



ChemLogic® Revive™ CL4R

4-Point Continuous Gas Detector Operating Manual

Original Instructions

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UK/EC DECLARATION OF CONFORMITY

Original

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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).

Machine Details

Product: Continuous Gas Monitor

Model: ChemLogic® Revive™ CL4R

Power Supply: 230 Vac, Single Phase 50Hz + PE

Standards utilised for compliance.**BS EN Standards Referenced**

BS EN ISO 11201:2010; BS EN ISO 12100:2010; BS EN ISO 13732-1:2008; BS EN ISO 13857:2019; BS EN ISO 14118:2018; BS EN ISO 14120:2015; BS EN 55011:2016+A2:2021; BS EN IEC 60204-1:2018; BS EN 61000-4-2:2019; BS EN IEC 61000-4-3:2021 and BS EN 61000-4-4:2019.

I declare that the machinery fulfils all the relevant provisions of these UK Regulations: Supply of Machinery (Safety) Regulations 2008 as amended and the Electromagnetic Compatibility Regulations 2016 as amended; and these European Directives: Machinery Directive 2006/42/EC and the Electromagnetic Compatibility Directive 2014/30/EU.

Place of Declaration

DOD Technologies
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Cary, IL 60013
USA

Person Empowered to Draw Up Declaration

Printed Name: Danny O'Donnell

Position held: Co-CEO & CTO

ORIGINAL DECLARATION



EMC Considerations

Your DOD Technologies continuous gas monitor has been designed to comply with Electromagnetic Compatibility (EMC) standards applicable at the time of its manufacturing. The design includes filtering, shielding and bypassing techniques. At the time of certification, simulated customer Input/ Output (I/O) schemes were tested.

All methods used in your equipment for emission suppression and reduction of susceptibility are interactive. Modifications to the monitor could result in increased emissions and higher vulnerability to other radiated fields.

Following the guidelines in this EMC Considerations section will ensure your monitor maintains an enhanced degree of EMC integrity. The guidelines listed apply only to I/O emissions and do not apply to A/C and D/C monitor power connections.

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Chapter 1 – Overview

1.1 Introduction

DOD Technologies' ChemLogic® Revive™ CL4R continuous gas detector simultaneously monitors up to four locations (or *points*) for targeted toxic and corrosive gases. The system can serve as a direct replacement for legacy CM4 units by seamlessly connecting into an existing CM4 rack enclosure. 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 CL4R 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 CL4R 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 CL4R employs DOD Technologies' ChemLogic colorimetric technology, utilizing ChemLogic cassettes with chemically infused tape for fast and accurate gas detection.



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 Sampling and Monitoring

The system draws sample flow simultaneously from all four sample locations to the ChemLogic CL4R. Part of the sample flow is diverted across the ChemLogic cassette where it is analyzed. All channels exhaust through a single port.

1.3 Theory of Operation

The system simultaneously extracts ambient samples from up to four locations (or points). The sample drawn is diverted across the ChemLogic cassette. The CL4R uses an advanced optical detection system to analyze the ambient samples drawn to the ChemLogic cassette. As a target gas is detected, the cassette records a colored stain from the sample pulled. This results in a loss of reflected light which is detected by the optics system. The CL4R will then report a gas concentration reading and/or a gas alarm.

Chapter 2 – Features & Layout

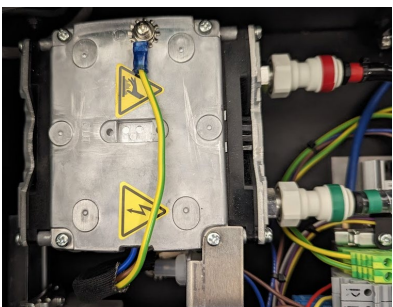
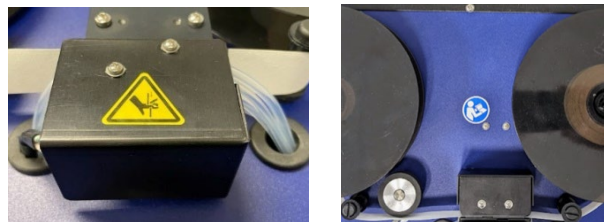
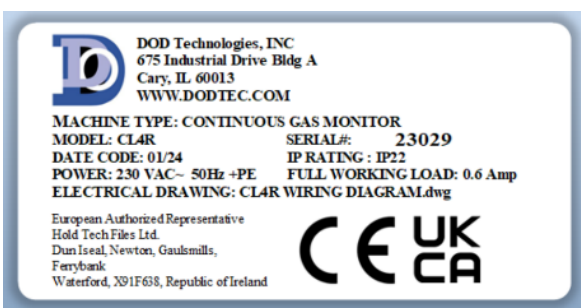
2.1 Features

2.1.1 Warning Labels, Descriptions, & Danger Zones

The table below references the warning labels (with descriptions) that may be encountered while operating and servicing the ChemLogic CL4R continuous gas detection system.

	<u>WARNING:</u> Hot Surface. This surface will be hot to the touch and may cause injury. Please avoid or take extra caution when working near this zone.
	<u>WARNING:</u> Pinch Point. This area has possible pinch points. Please avoid or take extra caution when working near this zone.
	<u>WARNING:</u> Protective Earth Ground. Terminal intended for connection to the external conductor for protection against electric shock in case of fault.
	<u>ATTENTION:</u> Please refer to the operation manual for instructions for this system. If the manual is not in your desired language, request an updated manual before using the equipment.
	<u>ATTENTION:</u> Please refer to the operation manual for "Lifting & Handling" instructions under installation instructions.
	<u>WARNING:</u> Electric Shock is possible, please use caution when accessing this zone.

Please be aware of the following danger zones on the ChemLogic CL4R continuous gas detection system. Each zone contains warning labels for operator safety.

A		This danger zone is in the service access point of the unit. This danger zone is referencing the top of the pump on the inside of the unit. Users should be cautious of hot surfaces and the potential of electric shock.
B		This danger zone is located on the gate assembly. During operation, operators could pinch fingers if not aware of hand placement.
C		This area warns of electrical shock and PE areas within the service door of the machine.
D		This danger zone is in the service access point of the unit. This danger zone is referencing the inside of the unit. Users should be cautious of hot surfaces and the potential of electric shock.
E		This image is an example of the Nameplate that resides on the rear of the unit. The nameplate contains electrical criteria and the EUAR.

2.1.2 Foreseeable Misuse

- Do not use this equipment outdoors as it is not rated for outdoor use.
- Do not use this equipment in a potentially explosive atmosphere, as it is not designed, or rated, for this use.
- Do not climb, step, sit or stand on the equipment, it is not designed for this purpose.
- Do not operate the equipment unless trained to do so.
- Follow proper operation as defined by this manual. There is a possibility of injury if the operator fails to follow proper installation and use of equipment.
- Ensure that LOTO (Lock Out Tag Out) procedures are implemented before conducting any maintenance, repair, lubrication, or cleaning of the equipment.

2.1.3 Residual Risk

All options added should only be used per their intended design. Any modifications made or procedures taken outside the intended use may void the warranty and/or produce unexpected results. DOD product is considered process control equipment. Contact DOD Technologies for additional requests regarding SIL rating.

2.1.4 Lifting and Handling Instructions

Due to the weight of the equipment, it is recommended that a 2-man lift be utilized to un-crate it and locate it into its operational position (Benchtop, or inside an existing enclosure on dedicated rails).

2.1.5 Touch Screen Display

The CL4R features a 7" LCD color touchscreen with menu-driven options for a simplified operator interface. Access to menus and data entry can be performed by touching the appropriate areas on the screen – see Chapter 5 "Basic Operation".

2.1.6 A/C Power & Switch

A/C power inlet and ON/OFF power switch is located on the rear panel. A standard AC power cable is included.

2.1.7 Noise Level

The maximum corrected noise level recorded for this equipment was less than 70db(A).

2.1.8 Flow Connections & Adjustments

Flow connections consist of "quick-connect" ports in the back of the CL4R unit. There are four inlets, one for each monitored point, and one exhaust outlet.

Flow adjustments for all points are located on the right-hand facing side of the front panel. Refer to Section 5.3.4 regarding flow adjustment.

2.1.9 ChemLogic® Cassette

The ChemLogic cassette is accessible from the top of the unit. The CL4R system utilizes DOD Technologies' exclusive ChemLogic colorimetric technology. Only use ChemLogic cassettes specifically offered for the CL4R system. Refer to Section 6.1 for additional details regarding cassette installation and replacement.

2.1.10 Cassette Take-Up Reel

An empty take-up reel must be in place when installing a new ChemLogic Cassette (see Section 6.1). All new CL4R systems include an empty take-up reel unit. When replacing an existing cassette, the take-up reel (containing the used cassette) must be removed and discarded. The previous ChemLogic Cassette reel – which is now empty – should be moved over and used as the next take-up reel.

2.1.11 Tubing Connections

Sample tubing and exhaust use a quick connection system for simple installation. The connections may be made on the rear panel. See Sections 3.2 & 3.4 for information on connecting the sample and exhaust tubing. See Appendix C for essential information on transport times for gas from the sampling point to the CL4R.

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

CL4R integrates seamlessly with an existing rack enclosure infrastructure (contact us for additional specifications) without re-wiring of outputs. The I/O (input/output) panel contains connections to 14 form C relays to activate external devices:

- A watchdog relay (RY12) indicates power loss or a CPU failure.
Note: The legacy PCB is not provided by DOD Technologies as the intent is to utilize the existing legacy enclosure. Contact us for alternate I/O relay options for use inside the existing enclosure.
- Eight gas alarm relays which indicate Level 1 and Level 2 alarms
- General Alarm 1 and Alarm 2 relays activate when any point moves above the set level
- Fault relays are activated when the CL4R requires maintenance and/or service

For complete details on alarm outputs, please see Section 4.3.

2.2 External Layout

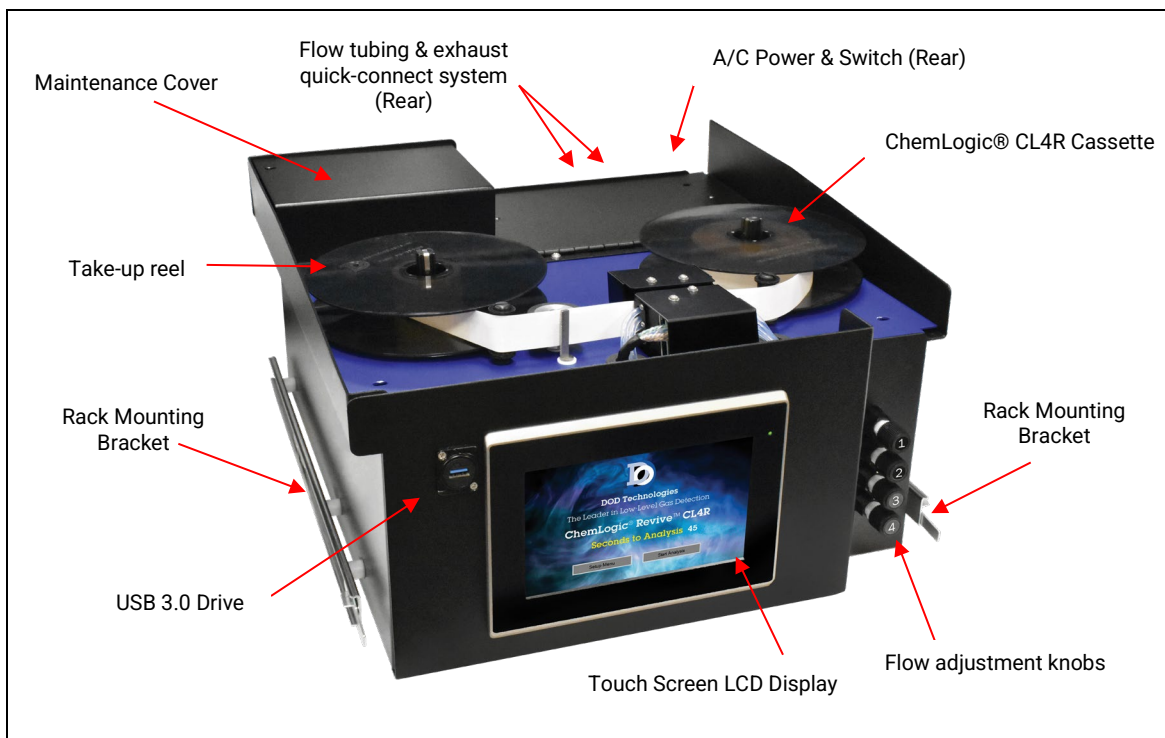


Figure 2.1

2.2.1 Maintenance Area

The maintenance area provides easy access for changing ChemLogic cassettes in the CL4R. Figure 2.2.1 shows the upper layout. See Section 6.1 for cassette installation.

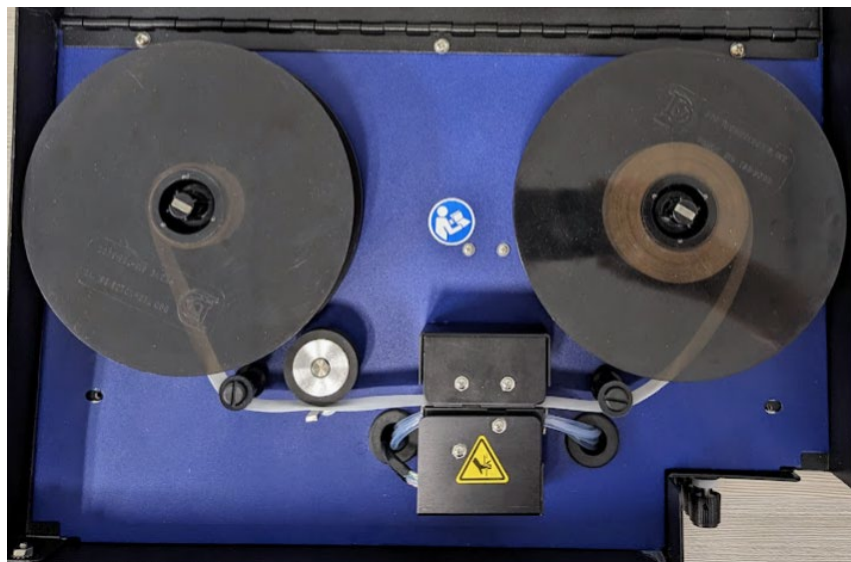


Figure 2.2.1

2.3 Internal Layout

2.3.1 Lock Out Tag Out (LOTO) Process

Internal access to the CL4R for installation and service is performed by removing the top cover (rear) secured by Phillips screws. Figure 2.3 shows the internal layout of the CL4R with the top cover open.

IMPORTANT: The top cover should remain closed and secured except when servicing critical components. Do not open the door while in Analysis Mode.



DANGER: Turn off the unit and disconnect A/C power before opening the top cover.

The cover should only be opened by trained service personnel. See Chapter 7 to contact us regarding service and support.

