8 USB Storage

The use of USB Storage drive is required to retain historical and performance information including events, alarms, and gas concentrations. Reliable USB storage drives are available from DOD Technologies (see Appendix A) and at most retail electronic stores. See section 7.5 for information on inserting and replacing a USB drive. See also appendix F for information on the data set stored.

4.9 Setup Complete

The CL96 is ready for gas detection and analysis.

Chapter 5 General Machine Operation

5.1 Introduction

The touch screen on the CL96 is used for all configuration and control of the unit. Analysis mode is active by default approximately 2 minutes after power on unless an operator intervenes. The machine is designed to continually monitor for gas 24/7. Various tasks can be completed while remaining in analysis including viewing faults and events, viewing Concentration history & TWA logs, checking point configuration and flow limits. Access to the help menu is also available while remaining in analysis.

Analysis is started either by:

1. Power on timeout without user intervention, approx. 2 minutes)
2. Touching the Start Analysis button for a specific analyzer on the Load Tape screen.
3. Touching the 'Analysis' button on the Main Menu which will start analysis for all installed analyzers at the same time.

Analysis will continue until one of the following occur:

1. Power loss.
2. Touching the 'Stop Analysis' button for a specific analyzer on the Load Tape screen. (password may be required)
3. Entering Setup by touching the Setup button on the main menu and entering an appropriate password which will halt analysis on all analyzers.
4. A critical machine fault which may stop an individual analyzer or the entire CL96.

5.2 General Screen Navigation

Figure 5.2.1

Figure 5.2.1 shows a portion of the main menu that appears at the top when the machine is powered on. The menu system on the CL96 allows simple access to all the functionality of the system with a simple touchscreen interface. The selected item on the menu ("Analysis" on the figure 5.2.1) will appear in slightly larger **BOLD text with a lighter shade of gray as the background.**

A few things to know about all the menus on the CL96:

- **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 5.2 explains the colors:**

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

Table 5.2

- Table 5.2 lists the colors in priority from lowest to highest since only 1 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 CL96.
- Items with a down arrow next to them (such as 'History' in Figure 5.2.1) indicate that the button will bring up a sub-menu of screen selections.
- When a sub-menu is selected the new menu will replace the previous menu and will always include the 'BACK' button at the start which will return to the previous menu (see Figure 5.2.2).
- Note in Figure 5.2.2, the background color is yellow indicating a Maintenance fault.

Figure 5.2.2

5.3 Initialization

When the CL96 is powered on it will begin with an initialization screen which is followed by the automatic restart screen (Figure 5.3)

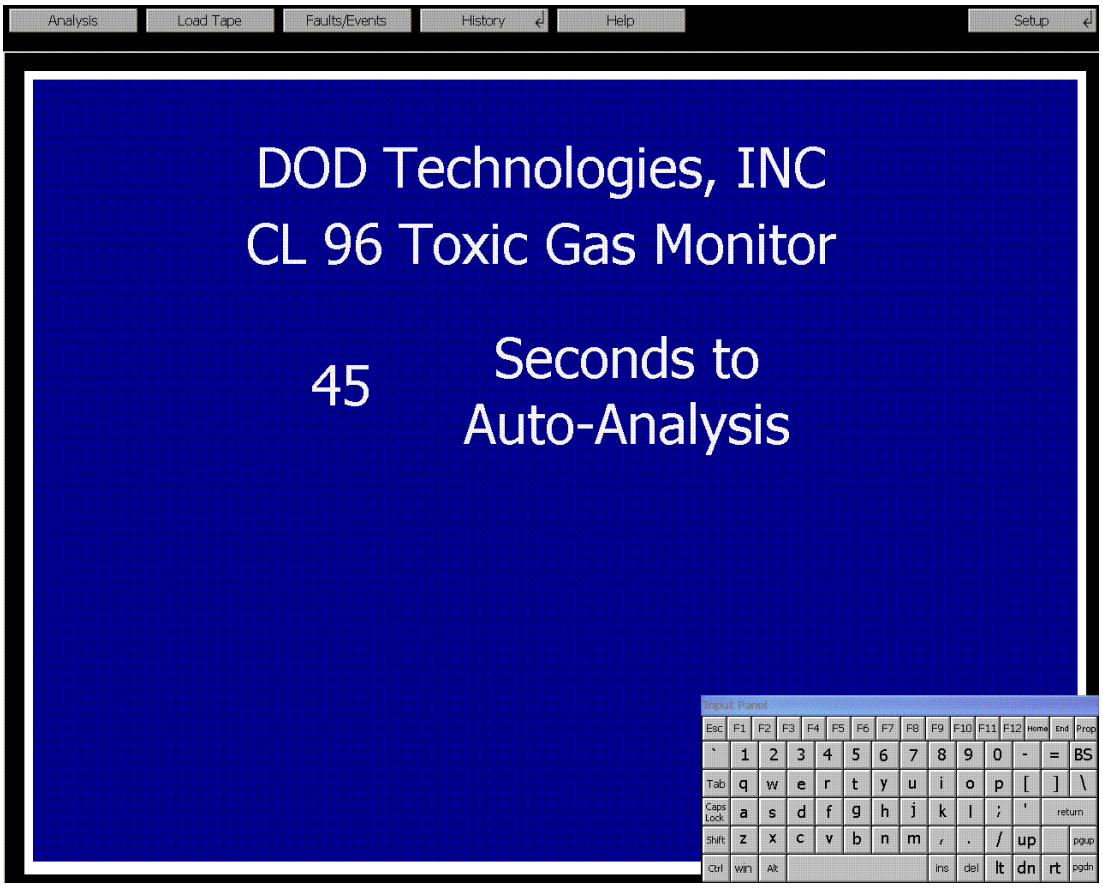


Figure 5.3

If the operator touched another menu button before the timer reaches 0 the machine will go to that screen and **WILL NOT** enter analysis (unless of course the operator touched the analysis button). If the machine should lose power at any time it will return to this screen when power is restored an automatically reenter analysis when the timeout is reached.

Chapter 6 The Main Menu

6.1 Main Menu

The main menu allows the operator to start/stop analysis and access to all information available while remaining in Analysis.

6.1.a Analysis

As the name implies, touching the 'Analysis' button will start the CL96 analysis for all active points. (see Setup in section 6.2.a). Figure 6.1.a.1 shows a 16-point system with analysis active. Note that the menu background is green indicating analysis active and all points are green indicating no flow problems or gas alarms active.

Black points indicate that the points are not installed or are inactive on the CL96.

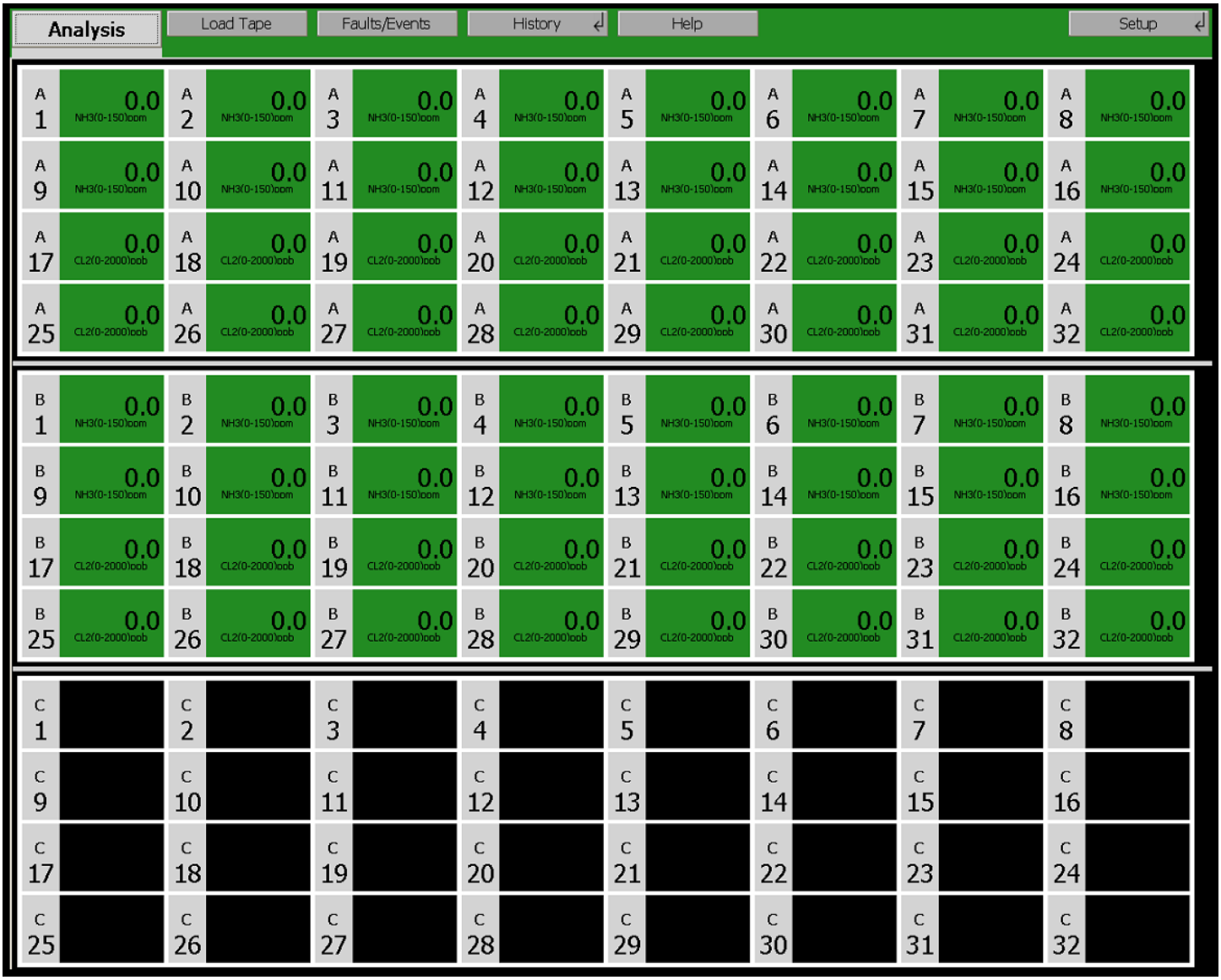


Figure 6.1.a.1

The color of each point on the analysis screen will change according to the current state of the point:

Disabled, Idle, Analyzing, Maintenance fault, or Alarm. (see colors in table 5.2)

Ex: Figure 6.1.a.2 displays which point 9 on analyzer A would look like when a full-scale reading is found while monitoring for H2SE(0-500ppb).

Figure 6.1.a.2

6.1.a.2 Point Trend Detail

Touching the gray area on any *active point on the analysis screen will display the detailed information for the selected point as shown in figure 6.1.a.3. The screen details the point #, name, location, range, alarm levels, flow level, current concentration, and a graph of the previous 15 minutes of concentration detected.

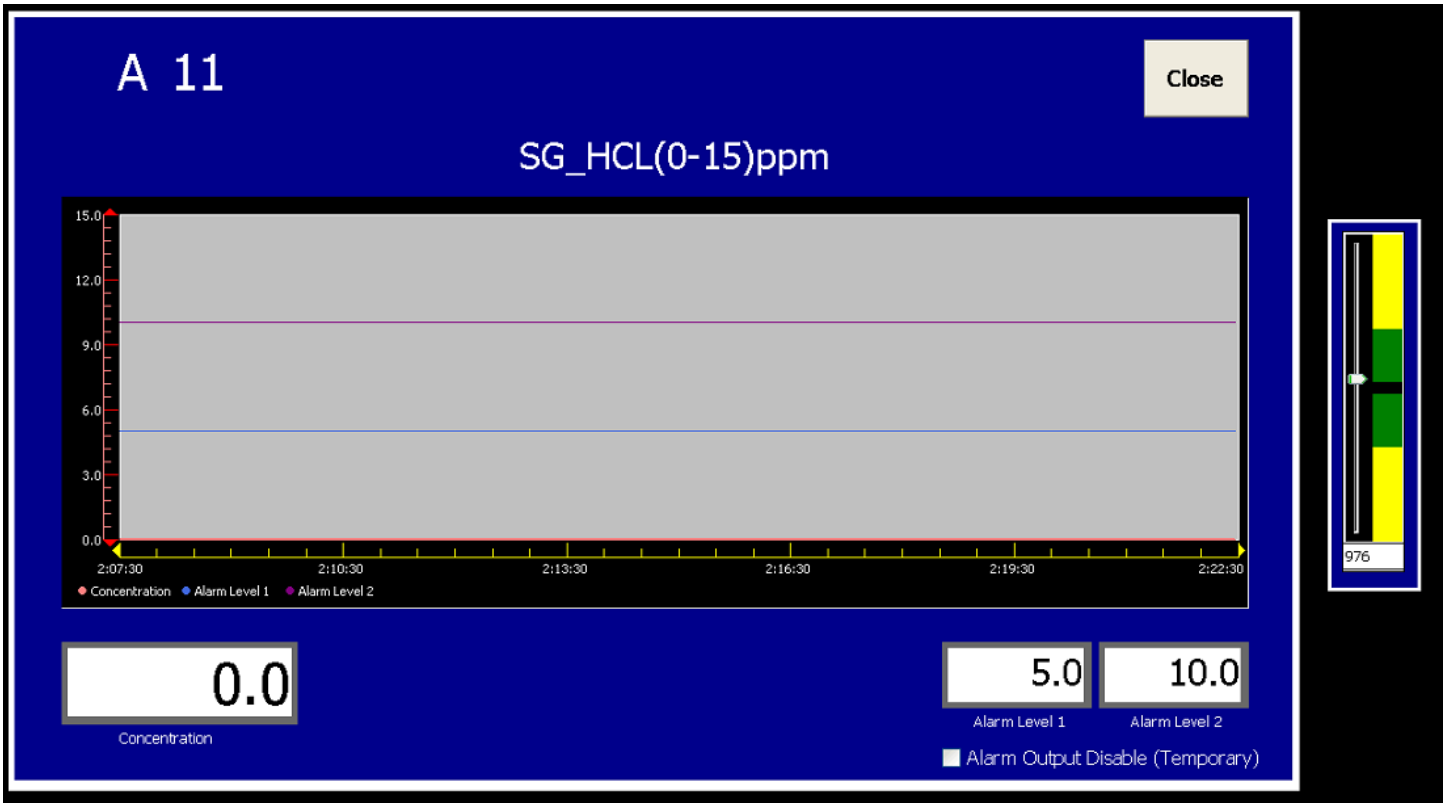


Figure 6.1.a.3

* Active = any point installed and enabled on the CL96.

6.1.b Load Tape

Touching the 'Load Tape' button on the main menu will bring up the screen shown below. Note that stacked analyzers can only be operated together although each analyzer tray can be started and stopped independently. From this screen the operator can also stop analysis for an individual analyzer to allow new tape to be loaded into the system. During Analysis, the buttons for "Open Gate", "reset Counter", and "Verity Optics" are all disabled. The background color of each analyzer will match the status of the analyzer since each analyzer tray can be started / stopped independently.

When loading a new tape follow the procedure described in Chapter 7.

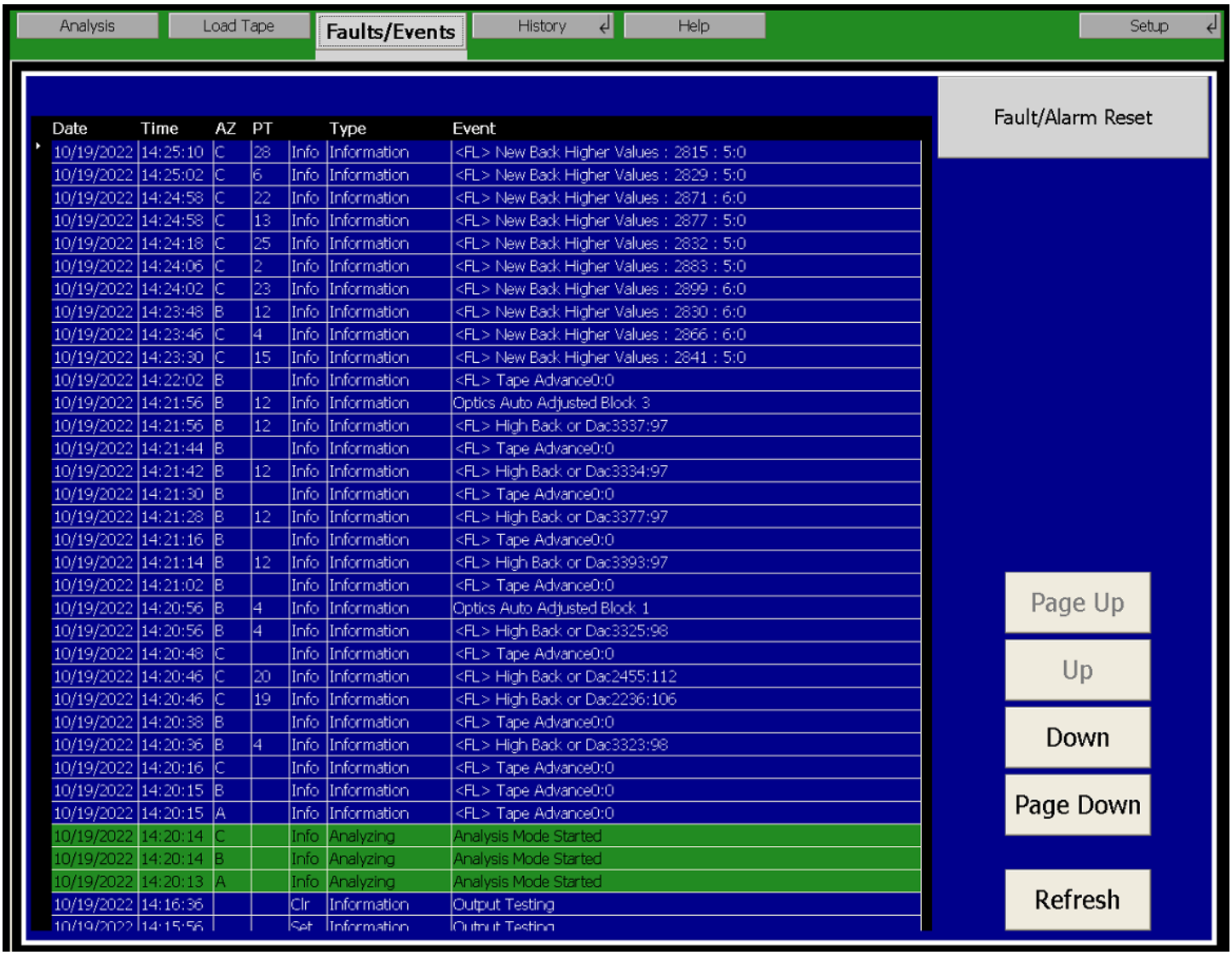
Figure 6.1.b

6.1.c Faults/Events

Touching the Faults/Events buttons on the main menu will bring up the screen show in Figure 6.1.c. Note this important difference between this screen and the fault/events screen on the 'History' sub-menu. The faults/events on the main menu shown on Figure 6.1.c retains a list of the most recent events (128-256). Regardless of whether a USB drive is inserted this list will show the most recent events. Each new fault or event is added to the top of this list and also written to the USB drive (if available).

> **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.

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



Date	Time	AZ	PT		Type	Event
10/19/2022	14:25:10	C	28	Info	Information	<FL> New Back Higher Values : 2815 : 5:0
10/19/2022	14:25:02	C	6	Info	Information	<FL> New Back Higher Values : 2829 : 5:0
10/19/2022	14:24:58	C	22	Info	Information	<FL> New Back Higher Values : 2871 : 6:0
10/19/2022	14:24:58	C	13	Info	Information	<FL> New Back Higher Values : 2877 : 5:0
10/19/2022	14:24:18	C	25	Info	Information	<FL> New Back Higher Values : 2832 : 5:0
10/19/2022	14:24:06	C	2	Info	Information	<FL> New Back Higher Values : 2883 : 5:0
10/19/2022	14:24:02	C	23	Info	Information	<FL> New Back Higher Values : 2899 : 6:0
10/19/2022	14:23:48	B	12	Info	Information	<FL> New Back Higher Values : 2830 : 6:0
10/19/2022	14:23:46	C	4	Info	Information	<FL> New Back Higher Values : 2866 : 6:0
10/19/2022	14:23:30	C	15	Info	Information	<FL> New Back Higher Values : 2841 : 5:0
10/19/2022	14:22:02	B		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:21:56	B	12	Info	Information	Optics Auto Adjusted Block 3
10/19/2022	14:21:56	B	12	Info	Information	<FL> High Back or Dac3337:97
10/19/2022	14:21:44	B		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:21:42	B	12	Info	Information	<FL> High Back or Dac3334:97
10/19/2022	14:21:30	B		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:21:28	B	12	Info	Information	<FL> High Back or Dac3377:97
10/19/2022	14:21:16	B		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:21:14	B	12	Info	Information	<FL> High Back or Dac3393:97
10/19/2022	14:21:02	B		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:20:56	B	4	Info	Information	Optics Auto Adjusted Block 1
10/19/2022	14:20:56	B	4	Info	Information	<FL> High Back or Dac3325:98
10/19/2022	14:20:48	C		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:20:46	C	20	Info	Information	<FL> High Back or Dac2455:112
10/19/2022	14:20:46	C	19	Info	Information	<FL> High Back or Dac2236:106
10/19/2022	14:20:38	B		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:20:36	B	4	Info	Information	<FL> High Back or Dac3323:98
10/19/2022	14:20:16	C		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:20:15	B		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:20:15	A		Info	Information	<FL> Tape Advance0:0
10/19/2022	14:20:14	C		Info	Analyzing	Analysis Mode Started
10/19/2022	14:20:14	B		Info	Analyzing	Analysis Mode Started
10/19/2022	14:20:13	A		Info	Analyzing	Analysis Mode Started
10/19/2022	14:16:36			Clr	Information	Output Testing
10/19/2022	14:15:56			Set	Information	Output Testing

Figure 6.1.c

6.1.d History

Touching the History button on the main menu will bring up the sub-menu screen shown in Figure 6.6. This sub-menu gives access to the historical data stored on the USB flash drive.

> **IMPORTANT** : The CL96 stores all historical data to the USB drive. Make sure a drive is always inserted properly (see Appendix F). If no USB drive is present none of the menu item on the history sub-menu will show any data.

6.1.d.1 History -> Concentration Log

Touching the Conc. Log button on the History Menu will bring up the screen shown below. This screen shows the concentrations recorded for each point for the data selected on the calendar.

The alarm levels are color-coded as indicated by the three colors on the top of the screen:

1. < alarm level 1
2. >= alarm level 1 and < alarm level 2
3. >= alarm level 2

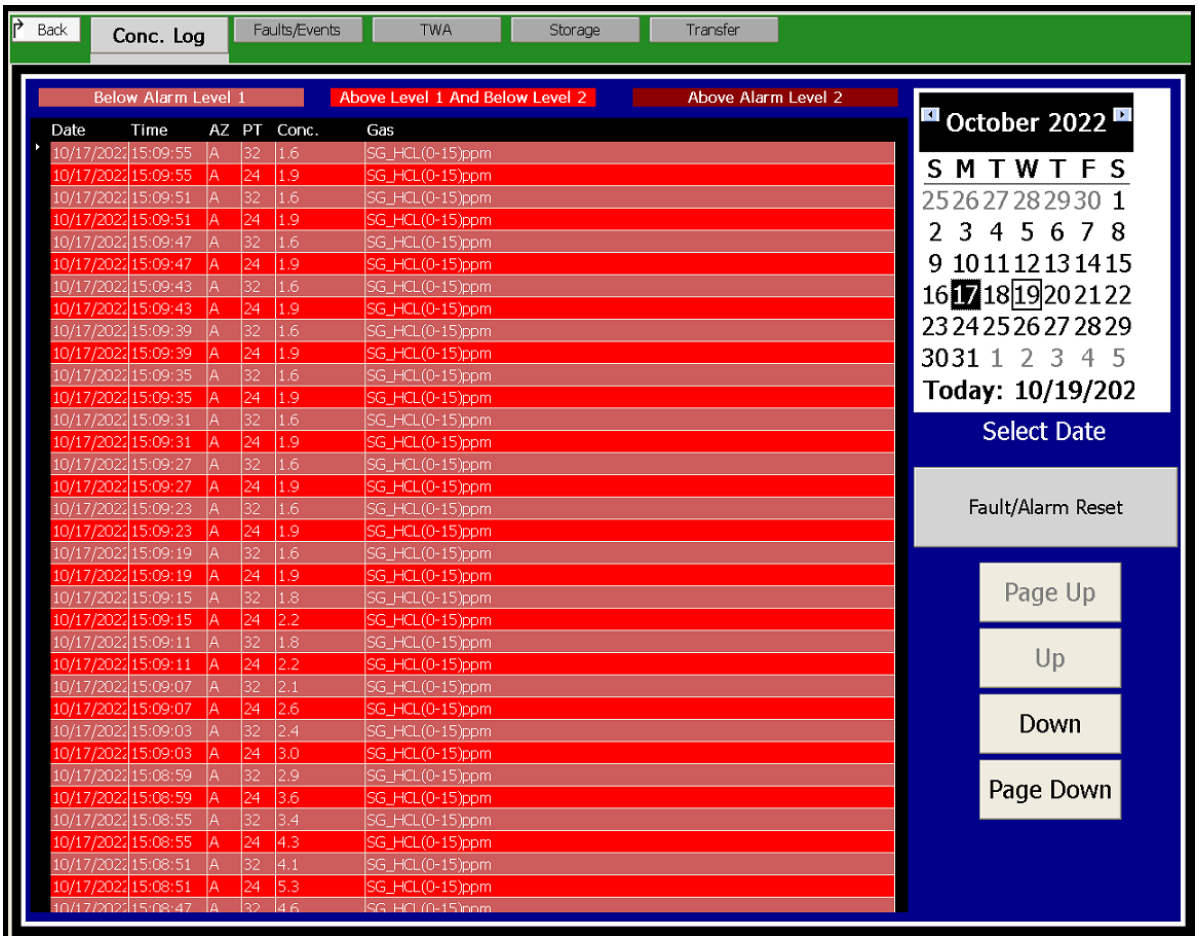


Figure 6.1.d.1

6.1.d.2 History -> Faults/Events

Touching the Faults/Events button on the History sub-menu will bring up screen show below. This screen shows only the events that occurred on the specific date selected using the calendar.

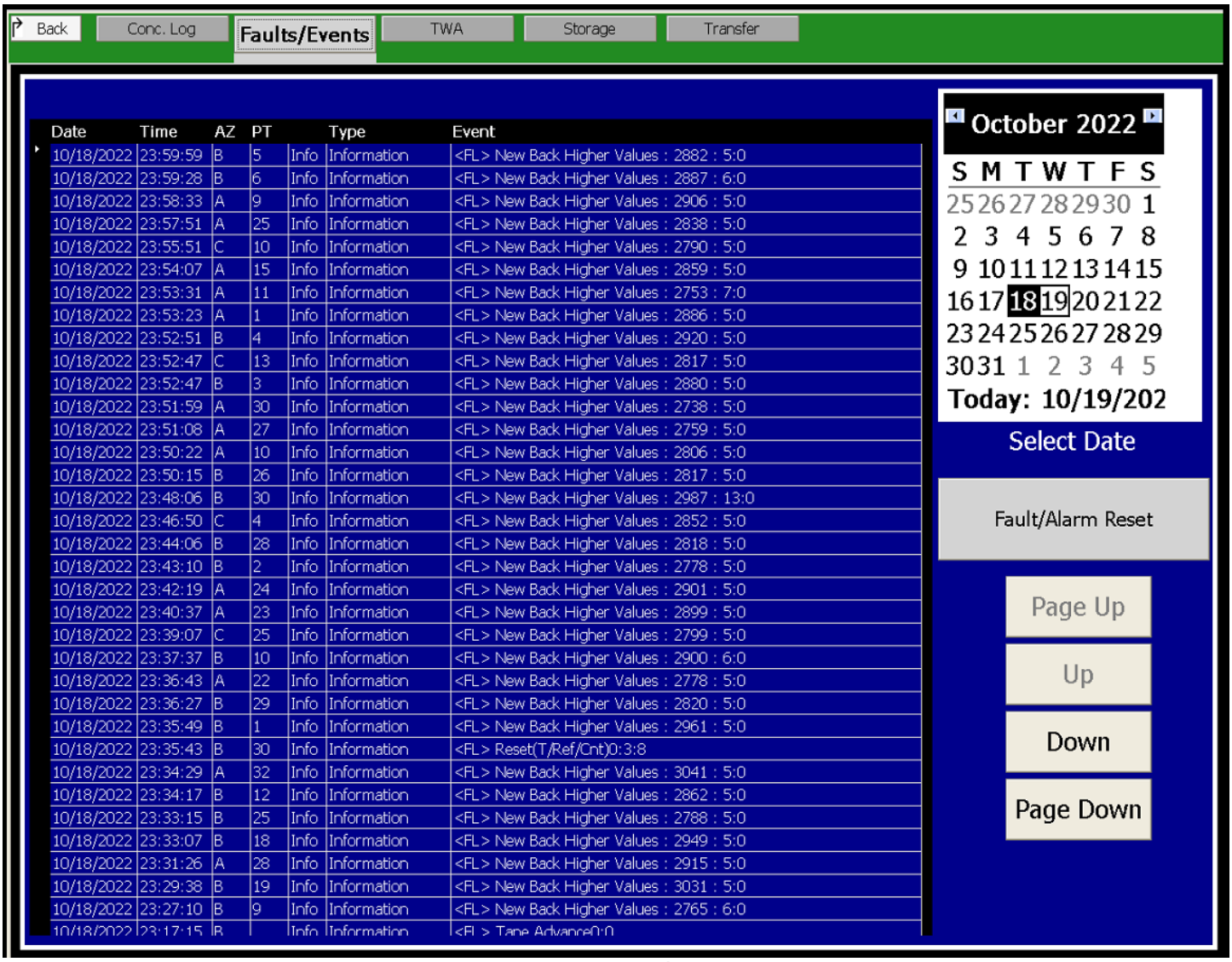


Figure 6.1.d.2

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

6.1.d.3 History -> TWA

Touching the TWA button on the main menu will bring up the sub-menu screen shown below. The operator may use the calendar to select the TWA information for each date.

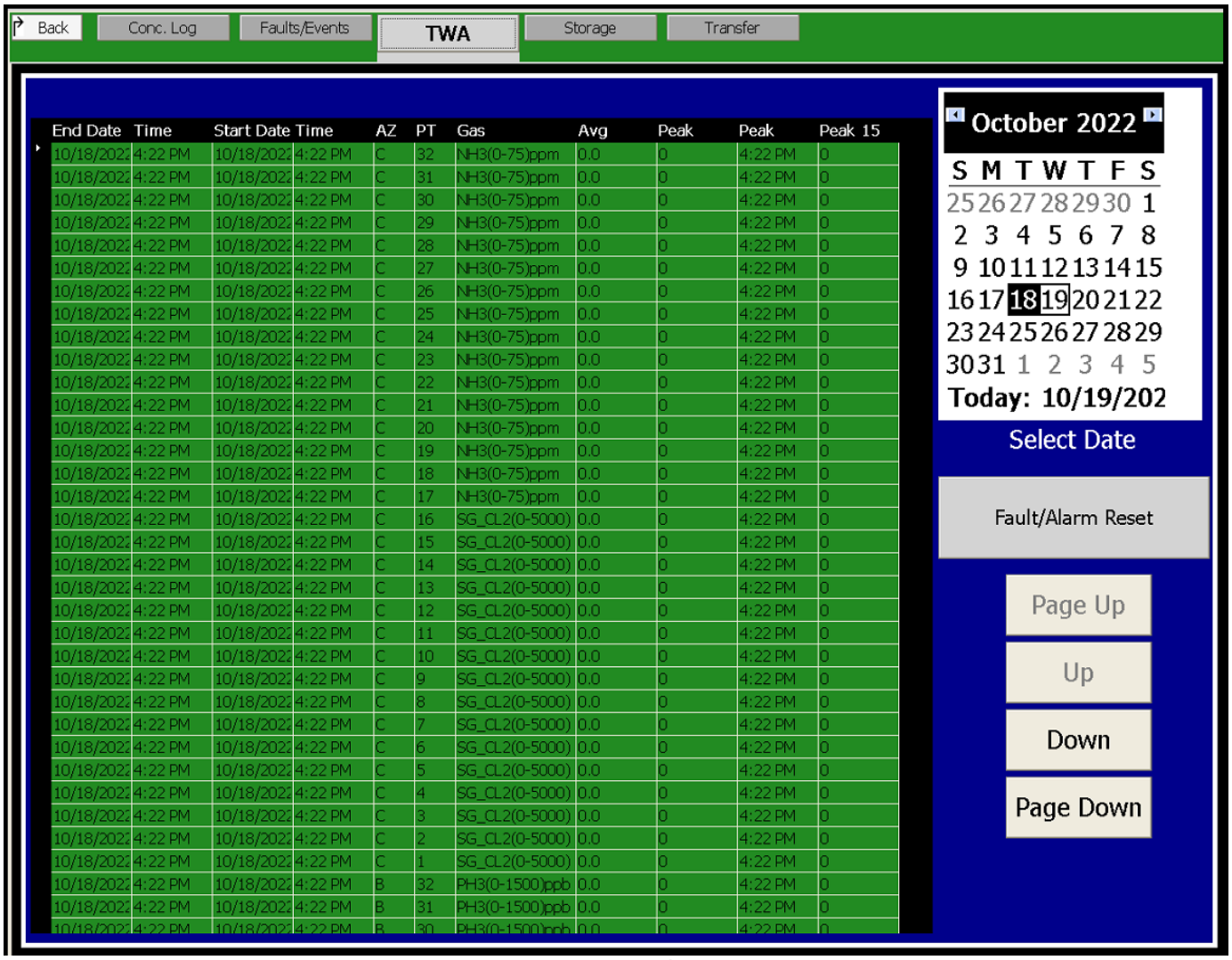
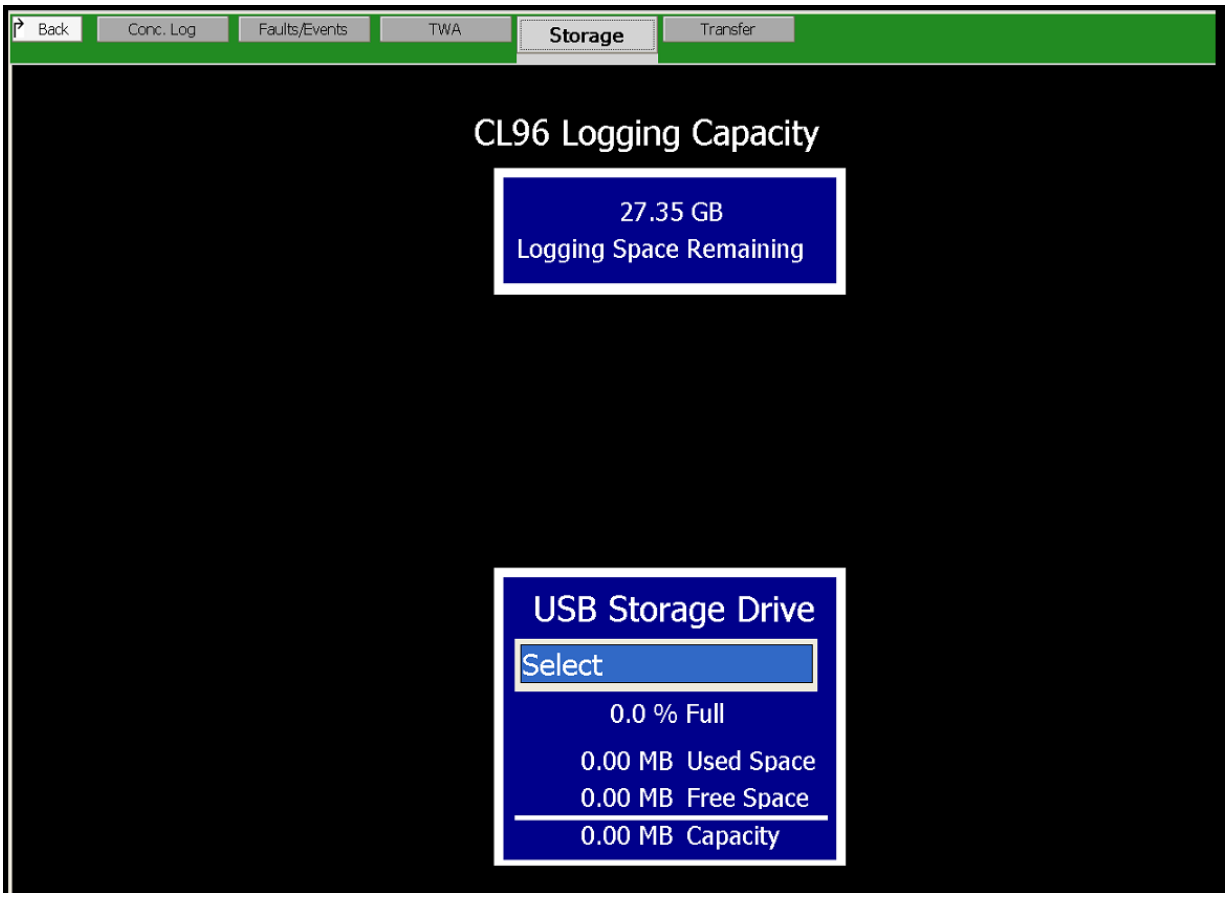
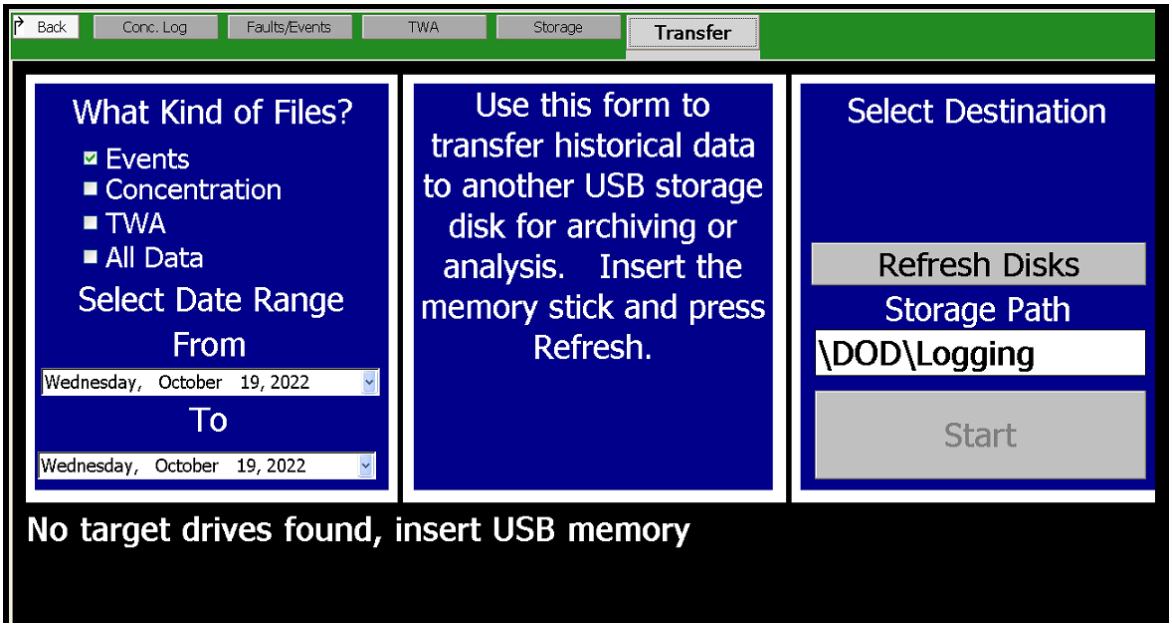


Figure 6.1.d.3

6.1.d.4 History -> Storage



6.1.d.5 History -> Transfer

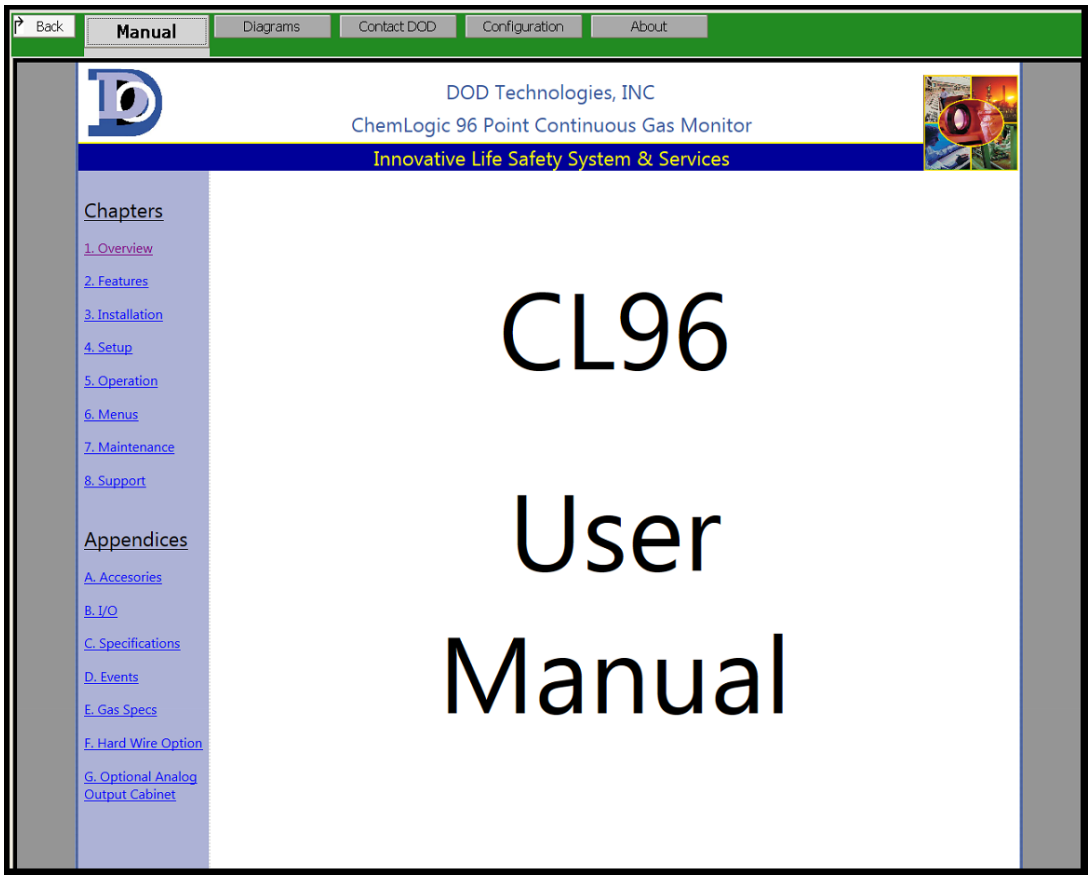


6.1.e. Help

Selecting the 'Help' button from the Main Menu will direct you to tabs and screens containing useful references and helpful information.