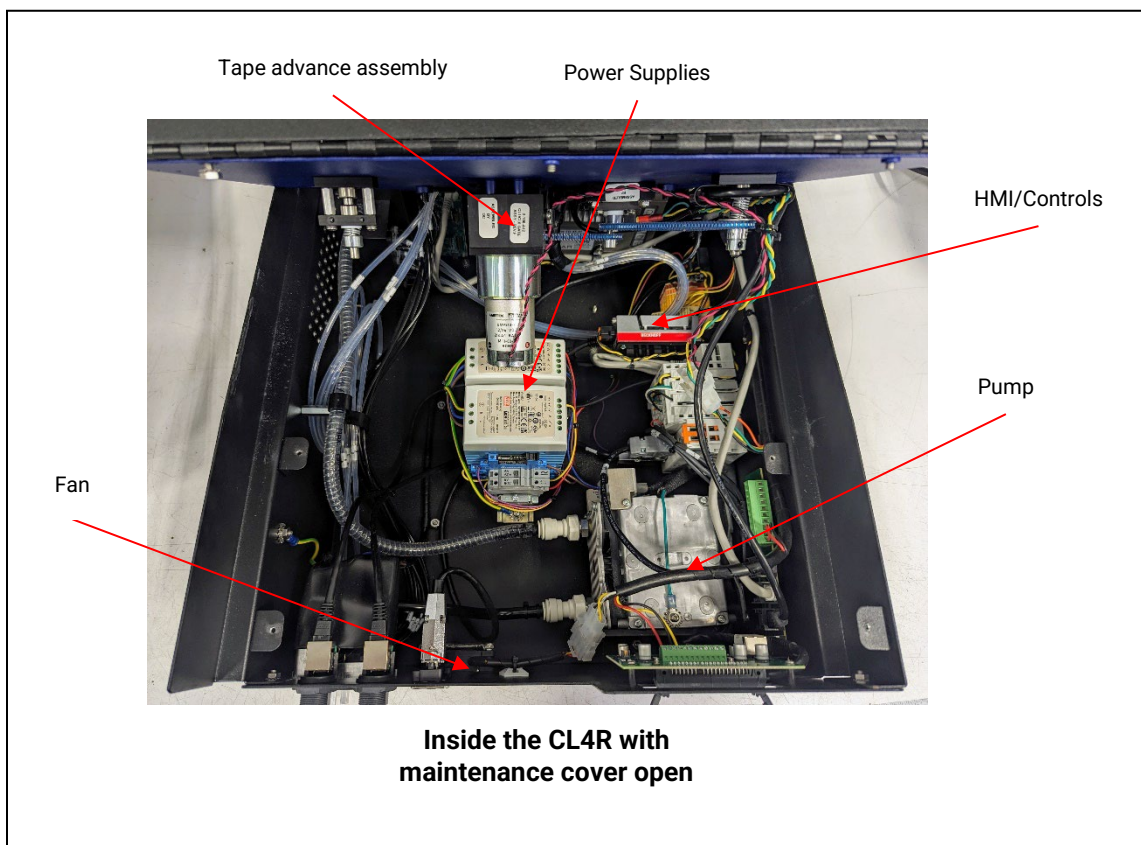


Figure 2.3

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.

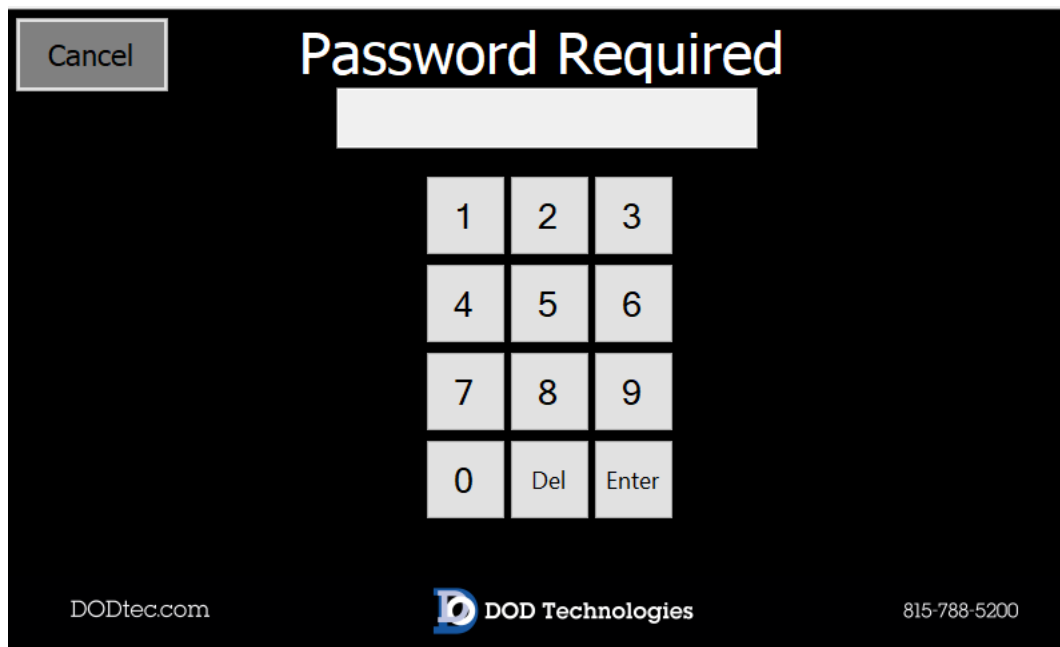


Figure 2.4

(Per software 24.0222 Build 299 or higher. Contact us if assistance is required for earlier software versions.)

When an attempt is made 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 require an administrative access password. Factory service screens require entry of a service password - see Chapter 7.

IMPORTANT: Once a password is entered it remains active for 2 minutes after entry so that it does not need to be repeatedly entered when switching between screens. Please keep in mind that anyone using the touchscreen may access restricted screen locations during this time if the machine is left unattended.

NOTE: The Administrative Password is included on the first page of this manual. It is suggested that you remove the page and keep it in a safe place. If you forget or lose your password, please contact DOD Technologies. See Chapter 7 for contact information.

2.5 Data History Storage

The CL4R uses internal memory to store historical information including concentration logging, event history, configuration information, and TWA data. USB storage drives may also be used to collect data at the unit.

Chapter 3 – Installation

3.1 Selecting a Location

The CL4R 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. Using the shortest possible sample line length will reduce transport times and increase the response time (See Appendix C)
- A/C power to the unit is required.
- Locate near proper ventilation (keep in mind, the maximum length of the exhaust tubing is 50 ft.)
- The CL4R requires stable temperature and humidity levels within range to operate properly.

Dust and Humidity Exposure

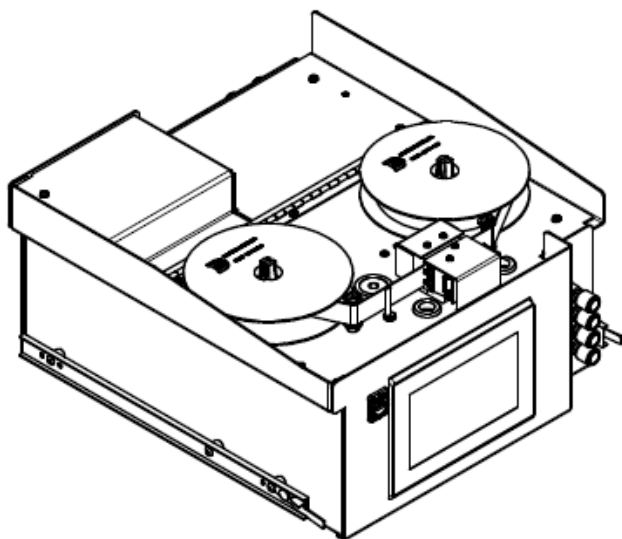
Placing the CL4R in a location exposed to excessive moisture, dust, corrosive gases, or any unusual environmental conditions which could significantly damage the unit and/or cause it to operate inaccurately. Ensure there is room behind and on the right side of the CL4R to service the unit and provide proper ventilation.

3.1.1 Mounting Options

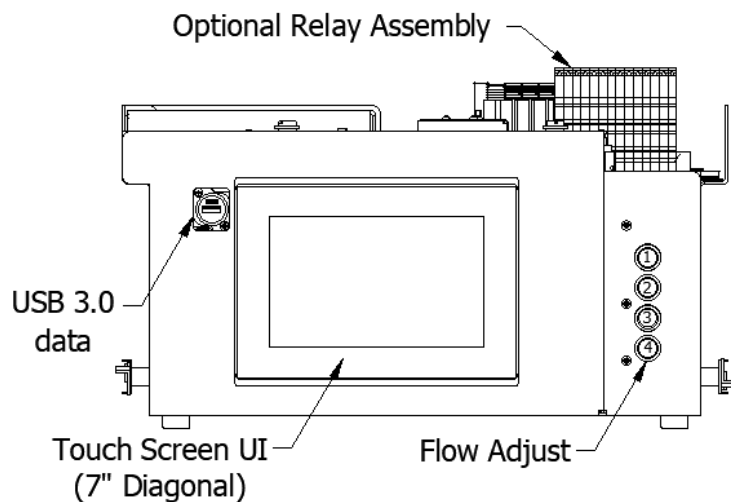
The CL4R is designed for tabletop or retrofit configuration in a rack enclosure (MDA-supplied cabinet). The tabletop is the basic, stand-alone configuration that is used throughout this manual to show instrument operation. Rack configurations require a separate enclosure. Please contact DOD Technologies if assistance is required using a wall mount or rack kit (user-supplied rack) configuration.

When selecting a site for installation of the CL4R, consider the mounting option best suited for your location. Operators can place the CL4R up to 400 feet (122 m) from monitoring points to monitor gas concentrations in an area removed from the location where gas may be leaking.

3.1.2 Product Dimensions

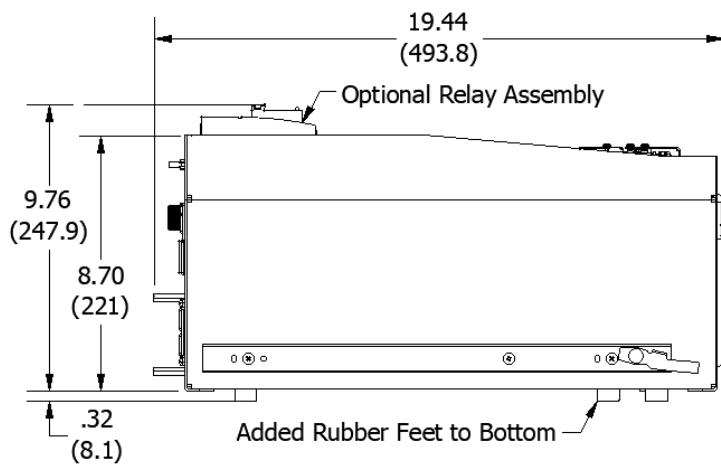


Top $\frac{3}{4}$ View



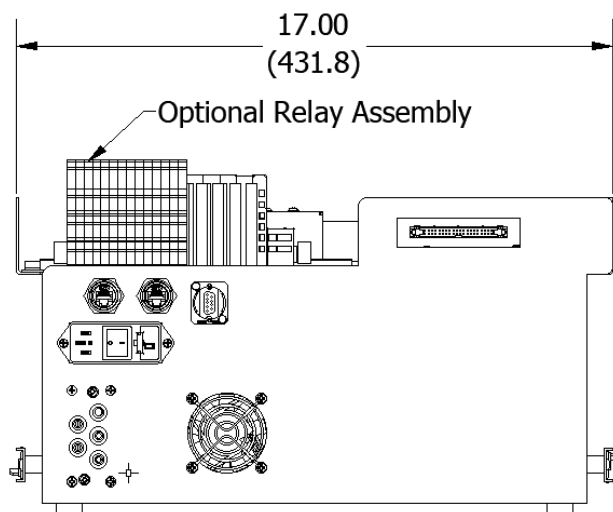
Front

Figure 3.1



Side

Figure 3.2



Rear

Figure 3.3

3.2 Sample Tubing

Sample tubing is connected to the CL4R from the back of the CL4R. 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 depress each sample tube into the proper hole when attaching. To detach the tube, push on the collet and pull the tubing out. Note, that the legacy rack does not use collets. In place of the collets, the legacy system utilizes an assembly that contains all 5 tubes and is secured with 2 thumb screws.

Do not crimp exhaust lines or place them in an area where weight could collapse the tubing or bend them to less than a 5-inch (12 cm) radius. Leave as many bends as possible visually exposed for periodic visual inspection of the line for kinked or damaged tubing.

3.2.1 Tubing Connections

To prepare for installation of sample lines, remove the FEP Teflon tubing (3/16-inch I.D. x 1/4-inch O.D.). The back of the unit includes five connections:

PT1 Sample Inlet - Point 1 **PT4 Sample Inlet - Point 4**
PT2 Sample Inlet - Point 2 **EXH Exhaust**
PT3 Sample Inlet - Point 3

NOTE: Always perform a leak check after installing all sample lines to verify line integrity.

If the system is used as a tabletop, and not in the legacy rack, ensure the quick-connect collets are installed for the tubing connections. The legacy rack utilizes an assembly that contains all 5 tubes and is secured with 2 thumb screws.

NOTE: Reference diagram below for legacy rack manifold connection.

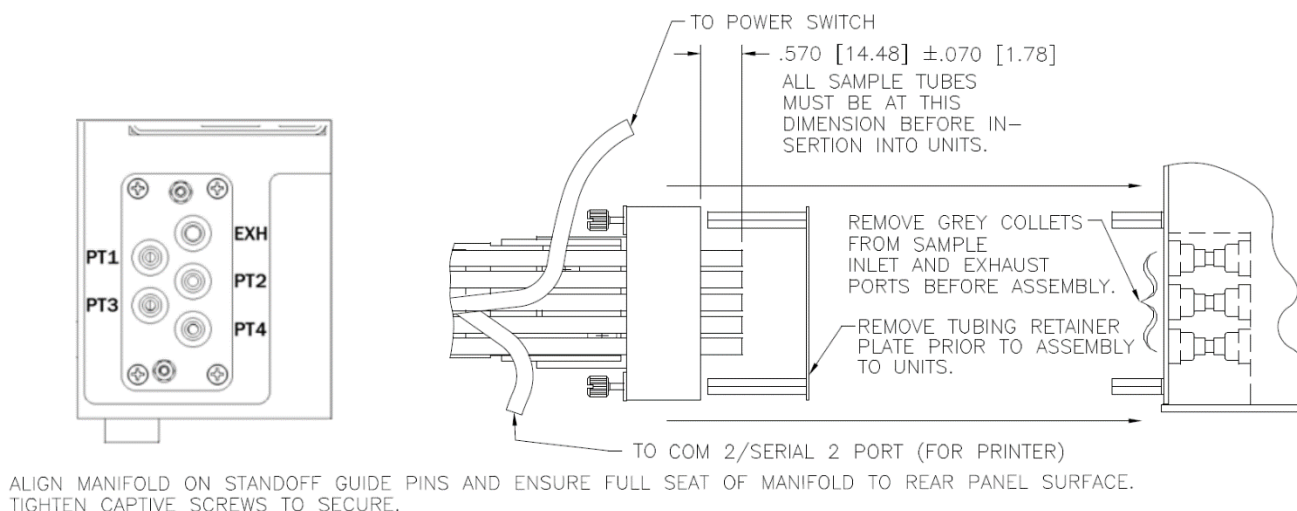


Figure 3.4

CL4R rear view connections.

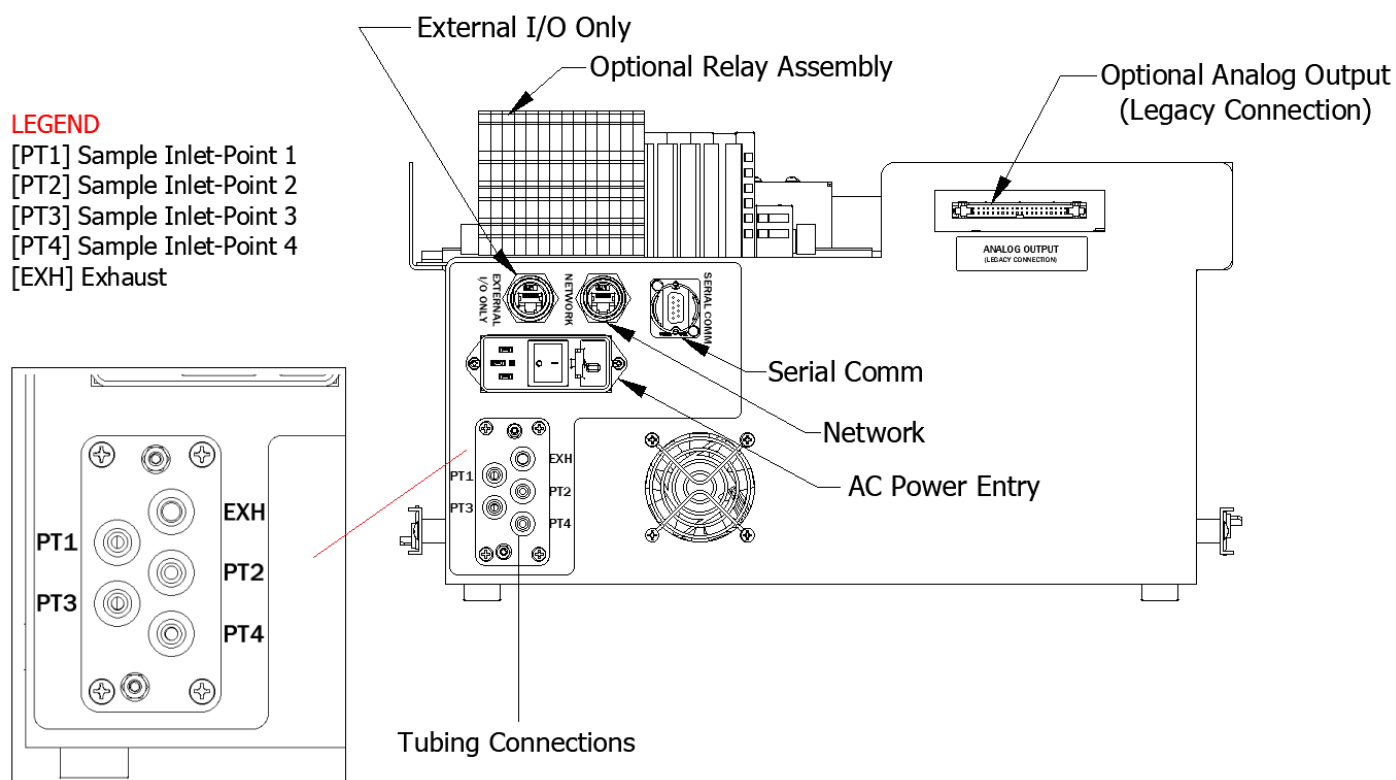


Figure 3.5

3.3 Sampling Environment

Before installing the CL4R, review and determine if the sampling environment locations has excessive dust or moisture. Use an external filter at the end of all sample lines. See Appendix A for selection of appropriate filter type for the target gas. Dust may be present due to construction or manufacturing activities. Moisture may occur from rain entering a line at an outdoor sampling location or from condensation caused by temperature fluctuations. Water condensation in the sample lines could cause false alarms.

NOTE: Variables such as air flow, the molecular weight and temperature of the sample gas, and the physical conditions of the areas being monitored influence the placement of the sampling locations. You may need to consult your company industrial hygiene or safety officer before installing sample lines to determine your company's policy related to sampling locations and monitoring of the desired sample gas.

3.3.1 End-Of-Line Particulate Filters

End-of-line particulate filters must be installed on all four 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 Section 6.2.

IMPORTANT: All points require filtration to prevent dust accumulation in tubing and internal damage to the CL4R. Dust that collects in the tubing or the internal system may cause sample loss and inaccurate gas 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 1/4" OD x 3/16" ID tubing with a maximum length of 50 ft. Polyethylene, polypropylene or Teflon may be used.

Exhaust tubing is available from DOD Technologies (see Appendix A)

3.5 Output Wiring

To restore functionality of the existing relay outputs, simply connect the 40-pin ribbon to the rear of the unit. If a 4-20mA output is required, ensure this is requested for factory installation when ordering your CL4R unit.

See Appendix B for a listing of output module connections.

3.6 Sample Line Particulate Filter Installation

See Appendix A to determine if you can use sample line filters with your target gas. Attach a sample line filter to the sampling end of the line only if you have determined that environmental dust or moisture is a concern at the sampling location.



CAUTION: When using a sample line particulate filter, excess dirt in the filters can slow the sample line flow and affect the analyzer's concentration readings. See Appendix A to determine the appropriate filter to use in conjunction with your target gas.

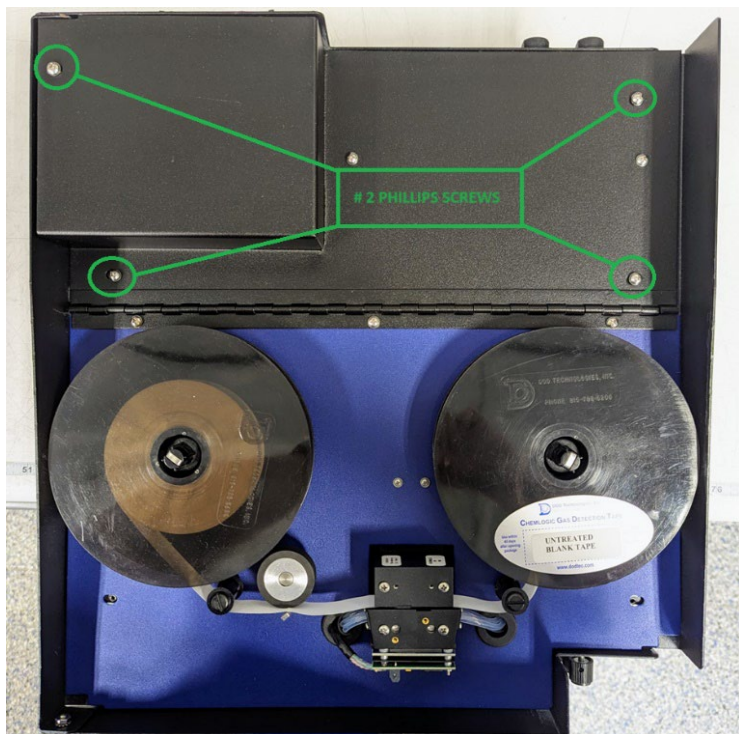
3.7 Pump Installation

Pumps do not arrive pre-installed and are shipped separately from the CL4R gas detection unit to prevent damage. The pump is intended to be installed by an installation and support technician. Carefully remove the system and pump from the packaging materials.

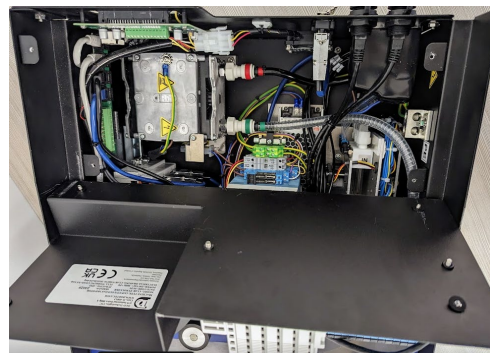
Prior to installing the pump, ensure the required power, equipment, and tubing for the CL4R is available for use. Ensure the CL4R is NOT connected to the power source while installing. A #2 Philips head screwdriver and SAE 11/32 Nut Driver (9 mm Nut Driver) will be required. Follow the pump installation procedures to proceed.

3.7.1 Pump Installation Procedure

Prior to installation, verify power is disconnected. Using a #2 Phillips screwdriver, remove the three screws from the upper rear cover (see image below). Place the screws nearby as they will need to be re-installed on the rear cover.



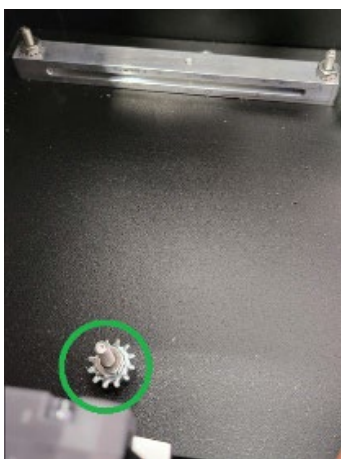
Lift the rear access door, using caution to not damage the wiring harnesses/tubing.



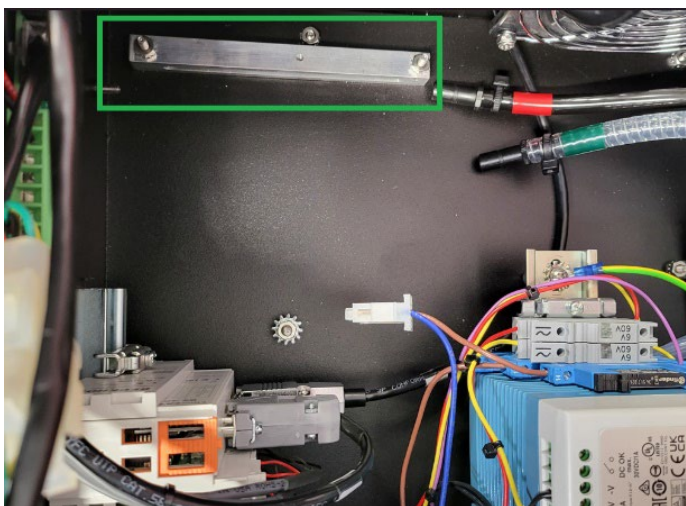
The system is now prepared for the pump installation.



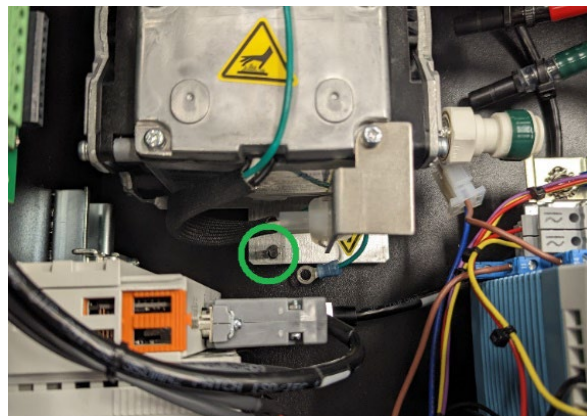
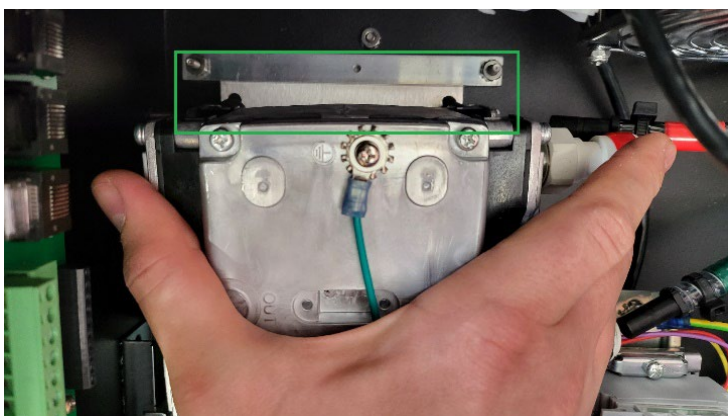
Remove the nut and star washer from the bottom of the enclosure pump PEM stud.



The enclosure has a retaining bar secured to the bottom (see images below).

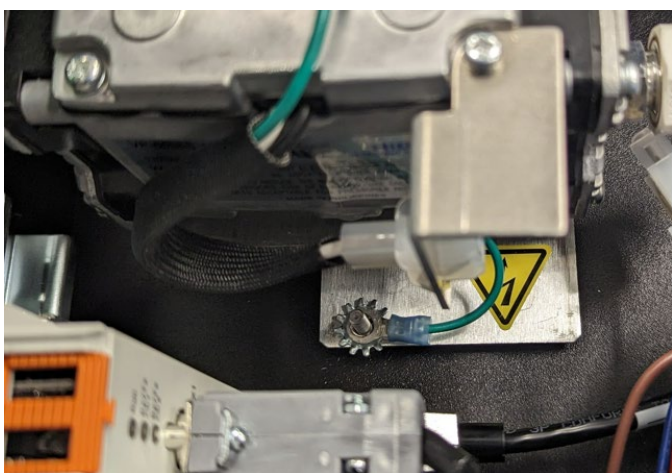
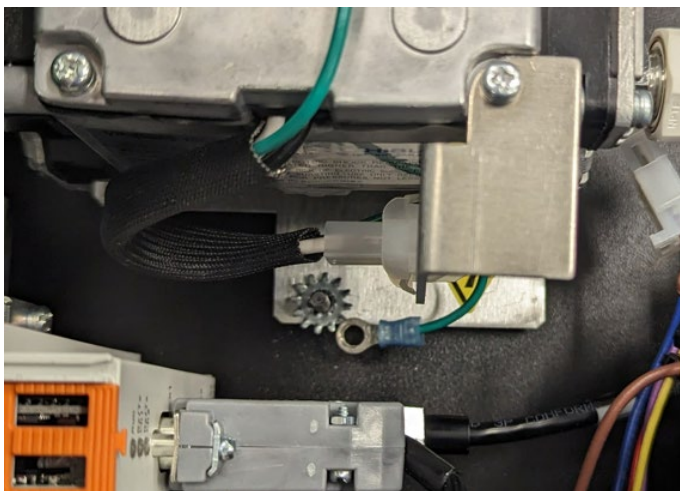


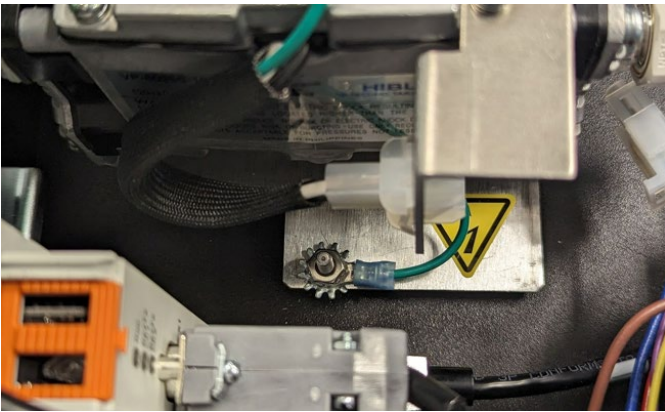
Insert the pump lower plate into the retaining bar as shown in images below. Ensure that the plate inserts in the retaining bar and the PEM stud aligns and passes through the hole in the front of the pump plate.