6.1.e.1 Help -> Manual

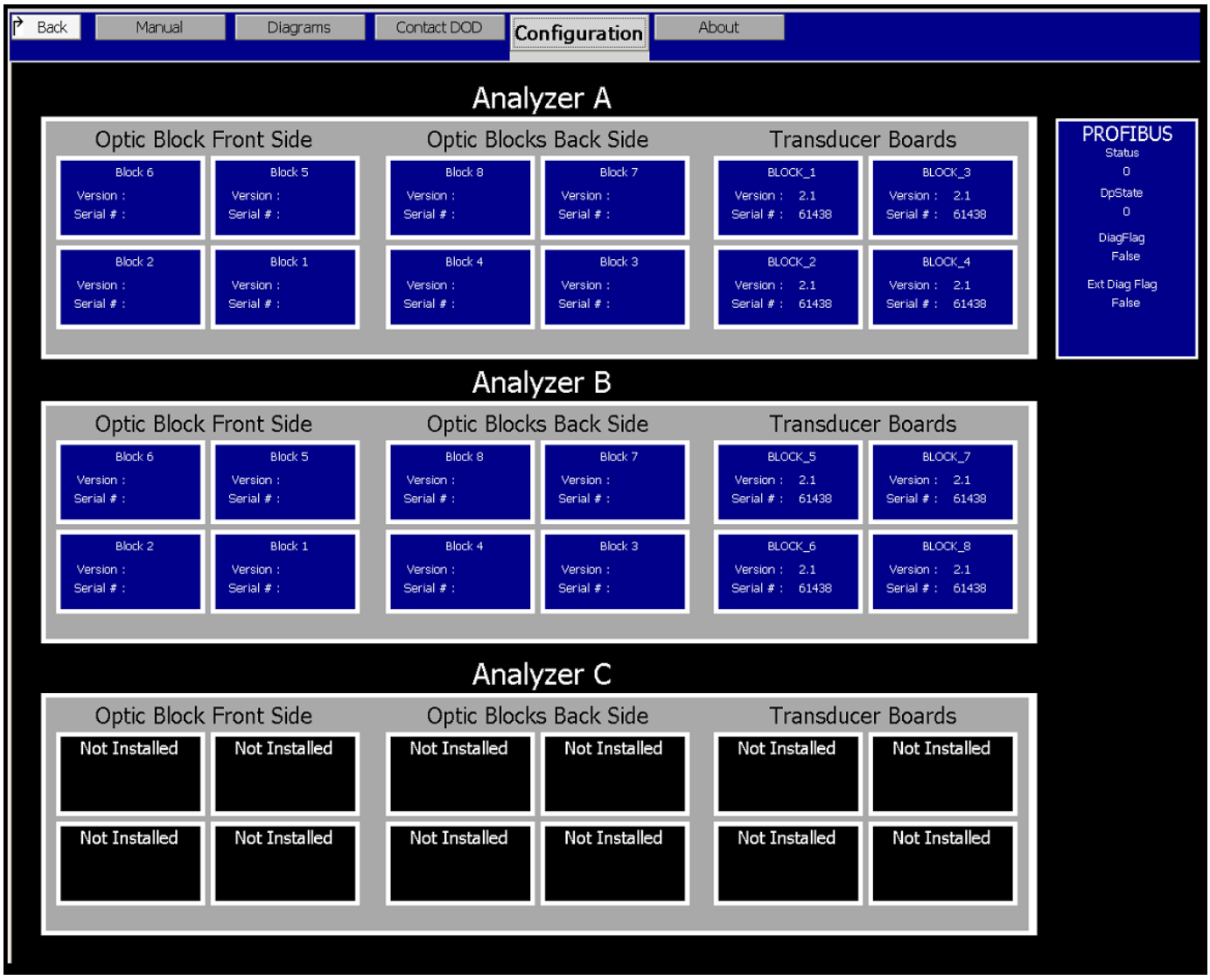
An interactive CL96 User Manual is available in this section. It is menu-driven to help you quickly find specifications and other useful information on your ChemLogic CL96 system. A PDF copy of the User Manual can also be viewed or downloaded by visiting the CL96 product page at DODtec.com.



6.1.e.2 Help -> Diagrams

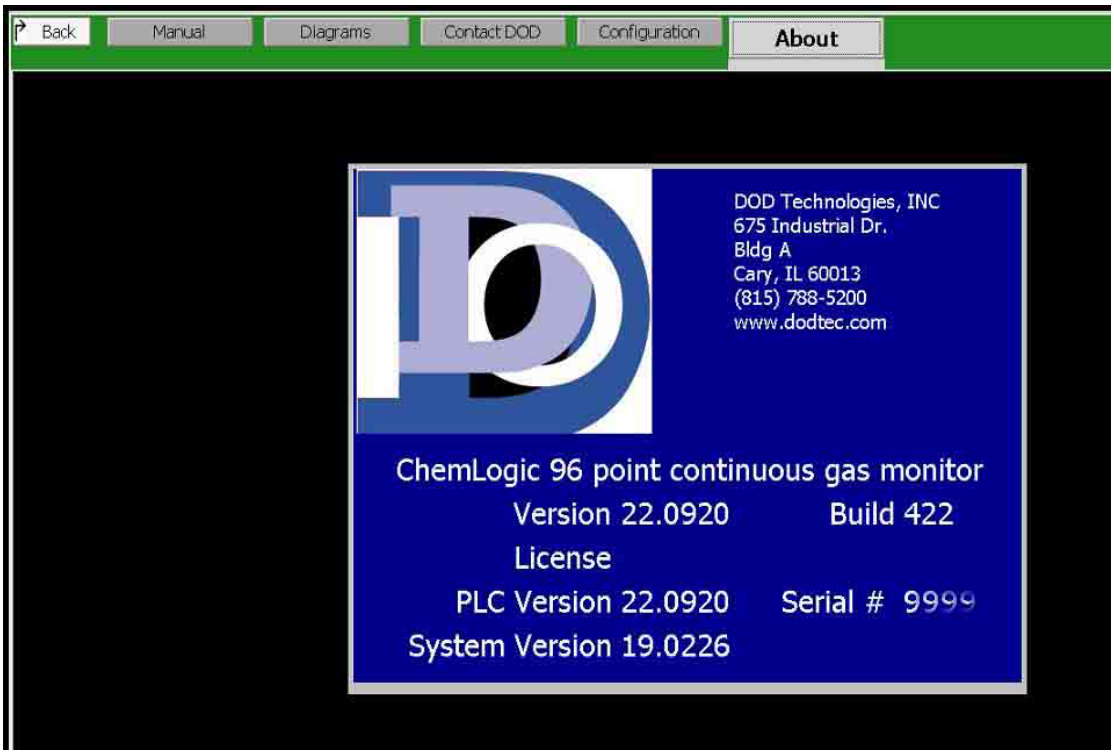
6.1.e.3 Help -> Contact DOD

6.1.e.4 Help -> Configuration



6.1.e.5 Help -> About

Selecting the 'About' tab from the 'Help' menu displays the screen shown below. This screen contains important system details including the version, license number, serial number and more.



Note: Certain references in the photo above have been altered or omitted for proprietary purposes. Details and references will vary by system.

6.1.f Setup

Pressing the Setup button while in analysis will end the analysis cycle on all installed analyzers if the proper password is entered. Touching the Setup button on the main menu will bring up the Setup sub-menu – see section 6.2 below.

6.2 Setup Sub-Menu

The setup sub-menu contains the configuration screen for the CL96 necessary for normal operation. Access to the Setup sub-menu is password protected (see section 6.2.f).

6.2.a Setup -> Point Setup

When the Point Setup button is touched the screen below appears. The buttons along the top allow selection of each analyzer that is installed (if not installed the buttons are disabled). Selecting an analyzer with the button at the top will display the configuration of the corresponding 16 points for the selected analyzer. Touching anywhere on the row for each point will bring up the screen in 6.2.a.2 which allows each point to be configured.

#	Enabled	K Factor	Gas	Alarm 1	Alarm 2	Multi	Location	Name	Description
1	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 1	
2	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 2	
3	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 3	
4	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 4	
5	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 5	
6	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 6	
7	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 7	
8	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 8	
9	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 9	
10	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 10	
11	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 11	
12	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 12	
13	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 13	
14	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 14	
15	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 15	
16	Yes	1.00	HCL(0-15)ppm	5.0	10.0			Point 16	

Figure 6.2.a.1

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.

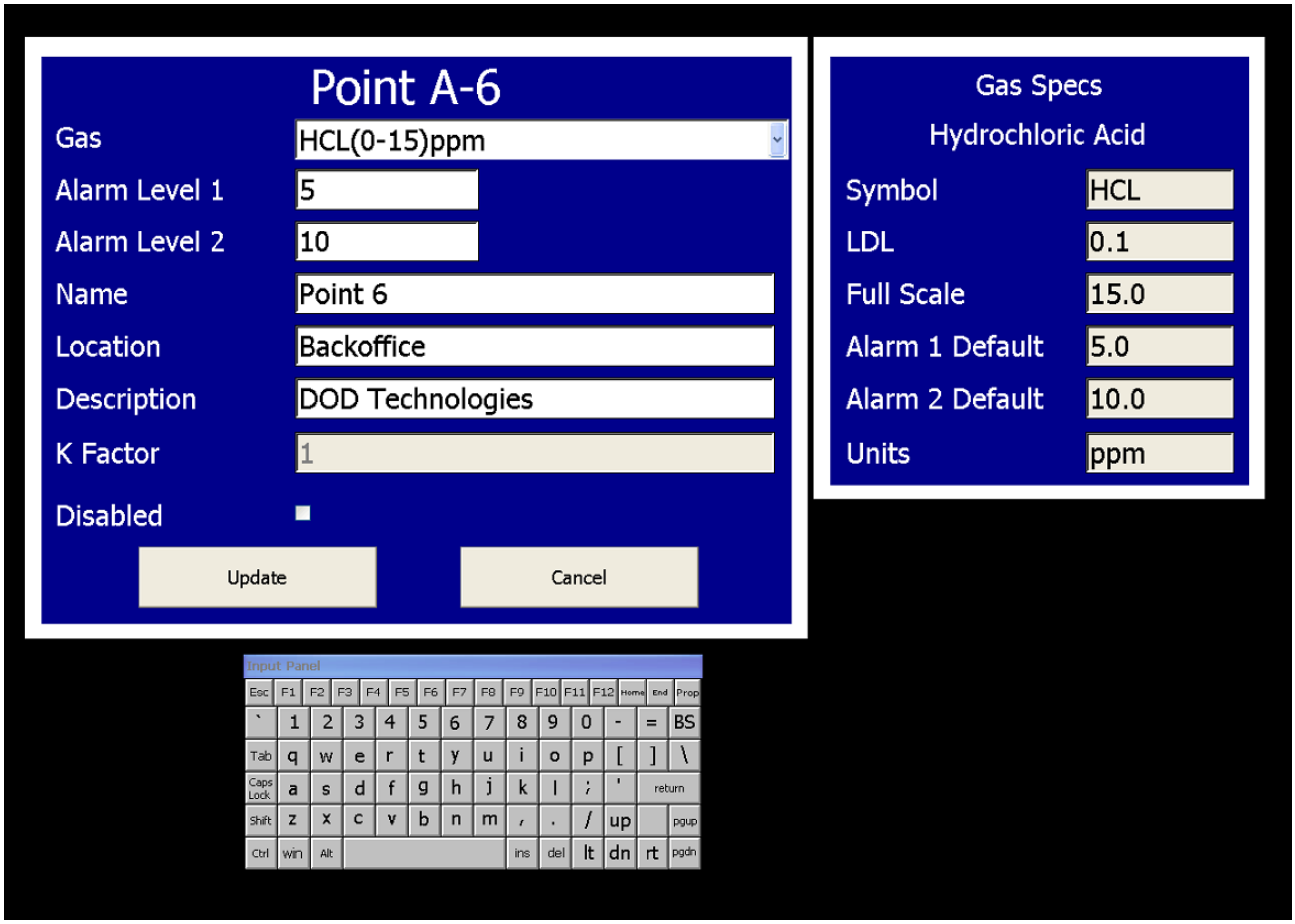


Figure 6.2.a.2

6.2.b Setup -Adjust Flow

When the Adjust Flow, button is touched the screen below appears. The buttons along the top allow selection of each analyzer that is installed (if not installed the buttons are disabled). Touch the button for the analyzer once to turn on the pump for that analyzer or touch the same button again to turn off the pump. When the button is touched the flow levels for those 16 points are displayed below and may be adjusted with the corresponding flow control valves on the top of the machine. Only 1 analyzer may be selected at a time.

IMPORTANT : Although only 16 points can be adjusted at a time, both pumps for the analyzer tray are active at the same time (if 32 points are installed).

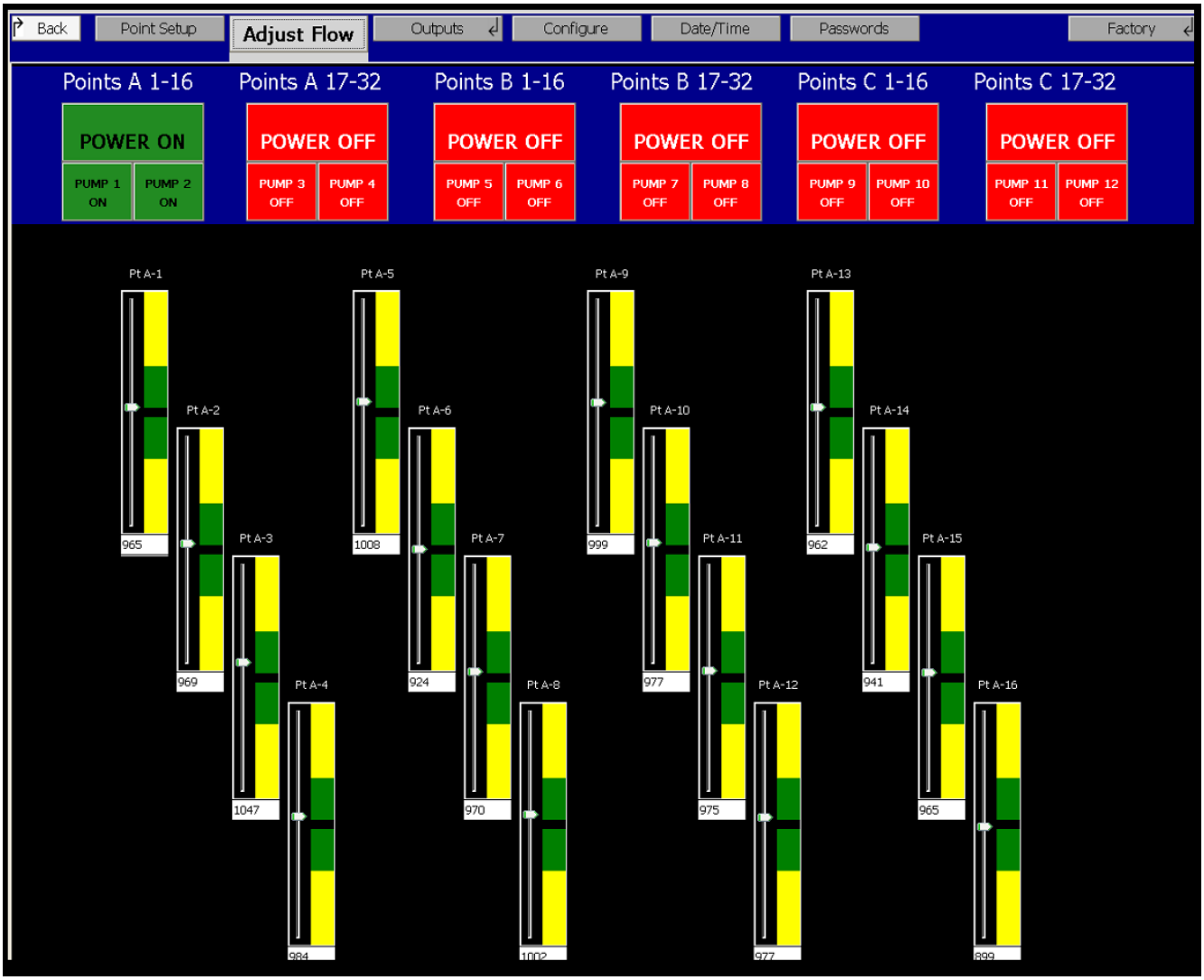


Figure 6.2.b

NOTE : There may be a slight delay between the time the control valve is turned and the update reading the CL96. Adjust the knob slowly and wait a few seconds to verify the level indicated on the unit is accurate.

6.2.C Setup -> Outputs

When the Point Setup button is touched the Outputs, Sub-Menu appears as described below. The outputs screen allows calibration & viewing of all output modules installed on the CL96.

6.2.c.1 Setup -> Outputs -> Alarms

When the Test Faults button is touched the screen below is displayed. This same screen is used to test the 24V output models and/or the relay contact if installed. For each installed analyzer, the touch button allows the operator to toggle the outputs active/inactive. Depending on the system setting for Energize/De-energized relays the output is set accordingly. On the left side of each analyzer tray display is a box which is colored appropriately for the selected faults. Below that is another box that shows which outputs are 'active'.

In figure 6.2.c.1 below both the critical fault for points 1-16 and general fault on points 17-32 are selected. Since the critical fault is higher priority the color of the box is orange (see table 5.2). If energized relays have previously been setup on the unit then the critical fault relay for analyzer A1 would not be off while the Alarm Level 1, Alarm Level 2, and general fault relays for analyzer A1 would be on.

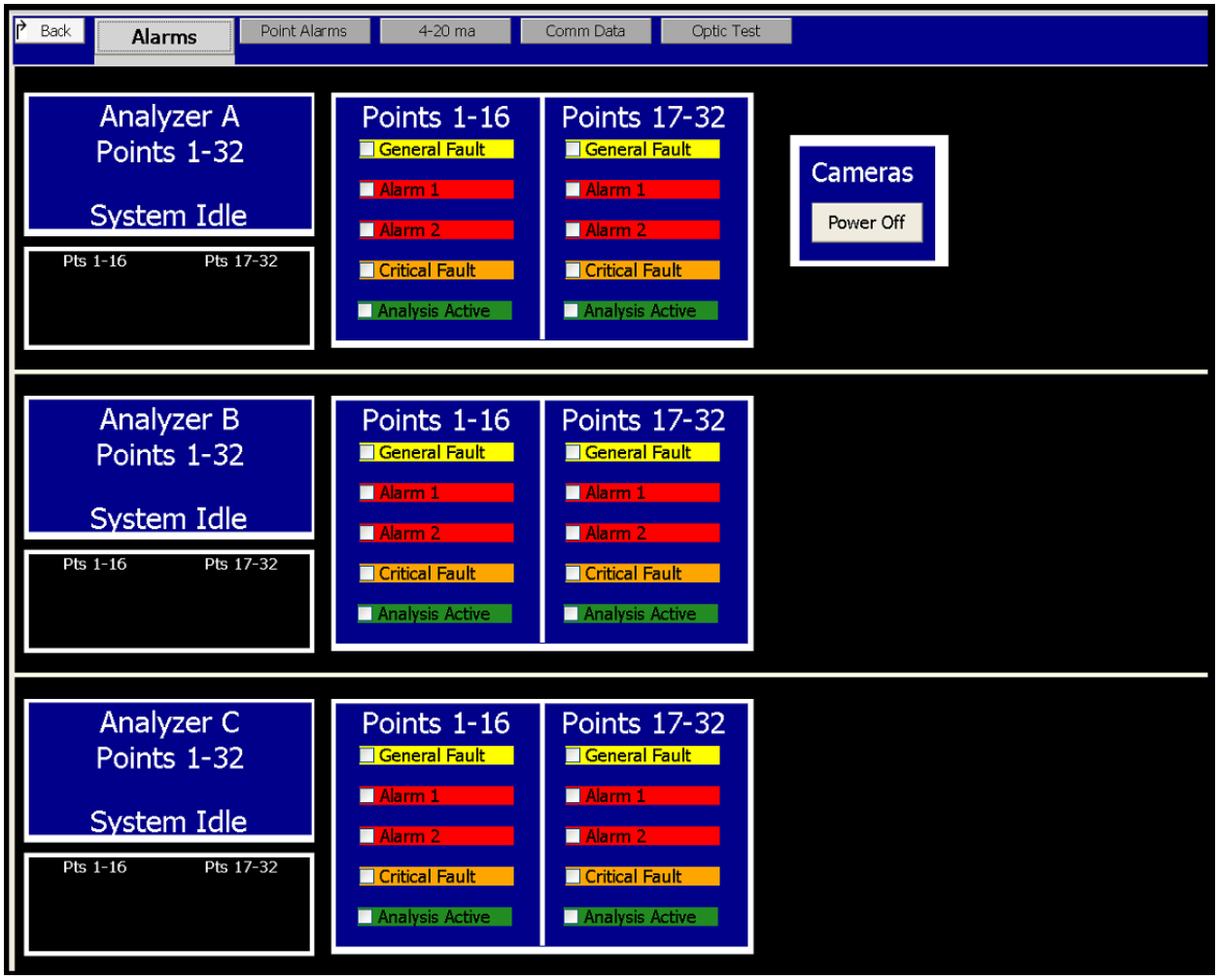


Figure 6.2.c.1

6.2.c.2 Setup -> Outputs -> Point Alarms

When the Test Points button is selected, the screen below is displayed. The buttons along the top allow selections of each analyzer that is installed (if not installed, the buttons are disabled). The same screen is used to test the 24V output modules and/or the relay contacts if installed. For each installed point, the touch buttons allow the operator to toggle the outputs active/inactive. Depending on the system setting for the Energized/De-energized relays the output is set accordingly.

In Figure 6.2.c.2 below, several of the point alarms have been selected for analyzer A1.

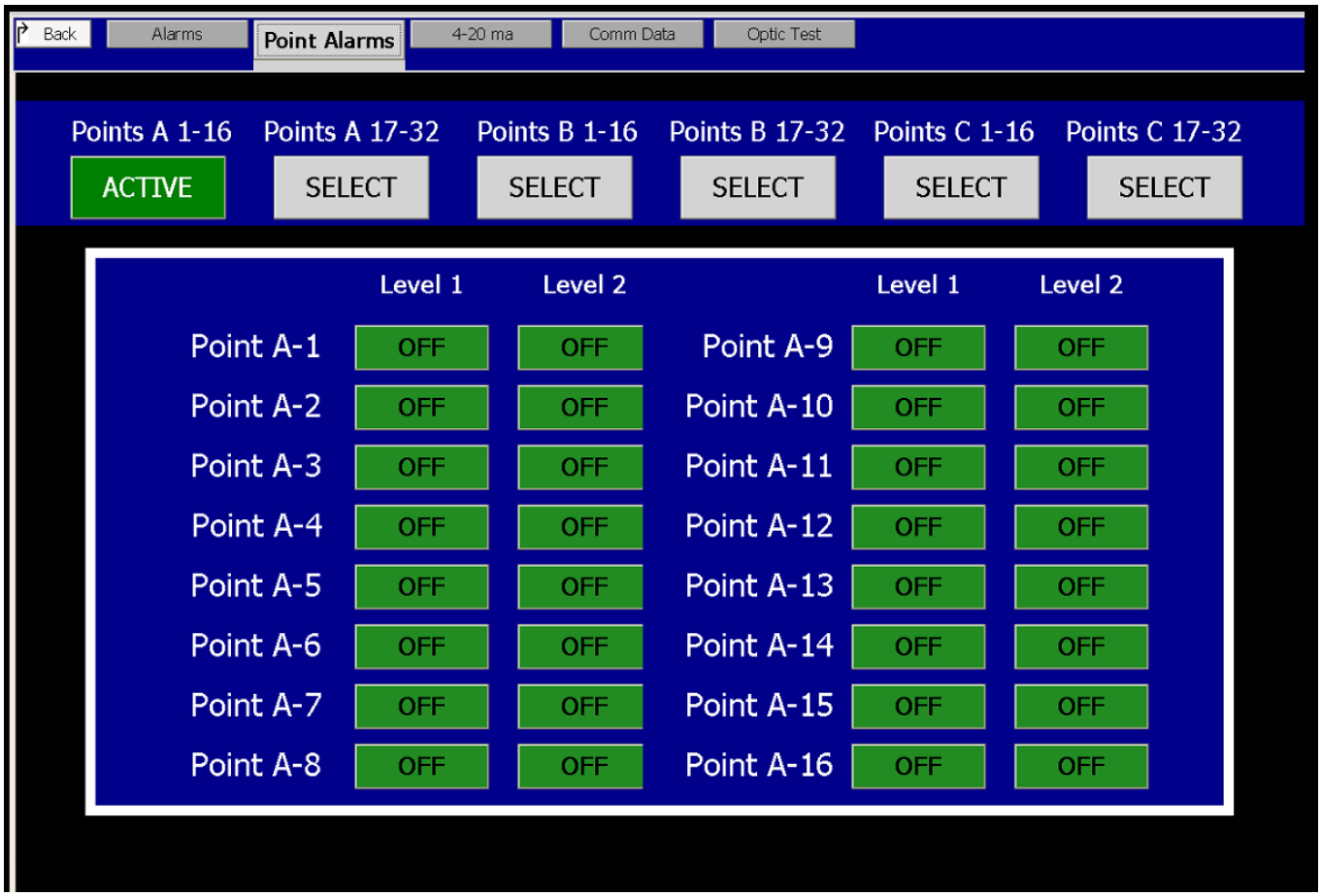
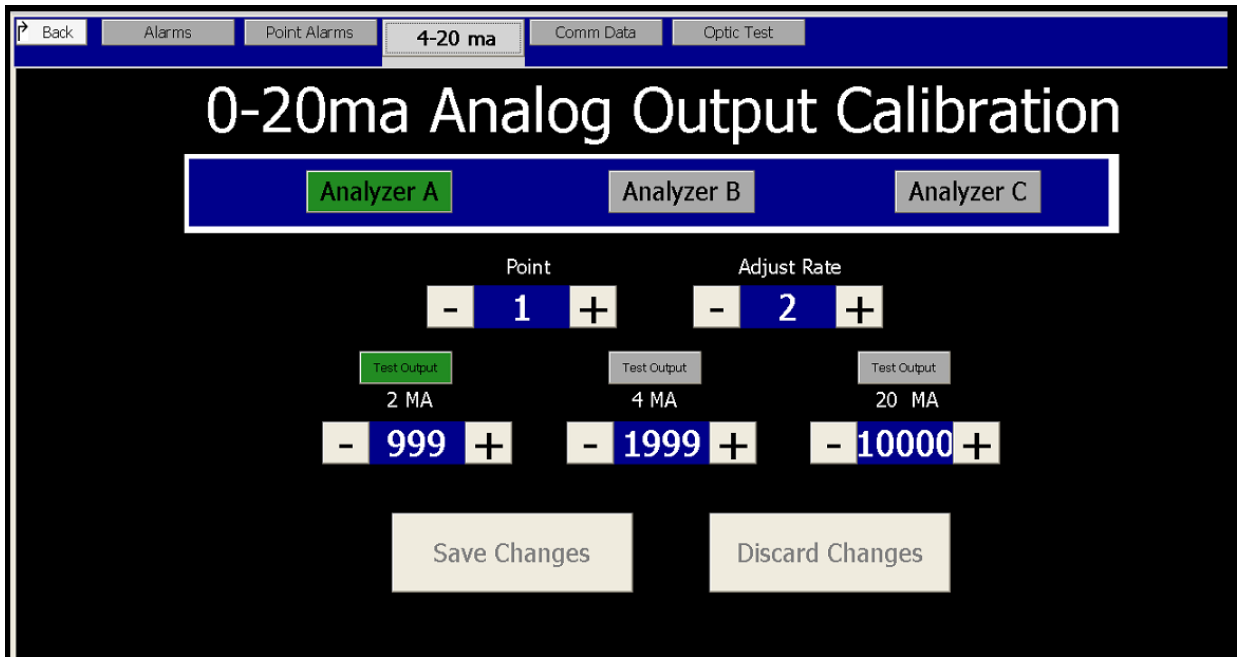
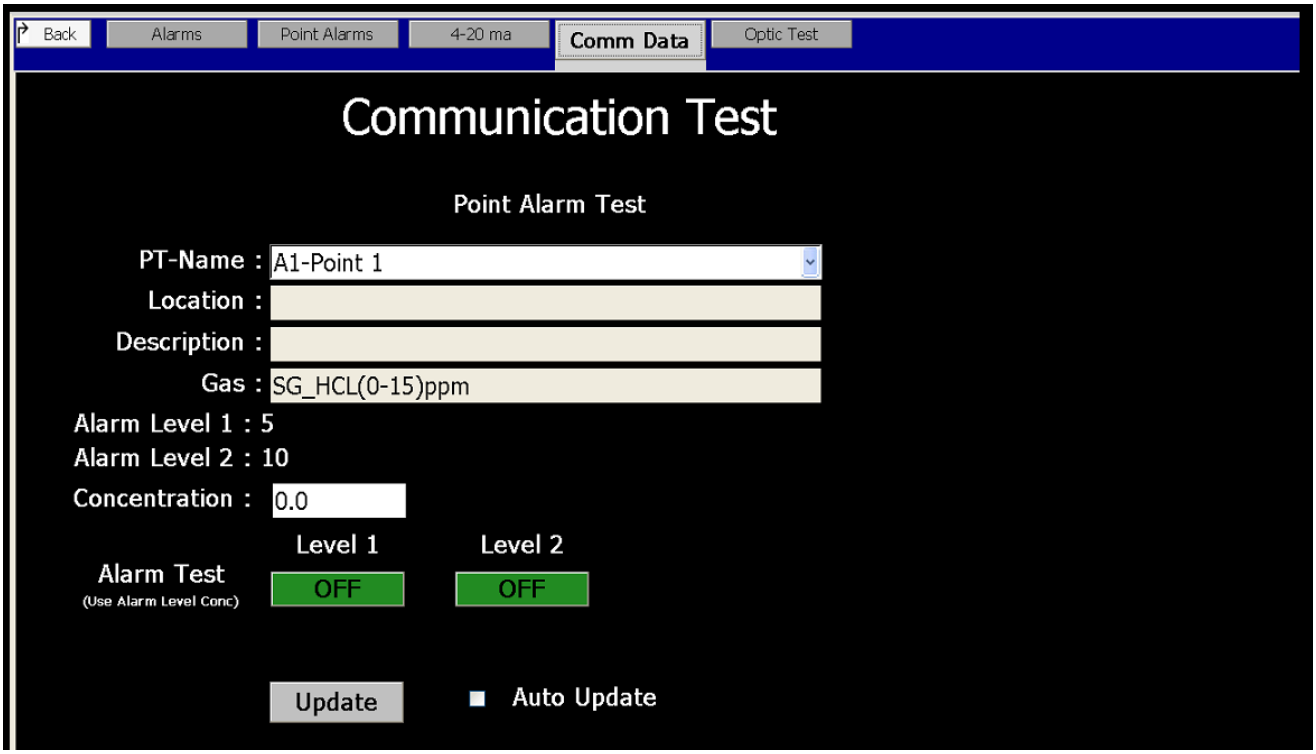


Figure 6.2.c.2

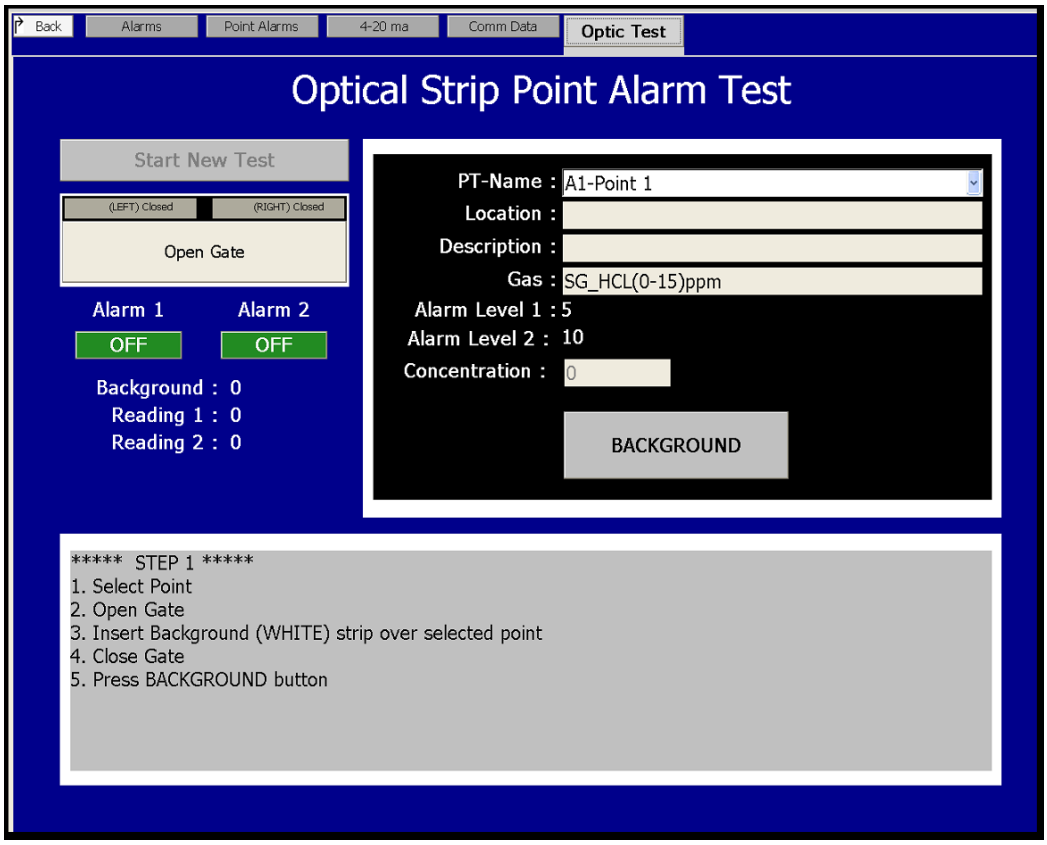
6.2.c.3 Setup -> Outputs -> 4-20mA



6.2.c.4 Setup -> Outputs -> Comm Data



6.2.c.5 Setup -> Outputs -> Optic Test



6.2.d Setup -> Configure

From the Main Menu, navigate to **Setup (password 1225) > Configure** to see the **CL96 Configuration Settings** menu below. When the Configure button is selected, a screen resembling below will be displayed. Each section is described in futher detail below.