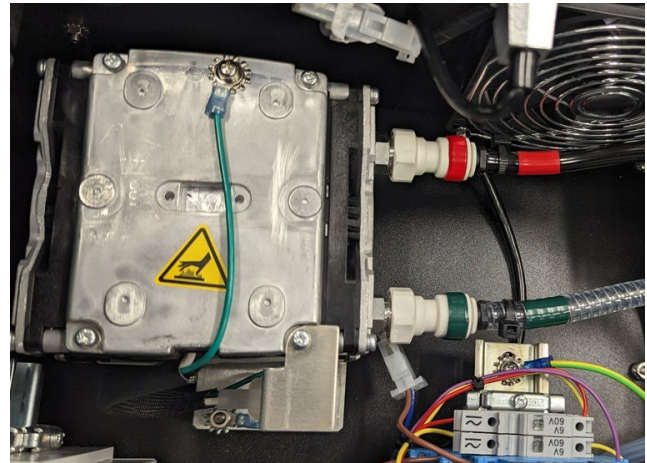
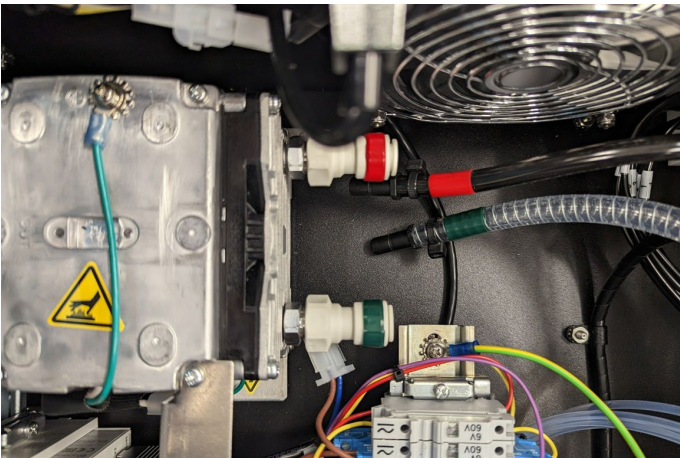
Install the following parts in the order listed:

1. Place the star washer over the PEM stud.
2. Place the terminal ring from the pump green wire over the PEM stud.
3. Tighten the nut on the enclosure pump PEM stud using a 11/32 (9mm) nut driver.

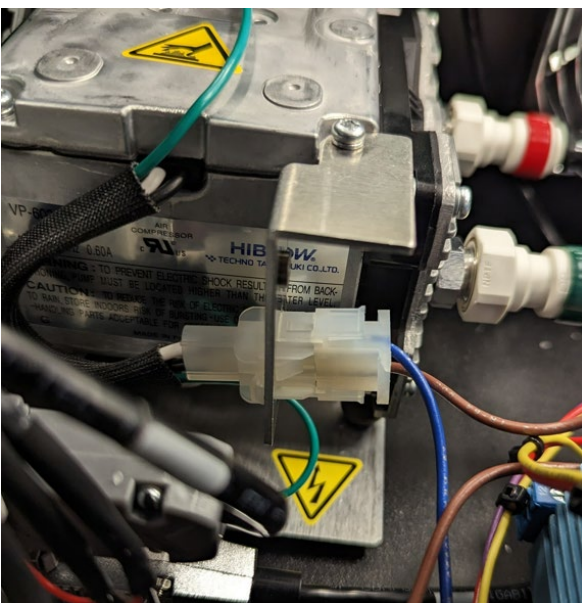




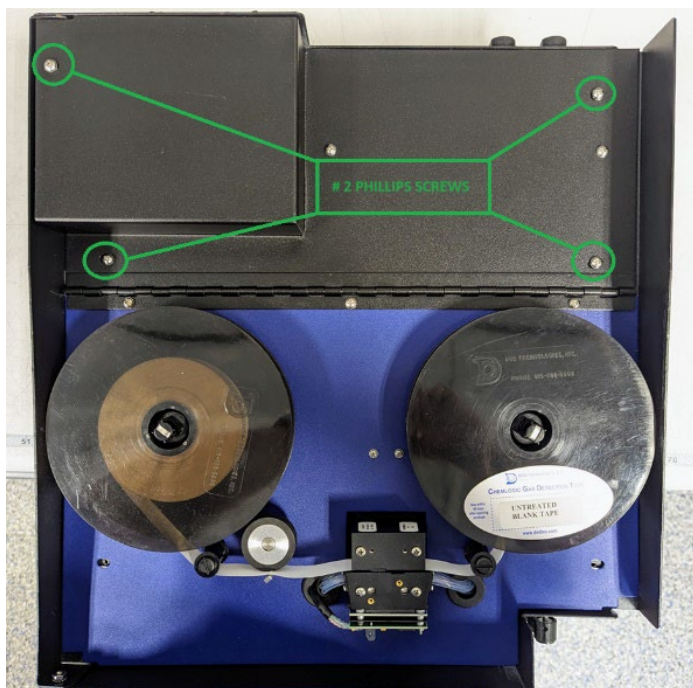
Connect the tubing to the pump. RED colored fittings together and GREEN colored fittings together. Ensure the tubing connections are fully seated.



Connect the pump power connector. Observe the proper orientation for the keyed connector.



Re-install the rear cover using a #2 Phillips screwdriver and the three screws (see image below).



When ready, re-connect power and tubing.

3.7.2 Retest Verification

Fully inspect the system for proper wiring and tubing connections. Verify all wiring and tubing have been properly connected. Retest to ensure the installation was performed correctly.

3.8 Pump Exhaust Line Installation

This section describes exhaust connections and installation.

3.8.1 Exhaust Line Installation Guide

Properly ventilate the exhaust line, which should not exceed 50 feet (15 m) in length. If longer distances are required, contact DOD Technologies.

- If multiple CL4R units are installed in the same location, use a separate line for each exhaust outlet
- Do not crimp exhaust lines, place them in an area where weight could collapse the tubing, or bend them to less than a 5-inch (12 cm) radius
- Leave as many bends as possible visually exposed for periodic visual inspection of the line for kinked or damaged tubing
- Varying exhaust pressure can induce pump failure

3.8.2 Exhaust Tubing Specifications

The instrument includes 50 feet (15 m) of 3/16-inch (4.7 mm) I.D. x 1/4-inch (6.35 mm) O.D. polypropylene tubing.

3.9 Loading the ChemLogic® Cassette

For ChemLogic cassette loading procedures, see Section 6.1.



WARNING: Be sure to install the correct ChemLogic® cassette (See *Appendix A* for part number information.) Make sure the label on the ChemLogic cassette and the label on the analyzer correspond. Incorrect ChemLogic cassette replacement defeats the CL4R's ability to warn of dangerous gas concentrations.

3.10 Powering ON/OFF

Use the rocker switch on the right rear of the unit at the power cord, to turn on power to the Model CL4R. For Rack Mount units, use the power panel at the top of the rack. The number of each switch correlates to the position of the CL4R unit in the rack.

Note:

The CL4R automatically enters Analysis Mode when it is switched on, following a brief delay.

Chapter 4 - Setup & Configuration

4.1 Set System Date and Time

See Section 5.3.2

4.2 Gas Selection

Each point on the CL4R must be setup for the appropriate gas and configured accordingly. See Section 5.3.1 for information on selecting the gas for each point.

4.3 Alarm Settings

See Section 5.3.1 for information on how to adjust the alarm settings after the gas has been selected for each point.

4.4 Output Relays

The CL4R supports both energized and de-energized relays 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 CL4R.

1. >0 - All concentrations detected $\geq$ LDL are added to the concentration log.
2. AP1 - Anytime alarm level 1 is reached, the concentrations are added to the log.
3. AP2 - Anytime alarm level 2 is reached, the concentrations are added to the log.

Regardless of which point the gas is detected on, all CL4R points are logged as long as the trigger is active. 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 Install New ChemLogic® Cassette

See Section 6.1 for installation instructions.

4.7 Setup Complete

Enter analysis.

Chapter 5 – Basic Operation

5.1 CL4R Menu Overview

I. Initialization (Power on) (Sec. 5.1) a. Setup Mode b. Timer II. Setup (11 button menu) (Sec. 5.2) a. Gas & Alarm Settings i. Points 1-4 b. Set Date/Time c. Load Tape d. Adjust Flow e. *Calibration Factors f. *Set/Test Outputs g. **Factory Settings h. Events History i. Fault Reset j. Start Analysis III. Concentration Log (sec. 5.3) IV. Analysis (5 buttons & 8 points w/detail) (sec. 5.4) a. Setup b. Concentration Log c. Event History d. Silence e. Fault Reset f. Point Detail (1-4) V. Time weight average (sec. 5.6)	Legend User Screens (No Password Required) *Administrative Screens (Administrator Password Required) **Service Screens (Service Password Required)
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5.2 Initialization

When the CL4R is powered on it will begin with an initialization screen, followed by the start-up screen (Figure 5.2).

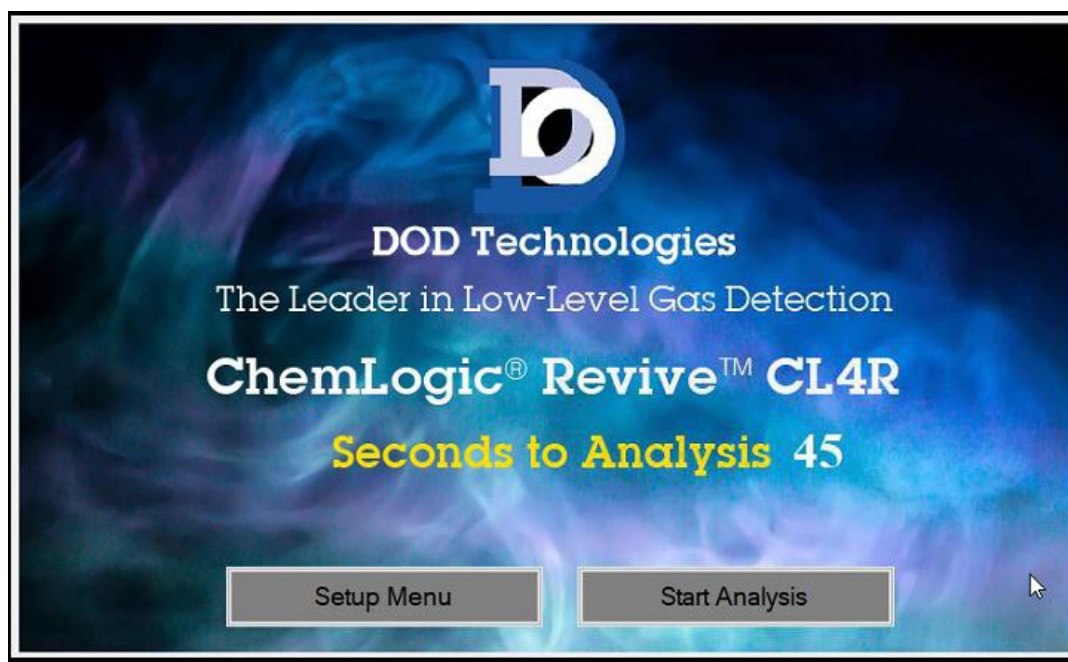


Figure 5.2

If the operator touches the 'Setup Menu' button before the 'Seconds to Analysis' timer reaches zero, the Setup screen will appear. Otherwise – after a brief timeout – the system will move into Analysis mode.

5.2.1 Keyboard Function

Several of the software screens feature the "abc..." button shown in Figure 5.3.2a. Select this button to initialize the keyboard.



Figure 5.3.2a

The default option is the 'moveable' keyboard which allows you to re-position it by holding and dragging the keyboard to your desired location – see Figure 5.3.2a1. Clicking the keyboard icon on the top-left corner also provides an option to choose a larger sized keyboard that locks in a 'fixed' position – see Figure 5.3.2a2.



Figure 5.3.2a1

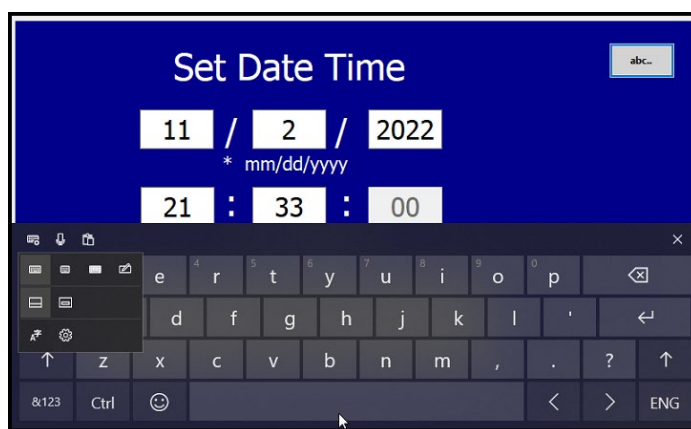


Figure 5.3.2a2

Note, you must first select a box or open field prior to entering an alphanumeric keyboard command. The 'moveable' keyboard is recommended as it provides the most flexibility to access the boxes/fields. Select the "X" function in the top-right corner to close the keyboard. If preferred, a physical keyboard can be connected using the USB port.

5.3 Setup / Main Menu

The setup menu is accessed either by touching the 'SETUP MENU' button on power up or by touching 'SETUP' from the analysis screen. Figure 5.3 below shows the setup screen and explains the various buttons.

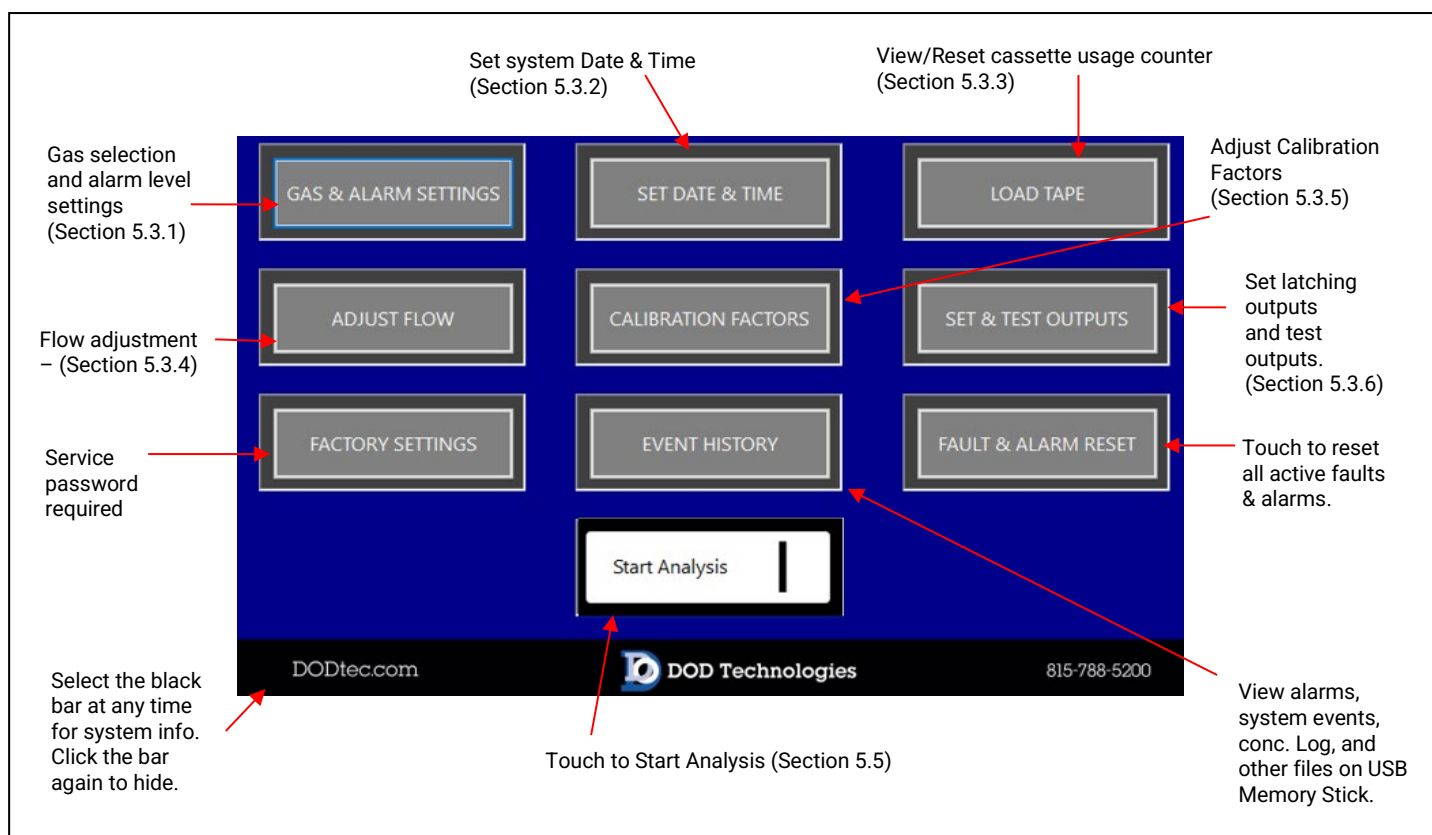


Figure 5.3

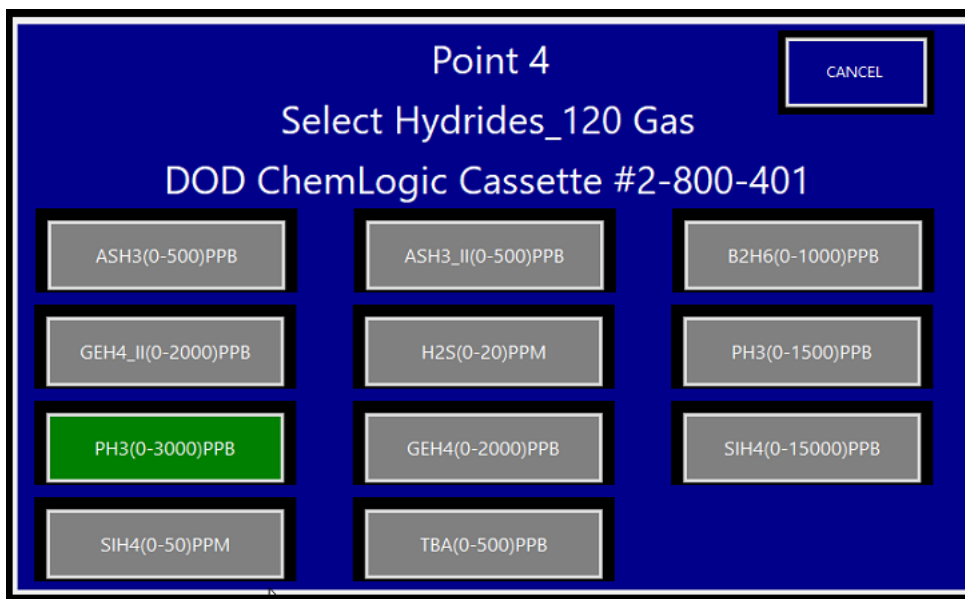
5.3.1 Gas & Alarm Settings Menu

Touching the 'GAS & ALARM SETTINGS' button on the setup screen brings up the first screen shown in Figure 5.3.1, which displays the configuration of points 1-4. Touching the 'DONE' button will then return to the SETUP screen.



Point	Location	Gas Selection	Alarm 1	Alarm 2	Alarm Status
Point 1	Gas Cabinet 3 GC3_A	SELECT GAS AsH3(0-500)ppb	50.0	100.0	NO YES Enabled
Point 2	Gas Cabinet 3 GC3_C	SELECT GAS AsH3(0-500)ppb	50.0	100.0	NO YES Enabled
Point 3	Exhaust Bldg F EBF_A	SELECT GAS AsH3(0-500)ppb	50.0	100.0	NO YES Enabled
Point 4	FAB 24 F11A	SELECT GAS PH3(0-3000)ppb	300.0	600.0	NO YES Enabled

Touch 'SELECT GAS' to bring up selection menu shown below.



Point 4
Select Hydrides_120 Gas
DOD ChemLogic Cassette #2-800-401

ASH3(0-500)PPB	ASH3_II(0-500)PPB	B2H6(0-1000)PPB
GEH4_II(0-2000)PPB	H2S(0-20)PPM	PH3(0-1500)PPB
PH3(0-3000)PPB	GEH4(0-2000)PPB	SIH4(0-15000)PPB
SIH4(0-50)PPM	TBA(0-500)PPB	

Figure 5.3.1

Touching the 'SELECT GAS' button brings up the gas selection menu from which you may either select a new gas or select the 'Cancel' button. All available gas calibrations for the current gas family will be shown.

5.3.2 Set Date/Time

Enter a valid password to proceed after selecting the 'SET DATE/TIME' option from the Setup screen. The following screen will appear (as shown in Figure 5.3.2).

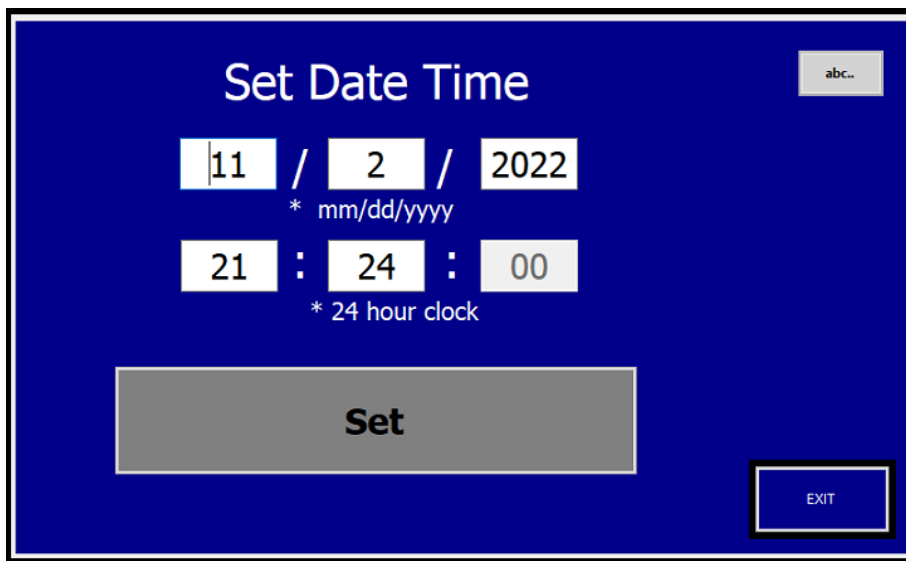


Figure 5.3.2

Touch any of the entry fields to bring up the numeric keypad and adjust the Month (mm), Day (dd), Year (yyyy), and Time as directed. The time must be entered in a 24-hour (military time) format. Select 'Set' once all fields have been entered. Then, select the 'EXIT' button to return to the Setup menu.

IMPORTANT: After entering the new date & time, you must touch the **"Set"** button to complete the process of updating the system date/time.

5.3.3 Load Tape

Touching the 'LOAD TAPE' button on the setup screen brings up the screen shown in Figure 5.3.3.

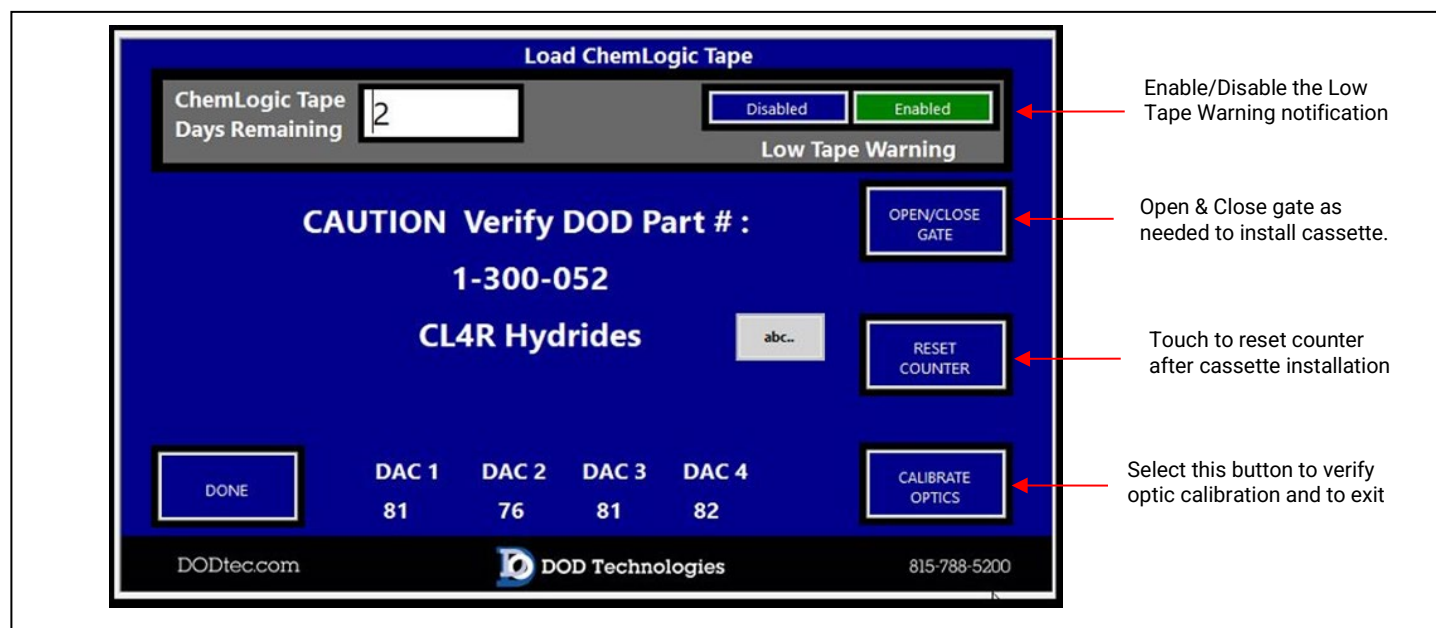


Figure 5.3.3

IMPORTANT: Each time a new cassette is loaded into the CL4R the 'RESET' button must be touched to accurately track usage.

Each time the 'OPEN/CLOSE' button is touched, the gate will open or close appropriately. If the gate is currently closed, touching the button will open the gate. If the gate is currently open, touching the button will close the gate.

NOTE: If the gate is not completely open touching the button will open the gate to the proper open position. Touch the button again to close.

Before exiting the screen, verification is required. When the 'CALIBRATE' button is selected, the machine will verify if the cassette is correctly aligned and the optics are calibrated appropriately. During this time a 'CALIBRATING OPTICS' window will appear.

IMPORTANT : If you choose 'NO' when asked to calibrate the optics, the CL4R may not function properly. Contact DOD Technologies for more information.

Upon completion of the process, either a notice of verification or a message with the recommended adjustment will be provided. If successful touch the “OK” button to return to the setup menu. If unsuccessful, an error screen will appear with further instructions. Verify that the cassette is installed and aligned correctly by using the ‘OPEN/CLOSE’ button as needed. Once you have verified that the cassette is correctly installed, you can touch the ‘YES’ button to recalibrate the optics for the new cassette or press ‘NO’ to return to the Setup menu.

5.3.4 Flow Adjustment

Touching the ‘ADJUST FLOW’ button on the setup screen brings up the screen shown in Figure 5.3.4 along with advancing the cassette and turning the pump on. Use the corresponding flow adjustment knobs located on the front panel to adjust the flow so that each level is as close as possible to the black line in the middle of the green section.

NOTE: There may be a slight delay between the time the knob is turned, and the updated reading is reflected on the screen. Adjust the knob slowly and wait a few seconds to verify that the level is accurate.

Touch the ‘EXIT’ button to return to the Setup menu.

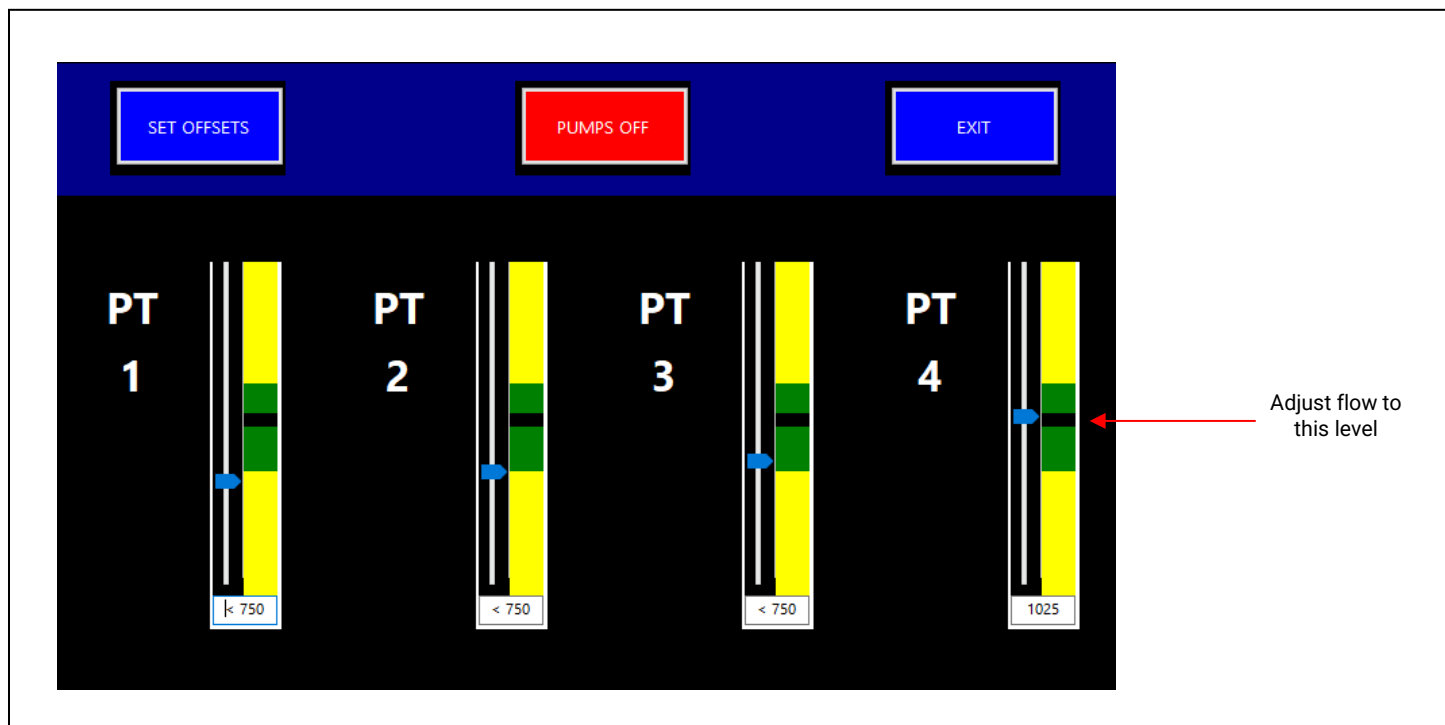
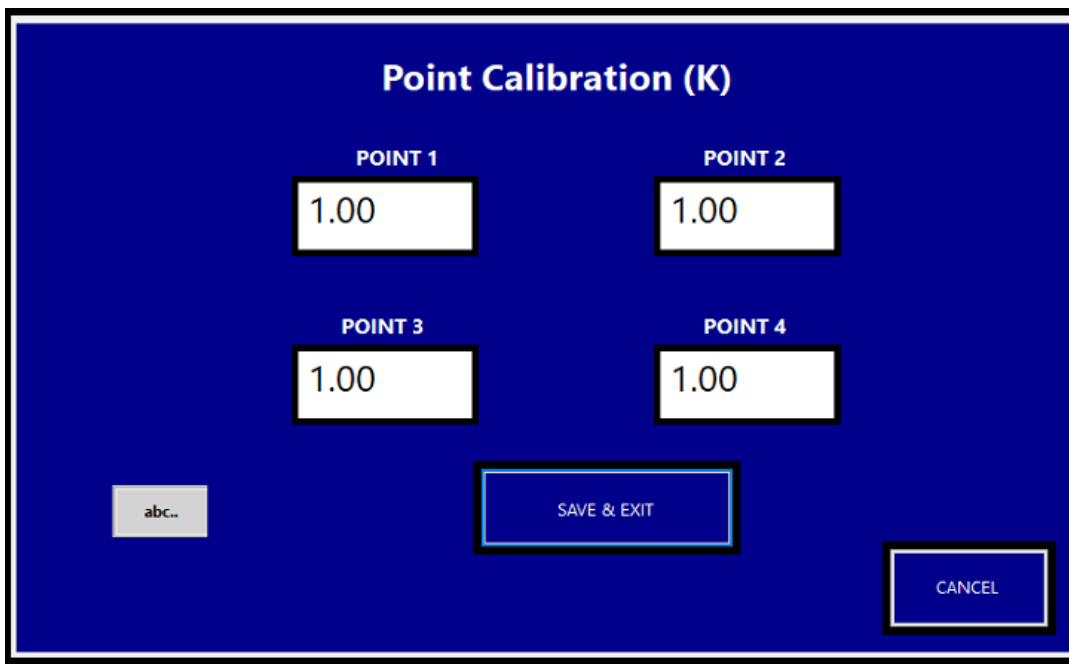


Figure 5.3.4

5.3.5 Calibration Factors

Select the 'CALIBRATION FACTORS' button on the Setup screen to bring up the screen in Figure 5.3.5. Note that this screen requires an administrator password for access. Contact DOD (see Chapter 7) for information on the use of Calibration Factors.