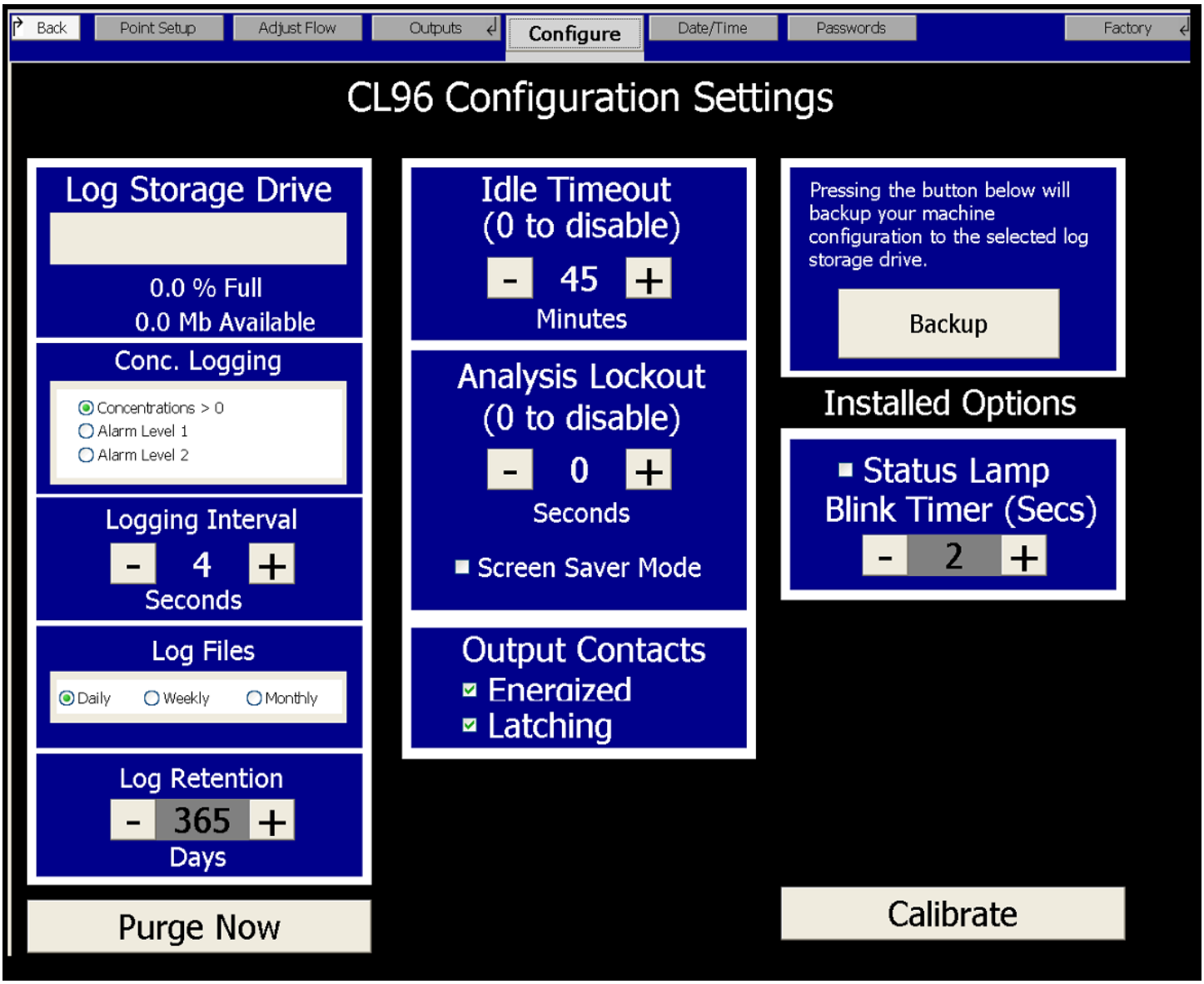


Figure 6.2.d

This section is intended for personnel responsible for the commissioning and maintenance of the CL96. Below are descriptions of each configurable **Setup** menu setting. Improper re-configuration of these settings can adversely affect the operation of the CL96, therefore adjustments should only be made by qualified personnel.

Logging Configuration

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 at the top will contain the available USB storage drives installed. Below the selected drive is the information on the space available for logging.

> **IMPORTANT** : Hard Disk 1 and Hard Disk 2 are reserved for use by the CL96 system. Each USB drive installed in the USB Hub will be sequentially named beginning with Hard Disk 3.

The list for Conc. Logging gives the operator the three available choices for what concentration data should be logged:

1. Concentrations > 0
2. Those above Alarm Level 1
3. Those above Alarm Level 2.

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.

The third component of the Logging Configuration is the logging interval. The value entered here determines how often the concentration is logged to the storage drive. Use the + and – keys to adjust the value from 4 to 120 seconds in 4-second increments.

Log Storage Drive – Indicates the external log storage drive plugged into the machine and displays storage consumption.

Conc. Logging – Use this to adjust the trigger for writing data to the Concentration Log. The default is 'Concentrations > 0'.

Logging Interval – Use this to adjust the frequency at which data is written to the Concentration Log once the trigger setting ('Conc. Logging') has been met. The default is 4 seconds.

Log Files – Use this to adjust how the log files are structured.

Log Retention – Use this to adjust the timeframe for which files are stored before being overwritten.

Purge Now – Erase all log files from the machine.

Idle Timeout

Idle state is when the analyzer is out of analysis not due to a fault. The idle timer begins once the analyzer is exited from analysis. Once the idle timer setting has elapsed, an Idle Timeout critical fault will be issued for that analyzer. The default is 45 minutes and setting to 0 will disable this feature. Use the + and – keys to adjust the value from 0-45 minutes.

Analysis Lockout – Adjusting this setting from anything but 0 – which disables the feature – delays the amount of time 'End Analysis' button is effective after pressing 'Start Analysis' without having to enter the Setup menu password. Once the timer is set and 'Start Analysis' is pressed, upon expiration of the timer, a password will be required to exit the analysis.

Output Contact

Use the 'Energized' checkbox to adjust the normal state for physical relay outputs (24V sink, 24V source, Form A) and digital communication outputs (Modbus, EIP, etc.).

Use the 'Latching' checkbox to adjust how the machine will clear faults and alarms. If this box is checked, and a fault or alarm is issued, a user will physically have to press Fault/Alarm Reset button to clear the output condition. If this box is unchecked, and a fault or alarm is issued, the output condition will return to normal state once the issue returns to normal without having to press Fault/Alarm Reset button.

> **NOTE** : Flow faults are not affected by the lathing faults option. Flow faults will never be latched on the CL96 but will always be recorded in the event log when they occur and are cleared. See below for flow fault filter.

Backup – If an external log storage drive is plugged into the machine, pressing the Backup button will create a backup file for all the CL96 Configuration Settings and point configurations (Locations, Descriptions, Alarm Set Points, etc.) which can be restored using the feature at **Setup (password 1225) > Factory > Restore**.

Installed Options – Status Lamp / Blink Timer – Check the 'Status Lamp' box only if the CL96 Light Tower Option is installed. Adjustment of the 'Blink Timer' will increase or decrease the flashing frequency of the light tower colors displayed with the option.

Calibrate – Pressing this button will display the touch-screen calibration crosshairs identical to what is seen during power-up.

Flow Fault Filter

The flow fault filter setting determines the minimum time to filter a flow fault (either high or low flow). For example: putting this setting to 30 seconds would require a continuous low flow for 30 seconds before a fault is set AND another continuous 30-second period of corrected flow before the flow is cleared.

6.2.e Setup -> Date Time

When the Date/Time button is touched the below is displayed. After adjusting the correct date and time on the screen be sure to touch the 'Set' button to save the settings.

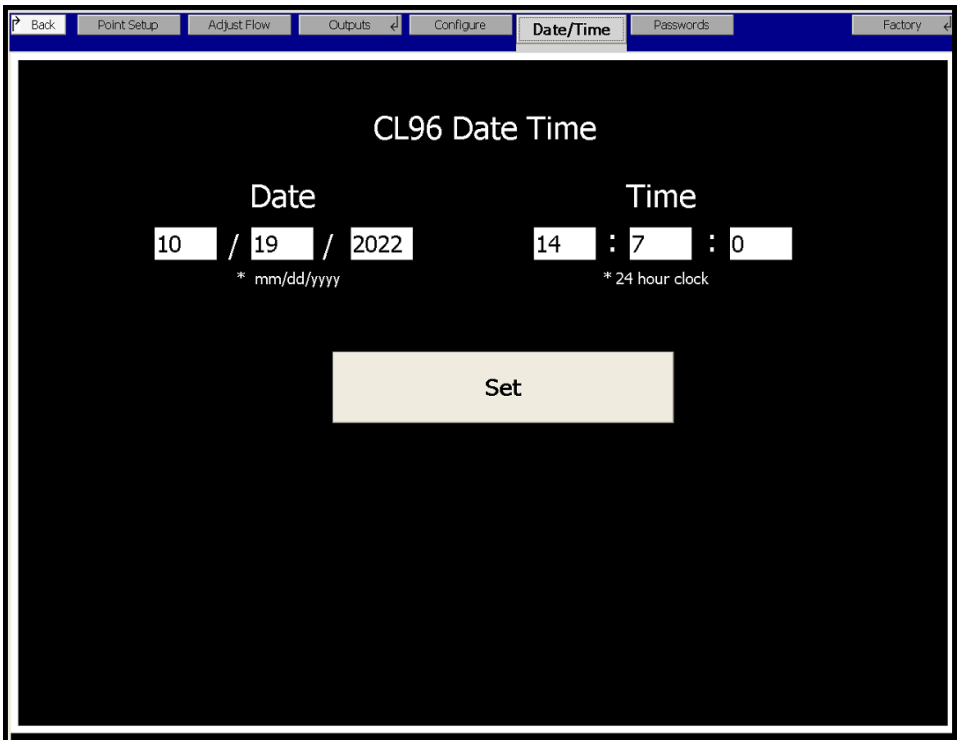
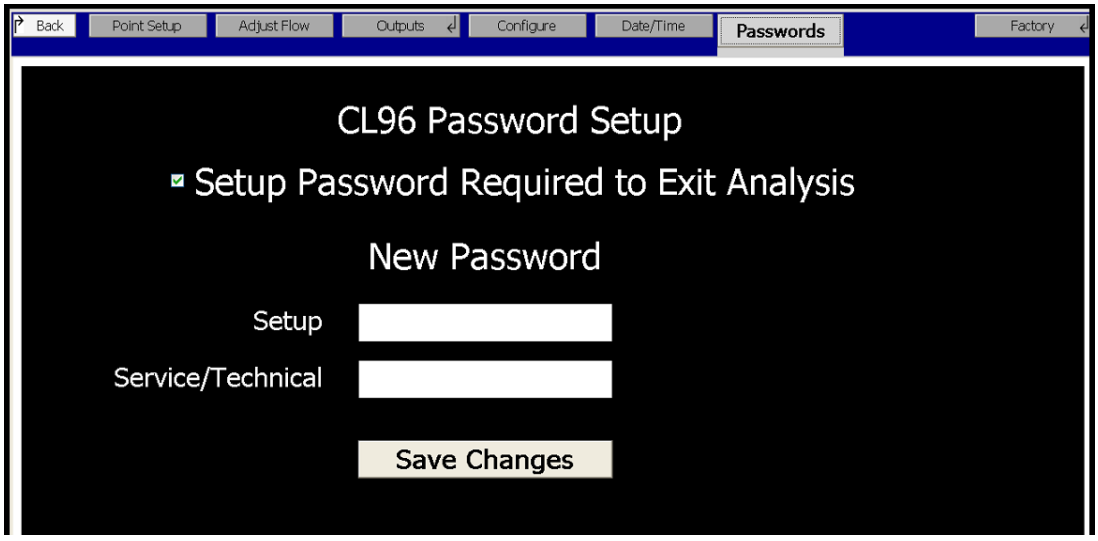


Figure 6.2.e

6.2.f Setup-> Passwords

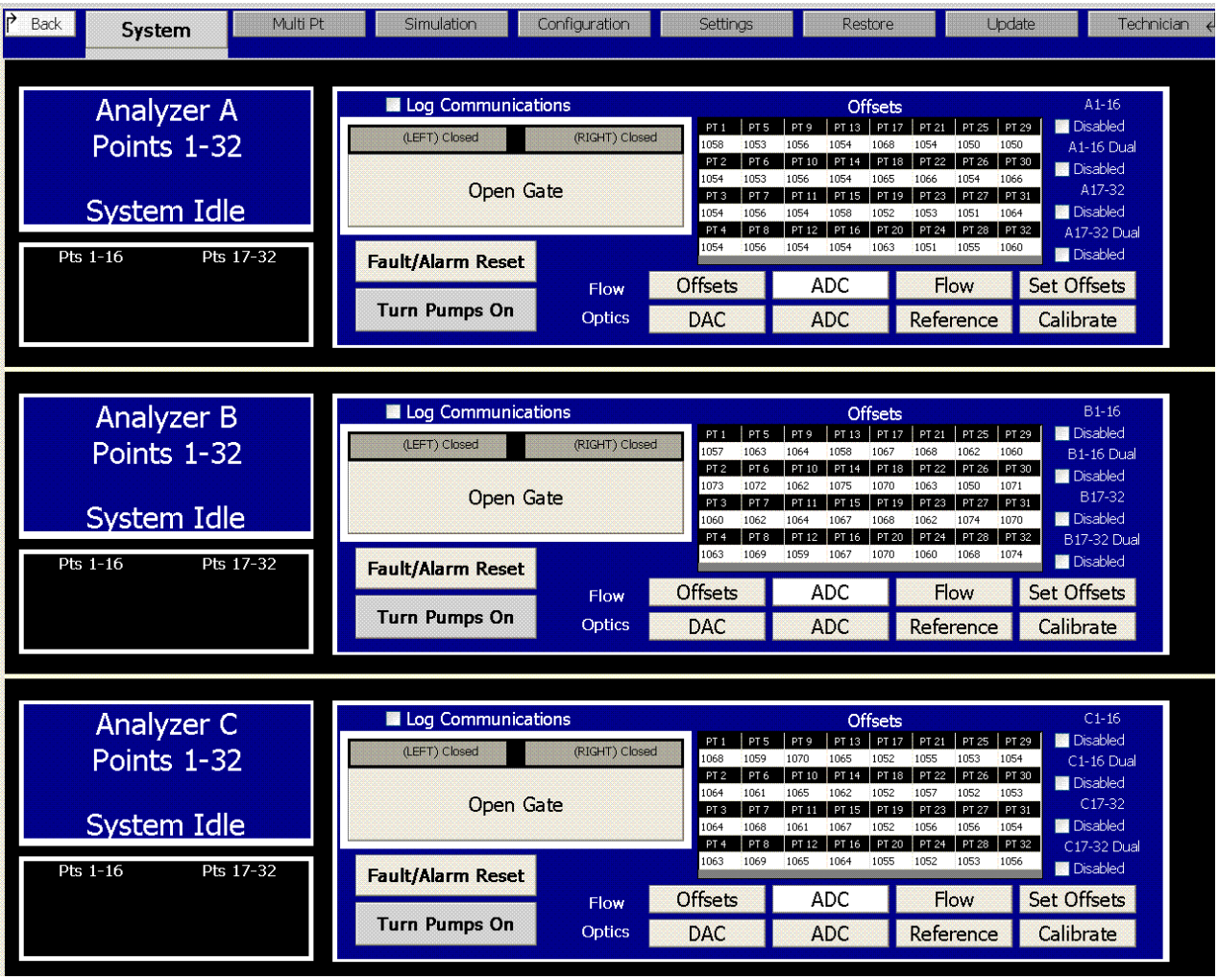
When the Passwords button the password entry screen will be displayed. Note that the Administrator password is required to access the screen.



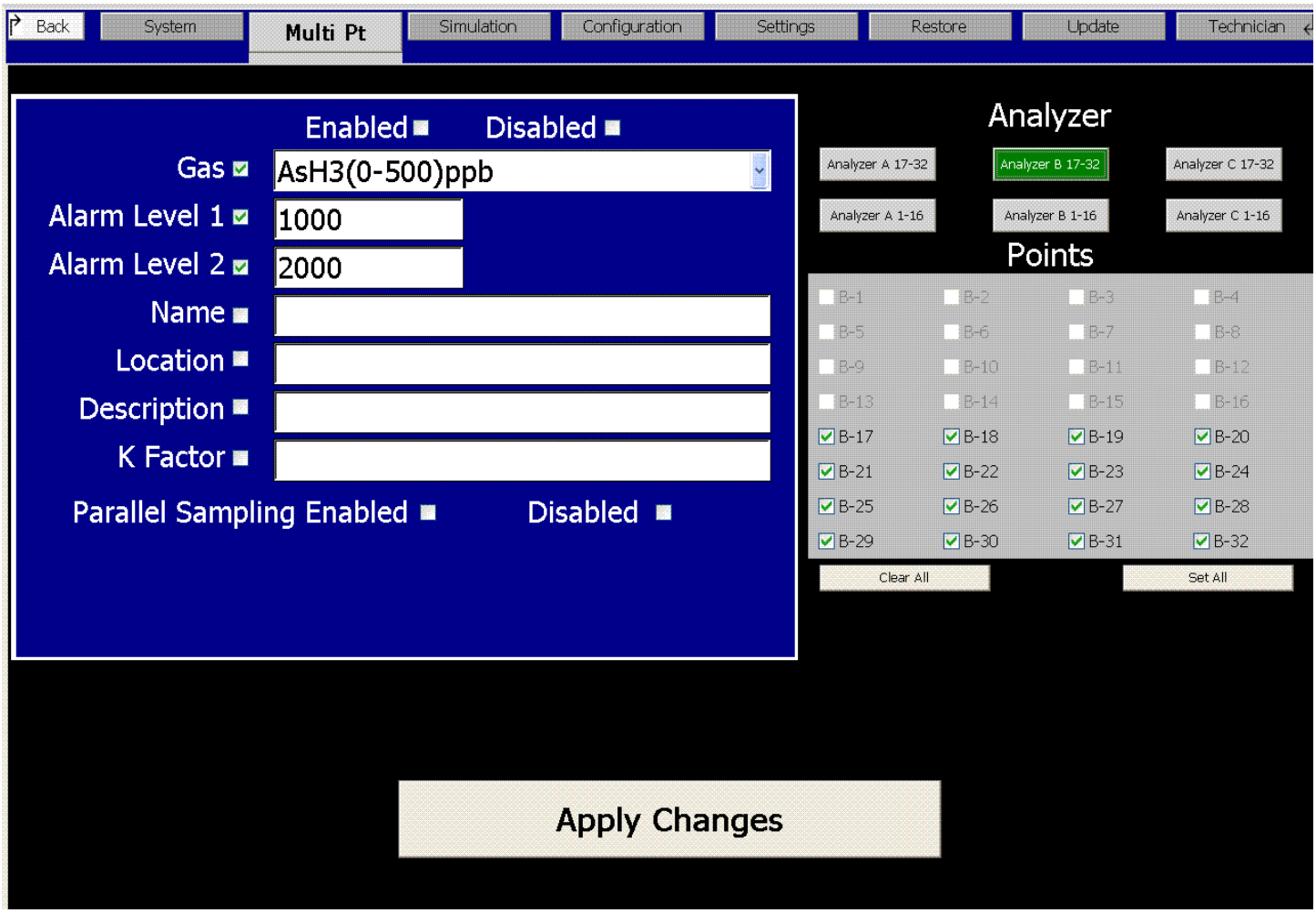
6.3 Factory Setup Sub-Menu

The Factory setup sub-menu contains the configuration screen for the CL96 necessary for normal operation. Access to the Setup sub-menu is password protected.

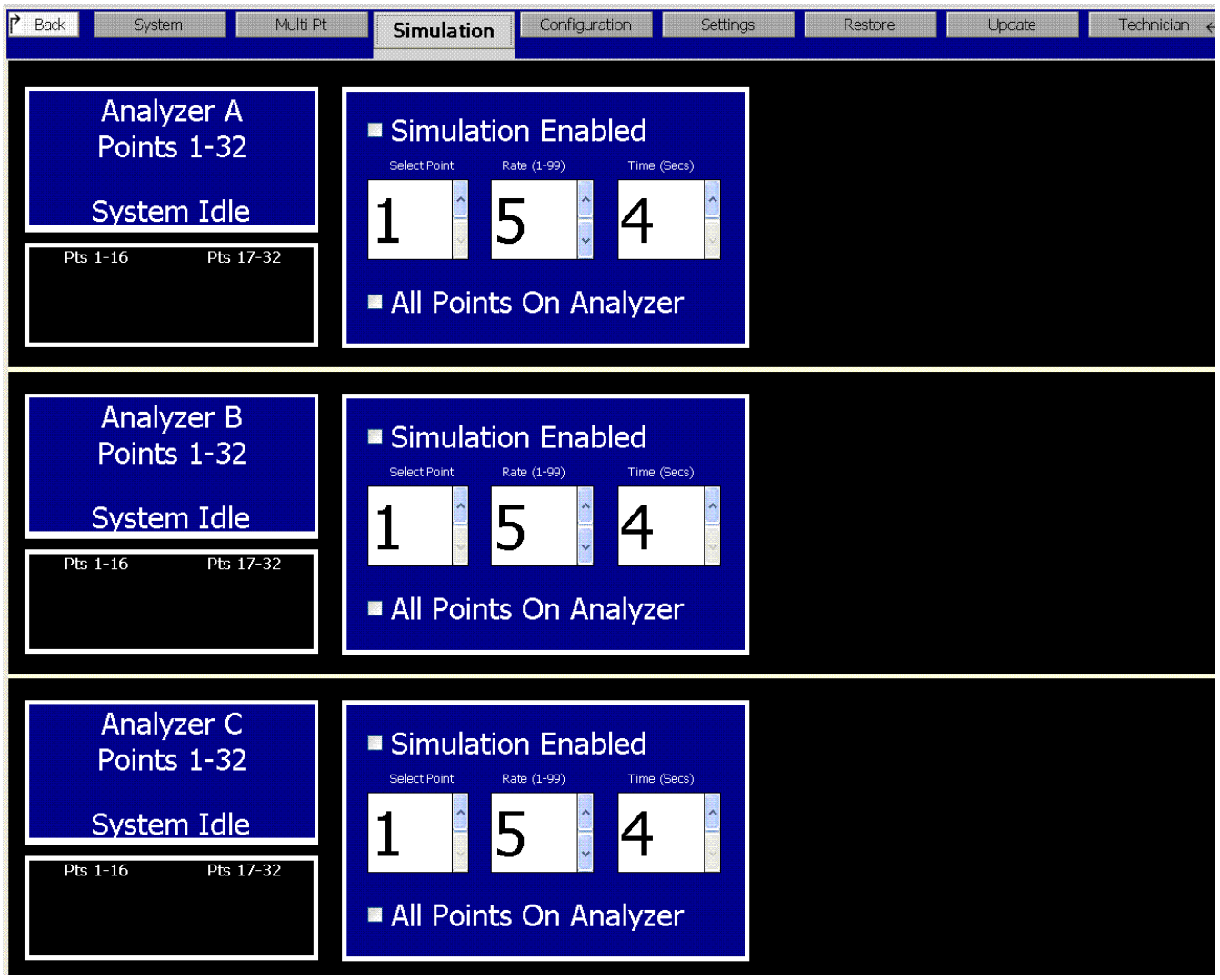
6.3.a Setup -> Factory -> System



6.3.b Setup -> Factory -> Multi Pt



6.3.c Setup -> Factory -> Simulation



6.3.d Setup -> Factory -> Configuration

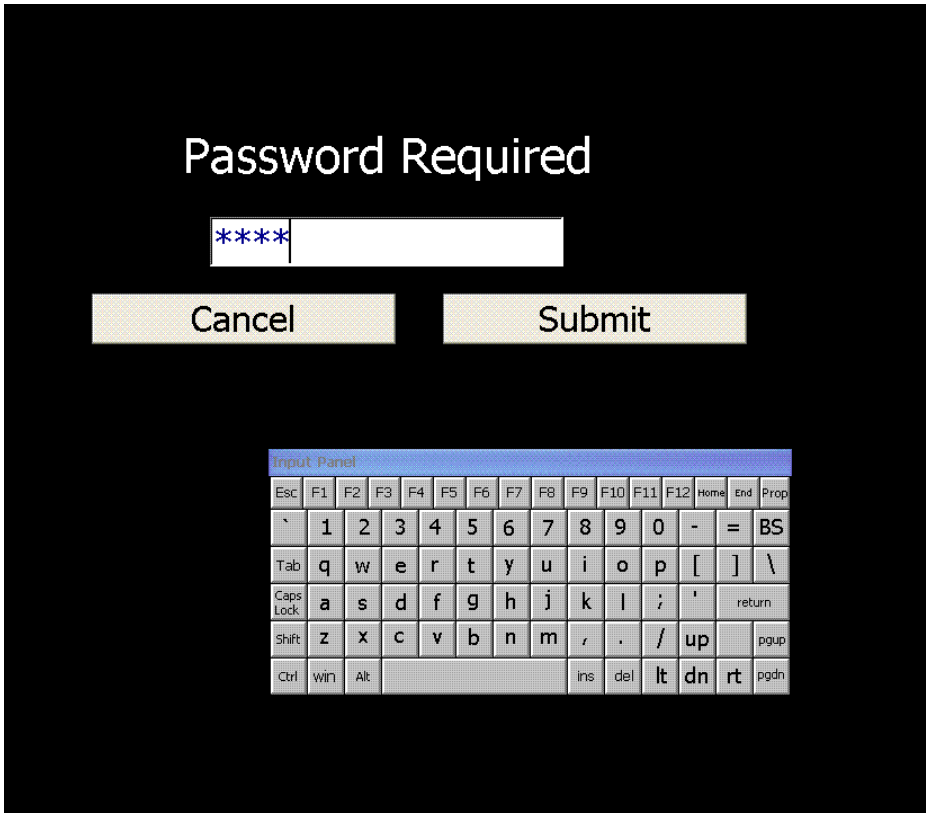
6.3.e Setup -> Factory -> Settings

This section is intended for personnel with commissioning and maintenance responsibilities for the CL96. Daily operators and users of the CL96 do not require comprehension of this knowledge. Below are descriptions of each configurable Factory menu setting. Improper re-configuration of these settings can adversely affect the operation of the CL96, therefore adjustments should only be made by qualified personnel.

To access the Configuration Settings menu for the CL96, complete the following steps:

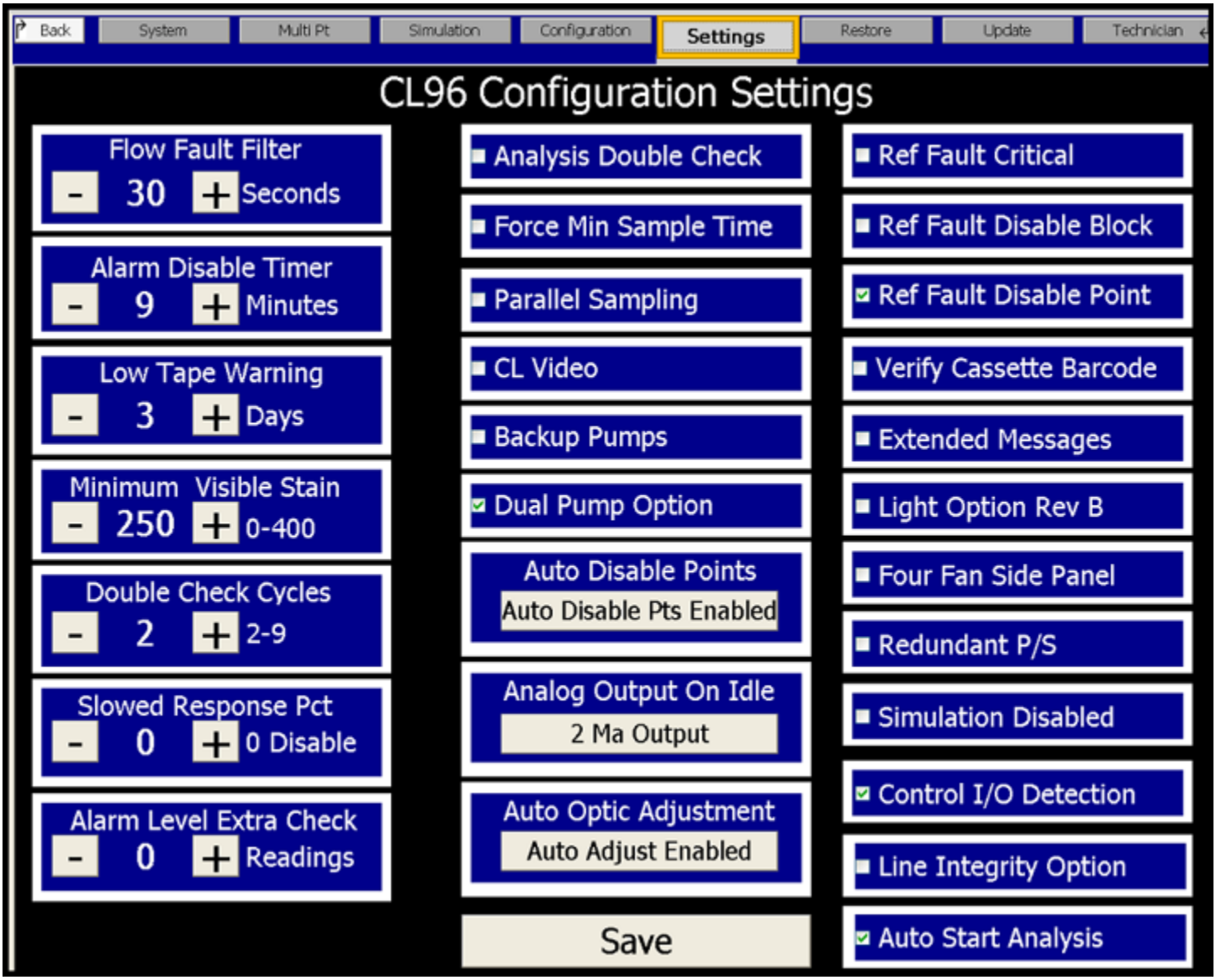
1. **CL96 Main Menu** ➡ **SETUP**

Enter password (default password 1225)



1. **SETUP Menu** ➡ **FACTORY Menu**

2. **From the FACTORY Menu** ➡ **SETTINGS**



6.3.e.1 Factory Menu Definitions

Flow Fault Filter – Determines the minimum time to issue AND clear a flow fault condition (either high or low flow). Individual point flow faults are General Faults.

Alarm Disable Timer – Use this to temporarily disable alarm outputs during an ensuing analysis window. Once the timer expires during that analysis window, alarm outputs will behave normally and can become active.

Low Tape Warning – When the Tape Days Remaining value reaches the value of this setting, a General Fault will be issued. This is adjustable from 1-30 days.

Minimum Visible Stain – See section 6.3.e.2 for further information.

Double Check Cycles – When Analysis Double Check is enabled, this is a setting to increase the number of consecutive checks (from 2) that are required before the CL96 reports gas and issues alarms.

Reference Verification – Range is 0-400. This setting is the minimum reference value that the software will accept when an optic calibration is attempted. If after an optic calibration the reference value for any point is detected below this setting, a Critical Fault is issued. This relevance of this setting only extends to original revision optic blocks (single reference photodiodes).

Slowed Response Percent – 0 is default, disabled and recommended. Input range is 0-100. This causes a gas event to be ratioed per this setting which delays the time for the CL96 to display 100% of what is detected. Example: If 100ppm is the concentration present and this setting is 50, the concentrations displayed will increment 50ppm, 75ppm, 87.5ppm, 93.75ppm, 96.875ppm, etc. until the calculation equals what is present. The intent is to produce smoother trend graphs rather than square shaped trend graphs.

Alarm Level Extra Check – Prior to setting a gas alarm on a point, this setting allows extra reading(s) to be required, verifying the concentration before setting the alarm.

Analysis Double Check – In the event of a gas detection, the software advances the tape and must see the same gas conditions repeat themselves consecutively before reporting gas and issuing alarms. By default, this is enabled.

Force Min Sample Time – The minimum sample time for each active point is equal to the amount of time it takes for that point to detect half the AL1 setpoint value OR the LDL (whichever is greater). The longest time of all the points for that drawer location (A, B or C) is the minimum sample time for that drawer (a CL96 can have a maximum of 3 minimum sample times assuming points are active on all three drawers). Enabling this option prevents the drawer from performing tape advances until this minimum sample time is met. It is recommended to have this enabled so that slower responding concentrations are given the chance to be detected as opposed to being interrupted from gas events on other points local to that drawer.

Parallel Sampling – See section 6.3.e.3 for further information.

CL Video – Enabled if camera option hardware (cameras, cables, DVR, etc.) is installed.

Backup Pumps – Enabled if backup pump hardware (inlet manifold and tubing) is installed. The inlet flowrate with this option is ~1.5 LPM. One pump operates 100% of the time until failure is detected, then switches to a backup pump at the same flow performance, and a General Fault is issued. Failed pumps require re-enabling of that output relay on the Factory Technician screen.

Dual Pump Option – See section 6.3.e.4 for further information.

Auto Disable Points – The default setting will display ‘Auto Disable Pts Disabled’ in the button. When enabled, the button will display ‘Auto Disabled Pts Enabled’. This setting – when enabled – is used in

conjunction with the value setting of Max Optic Value Increase at the Technician>Configure screen. See the tech note DC-TEC-MaxOpticIncrease.A for a detailed explanation.

Analog Output On Idle – Configuration of the analog output signal during machine IDLE state to be either 2mA or 4mA. Default is 2mA.

Auto Optic Adjustment – This enables auto software adjustment of the DAC values to achieve an acceptable background after each tape advance. Default is Enabled.

Ref Fault Critical, Ref Fault Disable Block, Ref Fault Disable Point – See Reference Validation Fault (section 6.3.e.5) for further information.

Verify Cassette Barcode – Enabled if the users want to utilize the barcodes on ChemLogic cassettes during tape loading. This requires a barcode scanner (available for purchase through DOD) and is a method to ensure the correct tape type is installed at any given analyzer location.

Extended Messages – Enable this option to produce extended message detail in the CL96 Event History table. Default is disabled.

Light Option Rev B – Enable this option if the CL96 cabinet is fitted with the side mount light stack option and the light is wired to the CL96 cabinet PLC outputs (NOTE: CL96 cabinet PLC I/O are not intended to be wired to by the customer; customers are to use the available for purchase CL96 output options if desired).

Four Fan Side Panel – Enabled if CL96 cabinet is fitted with pyrolyzer hardware in both analyzer B and C locations. CL96 enclosures with just pyrolyzer hardware in analyzer C do not require this enabled because there is only one fan on the side panel. When this is properly enabled, side panel fan failures can cause analyzers to enter Critical Fault to prevent pyrolyzer hardware from heating up the cabinet that is not venting the hot air.

Redundant P/S – Enable this option when the CL96 cabinet is fitted with the Redundant Power Supply Option (P/N 2-800-014).

Simulation Disabled – When this is enabled and a power cycle is performed, the option to put the CL96 into simulation mode is eliminated/disappears. If this becomes the case, and simulation mode is desired, a user must disable this and perform a power cycle to make visible the option to enter simulation mode again.

Control I/O Detection – For machines with version 23.0329 or later, this setting improves the detection of faults in the internal Beckhoff hardware used to operate the CL96. When properly configured, this setting will cause a critical fault when the machine detects possible failure of hardware that is critical to operating the machine. NOTE: Before enabling this feature, contact DOD Service to verify the machine has been properly configured with Beckhoff System tools to allow the feature to operate correctly. If this feature is enabled and the machine is not properly configured, it will continually issue critical faults and will not operate in analysis mode. In this case, the feature must be disabled until trained service personnel can configure the machine properly.

Line Integrity Option – This setting requires factory installation of the CL96 Line Integrity option. Please refer to Appendix J for further operation details on the Line Integrity Option.

Auto Start Analysis – When the machine is powered on, it will automatically enter Analysis (after a set amount of time) unless there is operator intervention. The intent is to ensure the machine returns to Analysis as soon as possible if there is a disturbance in the A/C power to the machine. DOD recommends this setting ALWAYS be checked. If unchecked, the machine will go into Setup mode when powered on.

Save – Press Save button for any adjustments to take effect. The settings on this screen are, by default, backed up and restored to the user's provided removable media.

6.3.e.2 Minimum Visible Stain

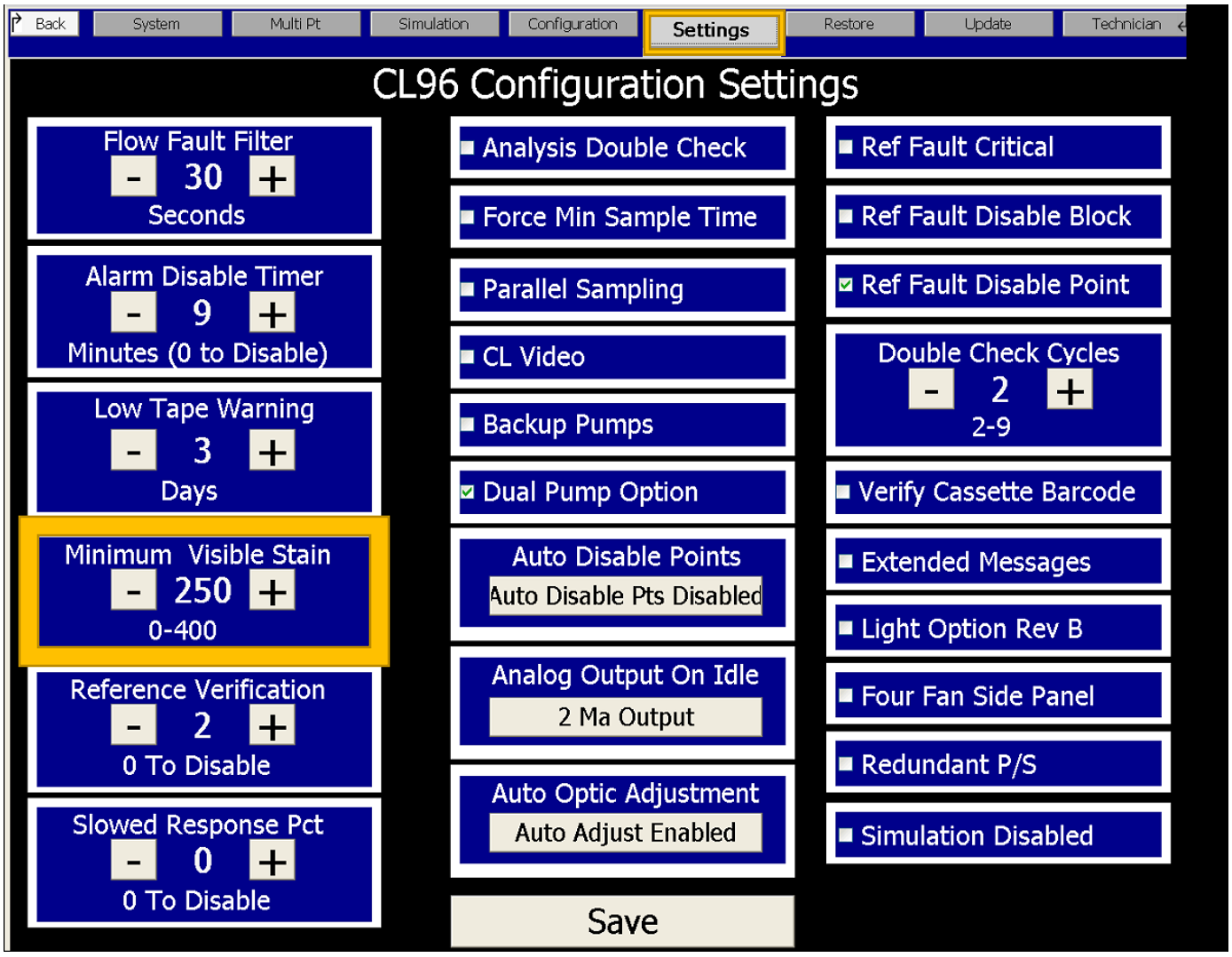
The Minimum Visible Stain (MVS) feature was implemented as an enhancement (in 2017) as part of the software version 17.0130 update. MVS allows color change or the stain to continue to accumulate during the same window, or on the same spot of the ChemLogic cassette, until the minimum count threshold is achieved.

The default setting for MVS is 250 counts. MVS is user adjustable from 0 to 400 counts. 0 counts would disable the MVS feature. When enabled, the MVS software will not trigger a tape advance during a gas event until the set MVS value is reached. MVS set at 250 counts and above should result in the stain being visible to the human eye during a gas event.

The typical counts required to see a stain with the human eye is approximately 200 counts. This varies slightly by gas and ChemLogic cassette.

The MVS software feature can be accessed and modified by following the below path.

From the FACTORY Menu ➡ **SETTINGS**



MVS was implemented to allow a stain or color change continue to accumulate to pre-set count changes. The purpose is to allow low level concentrations to accumulate on the same spot making the stain visible to the human eye. Previous software versions advanced tape when set count changes were reached. During low level detection this could result in tape advances and low-level readings without visible stains. MVS reduces the possibility of low-level detection without visible stains.

6.3.e.3 Parallel Sampling

The CL96 Parallel Sampling option allows a sample line to be shared between 2 or 3 analyzers, allowing multiple gases to be analyzed from a single sample line. The main sample line requires ¼”OD x 3/16” ID FEP Teflon tubing connected by ¼” T and elbow fittings (Teflon, PVDF or Polypropylene only) to the other analyzers.

Each analyzer that is used will increase the flow on the sample line resulting in reduced transfer times while the individual flow to each point on the manifolds will remain the same as the individual points not using the parallel sampling. You must enable parallel sampling in the CL96 Configuration settings and check parallel sampling for each point in the individual point set up screen.

See Figure A for an example of Parallel Sampling set up.

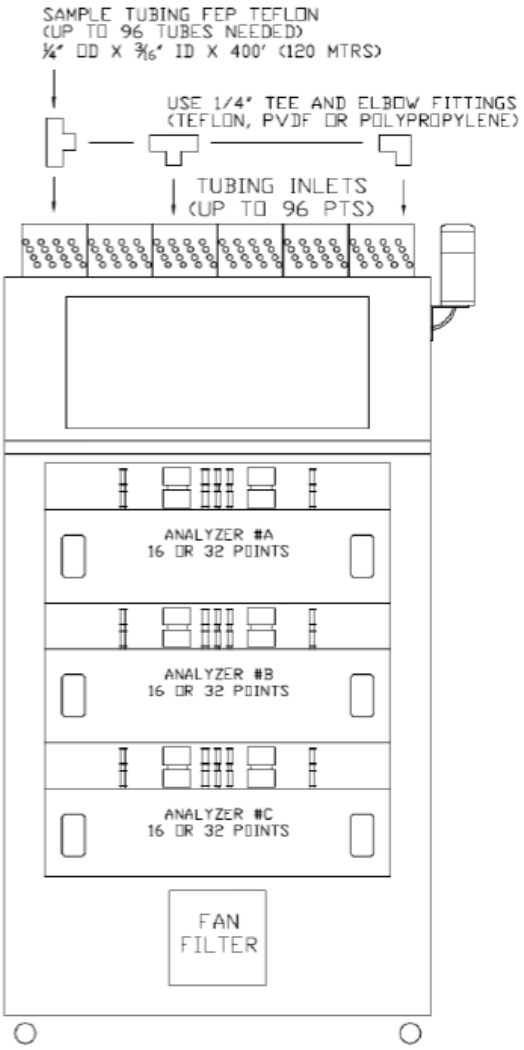


Figure A

6.3.e.3.1 Parallel Sampling Transport Times

The table below shows the time required for a sample to travel from the sampling location or the end of the sample line to the CL96. The transport times are based on various tubing lengths and sample lines.

Outer Diameter (OD)		0.25 in. (OD)							
Inner Diameter (ID)		0.15 in. (ID)				0.1875 in. (ID)			
Length in Feet		100	200	300	400	100	200	300	400
Length in Meters		30	61	91	122	30	61	91	122
Number of Analyzer's per Sample Line	**1**	16 sec.	32 sec.	48 sec.	64 sec.	24 sec.	48 sec.	72 sec.	96 sec.
	2	9 sec.	18 sec.	XXXX	XXXX	13 sec.	26 sec.	39 sec.	XXXX
	3	8 sec.	XXXX	XXXX	XXXX	11 sec.	22 sec.	XXXX	XXXX
	Transport Time in Seconds								
	Flow Rate: 1PT - 1.3LPM, 2PT's - 2.4LPM, 3PT's 3.0LPM								

6.3.e.4 Dual Pump Option

The CL96 Continuous Gas Monitor has an optional dual pump feature. This option includes an additional pump for each 16-point analyzer, resulting in up to 80% reduced transport time. This dual pump feature also acts as a backup pump in the event of a pump failure. For each 16-point set, two pumps are installed (see Figure 1). Check valves are connecting the two pumps in each 16-point analyzer (see Figure 2). In the event, one pump fails the other pump will take over for the failed pump. Flow rates will drop from the data provided in Table 2 to the data provided in Table 1, but all points will remain in analysis. A general fault will be issued stating that the pump has failed.

Below includes the data from the current standard CL96 transport times and flow rates (1) and the dual pump option transport times and flow rates (2).

1. **Single pump transport times and flow rates – STANDARD CL96 CONFIGURATION**

Outer Diameter (OD)		0.25 in. (OD)			
Inner Diameter (ID)		0.1875 in. (ID)			
Length in Feet		100	200	300	400
Length in Meters		30	61	91	122
Number of Analyzer's per Sample Line	**1**	24 sec.	48 sec.	72 sec.	96 sec.
	2	13 sec.	26 sec.	39 sec.	XXXX
	3	11 sec.	22 sec.	XXXX	XXXX
	Transport Time in Seconds - SINGLE PUMP				
	Flow Rate: 1PT - 1.4LPM, 2PT's - 2.5LPM, 3PT's 3.0LPM				

Table 1

2. **Dual pump transport times and flow rates – OPTIONAL CL96 CONFIGURATION**

Outer Diameter (OD)		.25 in (OD)			
Inner Diameter (ID)		0.1875 in. (ID)			
Length in Feet		100	200	300	400
Length in Meters		30	61	91	122
Number of Analyzer's per Sample Line	**1**	11 sec.	22 sec.	32 sec.	43 sec.
	2	6 sec.	12 sec.	18 sec.	24 sec
	3	5 sec.	10 sec.	15 sec	XXXX
	Transport Time in Seconds				
	Flow Rate: 1PT - 2.8LPM, 2PT's - 5.3LPM, 3PT's 7.0LPM				

Table 2

a. **Dual Pump Option –** 96-point system (6, 16 points analyzers) would include 12 pumps.

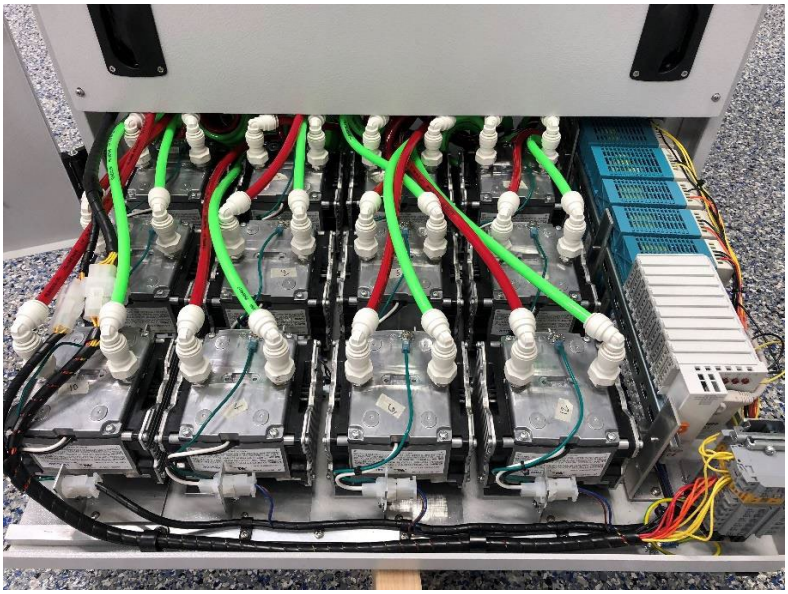


Figure 1

b. **Dual Pump Option** – Back up feature included with dual pump option. Check valves connecting the two pumps and automatically close the valve when one of the pumps fails.

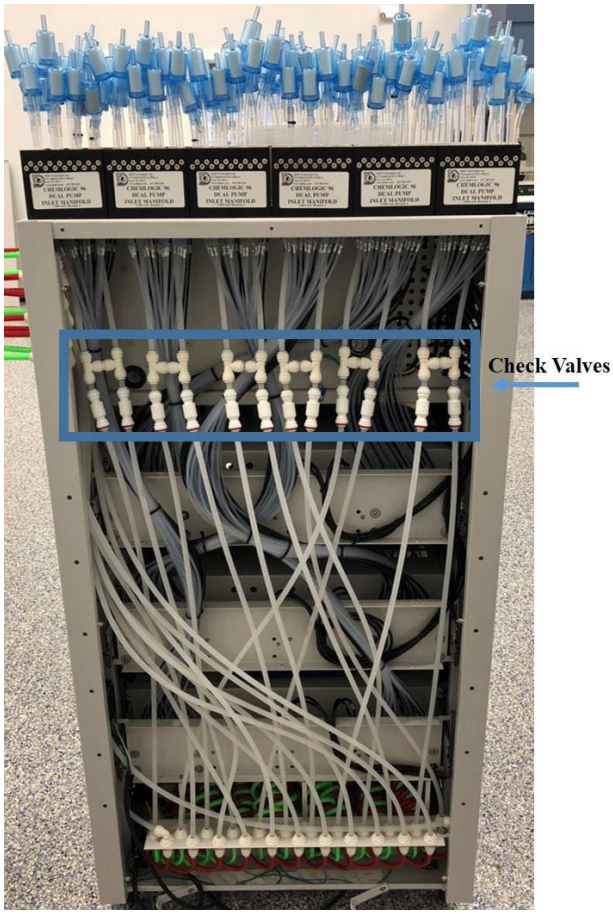


Figure 2

The Dual Pump option is only available when initially ordering the CL96. It is not available as a field upgrade. To ensure your system is properly equipped with this option, reference the following DOD part numbers:

2-800-071
Option – CL96 Dual Pump 110VAC (one required for every 16-point analyzer)

Input AC power specs (no redundant power supply option installed; no Pyro option installed):

- Current drawn states (Hiblow pump spec typically 0.6A). The data listed for the 110V system is actual measurements from a system.
    - Idle (no pumps running) 0.72 A
    - 2 pumps running 1.14 A (AZ A points 1-16)
    - 4 pumps running 2.0 A (AZ A points 1-32)
    - 8 pumps running 3.35 A (AZ A-B points 1-64)
    - 12 pumps running 4.75 A (AZ A-C points 1-96)

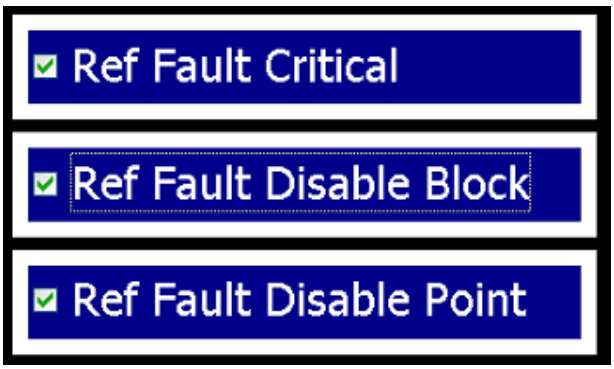
2-800-072
Option – CL96 Dual Pump 230VAC (one required for every 16-point analyzer)

Input AC power specs (no redundant power supply option installed; no Pyro option installed):

- 50Hz/60Hz (Hiblow pump spec 0.13A @ 50Hz/ 0.15A @ 60Hz). The data listed for the 230V 50Hz/60Hz system is estimated based on the pump specs.
    - Idle (no pumps running) 0.36 A @ 50Hz/ 0.42A @ 60Hz
    - 2 pumps running 0.62 A @ 50Hz/ 0.72A @ 60Hz (AZ A pnts 1-16)
    - 4 pumps running 0.88 A @ 50Hz/ 1.02A @ 60Hz (AZ A pnts 1-32)
    - 8 pumps running 1.40 A @ 50Hz/ 1.62A @ 60Hz (AZ A-B pnts 1-64)
    - 12 pumps running 1.92 A @ 50Hz/ 2.22A @ 60Hz (AZ A-C pnts 1-96)

6.3.e.5 Reference Validation Fault

CL96 software version 16.0620 (2016), implemented three features to take action when a reference validation message occurs. These features can be enabled or disabled in the Factory→Settings screen. To enable, check the desired box and save the configuration. To disable uncheck the box and save the configuration.



The CL96 advanced reference diode allows the optic system to verify the proper intensity of the LED's continuously (See Technical Note - ChemLogic Optic Block Diagram). In the rare event a fluctuation of an LED occurs, the reference diode catches the fluctuation and previously would report an informational message being logged for the specific analyzer and point combination in the event log with no faults occurring. Software version 16.0620 provides three optional actions or faults when a reference optic validation occurs.

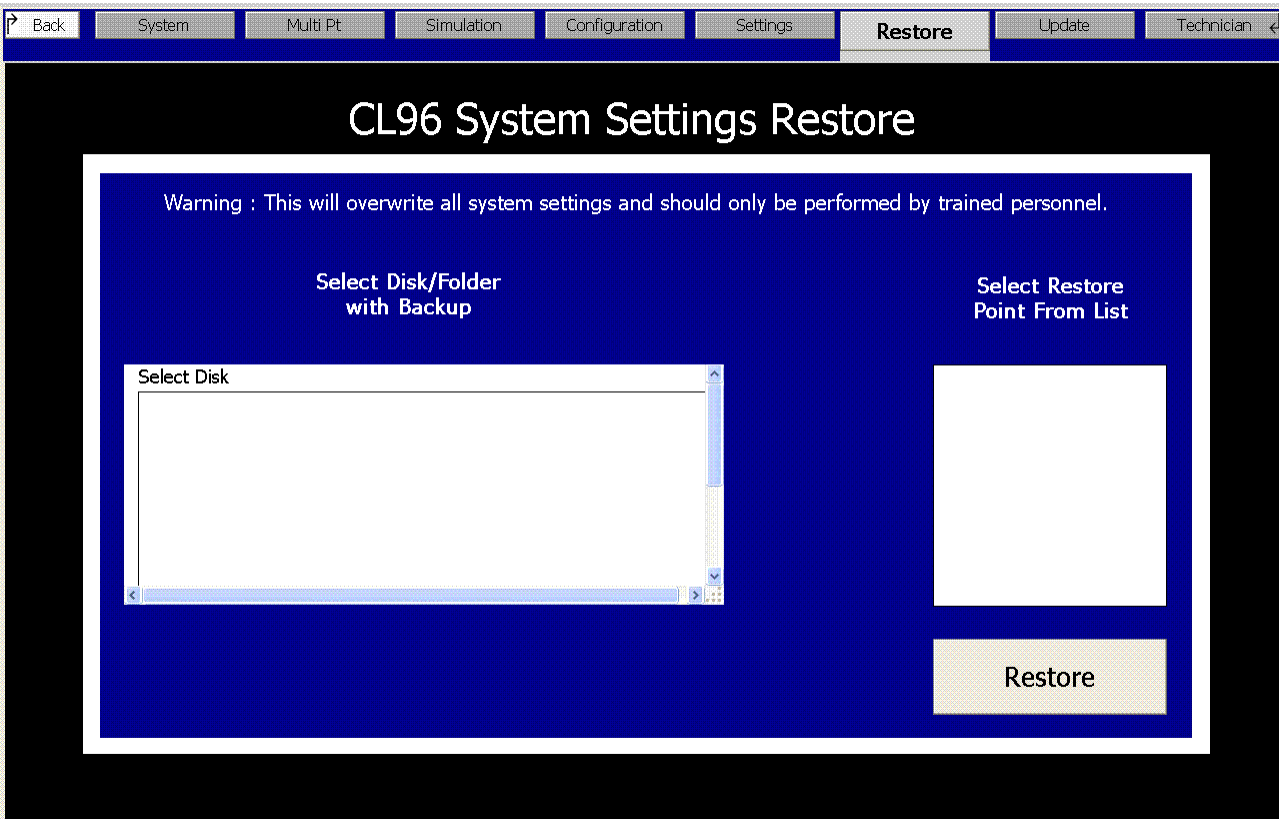
1. **REFERENCE FAULT CRITICAL**
   a. When a reference validation occurs, a Critical Fault is triggered and analysis mode is exited for the specific analyzer (16 points).
   NOTE: If enabled, this will disable upon power cycle and will require re-enabling.

2. **REF FAULT DISABLE BLOCK**
   a. When the reference validation occurs, a General Fault is triggered and all points on the affected optic block are disabled (4 points) but the remaining unaffected points stay in analysis.
   NOTE: If enabled, this will remain enabled through power cycles.

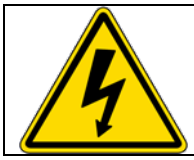
3. **REF FAULT DISABLE POINT**
   a. When the reference validation occurs, a General Fault is triggered and the single affected point is disabled (1 point) but the remaining unaffected points stay in analysis. This is the default selection.
   NOTE: If enabled, this will remain enabled through power cycles.

IMPORTANT : If only number 1 (REFERENCE FAULT CRITICAL) is enabled, it will remain enabled until the CL96 is power cycled. After a power cycle the fault will need to be re-enabled. Number 2 and 3 below will remain enabled during a power cycle.

6.3.f Setup -> Factory -> Restore



Chapter 7 – Maintenance and Disposal

	DANGER: Disconnect power before servicing

7.1 Returning to a Safe State (Post-Service)

Before returning the CL96 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.

7.2 Maintenance Door Access

The maintenance door is used to access the ChemLogic cassette. Two keyed latches secure the door. Turn both latches with the keys to open the maintenance door and be sure to secure both latches when closing the door.

IMPORTANT : The maintenance door should remain closed and latched except when servicing the ChemLogic® cassette.

7.3 Control Panel Door

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

To open the control panel door:

- Insert the key provided into the slot and rotate counterclockwise to unlock the door.
- Turn the latch counterclockwise to unlatch the door.
- Life the control panel access door until it locks (listen for click)
- The door should remain in the up position until the lock is released.

When service is completed be sure to close the service door and secure the keyed latch to the closed position. Verify that the service door cannot be pulled open – secure the door using the key to lock the door.

IMPORTANT : The control panel access door should remain closed and latched except when servicing the system.

7.4 ChemLogic® Cassette

The ChemLogic cassette paper tape has an expiration date printed on the label. Expired tape should be disposed of and replaced with new tape to assure proper gas concentration readings. Each DOD ChemLogic® tape cartridge for the CL96 will last for 120 days under normal usage. See Appendix A for ordering information.

7.5 ChemLogic Cassette Installation

1. From the main menu touch the 'Load Tape' button (section xxx)
2. Open the maintenance door. (section 7.1)
3. On the screen touch the 'OPEN/CLOSE GATE' button to open up the gate
4. (For 32-point systems only) Remove the upper take-up real by gently pulling.
5. Remove the lower take-up reel by gently pulling and dispose properly.
6. (For 32-point systems only) Remove the upper empty tape reel.
7. Remove the lower empty tape reel and install as the new lower take-up reel.
8. (for 32-point systems only) Install the empty reel as the new upper take up reel.
9. Secure the new lower ChemLogic cassette tape on the bottom take up reel. The tape should be around the bottom in a clockwise direction as shown.
10. Feed the tape as shown with the arrows in figure 7.1.
    a. From the lower tape reel
    b. Around the bottom tape guide
    c. Through the opening between the right-side optic blocks
    d. Between the middle tape guides
    e. Through the opening between the left side optic blocks
    f. Between the rubber roller and the capstan
    g. Around the tape guide on to the take-up reel
    h. Fold the end of the tape and insert into the slot in the empty tape reel. Be sure the tape is wound clockwise around the take up reel.
    i. Turn the take-up at least 2 full turns to secure the tape.
    j. (for 32-point systems only) Repeat these steps for the upper tape.
11. On the screen touch the 'OPEN/CLOSE GATE' button to close the gate
12. On the screen touch the 'Reset Counter' button. (See section 6.2.c)
13. On the screen touch the 'Verify Optics' button to calibrate the optics systems.

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

7.6 End-Of-Line Particular 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.

Table 7.1

7.7 Flow Adjustment

Each channel should be adjusted whenever a new ChemLogic® tape or particulate filter is installed. See section 6.2.b.

7.8 USB Storage Drive Replacement

It is highly recommended to keep a USB flash drive inserted in the unit at all times. A general fault is issued anytime a USB drive is not inserted or full. To insert or replace a USB drive follow this steps.

1. Exit analysis
2. Go to the USB Drive removal screen on the main menu under History.
3. Touch the 'remove' button to halt writing to the disk.
4. Follow the procedures from section 7.2 to open the control panel access door.
5. Remove the USB drive from the system and replace with new drive.
6. Wait 5 seconds for the system to initialize.
7. Close and latch the control panel access door.

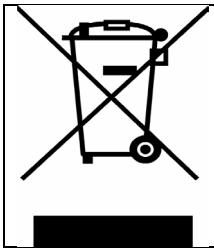
Appendix F details the data stored on the CF card and how to access it on a personal computer.

7.6 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.

7.7 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 8 – 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 – Parts & Accessories

Filters & Tubing

PART NUMBER	PART DESCRIPTION
780248	Particulate Filter for Non-Corrosives (Phosgene & Hydrides)
2-800-013	Particulate Filter for Corrosive Gases (Mineral Acids)
2-500-052	Pyrolyzer Freon Filter
2-100-503	Filter for H2S Scrubber
60009	Filter Housing for Teflon Membranes (Mineral Acids)
2-500-502	47mm Teflon Membranes (Pack of 10) - use with P/N 60009
60010	47mm Teflon Membranes (Pack of 100) - use with P/N 60009
2-800-007	Duct Mounting Kit for 1/4" Sample Line Tubing
2-800-008	KIT Duct Mounting Kit for 3/8" Tubing
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

Options and Accessories

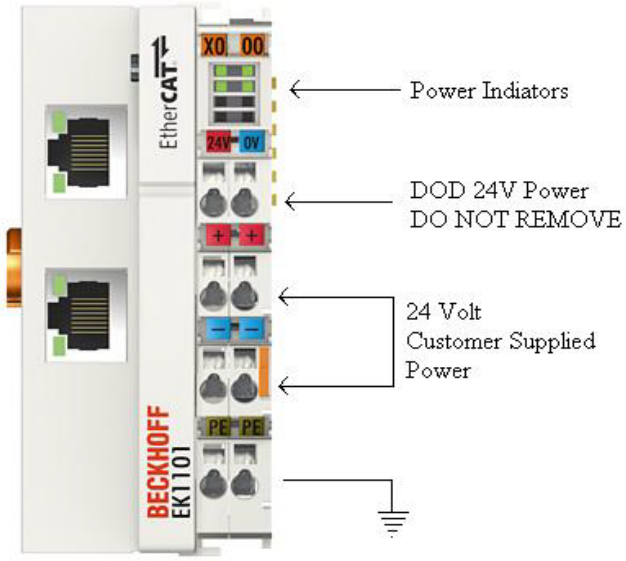
PART NUMBER	PART DESCRIPTION
2-200-058	USB Flash Drive
2-800-055	CL96 Cassette Verification Scanner
2-800-053	CL96 Circuit Breaker with Ground Fault Protection
2-800-073	CL96 Exhaust Manifold (12 Pumps)
2-800-077	CL96 Sample Line Integrity Option
2-800-410	4-Color LED Light with Horn
2-800-071	CL96 Dual Pump 110VAC (One Required for every 16 points)
2-800-072	CL96 Dual Pump 230VAC (One Required for every 16 points)
2-800-006	CL96 OPC Server Software Machine License (1 required per machine)
2-800-051	CL96 Expansion Analyzer Camera (for 1 analyzer)
2-800-050	CL96 Analyzer Camera (for 1 analyzer)
2-800-054	CL96 Backup Pump Configuration - Pump Sold Separately

Appendix B – I/O Connection Detail

	DANGER: Disconnect power before servicing

B.1 EK1101 Coupler

Each analyzer tray (16 or 32 point) has its own output module section, and each section is coupled together with an EK1101 module. Two different power sources are used for the module. Power to operate the module itself is supplied by the CL96 power and prewired by DOD Technologies. – do NOT remove. Power for all outputs must be supplied by the customer on pins 6 and 7.



B.2 Standard Output Module (24 V Sinking)

			Pts 1-16					Pts 17-32 (Optional)				
	Bus Connector	CL96 General	Analyzer 1 General	Points 1-4	Points 5-8	Points 9-12	Points 13-16	Analyzer 2 General	Points 17-20	Points 21-24	Points 25-28	Points 29-32
Part #	EK1101	EL2088	EL2088	EL2088	EL2088	EL2088	EL2088	EL2088	EL2088	EL2088	EL2088	EL2088
See Note #		1	2	3	3	3	3	2	3	3	3	3

Note 1 - CL 96 General Outputs

Output #	Description
1	Critical
2	General
3	Alarm 1
4	Alarm 2
5	Analysis Active
6	Watchdog
7	Power On
8	

Note 2 - Analyzer General

Output #	Description
1	Critical
2	General
3	Alarm 1
4	Alarm 2
5	Analysis Active
6	Watchdog
7	Power On
8	

Note 3 - Point outputs **

Output #	Description
1	Pt X Alarm 1
2	Pt X Alarm 2
3	Pt (X+1) Alarm 1
4	Pt (X+1) Alarm 2
5	Pt (X+2) Alarm 1
6	Pt (X+2) Alarm 2
7	Pt (X+3) Alarm 1
8	Pt (X+3) Alarm 2

** For each module X = the lowest Point #

Figure B.2.1

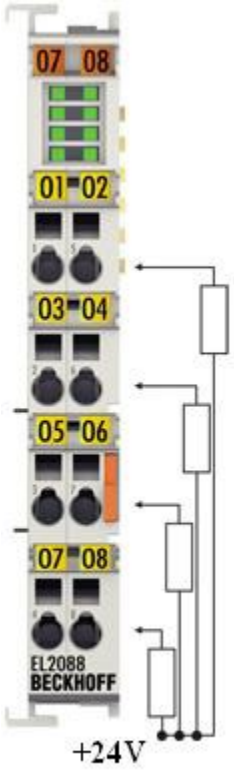


Figure B.2.2

B.3 Optional Output Relays

				Pts 1-16												Pts 17-32 (Optional)								
	Bus Connector	CL96 General(A)	CL96 General(B)	Analyzer 1 General(A)	Analyzer 1 General(B)	Points 1-2	Points 3-4	Points 5-6	Points 7-8	Points 9-10	Points11-12	Points 13-14	Points 15-16	Analyzer 2 General(A)	Analyzer 2 General(B)	Points 17-18	Point 19-20	Points 21-22	Points 23-24	Points 25-26	Points 27-28	Points 29-30	Points 31-32
Part #	EK1101	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624	EL2624
See Note #		1	2	3	4	5	5	5	5	5	5	5	5	3	4	5	5	5	5	5	5	5	5

Note 1 - CL 96 General Outputs(A)

Relay #	Description
1	Critical Fault
2	General Fault
3	Alarm Level 1
4	Alarm Level 2

Note 3 - Analyzer X General(A)

Relay #	Description
1	Critical Fault
2	General Fault
3	Alarm Level 1
4	Alarm Level 2

Note 5 - Point Alarms

Relay #	Description
1	Pt X Alarm 1
2	Pt X Alarm 2
3	Pt (X+1) Alarm 1
4	Pt (X+1) Alarm 2

Note 2 - CL 96 General Outputs(B)

Relay #	Description
1	Analysis Active
2	Watchdog
3	Power On
4	

Note 4 - Analyzer X General(B)

Relay #	Description
1	Analysis Active
2	Watchdog
3	Power On
4	

Figure B.3.1

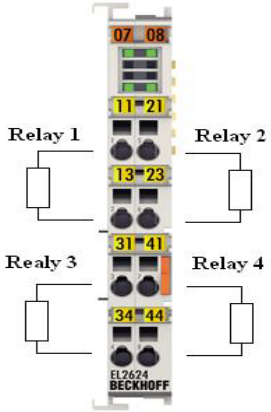


Figure B.3.2

B.4 Optional 4-20 Outputs

			Pts 1-16				Pts 17-32			
	Bus Connector	Kbus Conv	Points 1-4	Points 5-8	Points 9-12	Points 13-16	Points 17-20	Points 21-24	Points 25-28	Points 29-32
Part #	EK1101	**BK1250***	KL4414	KL4414	KL4414	KL4414	KL4414	KL4414	KL4414	KL4414
		* Required 24V power supply connection on BK1250								

Figure B.4.1

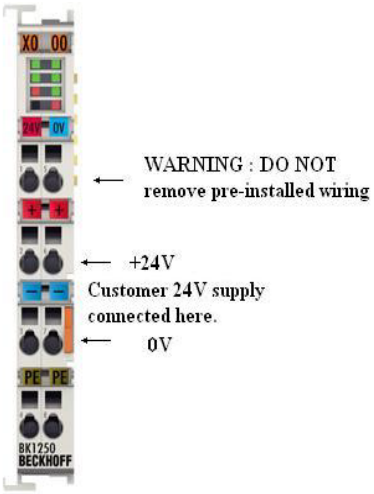


Figure B.4.2

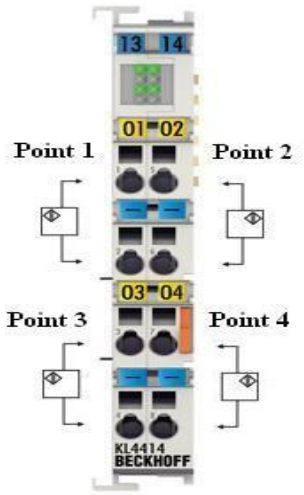


Figure B.4.3

Repeat for each module – Points 5-8, 9-12, etc.

The following table summarizes the analog output values with consideration of the Idle Output settings for various CL96 statuses:

CL96 - Analog Output w/ Consideration to Idle Setting		
Status	**Idle Setting @ 2mA**	**Idle Setting @ 4mA**
Idle	2mA	4mA
Analysis - No Gas (point specific)	4mA	4mA
Analysis - Full Scale (point specific)	20mA	20mA
Low/High Flow Condition (point specific)	2mA	2mA
Disabled Point	2mA	2mA
Critical Fault	2mA (all points - group of 16)	2mA (all points - group of 16)

Table B.4

Appendix C – System Specifications

The CL96 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.

CL96 System Specification

Height: 60.3” (+10” for tubing)
Width: 31” (+9 for wiring)
Depth: 28.5 “
Weight: 450pbs. (fully loaded), (Max shipping weight 600lbs)

A/C Power:
(North American Models)
110V ~ 60 Hz ~ 5 A

(European Models with Option Part #2-800-002)
230V~ 50/60 Hz ~ 2.5A

IP Rating: IP2x
IK Code: IK08 (European Models with Option Part #2-800-002)

System Power Input Fuse			
Power Input	No Pyro Option	with Group C Pyro Option	with Group B & C Pyro Option
110VAC, 60Hz	6A	10A	12A
230VAC, 50/60Hz	6A	10A	10A

Appendix D – System Event Message

COLOR CODING	
RED	Gas Alarm
ORANGE	Service Fault (critical)
YELLOW	Maintenance (non-critical)
BLUE	Information Message
GREEN	Status (during analysis)

Level	Text	Anlayzer	Point	Description
Alarm	"Alarm Level 1 "	Yes	Yes	Gas alarm level 1 on specificed analyzer/point
Alarm	"Alarm Level 2 "	Yes	Yes	Gas alarm level 2 on specificed analyzer/point
CriticalFault	"Cannot get background values "	Yes		Communicatin failure with 1 or more optic blocks
CriticalFault	"High Background "	Yes	Yes	Tape empty or too dark to read correctly
CriticalFault	"PLC Comm Error "			Cricital communication fault in PLC
CriticalFault	"Optic Calibration required "	Yes		Optic need calibration - see manual
CriticalFault	"Gas Configutration Error "			Gas File data missing or invalid
CriticalFault	"Low Flow - Verify Tray Insertion"	Yes	Yes	Multiple point low flow, check analyzer tray inserted properly
CriticalFault	"Modbus Comm Failure "			Failure reading data internally
CriticalFault	"Optic Block Comm Failure "			Failure reading data from 1 or more optic blocks
CriticalFault	"Flow Block Comm Failure "			Failure reading data from 1 or more tranducer blocks
CriticalFault	"Gate Open Fault "	Yes		Gate did not open before timeout
CriticalFault	"Gate Close Fault "	Yes		Gate did not close before timeout
CriticalFault	"Setting DAC to preset values "	Yes		Failure writing to optic blocks
CriticalFault	"System Fault"			Critical system fault - contact DOD Technologies
CriticalFault	"Block Below Minimum Voltage"			Power supply low - contact DOD Technologies
CriticalFault	"Output module failure or not installed"	Yes		Output modules missing or fault
CriticalFault	"Retentitive Memory Error			Critical internal memory error, event log or conc history fault
CriticalFault	"Idle Timeout (System) "			Idle timeout for all active analyzers on system
Analyzing	"Analysis Mode "	Yes		Analysis mode started/stopped as specified
Analyzing	"TWA Cycle Complete "	Yes	Yes	Written every 8 hours or when analysis mode ends
GeneralFault	"Low Flow "	Yes	Yes	Low flow on specified anlayzer/point
GeneralFault	"High Flow "	Yes	Yes	High flow on specified anlayzer/point
GeneralFault	"Idle Timeout (Analyzer) "	Yes		Idle timeout fault
GeneralFault	"ChemLogic tape low "	Yes		Less than 3 days of tape remaining on specified anlayzer.
GeneralFault	"Logging write error - verify disk inserted : "			USB Logging disk full, missing, or error writing to disk
GeneralFault	"Custom Output Module Failure"			Failure communicating with custom module installation
Information	"No event file found for selected date "			Machine was not operating or different USB disk inserted
Information	"Starting new log file "			New data file log started for specfied date
Information	"Power On "			Machine was powered on at date/time specified
Information	"Faults & Alarms Reset "			Fault Reset button was pressed by operator
Information	"Optic Calibrated "	Yes		Optic calibration complete
Information	"Flow Offsets Reset "			Flow offsets reset by technician
Information	"Point configuration updated/saved "	Yes		Configuration saved/updated for specified analyzer
Information	"Machine configuration updated/saved"			Machine configuration saved/updated
Information	"Simulation Mode"			Simluation mode started/stopped
Information	"Passwords updated"			Passwords were changed
Information	"Multi-Point configuration change"	Yes	Yes	Multiple points were updated simultaneously
Information	"Previous machine settings restored."			Default settings restored
Information	"ChemLogic tape days counter reset "	Yes		Operator reset the tape counter manually
Information	"Optics Auto Adjusted"	Yes		Optics were adjusted by system
Information	"Optic Point Needs Cleaning"	Yes		Clean optics at earliest possible date

Appendix E – Gas Specifications

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

ChemLogic CL96 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 F – Hard Wire Connection (Optional)

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

When the hard-wired option is specified the installation must be done by a qualified electrician.