Point Calibration (K)

POINT 1 1.00	POINT 2 1.00
POINT 3 1.00	POINT 4 1.00

abc..

SAVE & EXIT

CANCEL

Figure 5.3.5

NOTE: This screen requires the Administrator password for access – See Section 2.4.

Touching a numeric field on any Point will bring up the numeric entry keypad. The value entered must be between 0.5 and 2.000 for each channel. Once entered, select 'SAVE & EXIT' to complete the update.

5.3.6 Set & Test Outputs

Touching the 'SET & TEST OUTPUTS' button on the setup screen brings up the screen shown in Figure 5.3.6. This allows the user to test relays and analog outputs.

Two other features on this screen:

1. Require a password to exit analysis – If enabled the level 1 password must be used for anyone to exit the analysis screen. When disabled a simple "Are you sure?" window appears.
2. Idle Timeout – Set from 1-60 minutes to trigger a fault when the machine is left idle. Setting this to 0 minutes disables the fault.



CAUTION: Activating these outputs will trigger the associated connected alarms.

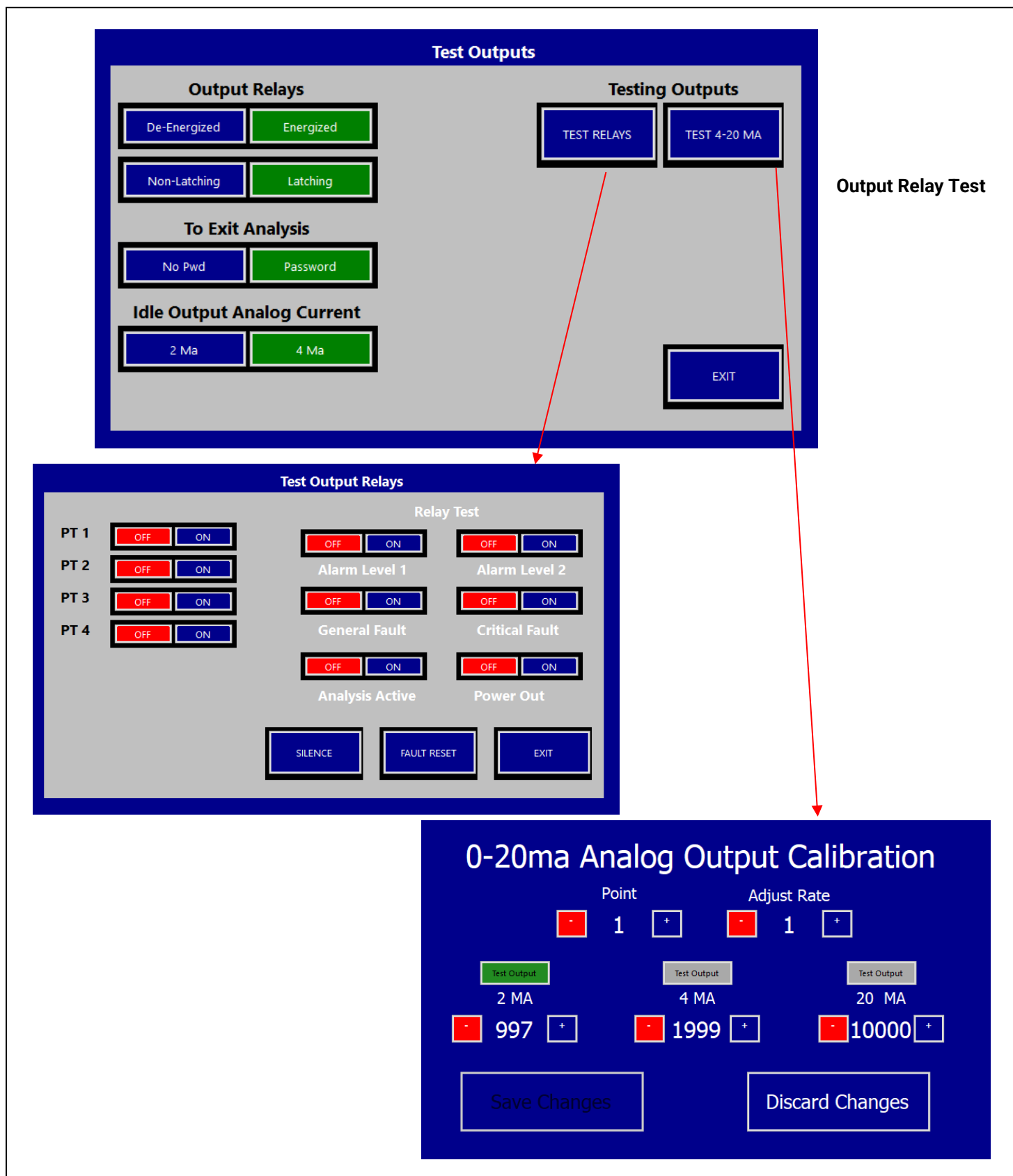


Figure 5.3.6

5.3.7 Factory Settings

The 'Factory Settings' menu option includes important details such as version and configuration information. Options include:

- Machine Setup
- Simulation
- Gas Family
- Configuration
- Cal Log
- Data Backup

This section is reserved for technical service and requires a service password. Contact DOD Technologies (see Section 7) for service information.

5.3.8 Event History

Touching the 'VIEW LOGS' button on the setup screen brings up the 'EVENTS' screen shown in Figure 5.3.8.

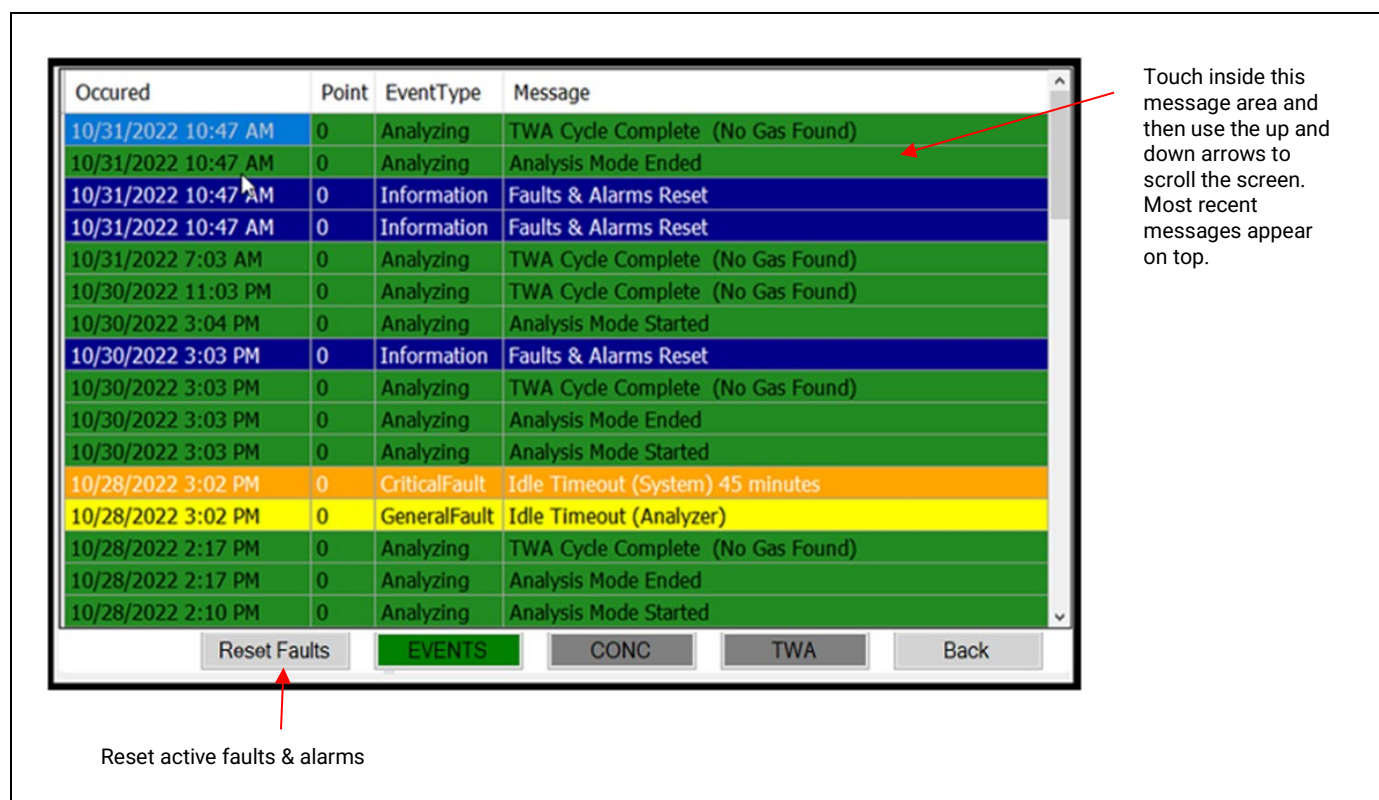


Figure 5.3.8

The event history is displayed with the most recent event/alarm at the top using the color coding listed in Table 5.3.8.

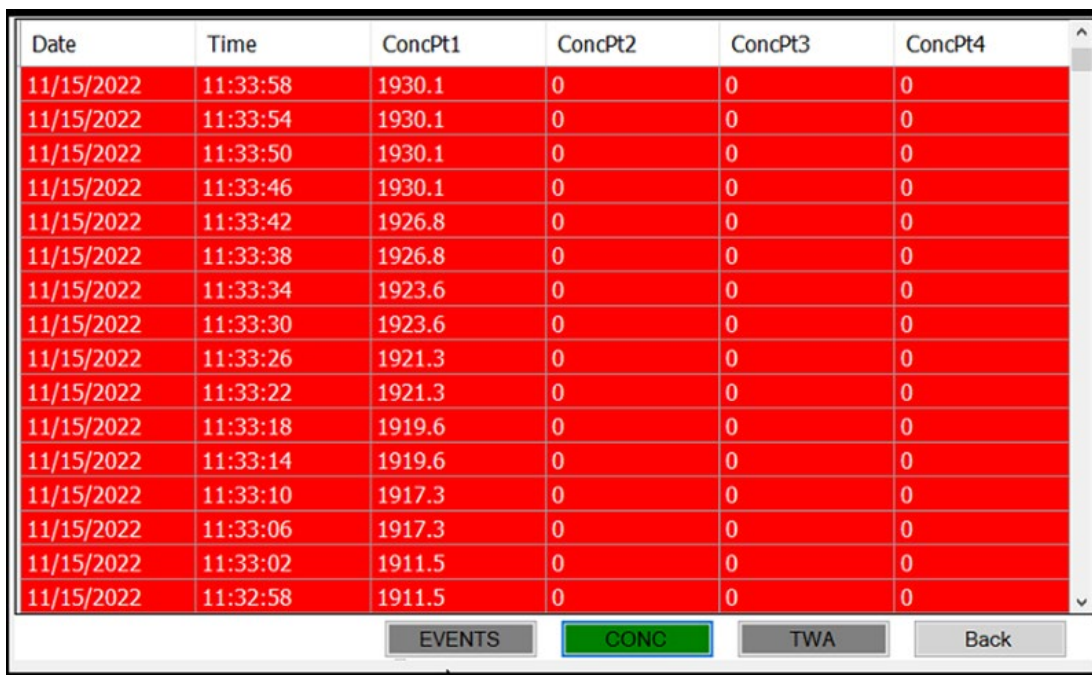
Green	Normal operation messages
Yellow	Fault (Maintenance) messages
Blue	Informational display messages – non-critical
Orange	Critical (Fault) Service messages
Red	Gas alarm messages

Table 5.3.8

Touch the 'BACK' button to return to the setup menu.

5.4 Concentration Log

Touching the 'CONC' button on the Event History screen (Section 5.3.8) will bring up the screen shown in Figure 5.4 with the logging history.



Date	Time	ConcPt1	ConcPt2	ConcPt3	ConcPt4
11/15/2022	11:33:58	1930.1	0	0	0
11/15/2022	11:33:54	1930.1	0	0	0
11/15/2022	11:33:50	1930.1	0	0	0
11/15/2022	11:33:46	1930.1	0	0	0
11/15/2022	11:33:42	1926.8	0	0	0
11/15/2022	11:33:38	1926.8	0	0	0
11/15/2022	11:33:34	1923.6	0	0	0
11/15/2022	11:33:30	1923.6	0	0	0
11/15/2022	11:33:26	1921.3	0	0	0
11/15/2022	11:33:22	1921.3	0	0	0
11/15/2022	11:33:18	1919.6	0	0	0
11/15/2022	11:33:14	1919.6	0	0	0
11/15/2022	11:33:10	1917.3	0	0	0
11/15/2022	11:33:06	1917.3	0	0	0
11/15/2022	11:33:02	1911.5	0	0	0
11/15/2022	11:32:58	1911.5	0	0	0

Figure 5.4

The log displays the concentration on each point when the trigger criteria is met. If you select >0 the system will log all CL4R points when any of the points have a concentration reading which is >LDL for the gas selected. (See Appendix E).

The buttons on the right of the screen allow scrolling through the most recently logged readings. Touch the configuration button to set the logging parameters.