IMPORTANT: When installing A/C voltage to the CL96 for the hard wire connection read carefully:

- A switch or circuit-breaker shall be included in the building installation.
- It shall be in close proximity to the equipment and within easy reach of the OPERATOR.
- It shall be marked as the disconnecting point for the CL96 equipment.

When the Hard-Wire option is specified the A/C power must be provided by the customer to the FILTER which is located on the right side of the unit inside the back cabinet. After disconnecting all power to the CL96 remove the back cabinet which will reveal the A/C filter shown in figure 1.

NOTE THE A/C FILTER IS MOUNTED UPSIDE DOWN IN THE CL96

- Connect A/C power to the screw terminals numbered 1 & 2
- Screw # 1 is Line and Screw #2 is neutral
- Connect the ground wire to the terminal as shown in Figure 2
- Replace the protective plastic cover over the screws

Make sure the wires are tightened properly and the protective plastic covers are replaced over the screws.

Figure 1

Figure 2

Appendix G – Optional Secondary Enclosures

WARNING : Disconnect power before servicing.

Many of the I/O options for the CL96 are packaged as secondary enclosures. These secondary enclosures are typically located remotely, mounted on the side or close to the CL96 cabinet. This section describes mounting (G.1), A/C Power (G.2), connecting to the CL96 (G.3), and external wiring (G.4) for the varying options available.

G.1 Mounting A Secondary Enclosure

Before mounting the secondary enclosure, be sure to read through sections G.2, G.3 and G.4 to understand and design your wiring requirements for A/C power to the unit and wiring to the I/O modules. It may be necessary to drill the opening for the wiring before mounting depending on the location selected for each cabinet.

Optional enclosure(s) must be firmly mounted before wiring.

G.1.1 Remote Secondary Enclosure Mounting

If the enclosure is to be mounted externally use the provided mounting brackets to secure the cabinet at the desired location.

G.1.2 Direct mounting on the CL96

If specified at time of purchase, the CL96 cabinet can be pre-drilled to easily mount secondary enclosures to the side of the cabinet. The CL96 cabinet will have four (4) bolts mounted on the side for each (max 2) cabinet that mounts on the side panel. – See figure G.1.1.

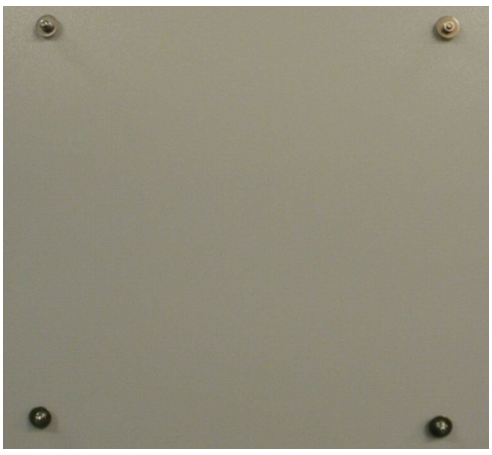


Figure G.1.1

Remove the nut and lock washer from each of the four bolts, mount the external cabinets onto the four bolts using the attached bracket then replace the lock washers and nuts. Tighten the nuts to secure the cabinet to the side of the CL96 panel.

G.2 Connecting A/C Power to the Secondary Enclosure

All optional secondary enclosures contain their own DC Voltage power supply. The cabinets are delivered with a power cable and a liquid tight cord grip which may be used to power the unit as described below.

IMPOTANT: When installing A/C power to the secondary enclosure read carefully:

- Installation of A/C power must be done by a qualified electrician.
- A switch or circuit breaker shall be included in the building installation.
- It shall be in close proximity to the secondary enclosure and within reach of the OPERATOR.
- It shall be marked as the disconnecting point for the secondary enclosure.

Be sure to follow all safety precautions and disconnect electrical power from both the CL96 and secondary enclosure before servicing.

G.2.1 Installing the liquid tight cord grip (DOD Part #2-9400-523)

- Drill a 7/8” hole in the side of the cabinet at the desired location
- Using the liquid tight cord grip (DOD Part #2-9400-523)
- Unscrew the cord grip cap
- Unscrew the inside nut (leave the fixed nut on the fitting)
- Place the included O-ring over the threads on the inside portion of the fitting so that it sits inside the fixed nut – see figure G.2.1.

Figure G.2.1

- Insert the threads through the hole from the outside into the cabinet and replace the nut on the inside as shown in figure G.2.2 – tighten securely.

Figure G.2.2

G.2.2 Installing the A/C Power Cable

- Insert the exposed wires of the power cord through the hole in the fitting from the outside and then into the cord grip cap as shown in figure G.2.3.

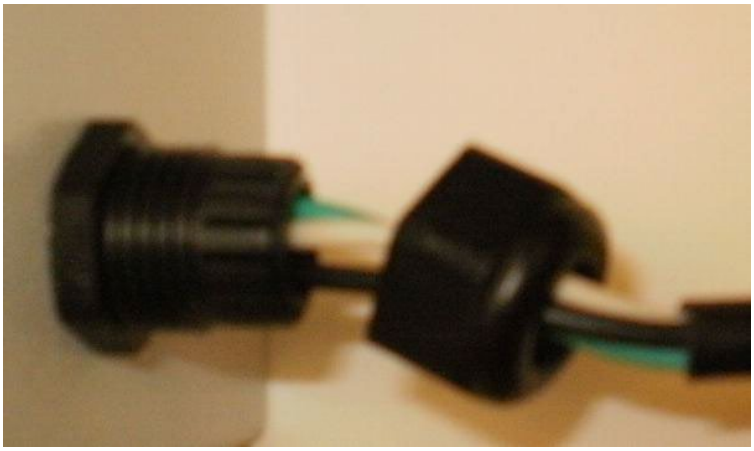


Figure G.2.3

- Pull the appropriate length of cord inside the cabinet to allow the shielded portion of the cable to reach the power filter.
- Tighten the cord grip cap shown in Figure G.2.3 back onto the fitting securely to hold the cord in place.

G.2.3 Attaching the A/C Power inside the cabinet

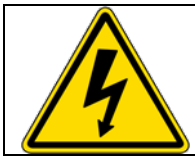
- See Figure G.2.4 below for reference
- Pull down lightly on the plastic cover on the Power Filter exposing screw connections #1 and #2.
- Attach the Neutral/White wire to the Power Filter at the label for Screw #2, tighten securely.
- Attach the LineBlack wire to the Power Filter at the label for Screw #1, tighten securely.
- Push the plastic cover back into place on the Power Filter over screws connections #1 and #2.

- Locate the Protective Earth (PE) Grown stud as shown in figure G.2.4.

Figure G.2.4

- Remove the top nut from the PE ground stud
- Leave the star washer on the bottom of the ground stud touching the cabinet, then place the ring terminal from the green wire over the star washer.
- Replace the nut on top of the ring terminal and tighten securely.
- NOTE: Do not attach any wires other than the Green ground wire from the A/C power cord to the PE Ground terminal.

G.3 Connecting to the CL96

	Warning: Do NOT use the A/C power opening to bring any other wires into the secondary enclosure. Analog wiring and the ethernet cable must be brought in through a separate opening dependent on the user's design.

Drill a second hole in the side of the external cabinet at the desired location. Bring the shielded ethernet cable into the cabinet through the hole and connect as described below.

G.3.1 Connecting to the CL96 with Ethernet Cable

All secondary enclosures connect to the CL96 with a shielded RJ45 cable (sold separately).

- Attach one end of the cable to the CL96. Depending on the configuration of your machine the connection point will vary. Contact DOD if you are not sure where to plug the ethernet cable.
- Attach the other end of the cable to the top connector on the EK1101 module as shown in Figure G6.
- Multiple external cabinets can be daisy-chained using the bottom RJ-45 connector as a starting point for the second shielded cable.

Figure G.3.1

G.4 Wiring Output Modules

G.4.1 Analog (4-20 ma) Output Wiring

See Appendix B.4 for information on wiring to analog output modules.

G.4.2 Beckhoff Form A Relays

See Appendix B.3 for information on wiring to Beckhoff Relay Modules.

G.4.3 Form C Relay Wiring

The Form C relay modules (blue) are labeled inside the external cabinet as shown below.

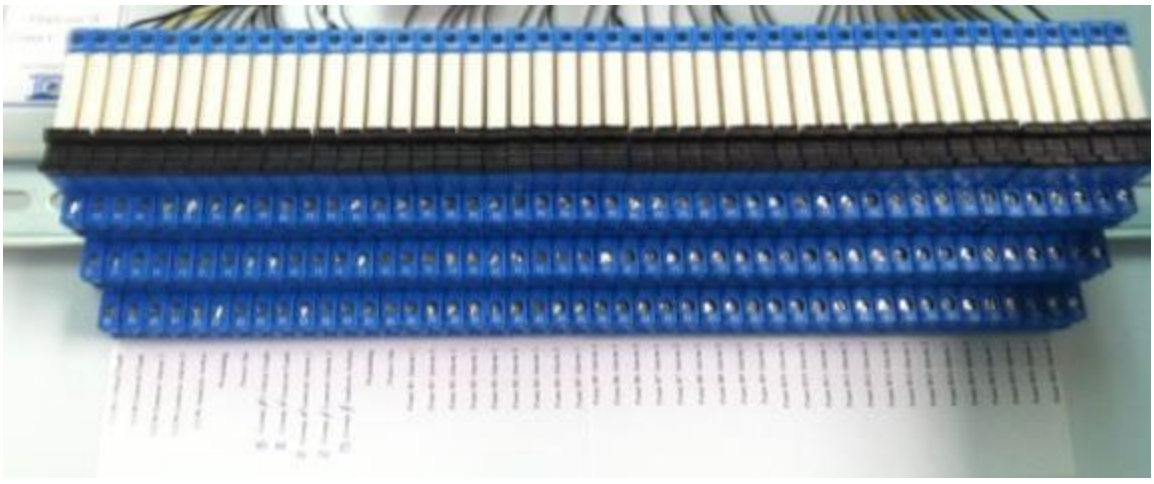


Figure G.4.1

Note: 32 point analyzers will have another 32 relays for points 17-32. Each of the relays has a normally open and a normally closed connection along with a common. Figure G.4.2 below shows the order of the relays as labeled inside the cabinet.

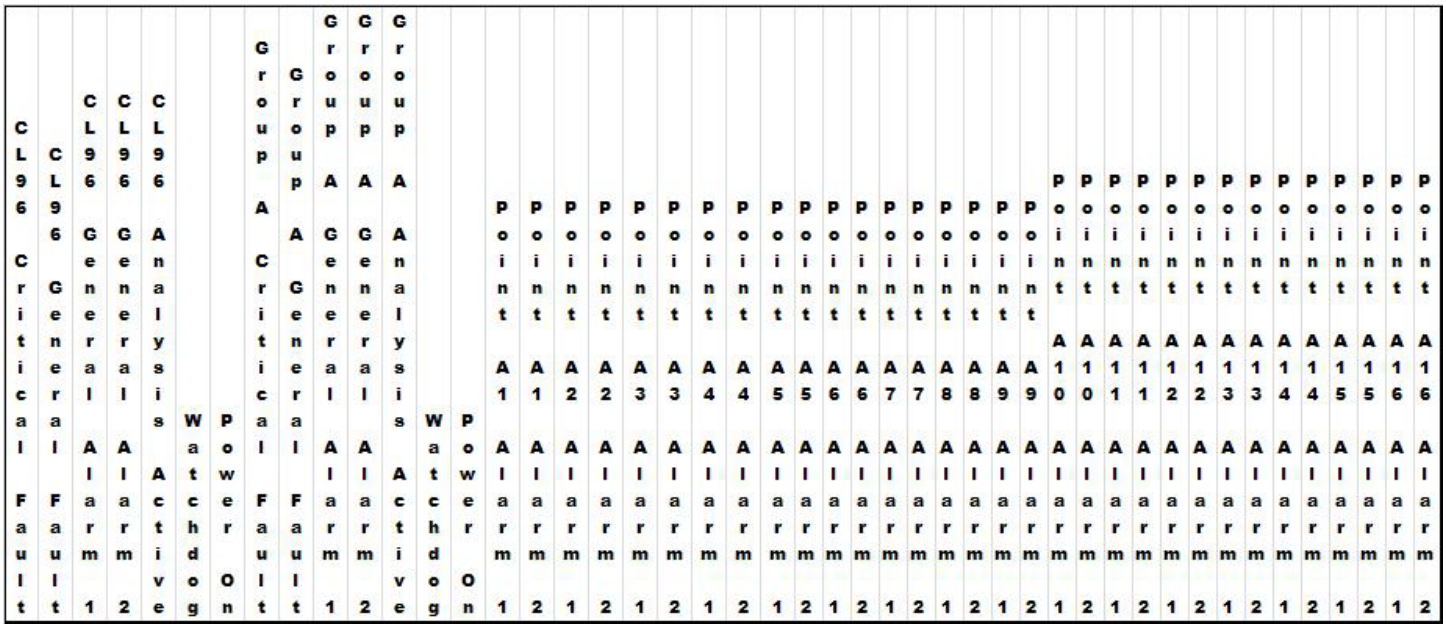


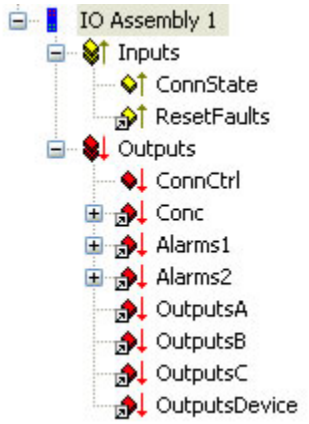
Figure G.4.2

Appendix H – Data Communication

H.1 – Ethernet/IP

IMPORTANT: if you move to change the IP address of the CL96 the System must be 're-activated' by DOD Technologies support before data can be monitored via the Ethernet/IP Slave connection.

The Ethernet/IP interface allows remote monitoring of fault/alarm outputs, concentration levels, and fault rest. You must supply the IP Address of the CL96 to DOD Technologies to configure the Ethernet/IP. The data is mapped as:



Downlink (From Master to CL96):
Assembly Instance: 102
Size (16-bit Words) : 3

The following information is available on the Ethernet/IP interface. Assembly Instance numbers vary depending if you are using the standard ports on the CPU or the EL6652-0010 Auxiliary Ethernet/IP ports.

- When using Standard network ports Assembly Instance 103 & 104 contain more detailed data. Assembly Instance 101 & 102 are available for existing customer compatibility.
- With the EL6652 device Assembly Use Instance 129 & 130 detailed below.

CL96 Faults/Alarms (Discrete Outputs)

Token	Description	Type
Machine Critical Fault	Machine has critical fault	Boolean
Machine Maintenance Fault	Machine has a maintenance issue	Boolean
Machine Gas Alarm 1	Level 1 Gas Alarm at Least 1 Machine Point	Boolean
Machine Gas Alarm 2	Level 2 Gas Alarm at Least 1 Machine Point	Boolean
Power On	Power is on to Analyzer	Boolean

Each Analyzer Faults/Alarms(Discrete Outputs)

Token	Description	Type
Analyzer Critical Fault	This Analyzer has critical fault	Boolean
Analyzer Maintenance Fault	This analyzer has a maintenance issue	Boolean
Analyzer Gas Alarm 1	Level 1 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzer Gas Alarm 2	Level 2 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzing	Analysis active on Analyzer	Boolean

Each Point Concentration & Alarm Indicators

Token	Description	Type
Concentration	**Current concentration (*10) for point**	**Boolean**
Alarm 1 Active	**Level 1 Gas Alarm active**	**Boolean**
Alarm 2 Active	**Level 2 Gas Alarm active**	**Boolean**

Fault Indicator Bits

Individual bits indicating Active System Faults, General Faults, & Alarms.
Note: Assembly Instance 103 contains Fault Indicator Bits.
Assembly Instance 101 does not contain Fault Indicator Bits.

Downlink from Master to CL96 (w/o Fault indicators)
Assembly Instance: 102 Size (16-bit Words): 3

Offset (Words)	Size # Words	Data Description	Format
0	**2**	**Connection Status**	
2	**1**	**Fault Reset**	**Bit 0 – From 1 to 0 to reset**

Uplink from CL96 to Master (w/o Fault Indicators)
Assembly Instance: 101 Size (16-bit Words): 114

Offset (Words)	Size # Words	Data Description	Format
0	**2**	**Connection Status**	
2	**96**	Concentration levels for all 96 Points	Conc * 10 (eg. 23 = 2.3 actual conc)
98	**1**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
99	**1**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
100	**1**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
101	**1**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
102	**1**	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
103	**1**	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32

104	**1**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
105	**1**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
106	**1**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
107	**1**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
108	**1**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
109	**1**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
110	**1**	Faults/Alarms Analyzer A	*See Table 1 Below
111	**1**	Faults/Alarms Analyzer B	*See Table 1 Below
112	**1**	Faults/Alarms Analyzer C	*See Table 1 Below
113	**1**	Faults/Alarms Combined CL96	*See Table 1 Below

Downlink from Master to CL96 (with Fault indicators)
Assembly Instance: 104 Size (16-bit Words): 3

Offset (Words)	Size # Words	Data Description	Format
0	**2**	**Connection Status**	
2	**1**	**Fault Reset**	**Bit 0 – From 1 to 0 to reset**

Uplink from CL96 to Master (with Fault Indicators)
Assembly Instance: 103 Size (16-bit Words): 118

Offset (Words)	Size # Words	Data Description	Format
0	**2**	**Connection Status**	
2	**96**	Concentration levels for all 96 Points	Conc * 10 (eg. 23 = 2.3 actual conc)
98	**1**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
99	**1**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
100	**1**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
101	**1**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
102	**1**	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
103	**1**	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
104	**1**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
105	**1**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
106	**1**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
107	**1**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
108	**1**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
109	**1**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32

110	**1**	Faults/Alarms Analyzer A	*See Table 1 Below
111	**1**	Faults/Alarms Analyzer B	*See Table 1 Below
112	**1**	Faults/Alarms Analyzer C	*See Table 1 Below
113	**1**	Faults/Alarms Combined CL96	*See Table 1 Below
114	**4**	Fault Indicators	*See Table 2 Below

Downlink from Master to CL96 (with Fault indicators)
Assembly Instance: 130 Size (16-bit Words): 2

Offset (Words)	Size # Words	Data Description	Format
0	**2**	**Connection Status**	

Uplink from CL96 to Master (with Fault Indicators)
Assembly Instance: 129 Size (16-bit Words): 120

Offset (Words)	Size # Words	Data Description	Format
0	**2**	**Connection Status**	
2	**96**	Concentration levels for all 96 Points	Conc * 10 (eg. 23 = 2.3 actual conc)
98	**1**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
99	**1**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
100	**1**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
101	**1**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
102	**1**	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
103	**1**	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
104	**1**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
105	**1**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
106	**1**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
107	**1**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
108	**1**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
109	**1**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
110	**1**	Faults/Alarms Analyzer A	*See Table 1 Below
111	**1**	Faults/Alarms Analyzer B	*See Table 1 Below
112	**1**	Faults/Alarms Analyzer C	*See Table 1 Below
113	**1**	Faults/Alarms Combined CL96	*See Table 1 Below
114	**8**	Fault Indicators	*See Table 2 Below

The Fault/Alarms per Analyzer and combined CL96 are indicated as follows :

- Bit 0 - Critical Fault
- Bit 1 - General Fault
- Bit 2 - Alarm Level 1
- Bit 3 - Alarm Level 2
- Bit 4 - Analysis Active
- Bit 5 – Power
- Bit 7 – Heartbeat

Table 1

For Analyzer A, B, and C the lower 8 bits (0-7) are for the lower analyzer and the upper 8 bits (8-15) are for the upper analyzer. For the CL96 Fault/Alarms the alarms indicate the status of the entire machine. See the Appendix B of the CL96 manual for details of the I/O indicators.

The bits for Alarm Level 1, Alarm Level 2, and all Fault/Alarms may be affected by the "Energized Faults/Alarms" setting of the CL96.

Fault Indicator Bits

64 Bits (4 Words) contain flags indicating Active System Faults, General Faults, & Alarms. The lowest Bit of the first Byte is Bit #1 (1 Based). See Table Below

Bit #	Error Message
1	**Pyrolyzer Failure - Point Disabled**
2	**Pyrolyzer Fan Failure**
3	**Pyrolyzer Module Fault**
4	**Cannot get background values**
5	**High Background**
6	**End of Tape (Bad Background)**
7	**PLC Comm Error**
8	**Optic Calibration required**
9	**Gas Configuration Error**
10	**Low Reference Value**
11	**Pyrolyzer Fan Failure**
12	**Alarm Level 1**
13	**Alarm Level 2**
14	**Low Flow**
15	**High Flow**
16	**Low Flow - Verify Tray Insertion**
17	**Modbus Comm Failure**
18	**Optic Block Comm Failure**

19	Flow Block Comm Failure
20	Idle Timeout (Analyzer)
21	Gate Open Fault
22	Gate Close Fault
23	Setting DAC to preset values
24	ChemLogic tape low
25	Log write error-Select Disk in Setup :
26	Pt Disabled Optic Issue
27	Pump Failure
28	All Pumps on Analyzer Disabled
29	Low Disk Space - Purge Recommended
30	System Fault
31	Block Below Minimum Voltage
33	Output module failure or not installed
34	Low Disk Space - Purge Recommended
38	Retentitive Memory Error
40	Idle Timeout (System)
44	Custom Output Module Failure
46	Output Module Offline
47	Point Disabled Due To High Background
48	Output Module Communication Error
49	Timeout Advancing Parallel Analyzers
53	Check Optic Block(Ref)

Table 2

H.2 – Profibus

The following information is available on the Profibus/Slave interface. The CL96 Faults/Alarms (Discrete Outputs)

CL96 Faults/Alarms (Discrete Outputs)

Token	Description	Type
Machine Critical Fault	Machine has critical fault	Boolean
Machine Maintenance Fault	Machine has a maintenance issue	Boolean
Machine Gas Alarm 1	Level 1 Gas Alarm at Least 1 Machine Point	Boolean
Machine Gas Alarm 2	Level 2 Gas Alarm at Least 1 Machine Point	Boolean
Power On	Power is on to Analyzer	Boolean

Each Analyzer Faults/Alarms(Discrete Outputs)

Token	Description	Type
Analyzer Critical Fault	This Analyzer has critical fault	Boolean
Analyzer Maintenance Fault	This analyzer has a maintenance issue	Boolean
Analyzer Gas Alarm 1	Level 1 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzer Gas Alarm 2	Level 2 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzing	Analysis active on Analyzer	Boolean

Each Point Concentration & Alarm Indicators

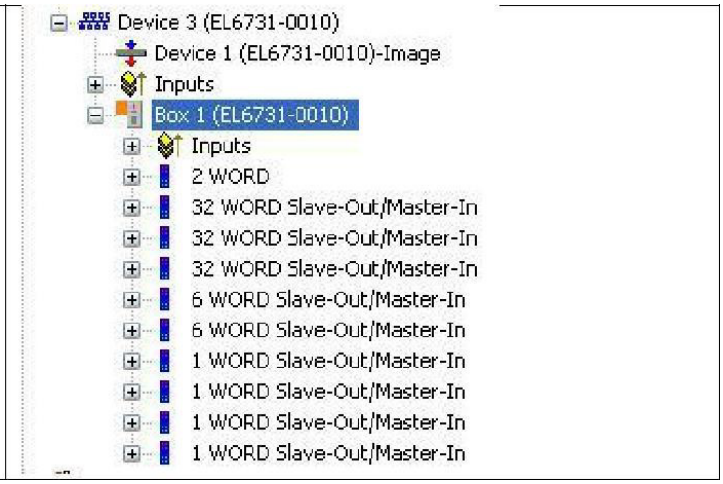
Token	Description	Type
Concentration	**Current concentration for point (X 10)****	**16 Bit Unsigned**
Alarm 1 Active	**Level 1 Gas Alarm active**	**Boolean**
Alarm 2 Active	**Level 2 Gas Alarm active**	**Boolean**

** Concentration levels are actual concentration multiplied by 10 as unsigned integer.
Example: An actual concentration of 2.7 is passed as 27 in the Profibus/Slave interface

Use Beckhoff Profibus GSD file

EL31095F

Available from www.beckhoff.com or from DOD Technologies



Profibus Data Format

Default Slave ID: 2 Size: 240Bytes (120 Words)

Byte # (Bytes)	Size # Bytes	Data Description	Format
1	**4**	**Connection Status**	
5	**192**	Concentration levels for all 96 Points	Conc * 10 (eg. 23 = 2.3 actual conc)
197	**2**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
199	**2**	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
201	**2**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
203	**2**	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
205	**2**	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
207	2	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
209	**2**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16

211	**2**	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
213	**2**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
215	**2**	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
217	**2**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 1-16
219	**2**	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 1 points 17-32
221	**2**	Faults/Alarms Analyzer A	*See Below
223	**2**	Faults/Alarms Analyzer B	*See Below
225	**2**	Faults/Alarms Analyzer C	*See Below
227	**2**	Faults/Alarms CL96	*See Below
229	**8**	Fault & Event Bit Flags	*** See Table 2 Below
237	**4**	WatchdogUpdateTime (Seconds)	Seconds since 1/1/2000

The Fault/Alarms are indicated as follows:

- Bit 0 - Critical Fault
- Bit 1 - General Fault
- Bit 2 - Alarm Level 1
- Bit 3 - Alarm Level 2
- Bit 4 - Analysis Active
- Bit 5 - Power

For Analyzer A, B, and C the lower 8 bits (0-7) are for the lower analyzer and the upper 8 bits (8-15) are for the upper analyzer. For the CL96 Fault/Alarms the alarms indicate the status of the entire machine. See the Appendix B of the CL96 manual for details of the I/O indicators. The bits for Alarm Level 1, Alarm Level 2, and all Fault/Alarms may be affected by the "Energized Faults/Alarms" setting of the CL96.

64 Bits (8 Bytes) contain flags indicating Active System Faults, General Faults, & Alarms.
The lowest Bit of the first Byte is Bit #1 (1 Based). See Table Below

Bit #	Error Message
1	**Pyrolyzer Failure - Point Disabled**
2	**Pyrolyzer Fan Failure**
3	**Pyrolyzer Module Fault**
4	**Cannot get background values**

Bit #	Error Message
5	High Background
6	End of Tape (Bad Background)
7	PLC Comm Error
8	Optic Calibration required
9	Gas Configuration Error
10	Low Reference Value
11	Pyrolyzer Fan Failure
12	Alarm Level 1
13	Alarm Level 2
14	Low Flow
15	High Flow
16	Low Flow - Verify Tray Insertion
17	Modbus Comm Failure
18	Optic Block Comm Failure
19	Flow Block Comm Failure
20	Idle Timeout (Analyzer)
21	Gate Open Fault
22	Gate Close Fault
23	Setting DAC to preset values
24	ChemLogic tape low
25	Log write error-Select Disk in Setup :
26	Pt Disabled Optic Issue
27	Pump Failure
28	All Pumps on Analyzer Disabled
29	Low Disk Space - Purge Recommended
30	System Fault
31	Block Below Minimum Voltage
33	Output module failure or not installed
34	Low Disk Space - Purge Recommended
38	Retentitive Memory Error
40	Idle Timeout (System)
44	Custom Output Module Failure
46	Output Module Offline
47	Point Disabled Due To High Background
48	Output Module Communication Error
49	Timeout Advancing Parallel Analyzers
53	Check Optic Block(Ref)

Table 2 – Fault & Event Flags

H.3 – Modbus/TCP

The following information is available on the Modbus/TCP interface.

CL96 Faults/Alarms (Discrete Outputs)

Token	Description	Type
Machine Critical Fault	Machine has critical fault	Boolean
Machine Maintenance Fault	Machine has a maintenance issue	Boolean
Machine Gas Alarm 1	Level 1 Gas Alarm at Least 1 Machine Point	Boolean
Machine Gas Alarm 2	Level 2 Gas Alarm at Least 1 Machine Point	Boolean
Power On	Power is on to Analyzer	Boolean

Each Analyzer Faults/Alarms(Discrete Outputs)

Token	Description	Type
Analyzer Critical Fault	This Analyzer has critical fault	Boolean
Analyzer Maintenance Fault	This analyzer has a maintenance issue	Boolean
Analyzer Gas Alarm 1	Level 1 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzer Gas Alarm 2	Level 2 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzing	Analysis active on Analyzer	Boolean

Each Point Concentration & Alarm Indicators

Token	Description	Type
Concentration	Current concentration for point	Float
Alarm 1 Active	Level 1 Gas Alarm active	Boolean
Alarm 2 Active	Level 2 Gas Alarm active	Boolean
Gas Type Code	Current Selected Gas For Point	Unsigned Integer
Alarm Level 1	Alarm Level 1 for Selected Gas on Point	Float
Alarm Level 2	Alarm Level 2 for Selected Gas on Point	Float
Full Scale	Full Scale Value for Selected Gas on Point	Unsigned Integer
ConcentrationX10	Concentration on Point * 10	Unsigned Integer

IMPORTANT: Floating Point and DINT numbers on the CL96 are stored Little Endian (least significant register first). The Master Modbus system should use "Read Holding Registers" to read data from the CL96.

Default Slave ID: 1

(word) Address	# Words	Type	Data Description	Format
40001	1	Bits	CL96 Analyzer Faults	*See Below
40002	1	Bits	Analyzer A Faults	*See Below
40003	1	Bits	Analyzer B Faults	*See Below
40004	1	Bits	Analyzer C Faults	*See Below
40005	192	Float	Concentration Points 1-96	Floating Point (Real – Little Endian)
40197	1	Bits	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points A 1-16
40198	1	Bits	Analyzer A Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points A 17-32
40199	1	Bits	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points B 1-16
40200	1	Bits	Analyzer B Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points B 17-32
40201	1	Bits	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points C 1-16
40202	1	Bits	Analyzer C Alarm Level 1 Indicators	Bit 0 - 15 = Alarm Level 1 points C 17-32
40203	1	Bits	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 2 points A 1-16
40204	1	Bits	Analyzer A Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 2 points A 17-32
40205	1	Bits	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 2 points B 1-16
40206	1	Bits	Analyzer B Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 2 points B 17-32
40207	1	Bits	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 2 points C 1-16
40208	1	Bits	Analyzer C Alarm Level 2 Indicators	Bit 0 - 15 = Alarm Level 2 points C 17-32
40209**	96	UINT	Array of 96 Concentrations	Concentration * 10 without any decimal points (3250.0 Maximum Concentration)
40305	192	Float	Alarm Level 1(Points 1-96)	Floating Point (Real – Little Endian)
40497	192	Float	Alarm Level 2 (Points 1-96)	Floating Point (Real – Little Endian)
40689	96	UINT	Full Scale (Points 1-96)	Unsigned Integer Full Scale
40785	96	UINT	Gas Type Code (Points 1-96)	Unsigned Integer Gas ID Code
40881	8	UINT	Fault Indicators For Entire Machine	See Table Below

(word) Address	# Words	Type	Data Description	Format
40889	6	Bits	Point Enabled	Bits 0-15 Each for Points 1-16,17-32,etc
40895	192	Float	Full Scale Points 1-96	Floating Point (Real – Little Endian)
41087	2	DINT	WatchdogUpdateTime (Secs)	Double Int #seconds since 1/1/2000
41089	6	UINT	Tape Days Remaining	# of tape days remaining on each analyzer
41095* **	192	UDINT	Array of 96 Concentrations	Concentration * 10 without any decimal points (No Maximum)
41287	1	Bits	Analyzer A Low Flow Indicators	Bit 0 - 15 = Low Flow points A 1-16
41288	1	Bits	Analyzer A Low Flow Indicators	Bit 0 - 15 = Low Flow points A 17-32
41289	1	Bits	Analyzer B Low Flow Indicators	Bit 0 - 15 = Low Flow points B 1-16
41290	1	Bits	Analyzer B Low Flow Indicators	Bit 0 - 15 = Low Flow points B 17-32
41291	1	Bits	Analyzer C Low Flow Indicators	Bit 0 - 15 = Low Flow points C1-16
41292	1	Bits	Analyzer C Low Flow Indicators	Bit 0 - 15 = Low Flow points C17-32
41293	1	Bits	Analyzer A High Flow Indicators	Bit 0 - 15 = High Flow points A 1-16
41294	1	Bits	Analyzer A High Flow Indicators	Bit 0 - 15 = High Flow points A 17-32
41295	1	Bits	Analyzer B High Flow Indicators	Bit 0 - 15 = High Flow points B 1-16
41296	1	Bits	Analyzer B High Flow Indicators	Bit 0 - 15 = High Flow points B 17-32
41297	1	Bits	Analyzer C High Flow Indicators	Bit 0 - 15 = High Flow points C1-16
41298	1	Bits	Analyzer C High Flow Indicators	Bit 0 - 15 = High Flow points C17-32
41299	8	UINT	Fault Indicators A Lower	Analyzer A Pts 1-16 (See Table Below)
41307	8	UINT	Fault Indicators A Upper	Analyzer A Pts 17-32 (See Table Below)
41315	8	UINT	Fault Indicators B Lower	Analyzer B Pts 1-16 (See Table Below)
41323	8	UINT	Fault Indicators B Upper	Analyzer B Pts 17-32 (See Table Below)
41331	8	UINT	Fault Indicators C Lower	Analyzer C Pts 1-16 (See Table Below)
41339	8	UINT	Fault Indicators C Upper	Analyzer C Pts 17-32 (See Table Below)
41347	1	Bits	A1-16 Reference Fault Indicators	Bit 0 - 15 = Ref Fault points A 1-16
41348	1	Bits	A17-32 Reference Fault Indicators	Bit 0 - 15 = Ref Fault points A 17-32
41349	1	Bits	B1-16 Reference Fault Indicators	Bit 0 - 15 = Ref Fault points B 1-16
41350	1	Bits	B17-32 Reference Fault Indicators	Bit 0 - 15 = Ref Fault points B 17-32
41351	1	Bits	C1-16 Reference Fault Indicators	Bit 0 - 15 = Ref Fault points C1-16
41352	1	Bits	C17-32 Reference Fault Indicators	Bit 0 - 15 = Ref Fault points C17-32

• For Analyzer A, B, and C the lower 8 bits (0-7) are for the lower analyzer and the upper 8 bits (8-15) are for the upper analyzer. For the CL96 Fault/Alarms the alarms indicate the status of the entire machine. See Appendix B for details of the I/O indicators. See Bit Descriptions below.

The Fault/Alarms (40001-4004) are indicated as follows :

- Bit 0 - Critical Fault
- Bit 1 - General Fault
- Bit 2 - Alarm Level 1
- Bit 3 - Alarm Level 2
- Bit 4 - Analysis Active
- Bit 5 – Power
- Bit 7 – Watchdog

- The full-scale values are available in both floating point format and as an unsigned integer that does not contain a decimal point. (i.e.: Full scale 500 value = 500)
- The concentrations are available in both floating point format and as unsigned integer values as described below

** Due to data value limitations, the Concentration values at 40209 are dependent on the Full-Scale value of the gas calibration selected for each point. For this reason, it is better to use the values at MODBUS addresses 40005 or 41095. Nearly all gas calibrations have a full-scale of 5000 or less (regardless of units).

1. When Full-scale is 6500.0 or less (regardless of units):
   a. The value will represent Concentration * 10
   (i.e. Actual concentration of 42.8 would have the value 428)
2. When Full-scale is greater than 6500.0
   a. The value will always represent the integer part of the concentration
   (i.e. Actual concentration of 42.8 would have the value 42)
   b. Note the maximum value would be 65000
   (i.e. Actual concentration of 99111.4 would have the value 65000)

*** The Concentration values at 41095 always represent the Actual Concentration * 10. (i.e. Actual concentration of 42193.6 would have the value 421936)

Gas Type Codes & Full Scale

(Note : Some gasses have multiple codes as shown)

Gas Type Code	Gas & Range	Gas Type Code	Gas & Range
1	AsH3 500ppb	35	HCL 15ppm
2	B2H6 1000ppb	36	HF 10ppm
3	GeH4 2000ppb	37	BF3 3200ppb
4	H2Se 500ppb	38	HBR 20ppm
5	PH3 1500ppb	39	COS 20 ppm

Gas Type Code	Gas & Range	Gas Type Code	Gas & Range
6	SiH4 50ppm	40	HNO3 5000ppb
8	CL2 5000ppb	41	H2SO4 3200ppb
9	H2S 25ppm	42	PH3 3000ppb
10	HCL 15ppm	43	F2 1000ppb
11	HF 10ppm	44	SG HCL 20ppm
12	BF3 3200ppb	45	SG HF 20 ppm
13	HBR 20ppm	46	SG BF3 1000ppb
16	COCl2 4000ppb	47	NH3 150ppm
17	AsH3 50ppb	48	CL2 2000ppb
18	H2S 20ppm	49	TDMAT 10ppm
20	AsH3 1000ppb	50	GeH4 2000ppb
21	AsH3 50ppb	51	NF3 50ppm
22	CL2 3200ppb	52	C4F6 40ppm
23	Br2 1000ppb	53	CL02 1000ppb
25	NH3 75ppm	54	SO2 2500ppb
26	F2 3200ppb	55	SG CL2 5000ppb
27	NO2 30ppm	56	SG CL2 2000ppb

Fault Indicator Bits

64 Bits (4 Words) contain flags indicating Active System Faults, General Faults, & Alarms. The lowest Bit of the first Byte is Bit #1 (1 Based). See Table below:

Bit #	Error Message
1	Pyrolyzer Failure - Point Disabled
2	Pyrolyzer Fan Failure
3	Pyrolyzer Module Fault
4	Cannot get background values
5	High Background
6	End of Tape (Bad Background)
7	PLC Comm Error
8	Optic Calibration required
9	Gas Configuration Error
10	Low Reference Value
11	Pyrolyzer Fan Failure
12	Alarm Level 1
13	Alarm Level 2
14	Low Flow

Bit #	Error Message
15	High Flow
16	Low Flow - Verify Tray Insertion
17	Modbus Comm Failure
18	Optic Block Comm Failure
19	Flow Block Comm Failure
20	Idle Timeout (Analyzer)
21	Gate Open Fault
22	Gate Close Fault
23	Setting DAC to preset values
24	ChemLogic tape low
25	Log write error-Select Disk in Setup :
26	Pt Disabled Optic Issue
27	Pump Failure
28	All Pumps on Analyzer Disabled
29	Low Disk Space - Purge Recommended
30	System Fault
31	Block Below Minimum Voltage
33	Output module failure or not installed
38	Retentitive Memory Error
40	Idle Timeout (System)
44	Custom Output Module Failure
46	Output Module Offline
47	Point Disabled Due To High Background
48	Output Module Communication Error
49	Timeout Advancing Parallel Analyzers
53	Check Optic Block(Ref)

H.4 – ControlNet

Data Monitoring Procedure

Beginning with PLC version 24.0425, the CL96 Faults/Alarms Bit #5 (POWER) should be monitored to indicate the validity and status of all Data. Upon power up or in the case of a power disruption this bit will remain 0 (FALSE) until the CL96 is configured and ready to restart analysis. A second bit (#8) must be used to verify validity and must be 0 to indicate validity.

Data is Valid ONLY when CL96 Faults/Alarms Bit 5 = 1/TRUE AND Bit 8 = 0/FALSE. Any other combination indicates the data is NOT VALID. These bits should be verified on each read from the CL96.

The status is at

Byte Offset	Data Description	Size	Format
8	CL96 Faults/Alarms	WORD	Bit 5 Power (zero based) Bit 8 Verification (zero based)

The following information is available on the ControlNet interface:

CL96 Faults/Alarms (Discrete Outputs)

Token	Description	Type
Machine Critical Fault	Machine has critical fault	Boolean
Machine Maintenance Fault	Machine has a maintenance issue	Boolean
Machine Gas Alarm 1	Level 1 Gas Alarm at Least 1 Machine Point	Boolean
Machine Gas Alarm 2	Level 2 Gas Alarm at Least 1 Machine Point	Boolean
Power On	Power is on to Analyzer	Boolean

Each Analyzer Faults/Alarms(Discrete Outputs)

Token	Description	Type
Analyzer Critical Fault	This Analyzer has critical fault	Boolean
Analyzer Maintenance Fault	This analyzer has a maintenance issue	Boolean
Analyzer Gas Alarm 1	Level 1 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzer Gas Alarm 2	Level 2 Gas Alarm at Least 1 Point on Analyzer	Boolean
Analyzing	Analysis active on Analyzer	Boolean

Each Point Concentration & Alarm Indicators

Token	Description	Type
Concentration	**Current concentration for point (X 10)****	**16 Bit Unsigned**
Alarm 1 Active	**Level 1 Gas Alarm active**	**Boolean**
Alarm 2 Active	**Level 2 Gas Alarm active**	**Boolean**

** Concentration levels are actual concentration multiplied by 10 as unsigned integer.
Example: An actual concentration of 2.7 is passed as 27 in the Profibus/Slave interface

Fault Indicator Bits

Token	Description	Type
Fault Indicators	**Bit indicators for CL96 System Faults &**	**16 Bit Unsigned**

64 Bits (4 Words) contain flags indicating Active System Faults, General Faults, & Alarms. The lowest bit of the first Byte is Bit 0. See Table below:

Size: 240 Bytes (120 Words)

Byte Offset	Data Description	Size # Bytes	Format
0	Live List (Anybus AM9003)	8	
8	CL96 Faults/Alarms	2	*See Below
10	Analzyer A Faults/Alarms	2	*See Below
12	Analzyer B Faults/Alarms	2	*See Below
14	Analzyer C Faults/Alarms	2	*See Below
16	Concentration (96 Points)	192	Conc * 10 (eg. 23 = 2.3 actual conc)
208	Alarm1 Pts 96-81	2	Bit 0 - 15 = Alarm Level 1 points 1-16
210	Alarm1 Pts 80-65	2	210 .. 211
212	Alarm1 Pts 64-49	2	212 .. 213
214	Alarm1 Pts 48-33	2	214 .. 215
216	Alarm1 Pts 32-17	2	216 .. 217
218	Alarm1 Pts 16-1	2	218 .. 219
220	Alarm2 Pts 96-81	2	220 .. 221
222	Alarm2 Pts 80-65	2	222 .. 223
224	Alarm2 Pts 64-49	2	224 .. 225
226	Alarm2 Pts 48-33	2	226 .. 227
228	Alarm2 Pts 32-17	2	228 .. 229
230	Alarm2 Pts 16-1	2	230 .. 231
232	Fault_Indicators_64_49	2	232 .. 233
234	Fault_Indicators_48_33	2	234 .. 235
236	Fault_Indicators_32_17	2	236 .. 237
238	Fault_Indicators_16_1	2	238 .. 239

The Fault/Alarms are indicated as follows :

- Bit 0 - Critical Fault
- Bit 1 - General Fault
- Bit 2 - Alarm Level 1
- Bit 3 - Alarm Level 2
- Bit 4 - Analysis Active
- Bit 5 - Power

For Analyzer A, B, and C the lower 8 bits (0-7) are for the lower analyzer and the upper 8 bits (8-15) are for the upper analyzer. For the CL96 Fault/Alarms the alarms indicate the status of the entire machine. See the Appendix B of the CL96 manual for details of the I/O indicators. The bits for Alarm Level 1, Alarm Level 2, and all Fault/Alarms may be affected by the "Energized Faults/Alarms" setting of the CL96.

Fault Indicator Bits

64 Bits (4 Words) contain flags indicating Active System Faults, General Faults, & Alarms. The lowest Bit of the first Byte is Bit #1 (1 Based). See Table Below

Bit #	Error Message
1	**Pyrolyzer Failure - Point Disabled**
2	**Pyrolyzer Fan Failure**
3	**Pyrolyzer Module Fault**
4	**Cannot get background values**
5	**High Background**
6	**End of Tape (Bad Background)**
7	**PLC Comm Error**
8	**Optic Calibration required**
9	**Gas Configuration Error**
10	**Low Reference Value**
11	**Pyrolyzer Fan Failure**
12	**Alarm Level 1**
13	**Alarm Level 2**
14	**Low Flow**
15	**High Flow**
16	**Low Flow - Verify Tray Insertion**
17	**Modbus Comm Failure**
18	**Optic Block Comm Failure**
19	**Flow Block Comm Failure**
20	**Idle Timeout (Analyzer)**
21	**Gate Open Fault**
22	**Gate Close Fault**
23	**Setting DAC to preset values**
24	**ChemLogic tape low**

Bit #	Error Message
25	Log write error-Select Disk in Setup :
26	Pt Disabled Optic Issue
27	Pump Failure
28	All Pumps on Analyzer Disabled
29	Low Disk Space - Purge Recommended
30	System Fault
31	Block Below Minimum Voltage
33	Output module failure or not installed
34	Low Disk Space - Purge Recommended
38	Retentitive Memory Error
40	Idle Timeout (System)
44	Custom Output Module Failure
46	Output Module Offline
47	Point Disabled Due To High Background
48	Output Module Communication Error
49	Timeout Advancing Parallel Analyzers
53	Check Optic Block(Ref)

H.5 – OPC

Available OPC Data Items

ItemName	Data Type	Array Size	Notes
OpcLevel1Alarm[x]	Bool	96	Level 1 alarm for each point
OpcLevel2Alarm[x]	Bool	96	Level 2 alarm for each point
OpcPointFault[x]	Bool	96	Point fault for each point
OpcConcPts[x]	Real	96	Concentration on each point
OpcGasAlarmLevel1[x]	Real	96	Alarm Level 1 on each point
OpcGasAlarmLevel2[x]	Real	96	Alarm Level 2 on each point
OpcGasType[x]	UINT	96	Gas Type Code on each point
OpcGasFullScale[x]	Real	96	Full Scale on each point
OpcCriticalFaultA	Bool	N/A	Analyzer A Critical Fault
OpcGeneralFaultA	Bool	N/A	Analyzer A General Fault
OpcLevel1AlarmGeneralA	Bool	N/A	Analyzer A Level 1 Alarm
OpcLevel2AlarmGeneralA	Bool	N/A	Analyzer A Level 2 Alarm
OpcAnalysisActiveA	Bool	N/A	Analyzer A Analysis Active
OpcCriticalFaultB	Bool	N/A	Analyzer B Critical Fault
OpcGeneralFaultB	Bool	N/A	Analyzer B General Fault
OpcLevel1AlarmGeneralB	Bool	N/A	Analyzer B Level 1 Alarm
OpcLevel2AlarmGeneralB	Bool	N/A	Analyzer B Level 2 Alarm
OpcAnalysisActiveB	Bool	N/A	Analyzer B Analysis Active
OpcCriticalFaultC	Bool	N/A	Analyzer C Critical Fault
OpcGeneralFaultC	Bool	N/A	Analyzer C General Fault
OpcLevel1AlarmGeneralC	Bool	N/A	Analyzer C Level 1 Alarm
OpcLevel2AlarmGeneralC	Bool	N/A	Analyzer C Level 2 Alarm
OpcAnalysisActiveC	Bool	N/A	Analyzer C Analysis Active
OpcCriticalFault	Bool	N/A	Analyzer C Critical Fault
OpcGeneralFault	Bool	N/A	Analyzer C General Fault
OpcLevel1AlarmGeneral	Bool	N/A	Analyzer C Level 1 Alarm
OpcLevel2AlarmGeneral	Bool	N/A	Analyzer C Level 2 Alarm
OpcAnalysisActive	Bool	N/A	Analyzer C Analysis Active
OpcWatchdog	Bool	N/A	Flag toggles for Watchdog
OpcActiveFaultBits[x]	Byte	16	** Bits indicating all active faults
OpcTapeDays[x]	UINT	6	# of days remaining for analyzer 1-6
OpcWatchDogTime	UDINT	N/A	# of seconds since 1/1/2000 (GMT)

NOTE : All arrays items may be accessed without subscript to retrieve all items. If array items need to be separated into individual nodes, please contact DOD Technologies for an update tool.

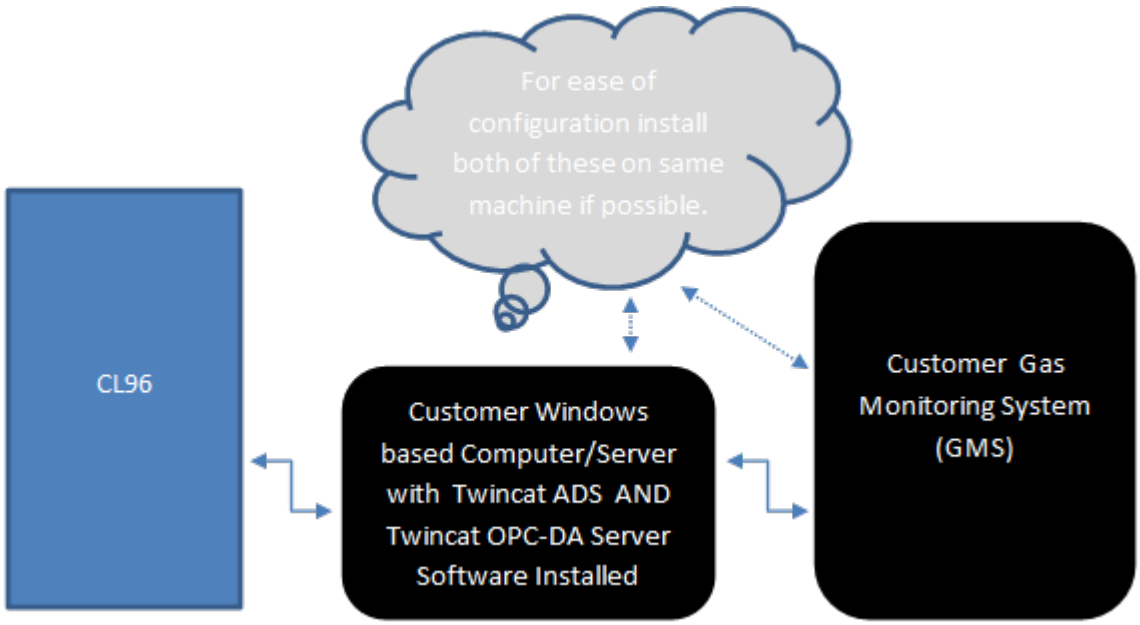
**Fault Indicator Bits

64 Bits (4 Words) contain flags indicating Active System Faults, General Faults, & Alarms. The lowest Bit of the first Byte is Bit #1 (1 Based). See Table below:

Bit #	Error Message
4	Cannot get background values
5	High Background
7	PLC Comm Error
8	Optic Calibration required
9	Gas Configuration Error
12	Alarm Level 1
13	Alarm Level 2
14	Low Flow
15	High Flow
16	Low Flow - Verify Tray Insertion
17	Modbus Comm Failure
18	Optic Block Comm Failure
19	Flow Block Comm Failure
20	Idle Timeout (Analyzer)
21	Gate Open Fault
22	Gate Close Fault
23	Setting DAC to preset values
24	ChemLogic tape low
25	Log write error-Select Disk in Setup :
30	System Fault
31	Block Below Minimum Voltage
33	Output module failure or not installed
38	Retentitive Memory Error
40	Idle Timeout (System)
44	Custom Output Module Failure
46	Output Module Offline
47	Point Disabled Due To High Background
48	Output Module Communication Error
49	Timeout Advancing Parallel Analyzers
53	Check Optic Block(Ref)

Installing OPC-DA Server

The OPC-DA server for CL96 requires installation of two software programs on another Windows computer/server on the same network node to pull the OPC data from the CL96. Since OPD-DA relies on Windows DCOM services it is much easier to configure if both programs are installed on the same machine. Detailed installation and configuration instructions are shown below for the two software programs: 1) Beckhoff Twincat ADS and 2) Beckhoff OPC-DA server for windows.



Beckhoff Twincat ADS (Version 3.1 or greater) Installation

Download the free Twincat ADS software program from the Beckhoff website (Twincat 3) or obtain the software from DOD Technologies. Run the install program with Administrator privileges on the designated computer.

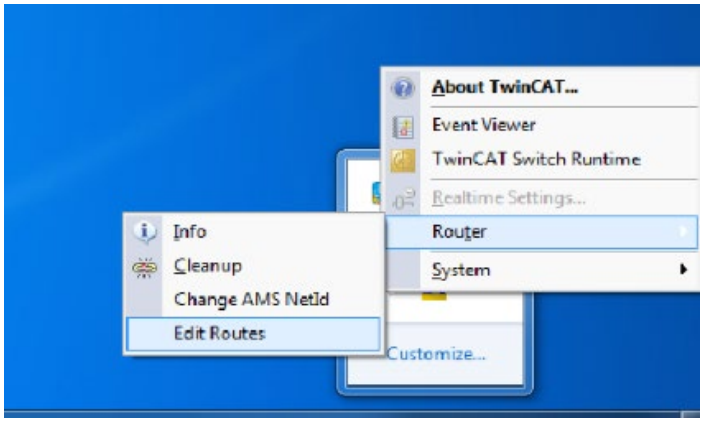
Beckhoff OPC-DA Installation

Install the Twincat OPC-DA Software from the disk provided by DOD Technologies, INC using the key provided with the software. Make sure to run the install as an Administrator on the computer. Also install the OPC Data Definition file (*.TPY) provided by DOD technologies on the same computer in a folder that can be accessed by the programs.

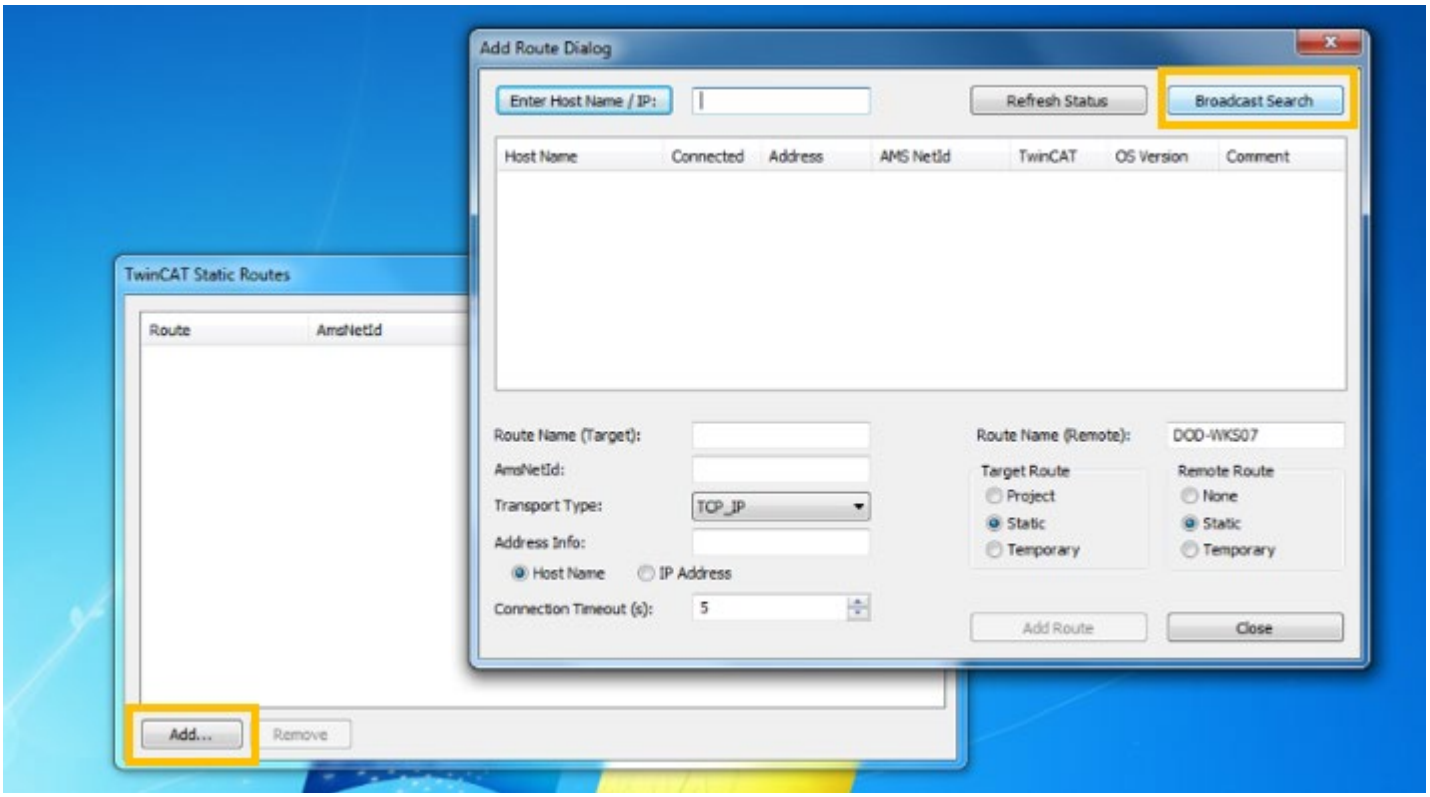
Be sure to restart the computer after both programs are installed!

Beckhoff Twincat ADS (Version 3.1 or greater) Configuration

After restarting the computer, you will have an item in the Task Bar for Twincat. Move the cursor over the ICON and right-click to get the menu shown below. Select “Router” then select “Edit Routes” from the sub-menu that appears as shown.

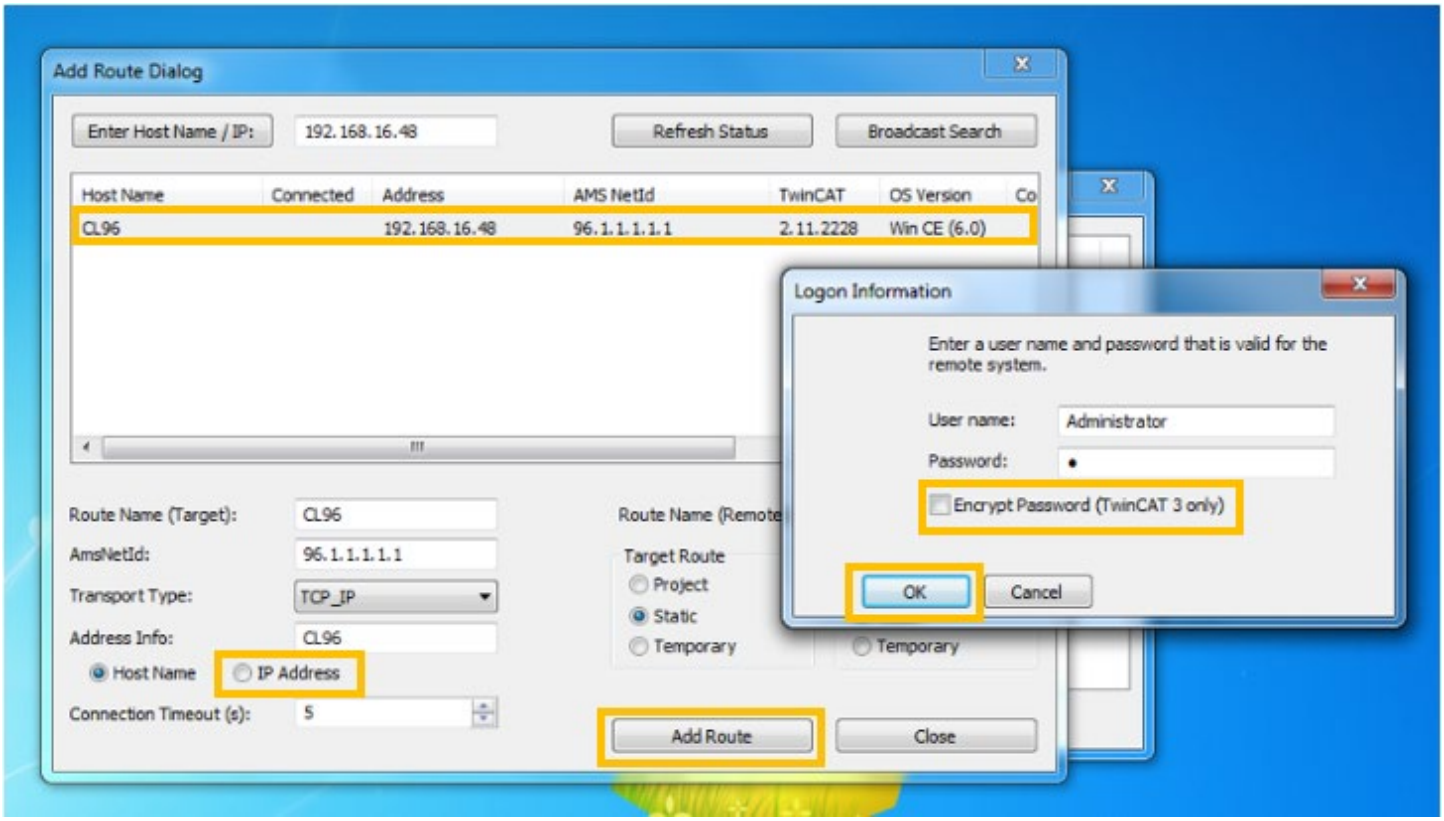


On the screen that appears click the “Add…” button (highlighted below) which will bring up the window shown to search for the CL96 on the network. Now click on the ‘Broadcast Search” button (as highlighted) which will begin exploring the network for the CL96.



When the program finds the CL96 it will appear as shown below in the selection window.

NOTE: If the router is unable to find the CL96 work with your IT department to assure the computer is on the correct network node and contact DOD Technologies, INC if you continue to have problems. The system will not function until this step is completed correctly.

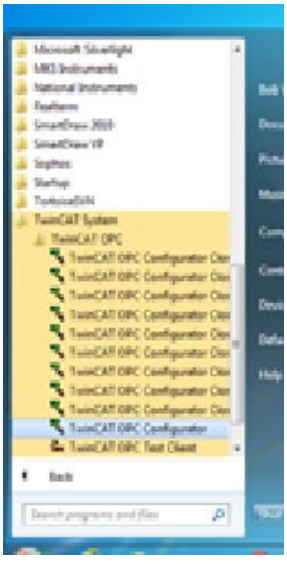


Steps:

1. Select the CL96 in the window as shown
2. Next select click the “IP Address” button
3. Click the “Add Route” button to bring up the Logon Information box as shown
4. Uncheck the box that says ‘Encrypt Password’, enter ‘1’ as the password and click OK.

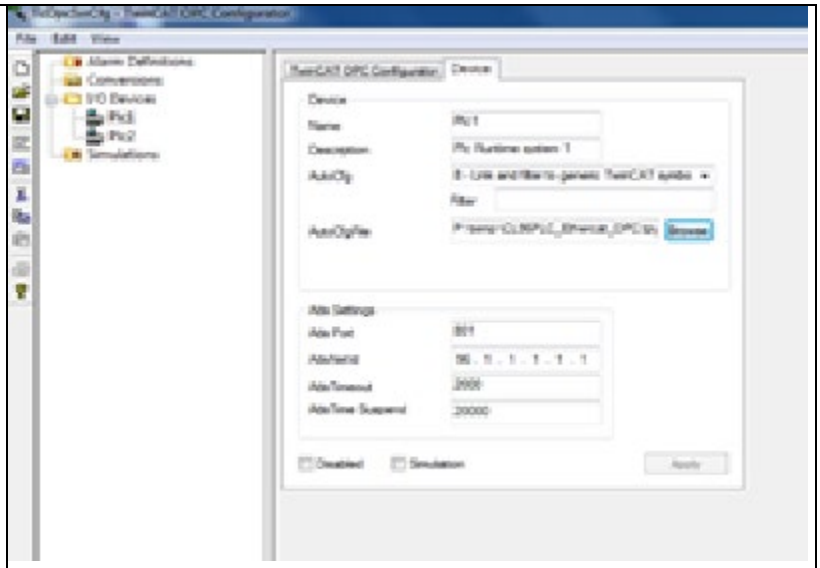
When the router finishes the window will close and you will see the CL96 route listed in the “Twincat Static Routes” window. You can now close that window.

Beckhoff OPC-DA Configuration



Start the OPC-DA Configurator by clicking as show below.
“Start Menu->Twincat System->Twincat OPC->Twincat OPC Configurator”

OPC Data Configuration

1) When the configurator opens select “PLC1” on the left side. 2)Select “8-Link & Filter to Generic…” 3)Click the “Browse” button and browse to the “.TPY” configuration file installed earlier. 4)Change the AMS Port to 801 5)Change the AMS Net ID to 96.1.1.1.1.1 **IMPORTANT**: You must now click File->Save on the menu to activate the configuration. Save the configuration file in a safe location.	

Your system is now configured to read the data from the CL96 and provide it via the OPC-DA server on this computer.
To test the data access you can download the free OPC Client program : Matrikon OPC Explorer from the internet. See www.matrikon.com for more information.

Appendix I – Unified Exhaust Option Installation

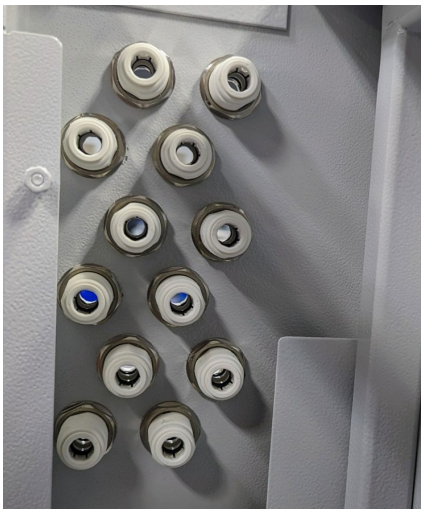
The Unified Exhaust Manifold (2-800-073) for the CL96 is an option that combines the 12 individual exhaust tubes into a single manifold. The CL96 Exhaust Manifold tubing can handle up to 50’ (using a qty of 2, part# 2-400-048).

The Unified Exhaust Manifold was designed to take the 12 exhaust tubes as an input, and output as one larger unified exhaust tube. The exhaust manifold output port can be mounted such that it can face upward or downward (dependent upon the customer installation requirements).

Qualified personnel are required to perform the installation.

Installation instructions

1. Required tools
    - 1.1. Masking tape (used for paper template).
    - 1.2. #2 phillips screwdriver.
    - 1.3. 7/8" Socket, 6-Point, deep well socket.
    - 1.4. 1" Socket, 6-Point, deep well socket.
    - 1.5. Ratchet Driver to fit deep well sockets.
    - 1.6. Center punch.
    - 1.7. Drill.
    - 1.8. 7/32” drill bit.
    - 1.9. Drop cloth to capture metal shavings while drilling holes.
    - 1.10. Small vacuum to remove any metal shavings.
2. Preparation
    - 2.1. Disconnect power to the CL96. Ensure your facility utilizes **Lockout processes**.
    - 2.2. Verify no power is supplied to the system prior to opening the system for installation.
    - 2.3. Remove the CL96 rear panel screws (3) using a #2 Phillips screwdriver.
    - 2.4. After the screws have been removed lift/slide the rear panel up for removal. Use caution as the panel has a grounding wire connected in the lower corner. Ensure the wire connection is not damaged. The ground wire is long enough to provide access to the exhaust ports.
    - 2.5. Label each of the individual exhaust tube according to the exterior panel label. The labeling with help identifying which exhaust tube to re-install after Exhaust Manifold has been mounted to the side of the enclosure.
    - 2.6. Next disconnect the interior exhaust fittings/plugs from the side panel bulkhead fittings. Press the fittings collet to release all tubing from the side panel bulkhead fittings. Set plugs aside to re-install at later time.

Images 1 2, and 3: Exterior and Interior Views from back of CL96 side panel. Tubing fittings/plugs and bulkhead fittings.

2.7. After the exhaust fittings are disconnected from the bulkhead fittings from the interior of the CL96 the exterior exhaust tubing also needs to be disconnected.

2.8. Next remove the bulkhead fittings from the CL96 side panel. Utilize the 7/8" Socket, 6-Point, deep well socket for the exterior and the 1" Socket, 6-Point, deep well socket for the interior to remove the bulkhead fitting.

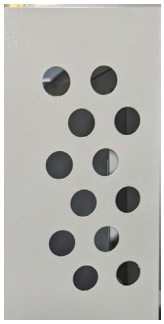
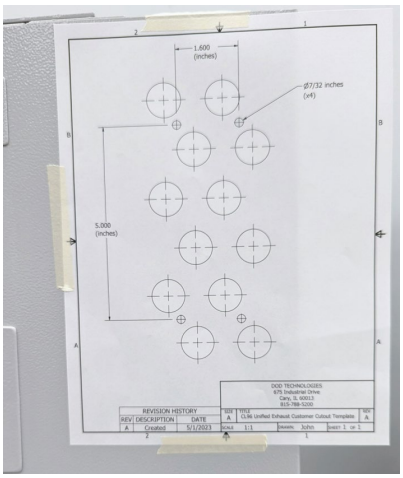


Image 4: CL96 side panel view with bulkhead fittings removed.

2.9. The system is now ready to use template to drill holes for mounting the Exhaust manifold.

3. Exhaust Manifold mounting holes (Skip this section 3 if the side panel has the holes pre-drilled).

3.1. Utilizing the pdf named CL96 Unified Exhaust Customer Cutout Template. Align the larger diameter holes with the holes in the side panel where the bulkhead fittings were previously installed. Verify the outline of the holes from the template are visibly aligned with the holes of the side panel. View from the interior and exterior of the enclosure to ensure alignment.



Images 5 and 6: CL96 side panel view with template affixed to the side panel.

3.2. Place drop cloth or other method to prevent metal shavings from drilling are captured.
NOTE: Ensure metal fillings are completed removed from the enclosure interior to prevent shorts or any other damage.

3.3. After drop cloth or other method to prevent metal shavings from drilling is in place, use a center punch to mark the (4) smaller hole centers on the template.

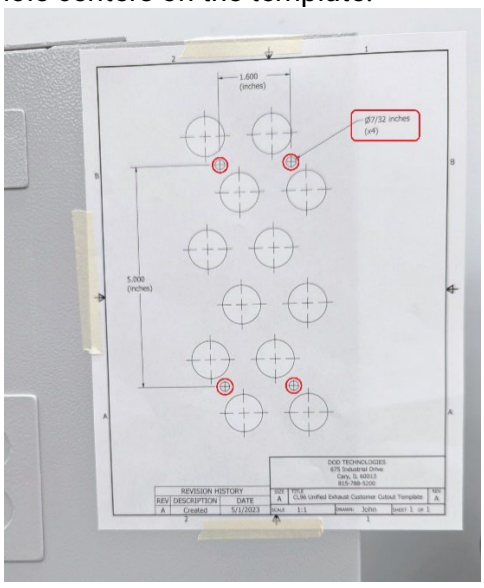


Image 7: CL96 side panel view with template affixed to the side panel.

3.4. Next using a drill with the 7/32” bit align the drill bit with the center punch indentation to drill out the mounting holes for the exhaust manifold.

3.5. Deburr the (4) holes.

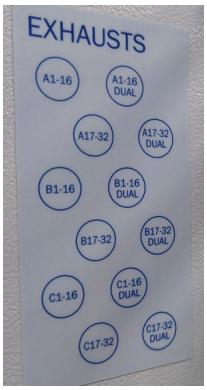
Images 8 and 9: CL96 side panel view with (4) mounting holes the side panel.

3.6. Remove the template and drop cloth.
NOTE: Ensure metal fillings are completed removed from the enclosure interior to prevent shorts or any other damage.
3.7. The side panel is now ready to mount the Exhaust Manifold.

4. Installation of Exhaust Manifold.
4.1. Utilizing the (4) 10-32 3/8” long screws mount the manifold to the side of the enclosure. Utilize typical torque for a 10-23 stainless steel screw.
4.2. Mount the manifold with the outlet port facing upwards or downwards according to your location requirements.

Images 10, 11, and 12: CL96 side panel view with (4) mounting holes the side panel.

4.3. Re-installing the system exhaust tubing following the labeling placed on the tubing/plugs when they were disconnected in section 2. For ease of installation start with the lower exhaust tubing/plug first. Ensure fittings/plugs are fully seated to prevent any exhaust leak.



Images 13: Exterior label for Exhaust locations

Image 14: Example of fitting not fully seated. Image 15: Example of fitting fully seated.

Images 16, 17, and 18: Interior Exhaust tubing/plugs (varies depending on options installed)

4.4. Re-install rear panel.

4.5. Install Exhaust tubing into manifold.

4.6. Ensure exhaust tubing is fully seated.

5. Verify exhaust tubing is properly installed for the system.
6. Remove Lockout/Tagout equipment and apply power to the system.
7. Verify the system is operating properly with no exhaust leaks. Contact DOD service for support if required.

Appendix J – CL96 Pyrolyzer Option

Theory Of Operation

It's essential to understand that the pyrolyzer option involves a combination of pyrolysis and colorimetric detection. Here's a breakdown of the key specifications. The pyrolyzer option is specially designed to detect specific gases using high temperature “needed to induce molecular breakdown” and those gases are detected on ChemLogic® cassette.

CAUTION WARNINGS

Operation
Do not operate the pyrolyzer unit in a place where combustible gases or vapors are present. Operating the pyrolyzer unit in such an environment will lead to extreme dangers.

Tubing
The pyrolyzer option unit is designed to draw gases under atmospheric pressure. Ensure that the sampling does not have excessive pressure applied to the pyrolyzer option while used. Detected gases must be exhausted via exhaust tubing in a safe manner.

Pyrolyzer oven
The pyrolyzer oven (contained within the option analyzer drawer) becomes hot when in operation. Do not touch the pyrolyzer oven because your hands may be burnt. Do not touch the pyrolyzer oven just after power-off because it is still hot. The pyrolyzer operates at a very high temperature. Before performing any service, always wait 15 minutes after powering off to allow the pyrolyzer to return to room temperature.

1. Pyrolysis Oven Specifications:

- **Temperature Range:**
  - Typically, the Pyrolyzer oven operates > 800°C.
  - The Pyrolyzer oven controls the temperature based upon the factory calibration.
  - Each Pyrolyzer oven pyrolysis for 4 points.
- **Sample Handling:**
  - The sample gas passes through the pyrolysis oven.
- **Heating Method:**
  - The method uses heating of the sample (e.g., furnace, resistive heating) influences temperature uniformity and control.
  - Pyrolysis involves using heat to break down (or "crack") gas molecules. The temperatures needed to induce molecular breakdown are dependent on the molecular species.
  - This results in the gaseous molecules breaking apart into different, sometimes smaller, molecular species.
  - The byproducts of the pyrolyzed gas are then detected using colorimetric principles.

2. Colorimetric Detection Specifications:

- **Detection Principle:**
  - Colorimetric detection relies on chemical reactions that produce a color change proportional to the concentration of the target analyte.
- **Reagent Chemlogic® Cassettes:**

- These contain the chemical reagents necessary for the colorimetric reactions.
- Specifications include the range of detectable gases, sensitivity (detection limits), and accuracy. Refer to DOD detectable gases website and product specifications.

- **Optical System:**
  - Use of an optical system to measure the color change. This involves:
    - Light source (e.g., LED).
    - Optical sensors (e.g., photodiodes).
- **Data Acquisition and Analysis:**
  - The system can acquire and analyze the colorimetric data.
  - Software for data processing, calibration, and reporting is essential.
- **Detection Range:**
  - This is the range of concentration of the target gas that can be accurately measured. This is often in the parts per million (ppm) or parts per billion (ppb) range.
- **Response time:**
  - The time it takes for the system to report a gas concentration.