5.4.1 Concentration Configuration

Selecting FACTORY SETTINGS → CONFIGURE brings up the concentration configuration screen shown in Figure 5.4.1. A password is required to access this screen. Four levels of logging are available depending on your needs:

1. **All Conc > 0** – Logging on when any channel is above 0
2. **Alarm Level 1** – Logging on when any channel is above Alarm Level 1
3. **Alarm Level 2** – Logging on when any channel is above Alarm Level 2
4. **All ***** – Logging always on (not recommended)

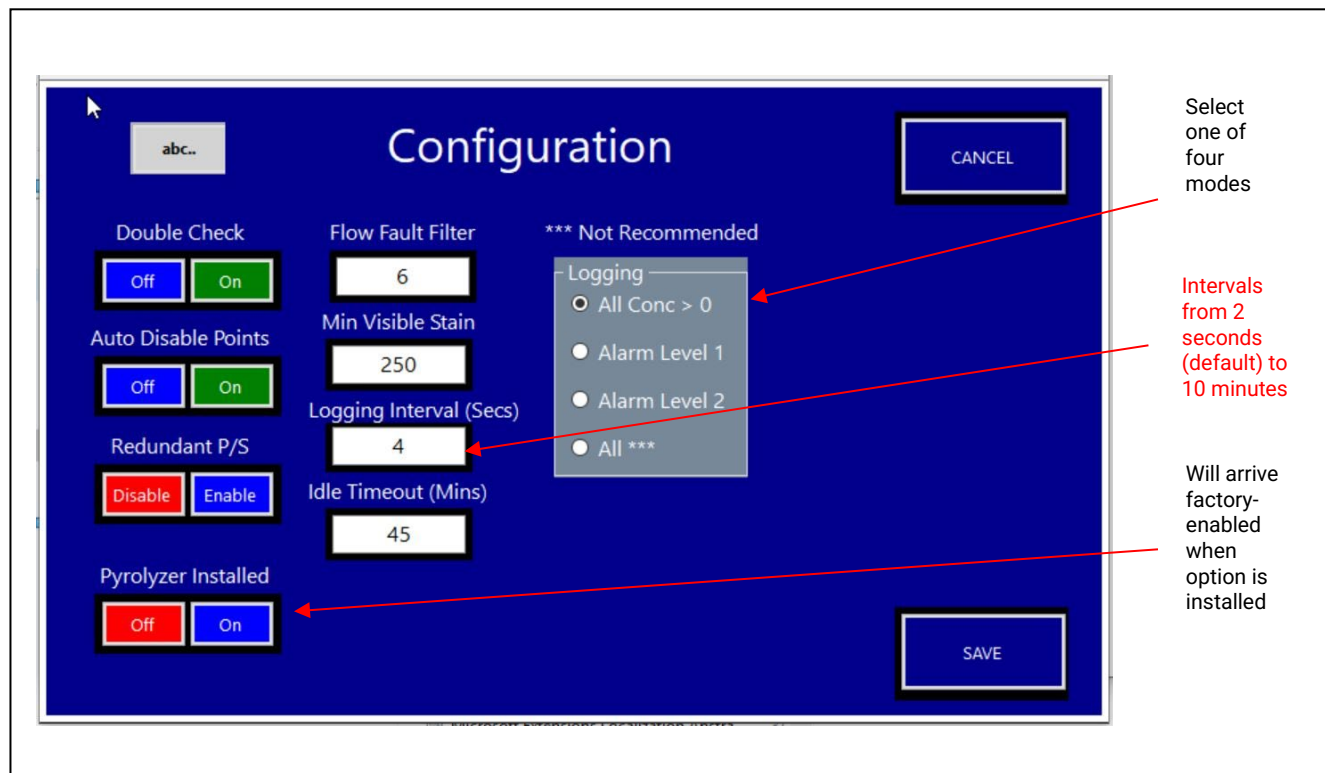


Figure 5.4.1

In addition, the logging interval can be adjusted from the default of 2 seconds to a maximum of 10 minutes (600 seconds).

When the pyrolyzer option is factory-installed, the configuration screen will be enabled at the factory.



WARNING: The 'Pyrolyzer Installed' feature should only be enabled when the pyrolyzer option is installed. When enabled, the CL4R will only function with the factory-installed pyrolyzer option and calibrated for gases that require a pyrolyzer.

5.5 Analysis Mode

Figure 5.5 shows the main analysis screen which is entered either automatically during power on or by touching the 'START ANALYSIS' button on the setup screen. It also shows the main analysis screen with a detailed view of the information on point 3.

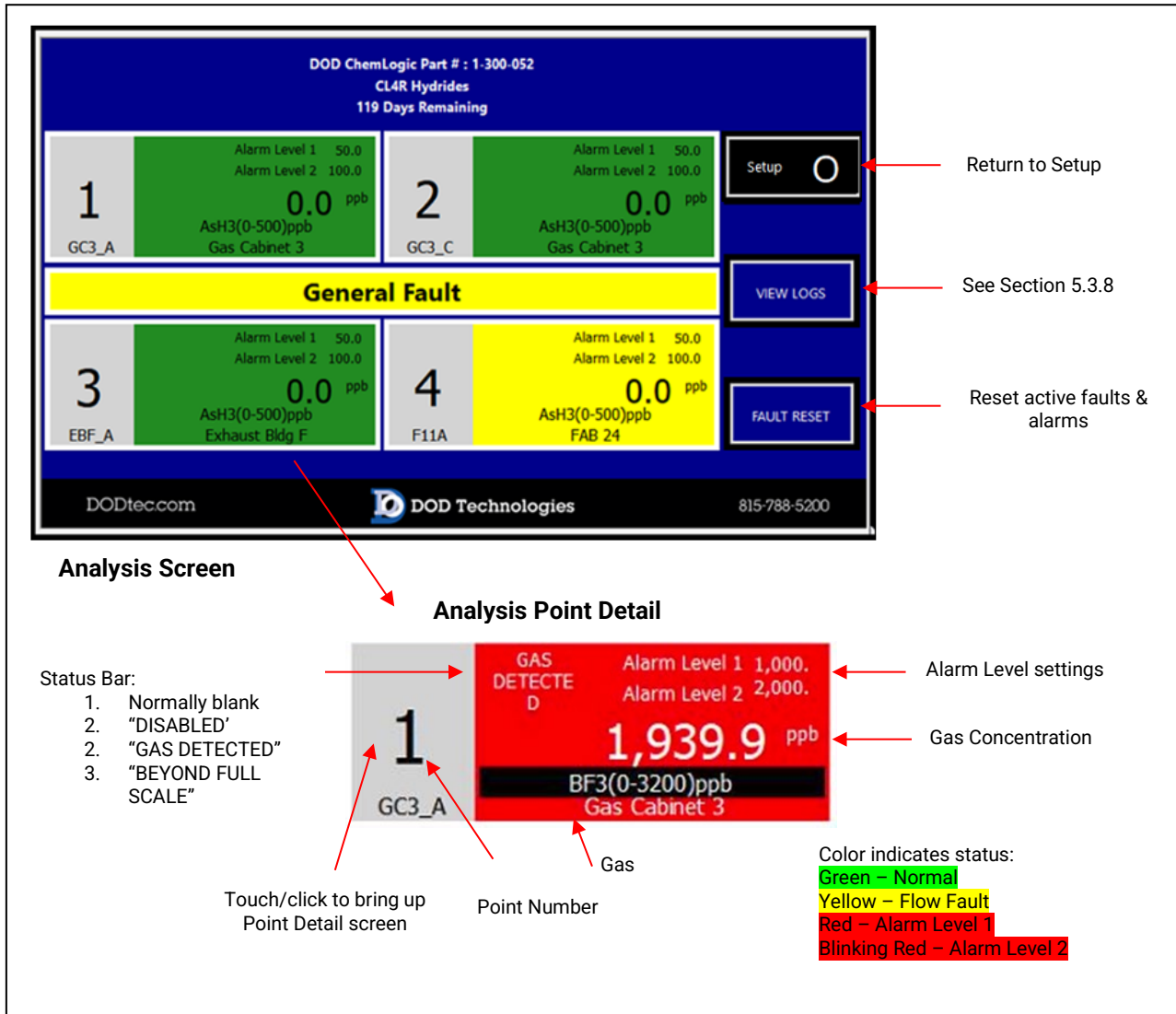


Figure 5.5

At the bottom of the analysis screen on the right side is the current date & time and a message box below it. The message box will either display the blinking message 'NO USB Memory Stick' or will be blank if a USB Memory Stick is inserted in the machine.

To display detailed information on any point touch along the left-hand side from the point # to the square box above it which will bring up the point detail screen (Section 5.5.1).

Touch the 'BACK' button to return to the setup menu.

5.5.1 Point Detail Screen

Touching a point # on the analysis screen will bring up the point detail screen shown in Figure 5.5.1.

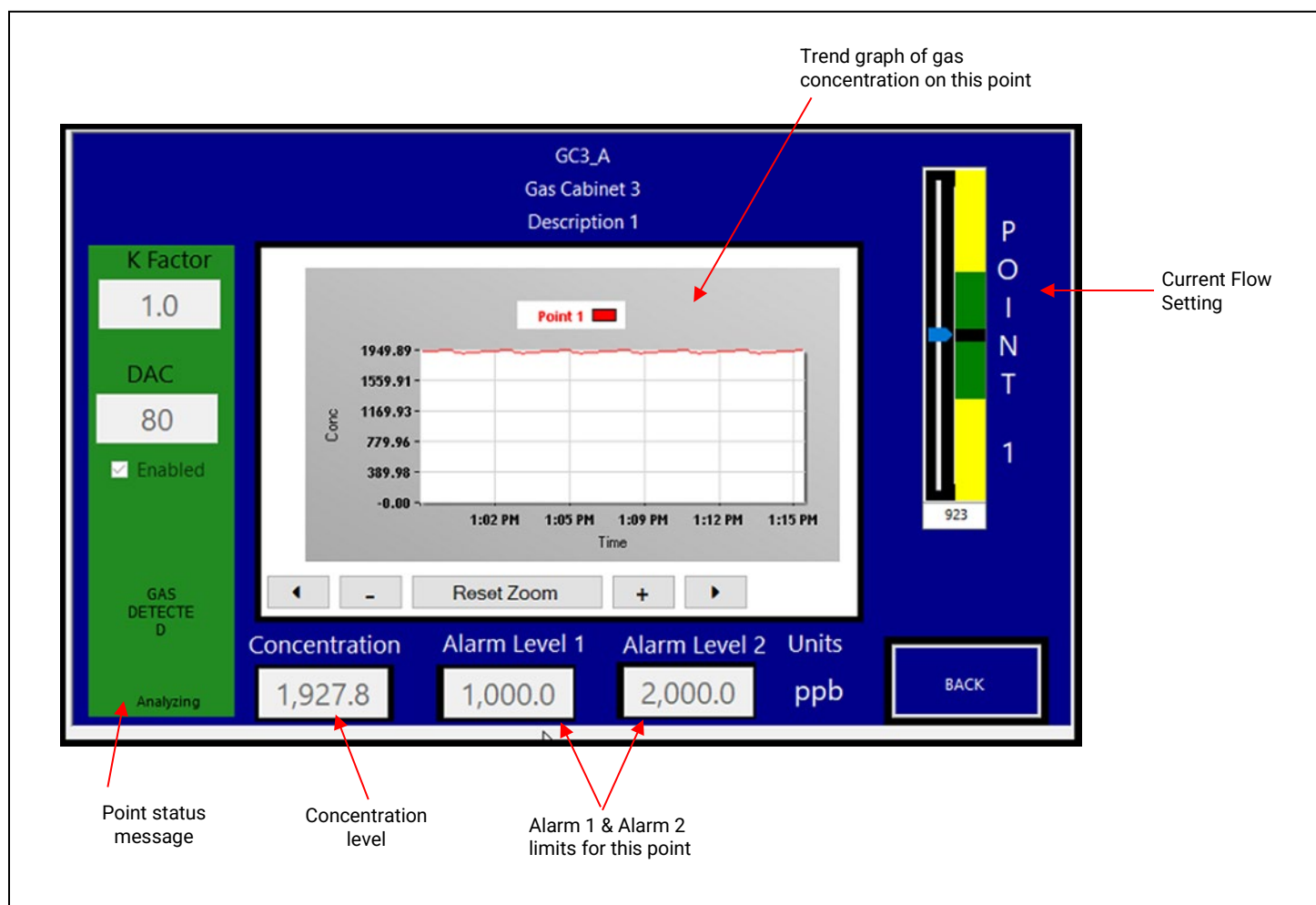


Figure 5.5.1

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

NOTE: The display of the current flow may not be immediately displayed on this screen. It is recommended that the flow adjustment screen (Section 5.3.4) be used for all flow calibration.

5.6 Time Weighted Average (TWA)

Touching the 'TWA' button on the concentration log screen brings up the TWA screen shown in Figure 5.6.

Peak value reached in cycle

PT	Gas	Start Date	Time	End Date	Time	Duration	Peak	Time
1	AsH3(0-...	11/14/2...	5:00 PM	11/15/2...	1:00 AM	8:0:0	0	5:00 PM
2	H2S(0-2...	11/14/2...	5:00 PM	11/15/2...	1:00 AM	8:0:0	0	5:00 PM
3	AsH3(0-...	11/14/2...	5:00 PM	11/15/2...	1:00 AM	8:0:0	0	5:00 PM
4	AsH3(0-...	11/14/2...	5:00 PM	11/15/2...	1:00 AM	8:0:0	0	5:00 PM
1	AsH3(0-...	11/15/2...	1:00 AM	11/15/2...	9:00 AM	8:0:1	0	1:00 AM
2	H2S(0-2...	11/15/2...	1:00 AM	11/15/2...	9:00 AM	8:0:1	0	1:00 AM
3	AsH3(0-...	11/15/2...	1:00 AM	11/15/2...	9:00 AM	8:0:1	0	1:00 AM
4	AsH3(0-...	11/15/2...	1:00 AM	11/15/2...	9:00 AM	8:0:1	0	1:00 AM
1	AsH3(0-...	11/15/2...	9:00 AM	11/15/2...	9:10 AM	0:9:51	0	9:00 AM
2	H2S(0-2...	11/15/2...	9:00 AM	11/15/2...	9:10 AM	0:9:51	0	9:00 AM
3	AsH3(0-...	11/15/2...	9:00 AM	11/15/2...	9:10 AM	0:9:51	0	9:00 AM
4	AsH3(0-...	11/15/2...	9:00 AM	11/15/2...	9:10 AM	0:9:51	0	9:00 AM
1	AsH3(0-...	11/15/2...	9:10 AM	11/15/2...	10:34 AM	1:23:54	0	9:10 AM
2	H2S(0-2...	11/15/2...	9:10 AM	11/15/2...	10:34 AM	1:23:54	0	9:10 AM
3	AsH3(0-...	11/15/2...	9:10 AM	11/15/2...	10:34 AM	1:23:54	0	9:10 AM
4	AsH3(0-...	11/15/2...	9:10 AM	11/15/2...	10:34 AM	1:23:54	0	9:10 AM

EVENTS
CONC
TWA
Back

Figure 5.6

The first screen displays the current TWA information including the minutes and seconds elapsed since the cycle started. The CL4R retains the most recent 5 analysis cycles (up to 40 hours) in addition to the current cycle in memory. The previous cycles are accessed by touching the 'View History' button which brings up the screen shown in the lower right of Figure 5.6. Use the up and down arrows to review the previous 5 cycles in this screen.

Chapter 6 – Maintenance

It is recommended for complete safety that the ChemLogic CL4R continuous gas detection system be serviced on-site every 6-12 months by a certified DOD Service Technician or by submitting the unit to the manufacturer for routine maintenance. A certificate of repair should be received and kept with operation documents of the machine. Any malfunctions in the device should be reported and corrected before further use.