3. System Specifications:

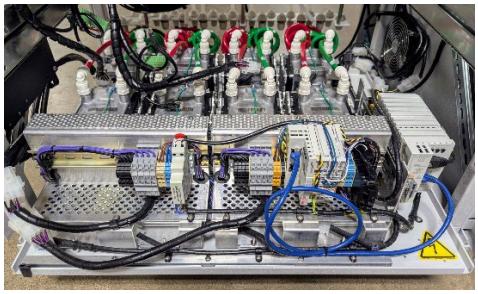
- **Automation:**
  - Automated operation enhances efficiency and reduces human error.
- **Data Logging and Connectivity:**
  - Logs data (e.g., computers, networks) is essential for data management.
- **Safety Features:**
  - Pyrolyzer Safety features:
    - Fan operation both on main enclosure and at the 4-point oven.
    - Individual Pyrolyzer element monitoring.
    - Sample(s) disabled if fault occurs. Along with system fault indicators.

Key Datasheet Components:

- **General Information:**
  - CL96 Pyrolyzer Anaylzer Option Drawer contains 16 points. A total of two Pyrolyzer Anaylzer Option Drawers can be configured into a CL96 system. This provides the capability of up to 32 points (configured at Analyzer Drawer B and Analyzer Drawer C). For a CL96 configuration with Analyzer Drawer A [configured for non-pyrolyzer points (Hydrides, Acis, Etc.)] would allow a maximum of 64 points (16 or 32 points in Analyzer Drawer A plus Pyrolyzer Analyzers Drawer B and C).
  - When configuring CL96 system with the Pyrolyzer option(s) follow the requirements listed below.
    - Drawer C Pyrolyzer is populated first (Points C1-16). Drawer C must be configured/installed before installation of Drawer B due to wiring and cooling requiremtents.
      - 2-800-060 Option CL96 Pyrolyzer (Point C1-16) Analyzer Ordered Separately
      - 2-800-060-FIELD Option CL96 Pyrolyzer (Point C1-16) Analyzer Ordered Separately Includes Power Supply Assembly w/Pyrolyzer Components and Pyro Fan w/Sense

- Drawer B Pyrolyzer is populated second (Points B1-16). Drawer C Pyrolyzer should only be installed when Drawer C Pyrolyzer is populated first.
  - 2-800-061 Option CL96 Pyrolyzer (Point B1-16) Analyzer Ordered Separately
  - 2-800-061-FIELD Option CL96 Pyrolyzer (Point B1-16) Analyzer Ordered Separately Includes Power Supply Assembly w/Pyrolyzer Components and Pyro Fan w/Sense


Pyrolyzer Analyzer Drawer Assembly


Pyrolyzer Pump Plate Assembly

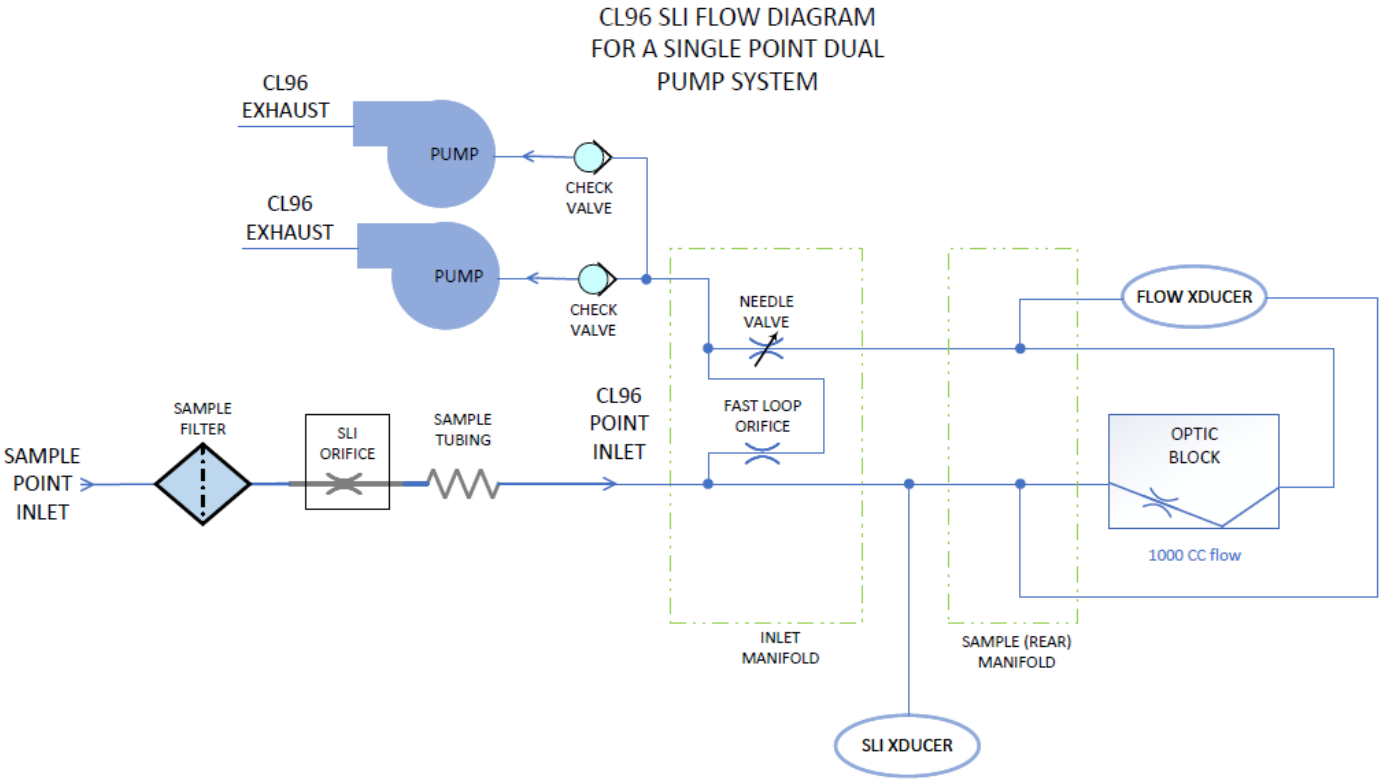

CL96 4 Fan side panel

- The CL96 Pyro option intended application is for gases that require pyrolysis to be detectable with a Chemlogic® cassette.
- Review section in manual regarding Theory of Operations for the pyrolyzer option.

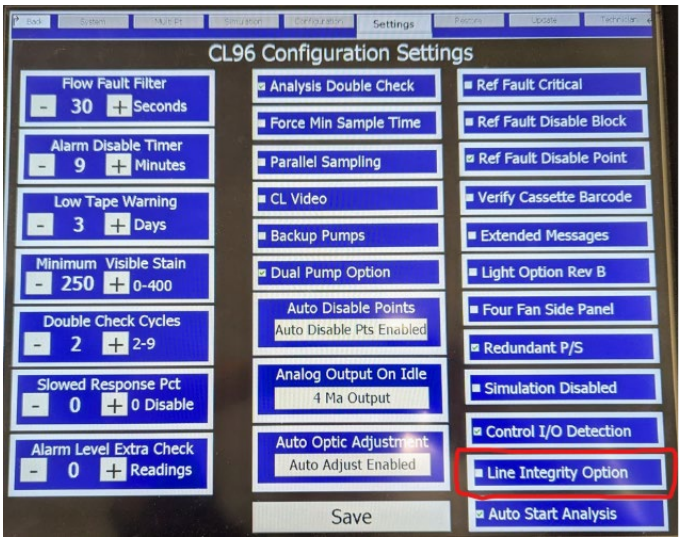
- **Technical Specifications:**
  - **Temperature:**
    - Operating temperature ≈1000°C.
    - Temperature control calibration performed during factory assembly of analyzer.
  - **Heating Method:**
    - Quartz tube with heating elements and PCB control circuitry.
  - **Sample Handling:**
    - Sample type gas.
    - 200cc flow rate passed through pyrolyzer oven.
  - **Gas Flow:**
    - Older 6 pump system type ≥1.5 LPM (typ. 1.6LPM, uses 1 pump for 16 pts).
    - 12 pump system type ≥ 2.1LPM (typ. 2.3LPM, uses Daul pump for 16 points).
  - **Analytical Capabilities:**
    - Detection limits dependent upon selected gas detection in software settings.

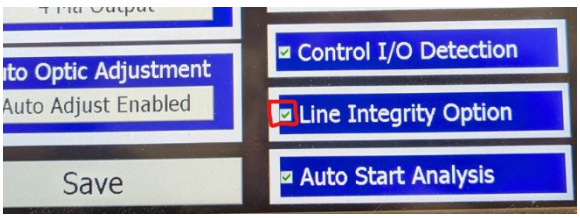
Appendix K – Line Integrity Setup and Verification Process

1. Follow standard CL96 installation processes
2. In this example, 60M (197 ft.) lines have been installed
3. After sample inlet tubing is in place:
    a) Install the Line Integrity (LI) orifice on the end of the tubing
    b) Install the sample filter before the LI orifice (reference the flow diagram below)

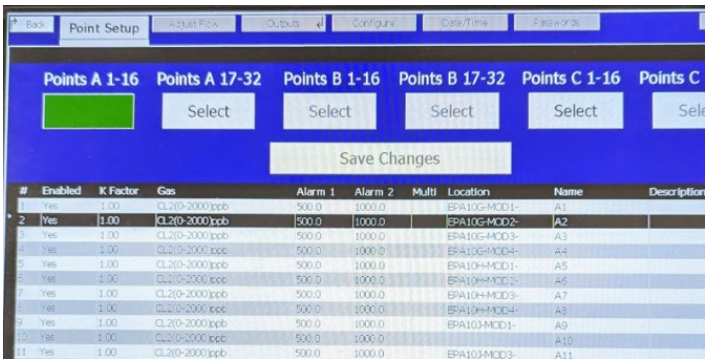


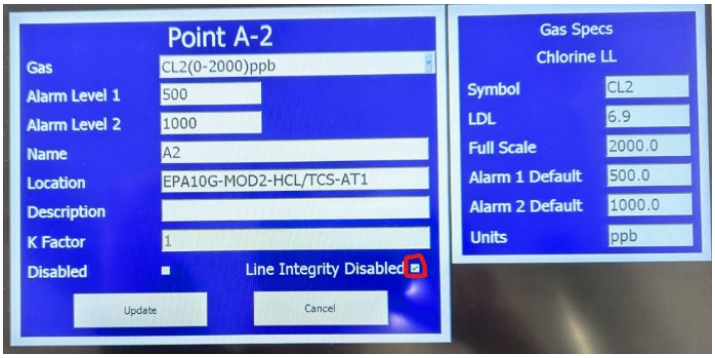
4. Power on the CL96 and enter the Settings menu to enable the Line Integrity option. Click the Save button.



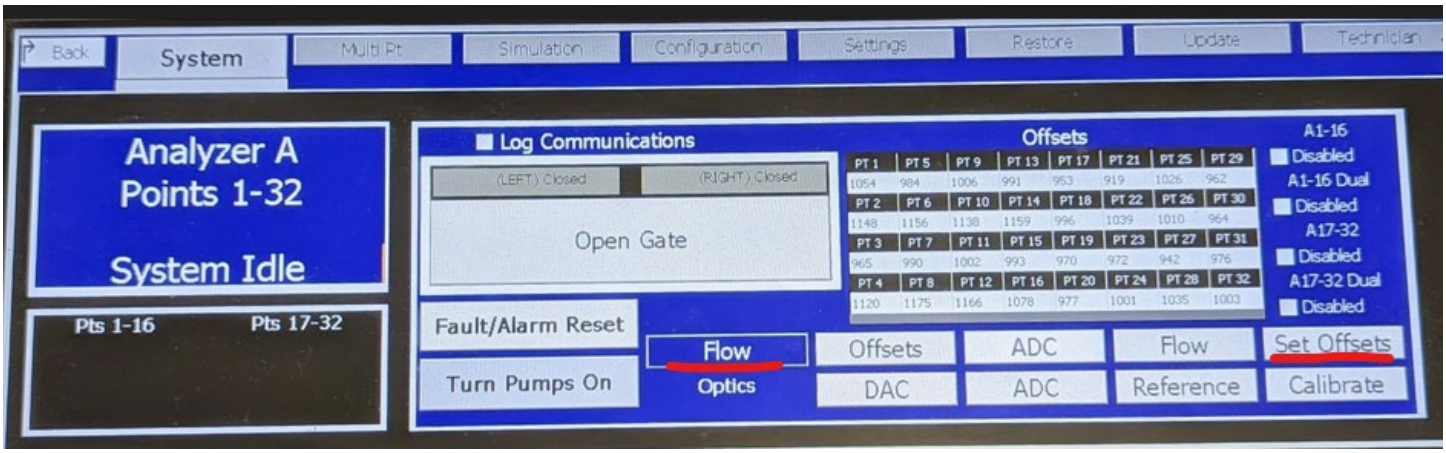


5. Ensure the points with the LI orifice installed are enabled. If a point does not have the LI orifice installed, the Line Integrity feature must be disabled for the point.
    a) Note, when the Line Integrity option is enabled all points are enabled by default.
    b) Points not using Line Integrity must be individually disabled if the LI orifice is not installed. Failure to setup the Line Integrity feature properly could cause false alarms.
    c) Enter the Point Setup menu to disable or enable the Line Integrity feature for individual points.

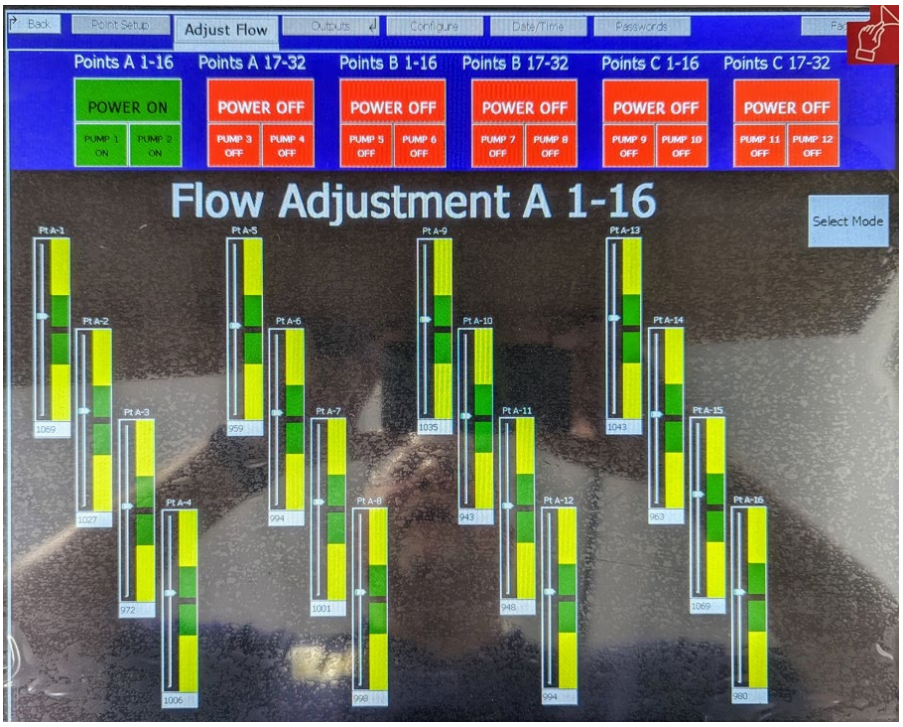




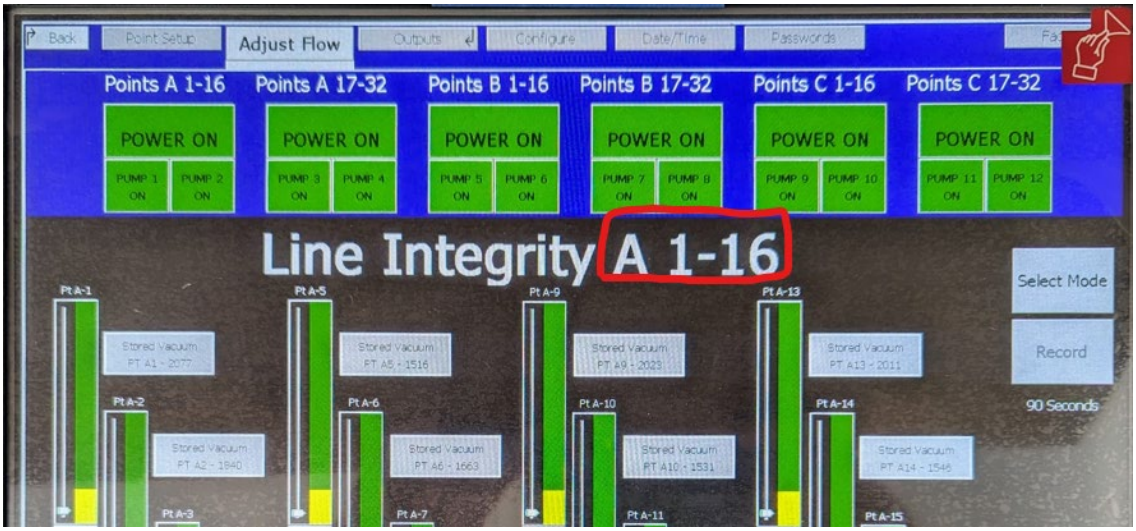
6. After the Line Integrity is enabled on points installed with the Line Integrity orifice, proceed to the System menu.
7. Set Offsets for both the flow and Line Integrity Transducers. Press the Set Offsets button and the offsets will be performed for both transducers.



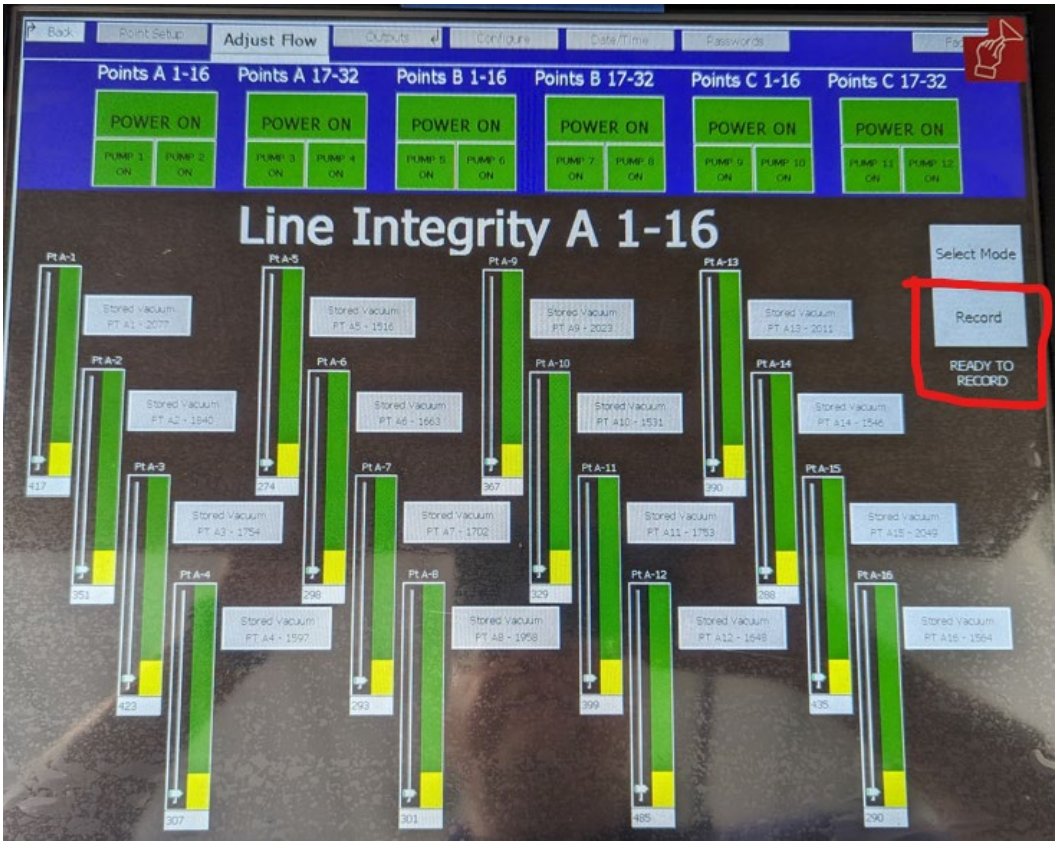
8. Adjust Flow is now performed as would normally done for a CL96 system.
    a) Adjust the flow for each point and Analzyer pump group.



    b) Verify the flow value drops to zero when the corresponding point is plugged at the end of the sample line. Plugging the end of the sample line and observing the flow value verifies the integrity of the line (no leaks).
    c) After all points for each Analyzer and pump group has been flow balanced press the Select Mode button.
    d) All enabled/installed Analyzers/Pumps will automatically turn on.
    e) After a minimum of 90 seconds the Line Integrity readings will stabilize.

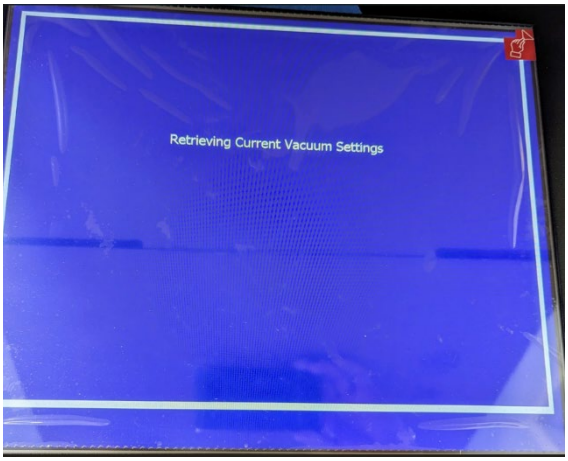


f) After a minimum of 90 seconds, the Record button will be enabled and 'READY TO RECORD' will be displayed.

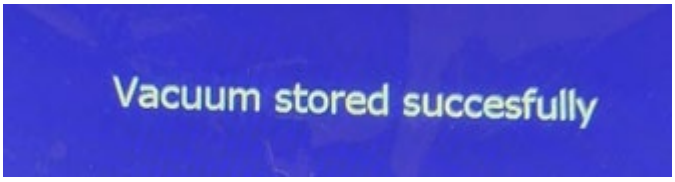


g) Press the Record button for the current group of points. This example was shown for Points A 1-16.

h) The display will show the message below while recording Line Integrity values.

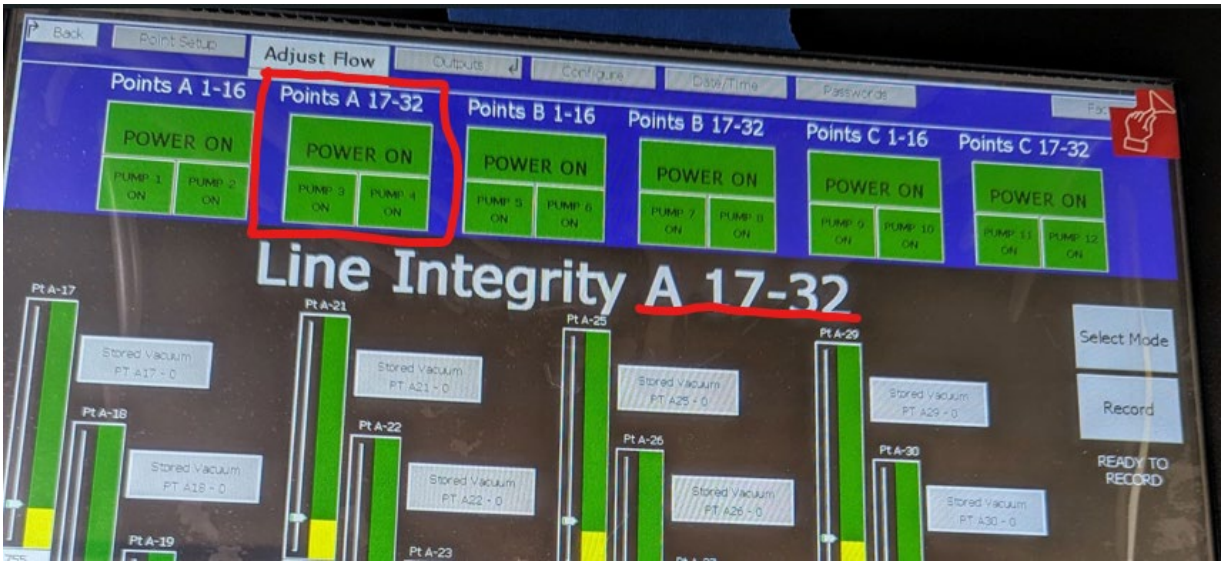


i) When the values have completed recording, the following is displayed:



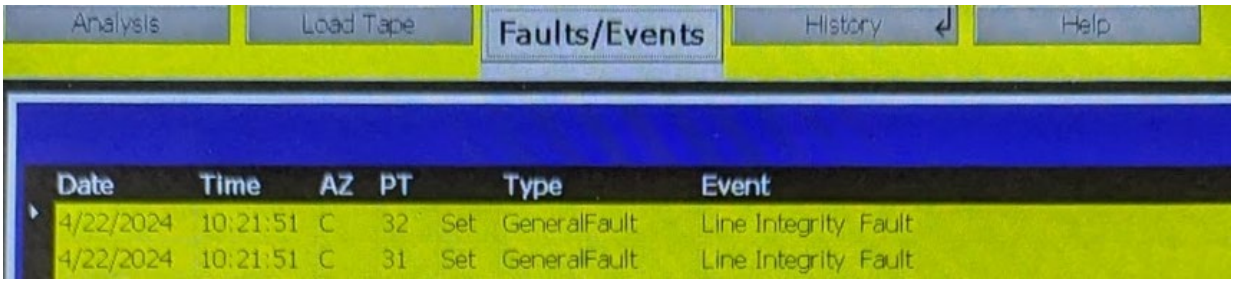
j) Verify the display shows 'Vacuum stored successfully'.

k) Press the Power On button for Points A 17-32.



l) Press the Record button for the group of points
m) Repeat the last 6 steps to record the other group of Points if the option is installed.
n) After all point groups have had the Line Integrity Recorded return the Analysis display and enter Analysis.
o) Run in Analysis mode for a minimum of 10 minutes.
p) Verify no Line Integrity faults occur.

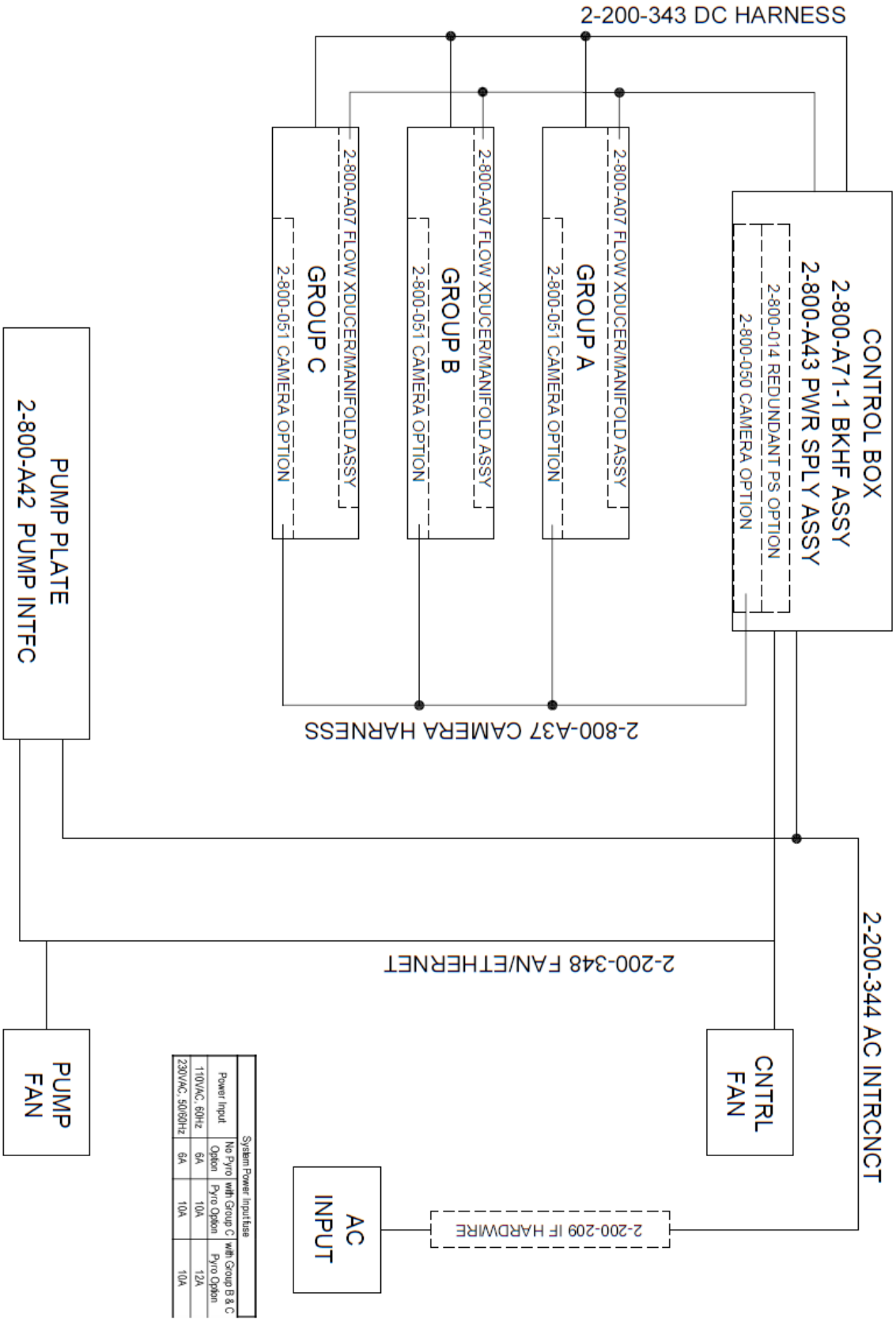
9. To verify the Line Integrity feature is functioning perform the following steps to verify.
    a) Remove the line filter, Line Integrity Orifice, and shorten the amount of tubing by a minimum of 10-15%. Perform this step for each point that is to be verified.
    b) Wait a minimum of 10 minutes.
    c) For the points that are being verified (points that had the filter, Line Integrity Orifice, and shorter tubing). A General Fault (Maintenance) alarm should occur. The alarm will be displayed as the example below.

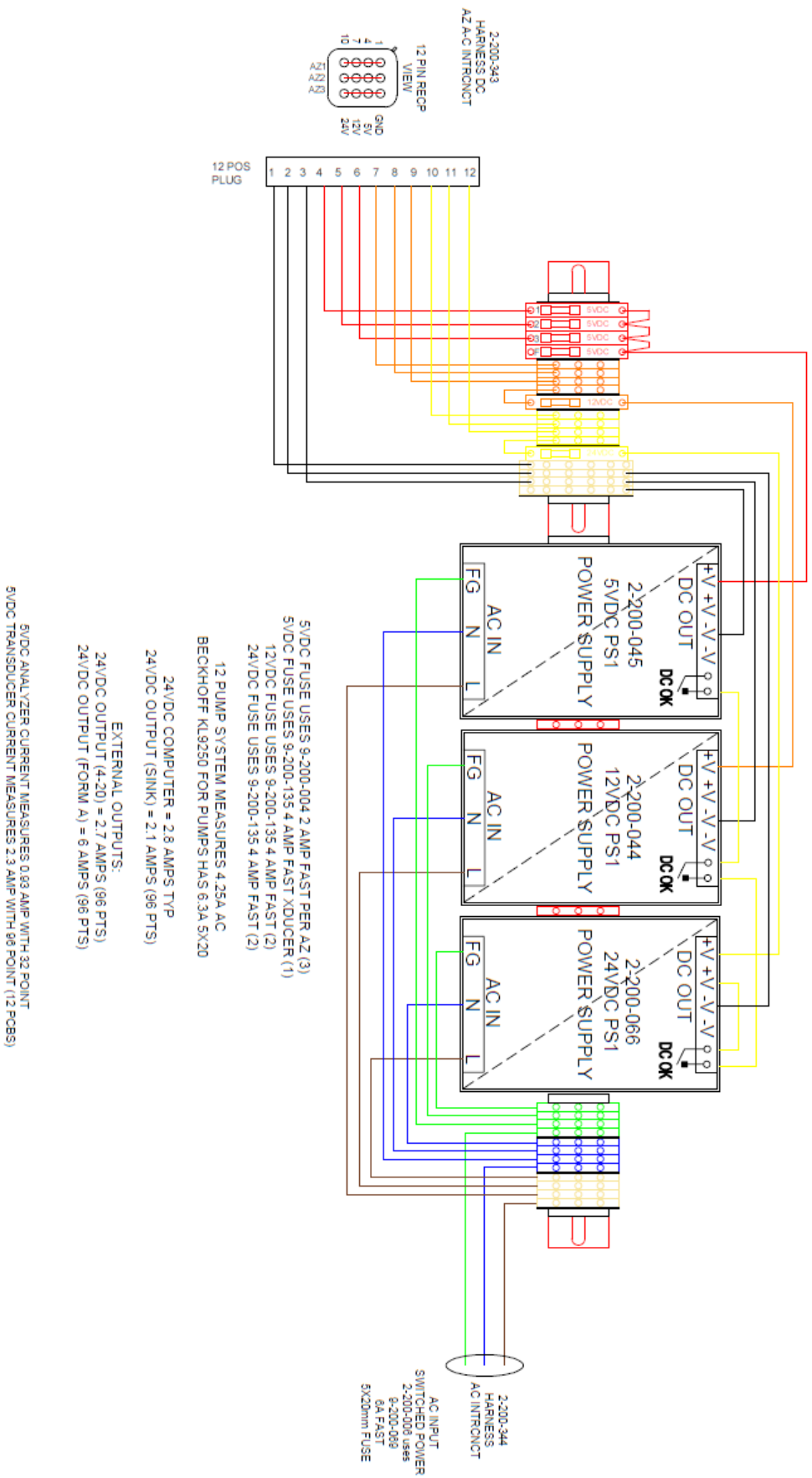


    d) Line Integrity software test conditions as follows:
        1. **Condition 1**: When the sample line is cut and loses ↓ 10% or greater of tubing, LI orifice, and filter the FLOW transducer counts ↑ increase and the LI sample transducer counts ↓ decrease. IF THIS CONDITION occurs issue a LI fault notification.
        2. **Condition 2**: When the sample line is kinked/pinched the FLOW transducer counts ↓ decrease and the LI sample transducer counts ↑ increase. IF THIS CONDITION occurs issue a LI fault notification for a kinked/pinched line.
        3. **Condition 3**: During normal operation, the sample line flow can fluctuate. When the FLOW transducer counts ↓ decrease and the LI sample transducer counts ↓ decrease at least 150. DO NOT ALLOW a LI fault notification to be issued.
        4. **Condition 4**: During normal operation, the sample line flow can fluctuate. When the FLOW transducer counts ↑ increase and the LI sample transducer counts ↑ increase at least 300. DO NOT ALLOW a LI fault notification to be issued.
    e) Testing of the Line Integrity option is now complete. The option has been verified as functioning.
    f) Restore the line filter, Line Integrity Orifice, and tubing length to the initial installation setup criteria.

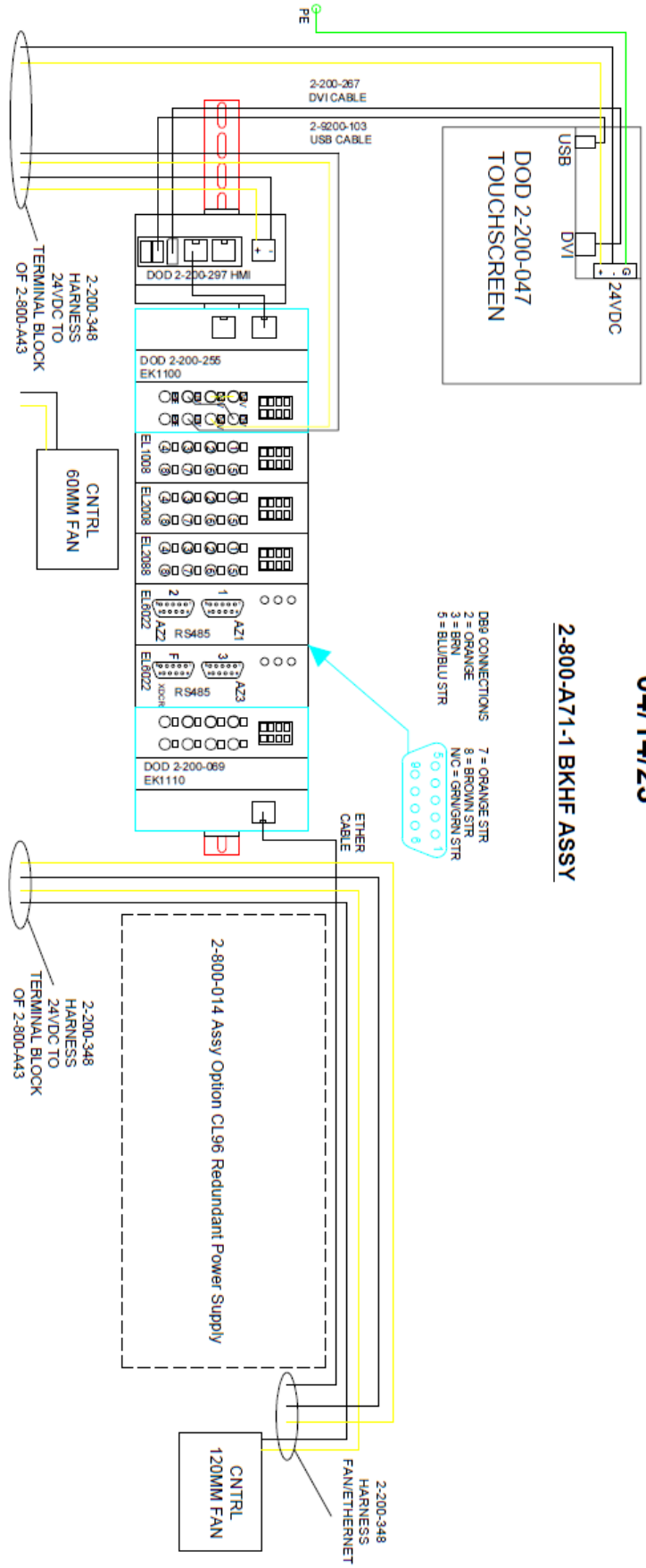
10. The CL96 system is now ready to enter into normal operation.

Appendix L – Wiring Diagrams




CL96 SN > 12000 CONTROL BOX WIRING page 2 of 9
04/14/23
2-800-A43 CONTROL BOX POWERSUPPLY
2-200-343
HARNESS DC
AZ A-C INTRONCT
12 PIN RECP
VIEW
GND
5V
12V
24V
12 POS
PLUG
1 2 3 4 5 6 7 8 9 10 11 12
5VDC
12VDC
2-200-045
5VDC PS1
POWER SUPPLY
2-200-044
12VDC PS1
2-200-066
24VDC PS1
AC IN
FG
N
L
DC OUT
+V +V -V -V
DC OK
2-200-344
HARNESS
AC INTRONCT
AC INPUT
SWITCHED POWER
2-200-008 uses
9-200-089
6A FAST
5X20mm FUSE
5VDC FUSE USES 9-200-004 2 AMP FAST PER AZ (3)
5VDC FUSE USES 9-200-135 4 AMP FAST XDUCER (1)
12VDC FUSE USES 9-200-135 4 AMP FAST (2)
24VDC FUSE USES 9-200-135 4 AMP FAST (2)
12 PUMP SYSTEM MEASURES 4.25A AC
BECKHOFF KL9250 FOR PUMPS HAS 6.3A 5X20
24VDC COMPUTER = 2.8 AMPS TYP
24VDC OUTPUT (SINK) = 2.1 AMPS (96 PTS)
EXTERNAL OUTPUTS:
24VDC OUTPUT (4-20) = 2.7 AMPS (96 PTS)
24VDC OUTPUT (FORM A) = 6 AMPS (96 PTS)
5VDC ANALYZER CURRENT MEASURES 0.93 AMP WITH 32 POINT
5VDC TRANSDUCER CURRENT MEASURES 2.3 AMP WITH 96 POINT (12 PCBS)

CL96 SN > 12000 CONTROL BOX WIRING page 3 of 9
04/14/23



2-800-A71-1 BKHF ASSY

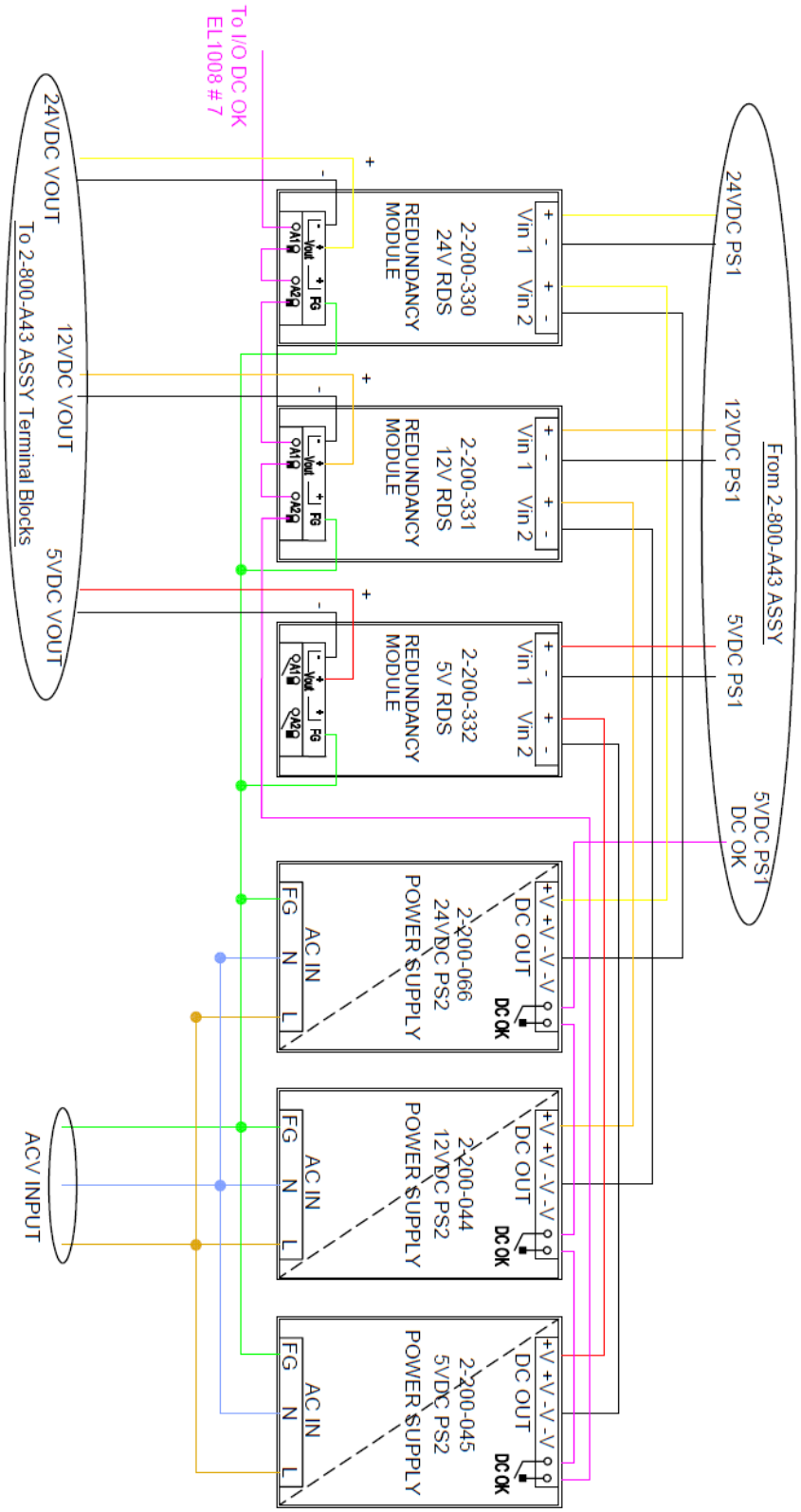
2-800-A43 TERMINAL BLOCKS

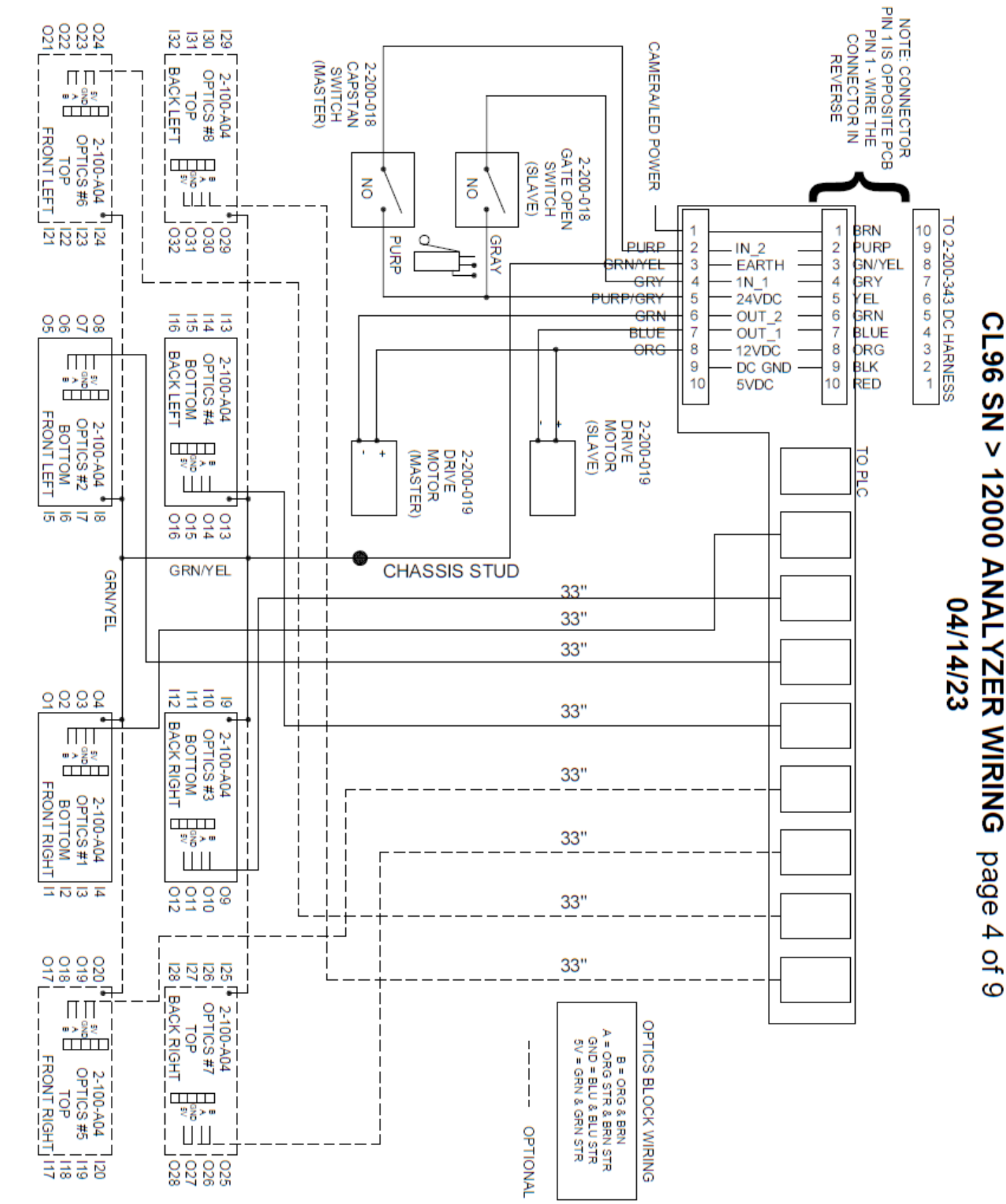
WIRE GROUP	WIRE COLOR	DISPLAY	BKHF HMI	EK1100	CNTRL FAN	2-200-348 HARNESS
24V	YEL	24V IN	24V	24V	24V	24V
0V	BLK	0V IN	GND	0V	0V	0V

2-200-343 DC HARNESS TO CONTROLS CONNECTION TABLE

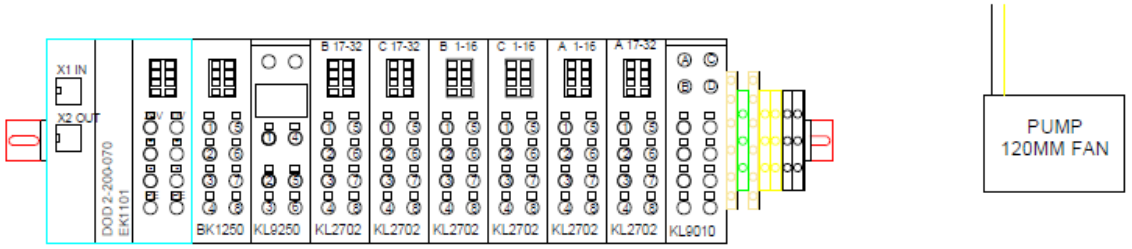
WIRE GROUP	WIRE COLOR	EL1008	EL2008	EL2088
1	GRN	x	x	2
	GRY	1	x	x
	BLU	x	x	1
	PUR	2	x	x
2	GRN	x	x	4
	GRY	3	x	x
	BLU	x	x	3
	PUR	4	x	x
3	GRN	x	x	6
	GRY	5	x	x
	BLU	x	x	5
	PUR	6	x	x

DB9 CABLE GROUP	EL6022 (LEFT)	EL6022 (RIGHT)
1	TOP CONN	x
2	BOTTOM CONN	
3	x	x
F	x	TOP CONN
		BOTTOM CONN


2-800-014
CL96 REDUNDANT POWER SUPPLY OPTION
WIRING DIAGRAM
From 2-800-A43 ASSY
24VDC PS1
12VDC PS1
5VDC PS1
5VDC PS1 DC OK
To I/O DC OK EL1008 #7
24VDC VOUT
12VDC VOUT
5VDC VOUT
To 2-800-A43 ASSY Terminal Blocks
ACV INPUT
2-200-330 24V RDS REDUNDANCY MODULE
2-200-331 12V RDS REDUNDANCY MODULE
2-200-332 5V RDS REDUNDANCY MODULE
Vin 1
Vin 2
2-200-066 24VDC PS2 POWER SUPPLY
2-200-044 12VDC PS2 POWER SUPPLY
2-200-045 5VDC PS2 POWER SUPPLY
AC IN
FG
N
L
DC OUT
+V +V -V -V
DC OK


CL96 SN > 12000 ANALYZER WIRING page 4 of 9
04/14/23
NOTE: CONNECTOR PIN 1 IS OPPOSITE PCB PIN 1 - WIRE THE CONNECTOR IN REVERSE
TO 2-200-343 DC HARNESS
CAMERA/LED POWER
2-200-018 CAPSTAN SWITCH (MASTER)
2-200-018 GATE OPEN SWITCH (SLAVE)
2-200-019 DRIVE MOTOR (MASTER)
2-200-019 DRIVE MOTOR (SLAVE)
TO PLC
CHASSIS STUD
GRN/YEL
33"
OPTICS BLOCK WIRING
B = ORG & BRN
A = ORG STR & BRN STR
GND = BLU & BLU STR
5V = GRN & GRN STR
OPTIONAL
2-100-A04 OPTICS #8 TOP BACK LEFT
2-100-A04 OPTICS #6 TOP FRONT LEFT
2-100-A04 OPTICS #4 BOTTOM BACK LEFT
2-100-A04 OPTICS #2 BOTTOM FRONT LEFT
2-100-A04 OPTICS #3 BOTTOM BACK RIGHT
2-100-A04 OPTICS #1 BOTTOM FRONT RIGHT
2-100-A04 OPTICS #7 TOP BACK RIGHT
2-100-A04 OPTICS #5 TOP FRONT RIGHT

CL96 SN > 12000 PUMP PLATE WIRING page 5 of 9
04/14/23

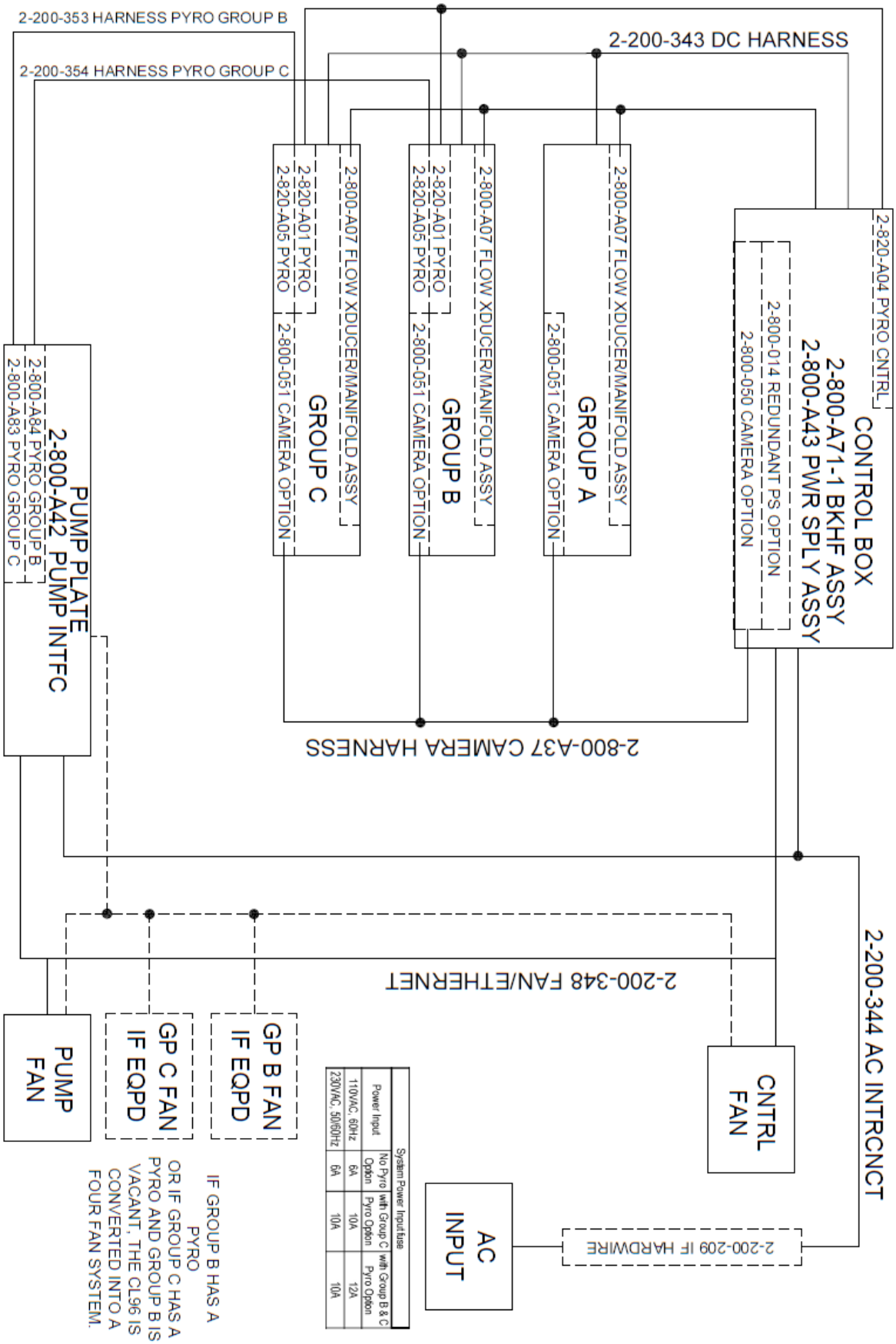


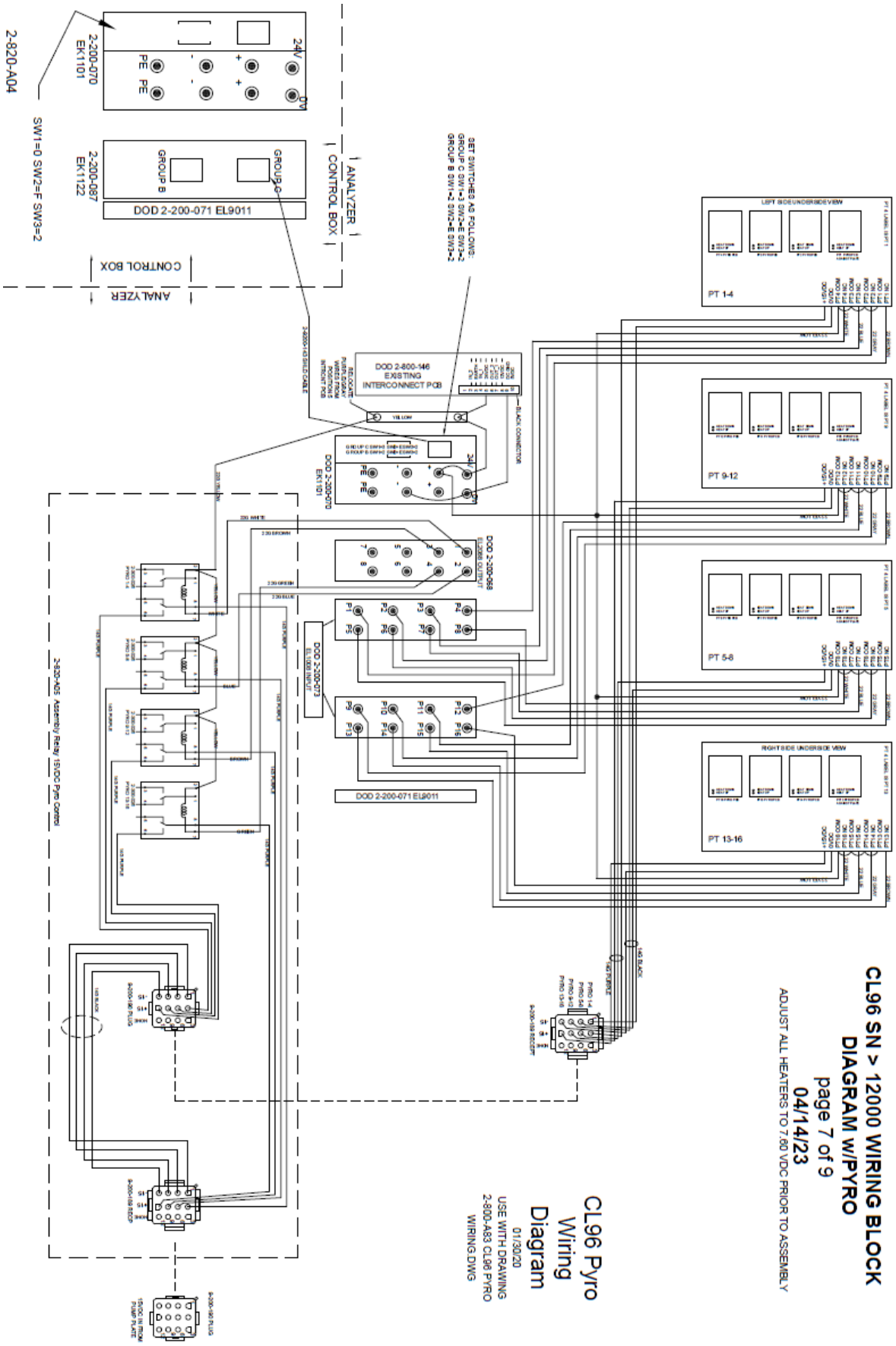
2-200-246 HARNESS TO BKHF MODULE PIN

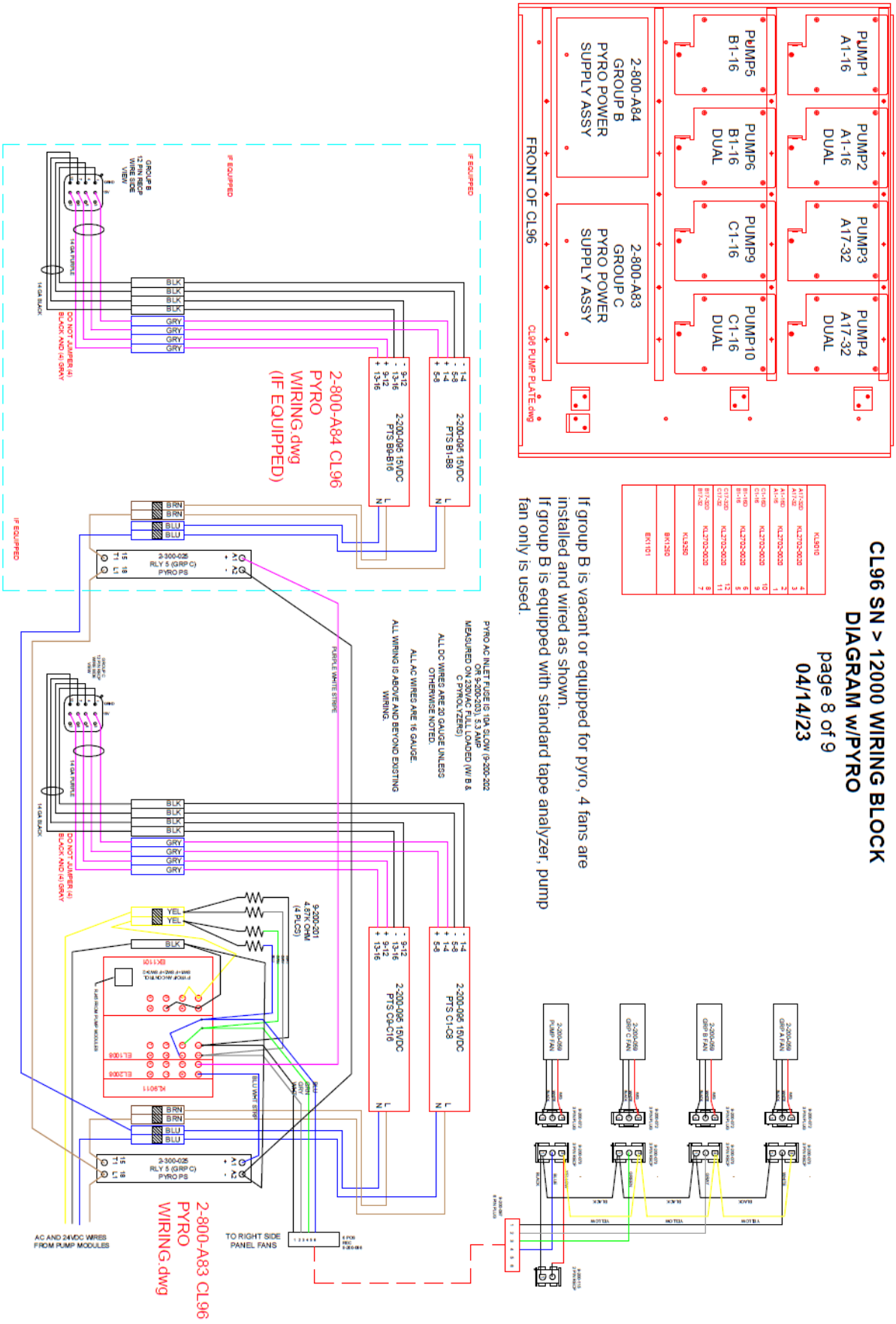
PUMP	WIRE COLOR	KL2702 / B 17-32	KL2702 / C 17-32	KL2702 / B 1-16	KL2702 / C 1-16	KL2702 / A 1-16	KL2702 / A 17-32
PUMP	BRN	1	x	x	x	x	x
	BLU	3	x	x	x	x	x
DUAL PUMP	BRN	5	x	x	x	x	x
	BLU	7	x	x	x	x	x
PUMP	BRN	x	1	x	x	x	x
	BLU	x	3	x	x	x	x
DUAL PUMP	BRN	x	5	x	x	x	x
	BLU	x	7	x	x	x	x
PUMP	BRN	x	x	1	x	x	x
	BLU	x	x	3	x	x	x
DUAL PUMP	BRN	x	x	5	x	x	x
	BLU	x	x	7	x	x	x
PUMP	BRN	x	x	x	1	x	x
	BLU	x	x	x	3	x	x
DUAL PUMP	BRN	x	x	x	5	x	x
	BLU	x	x	x	7	X	x
PUMP	BRN	x	x	x	x	1	x
	BLU	x	x	x	x	3	x
DUAL PUMP	BRN	x	x	x	x	5	x
	BLU	x	x	x	x	7	x
PUMP	BRN	x	x	x	x	x	1
	BLU	x	x	x	x	x	3
DUAL PUMP	BRN	x	x	x	x	x	5
	BLU	x	x	x	x	x	7

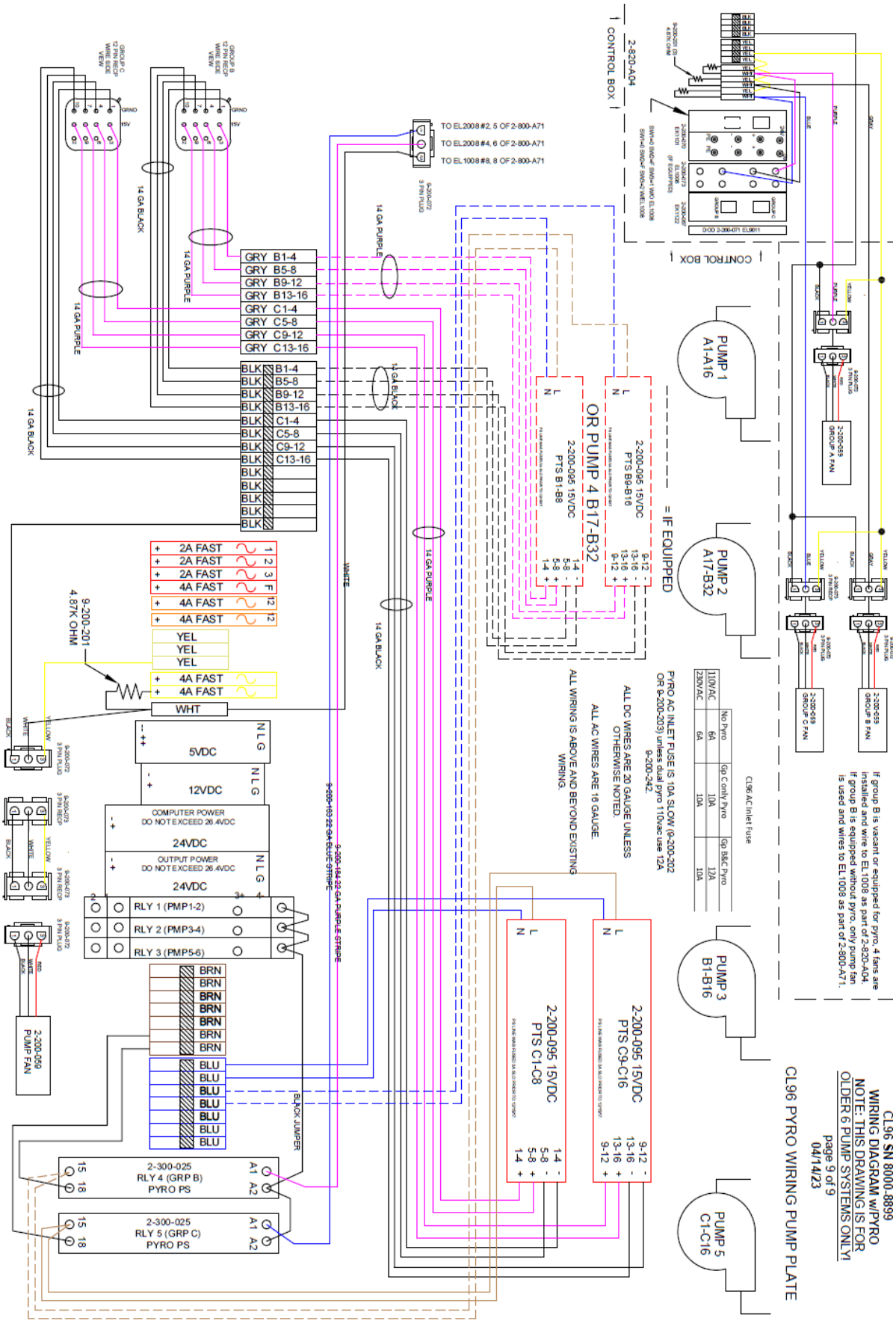
HARNESS TO BKHF MODULE PIN

HARNESS	CABLE/ WIRE COLOR	EK1101	EK1250	KL9250
2-200-348	ETHERNET	X1 IN	x	x
	YEL	24V	1 (24V)	x
	BLK	0V	5 (0V)	x
2-200-344	BRN	x	x	1
	BLU	x	x	2
	GRN/YEL	x	x	6


CL96 SN > 12000 WIRING BLOCK DIAGRAM w/PYRO page 6 of 9
04/14/23
2-200-353 HARNESS PYRO GROUP B
2-200-354 HARNESS PYRO GROUP C
2-200-343 DC HARNESS
CONTROL BOX
2-800-A71-1 BKHF ASSY
2-800-A43 PWR SPLY ASSY
2-820-A04 PYRO CNTRL
2-800-014 REDUNDANT PS OPTION
2-800-050 CAMERA OPTION
GROUP A
2-800-A07 FLOW XDUCER/MANIFOLD ASSY
2-800-051 CAMERA OPTION
GROUP B
2-820-A01 PYRO
2-820-A05 PYRO
2-800-A07 FLOW XDUCER/MANIFOLD ASSY
2-800-051 CAMERA OPTION
GROUP C
2-820-A01 PYRO
2-820-A05 PYRO
2-800-A07 FLOW XDUCER/MANIFOLD ASSY
2-800-051 CAMERA OPTION
2-800-A37 CAMERA HARNESS
PUMP PLATE
2-800-A42 PUMP INTFC
2-800-A84 PYRO GROUP B
2-800-A83 PYRO GROUP C
2-200-348 FAN/ETHERNET
2-200-344 AC INTRCNCT
2-200-209 IF HARDWIRE
AC INPUT
CNTRL FAN
PUMP FAN
GP C FAN IF EQPD
GP B FAN IF EQPD
System Power Input fuse
Power Input
No Pyro Option
with Group C Pyro Option
with Group B & C Pyro Option
110VAC, 60Hz
230VAC, 50/60Hz
6A
6A
10A
10A
12A
10A
IF GROUP B HAS A PYRO OR IF GROUP C HAS A PYRO AND GROUP B IS VACANT, THE CL96 IS CONVERTED INTO A FOUR FAN SYSTEM.


2-920-A04
2-200-070 EK1101
2-200-087 EK1122
GROUP B
GROUP C
DOD 2-200-071 EL9011
SW1=0 SW2=F SW3=2
ANALYZER CONTROL BOX
CONTROL BOX
ANALYZER
SET SWITCHES AS FOLLOWS:
GROUP C SW1=3 SW2=E SW3=2
GROUP B SW1=2 SW2=E SW3=2
DOD 2-600-146 EXISTING INTERCONNECT PCB
DOD 2-200-070 EK1101
DOD 2-200-088
DOD 2-200-073
DOD 2-200-071 EL9011
LEFT SIDE UNDERSIDE VIEW
PT 1-4
PT 9-12
PT 5-8
RIGHT SIDE UNDERSIDE VIEW
PT 13-16
2-920-A05 Assembly Relay 150DC Pyro Control
CL96 SN > 12000 WIRING BLOCK DIAGRAM w/PYRO
page 7 of 9
04/14/23
ADJUST ALL HEATERS TO 7.60 VDC PRIOR TO ASSEMBLY
CL96 Pyro Wiring Diagram
01/30/20
USE WITH DRAWING 2-600-A83 CL96 PYRO WIRING.DWG


CL96 SN > 12000 WIRING BLOCK DIAGRAM w/PYRO
page 8 of 9
04/14/23
If group B is vacant or equipped for pyro, 4 fans are installed and wired as shown.
If group B is equipped with standard tape analyzer, pump fan only is used.
PUMP1 A1-16
PUMP2 A1-16 DUAL
PUMP3 A17-32
PUMP4 A17-32 DUAL
PUMP5 B1-16
PUMP6 B1-16 DUAL
PUMP9 C1-16
PUMP10 C1-16 DUAL
2-800-A84 GROUP B PYRO POWER SUPPLY ASSY
2-800-A83 GROUP C PYRO POWER SUPPLY ASSY
FRONT OF CL96
CL96 PUMP PLATE.dwg
2-800-A84 CL96 PYRO WIRING.dwg (IF EQUIPPED)
2-800-A83 CL96 PYRO WIRING.dwg
2-300-025 RLY 5 (GRP C) PYRO PS
2-200-066 15VDC PTS B1-B8
2-200-066 15VDC PTS B9-B16
2-200-066 15VDC PTS C1-C8
2-200-066 15VDC PTS C9-C16
9-200-201 4.87K OHM (4 PLCS)
PYRO AC INLET FUSE IS 10A SLOW (9-200-302 OR 9-200-203) 5.3 AMP MEASURED ON 230VAC FULL LOADED (W/ B & C PYROLYZERS)
ALL DC WIRES ARE 20 GAUGE UNLESS OTHERWISE NOTED.
ALL AC WIRES ARE 16 GAUGE.
ALL WIRING IS ABOVE AND BEYOND EXISTING WIRING.
AC AND 24VDC WIRES FROM PUMP MODULES
TO RIGHT SIDE PANEL FANS
KL9010
KL3250
KL2702-0020
KL2702-0030
EK1101
2-300-069 PUMP FAN
2-300-069 GRP C FAN
2-300-069 GRP B FAN
2-300-069 GRP A FAN


2-820-A04
CONTROL BOX
CONTROL BOX
TO EL2008 #2, 5 OF 2-800-A71
TO EL2008 #4, 6 OF 2-800-A71
TO EL1008 #8, 8 OF 2-800-A71
14 GA BLACK
14 GA PURPLE
GRY B1-4
GRY B5-8
GRY B9-12
GRY B13-16
GRY C1-4
GRY C5-8
GRY C9-12
GRY C13-16
BLK B1-4
BLK B5-8
BLK B9-12
BLK B13-16
BLK C1-4
BLK C5-8
BLK C9-12
BLK C13-16
PUMP 1
A1-A16
PUMP 2
A17-B32
OR PUMP 4 B17-B32
= IF EQUIPPED
2-200-095 15VDC
PTS B1-B8
2-200-095 15VDC
PTS B9-B16
2A FAST
2A FAST
2A FAST
4A FAST
4A FAST
4A FAST
YEL
YEL
YEL
4A FAST
4A FAST
WHT
9-200-201
4.87K OHM
5VDC
12VDC
COMPUTER POWER
DO NOT EXCEED 26.4VDC
24VDC
OUTPUT POWER
DO NOT EXCEED 26.4VDC
24VDC
RLY 1 (PMP1-2)
RLY 2 (PMP3-4)
RLY 3 (PMP5-6)
BRN
BLU
2-300-059
PUMP FAN
2-300-025
RLY 4 (GRP B)
PYRO PS
2-300-025
RLY 5 (GRP C)
PYRO PS
BLACK JUMPER
WHITE
9-200-163 22 GA BLUE STRIPE
9-200-164 22 GA PURPLE STRIPE
ALL WIRING IS ABOVE AND BEYOND EXISTING WIRING.
ALL AC WIRES ARE 18 GAUGE.
ALL DC WIRES ARE 20 GAUGE UNLESS OTHERWISE NOTED.
9-200-242.
PYRO AC INLET FUSE IS 10A SLOW (9-200-202 OR 9-200-203) unless dual pyro 110vac use 12A
CL96 AC Inlet Fuse
110VAC
230VAC
No Pyro
6A
6A
Gp C only Pyro
10A
10A
Gp B&C Pyro
12A
10A
2-200-095 15VDC
PTS C1-C8
2-200-095 15VDC
PTS C9-C16
PUMP 3
B1-B16
PUMP 5
C1-C16
If group B is vacant or equipped for pyro, 4 fans are installed and wire to EL1008 as part of 2-820-A04.
If group B is equipped without pyro, only pump fan is used and wires to EL1008 as part of 2-800-A71.
CL96 PYRO WIRING PUMP PLATE
CL96 SN 8000-8899
WIRING DIAGRAM w/PYRO
NOTE: THIS DRAWING IS FOR
OLDER 6 PUMP SYSTEMS ONLY!
page 9 of 9
04/14/23