DANGER: Turn off the unit and disconnect A/C power before servicing the CL4R.

To open the door:

1. Insert the key provided into the slot and rotate counterclockwise to unlock the unit.
2. Turn the latch counterclockwise to unlatch the door.
3. Open the door for service as required.

When service is complete 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 service door must remain securely latched when the unit is not being serviced. Verify that the latch is secure and use the keyed lock to prevent unauthorized access.

6.1 ChemLogic® Cassettes

All ChemLogic cassettes have an expiration date printed on the label. An expired cassette should be disposed of and replaced with a new ChemLogic cassette to assure proper gas concentration readings. ChemLogic CL4R cassettes will last 60 or 120 days (depending on model) under normal usage. See Appendix A for ordering information.

6.1.1 Installing/Replacing ChemLogic Cassettes

- A. From the setup menu touch the 'Load Tape' button (Section 5.3.3)
- B. On the screen touch the 'OPEN/CLOSE GATE' button to open the gate
- C. Remove the old take-up reel by gently pulling and dispose of it properly
- D. Remove the empty cassette reel and install it in place of the old take-up reel, as the new take-up reel.
- E. Secure the new ChemLogic reel on the right side as shown in Figure 6.1. This should be around the tape guide in a clockwise direction as shown.
- F. Feed the tape as shown with the arrows in Figure 6.1.
 1. From the left reel
 2. Around the left tape guide
 3. Through the opening between the optic blocks
 4. Between the rubber roller and the capstan
 5. Around the top of the left tape guide

6. Fold the end of the tape and insert into the slot in the empty cassette reel. Be sure the tape is wound clockwise around the take-up reel.

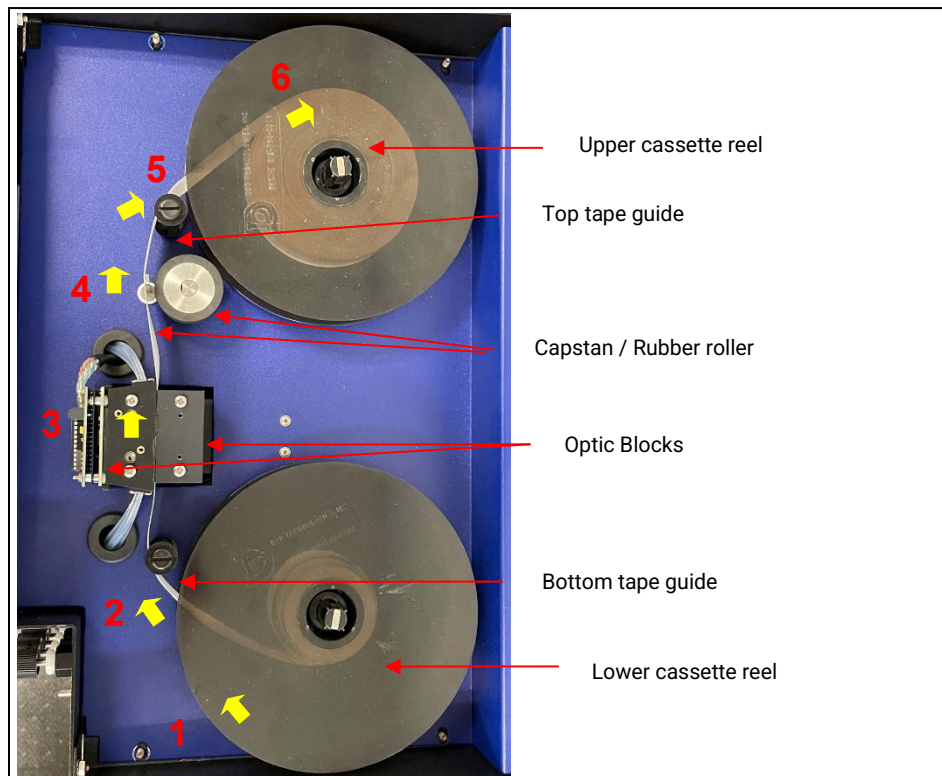


Figure 6.1

- G. Turn the right wheel clockwise at least 2 full turns to secure the tape
- H. On the screen touch the 'OPEN/CLOSE GATE' button to close the gate
- I. On the screen touch the 'Reset Counter' button. (See Section 5.3.3)



WARNING: Keep fingers clear during cassette advance.

6.2 End-Of-Line Particulate Filters

End-Of-Line Particulate Filters – which protect the CL4R 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.** Figure 6.2 details the type of filter required for each gas. Filters must be replaced on a regular basis as shown in Table 6.2. Filter orientation is not critical in either application.

IMPORTANT : All points require filtration to prevent dust accumulation in tubing and internal damage to the CL4R. Dust that collects in the tubing or the internal system may cause sample loss and inaccurate gas concentration readings.

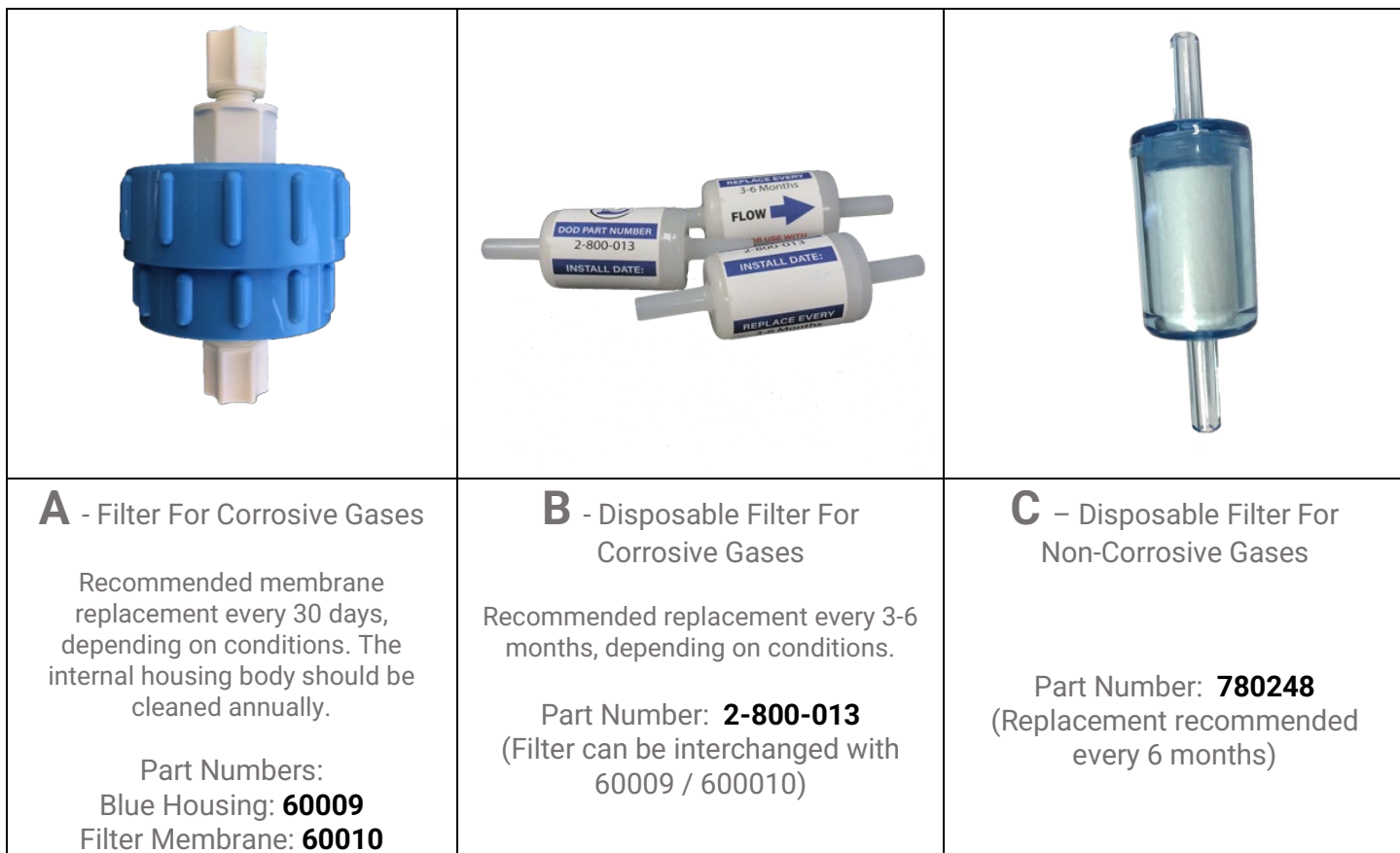


Figure 6.2

Gas	Description	Suggested Replacement	DOD Filter Part #
AsH ₃	Arsine	6 Months	780248
B ₂ H ₆	Diborane	6 Months	780248
GeH ₄	Germane	6 Months	780248
H ₂ SE	Hydrogen Selenide	6 Months	780248
PH ₃	Phosphine	6 Months	780248
SiH ₄	Silane	6 Months	780248
TBA	Tertiary-Butyl-Arsine	6 Months	780248
H ₂ S	Hydrogen Sulfide	6 Months	780248
HCL	Hydrogen Chloride	1 Month (membrane)	60009 (Housing) 60010 (membrane)
HF	Hydrogen Flouride	1 Month (membrane)	60009 (Housing) 60010 (membrane)
BF ₃	Boron Trifluoride	1 Month (membrane)	60009 (Housing) 60010 (membrane)
HBR	Hydrogen Bromide	1 Month (membrane)	60009 (Housing) 60010 (membrane)
COCL ₂	Phosgene	6 Months	780248

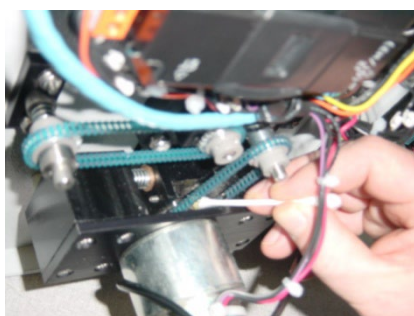
Table 6.2

6.3 Flow Adjustment

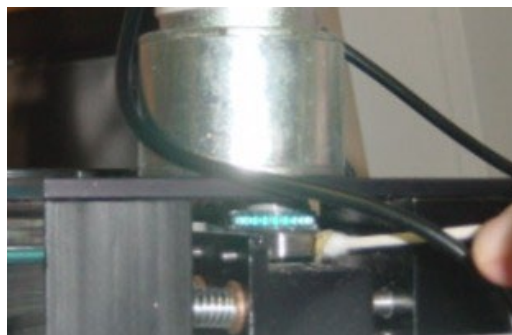
Each channel should be adjusted whenever a new ChemLogic Cassette or particulate filter is installed. See Section 5.3.4.

6.4 Preventative Maintenance

The cam attached to the gate motor should be greased every 6-12 months to prevent wear. Apply a small amount of number 2 type petroleum or synthetic grease (such as McMaster Carr #1378K27) to the rounded portion of the cam. – See Figure 6.4



Top of gate mechanism



Bottom of gate mechanism

Figure 6.4 -Grease may be applied either from the top of the gate mechanism or the bottom.

6.5 Fuse Replacement

The CL4R rack-mounted (2-510-001) and table top (2-510-001-T) systems are fused with a 2A 5x20 Fast Acting fuse (DOD part # 9-200-004). If the Pyrolyzer option (2-510-050) is installed, utilize the 3.15A 5x20 fuse (DOD part # 102531-1). The 5VDC and 24VDC power supply utilize a 4A 5x20 Fast Acting fuse (DOD part # 9-200-135). For further reference, review the Wiring Diagrams in Appendix J.

6.6 Optics

No optics maintenance is required. The background is self-adjusting. For preventative maintenance, review the optic block cleaning procedure in Appendix G.

Chapter 7 – Service & Support

Contact DOD Technologies for product assistance and technical support:

Phone Support

M-F 8:30am – 5pm (Central Time Zone-U.S.A.)

815.788.5200

International Headquarters

675 Industrial Drive, Bldg. A.

Cary, IL 60013

Visit our website:

DODtec.com

Decommissioning, Disposal & Recycling of the Electrical Equipment

When decommissioning, ensure the sample inlet and exhaust tubing is cut and removed. Power to the vacuum pump and power entry must also be cut and removed. Follow all local regulations when disposing of electrical components and systems.

Discontinued units may be eligible for recycling. Please contact DOD Technologies for additional information and instructions for arranging the safe return of your equipment.



RECYCLING WASTE ELECTRICAL & ELECTRONIC EQUIPMENT (WEEE)

Systems manufactured for use in Europe must be disposed of at a designated collection point. Contact our European Representative for WEEE Directive disposal arrangements.

Appendix A – Parts & Accessories

Replacement ChemLogic® Cassettes

Part #	Description
120-Day Cassettes	
1-200-052	CL4R Phosgene 120-Day ChemLogic Cassette Gas Detected: COCl ₂
1-300-052	CL4R Hydride 120-Day ChemLogic Cassette Gas Detected: AsH ₃ , B ₂ H ₆ , GeH ₄ , H ₂ S, H ₂ Se, PH ₃ , SiH ₄
1-420-052	CL4R Mineral Acid SG 120-Day ChemLogic Cassette Detects: BF ₃ , C ₄ F ₆ , CH ₂ F ₂ , CH ₃ F, HBr, HCl, HF
1-560-052	CL4R Chlorine SG 120-Day ChemLogic Cassette Detects: Cl ₂
1-700-052	CL4R Ammonia 120-Day ChemLogic Cassette Detects: NH ₃ , TDMAT
1-720-052	CL4R Ammonia SG 120-Day ChemLogic Cassette Detects: NH ₃
60-Day Cassettes	
1-550-052	CL4R Fluorine 60-Day ChemLogic Cassette Detects: ClO ₂ , F ₂ , NO ₂
1-600-052	CL4R Nitrogen Dioxide 60-Day ChemLogic Cassette Detects: NO ₂
1-D11-052	CL4R Hydrazine 60-Day ChemLogic Cassette Detects: N ₂ H ₄

Filters & Tubing

Part #	Description
780248	Particulate Filter for Non-Corrosives (Phosgene & Hydrides)
2-800-007	Duct Mounting Kit for 1/4" Sample Line Tubing
2-800-013	Particulate Filter for Corrosive Gases (Mineral Acids)
2-800-008	KIT Duct Mounting Kit for 3/8" Tubing
2-500-502	47mm Teflon Membranes (Pack of 10) - use with P/N 60009
2-500-052	Pyrolyzer Freon Filter
60009	Filter Housing for Teflon Membranes (Mineral Acids)
2-100-503	Filter for H ₂ S Scrubber
60010	47mm Teflon Membranes (Pack of 100) - use with P/N 60009
14249	250 ft. FEP Teflon Tubing (3/16 ID x 1/4 OD)
77347	500 ft. FEP Teflon Tubing (3/16 ID x 1/4 OD)
48423	Tubing FEP 1/4 OD x 3/16 ID x 1000'
2-400-004	Tubing Exhaust 3/8 x 1/4 Polypropylene, 25' max

Appendix B – Communication Protocols

CL4R MODBUS/TCP Data Option

MODBUS/TCP data contains concentrations, alarm levels, and gas types for all points in addition to machine fault, general alarm, and misc bit indicators. Alarm Levels and Concentration are passed as unsigned integers.

Default Slave ID: 1

Total Size: 202 Words

4x MODBUS Address	Format	Size	Description
40001	Numeric	16 Bit (Word)	Version
40006	Integer	16 Bit (Word)	Heartbeat Seconds
40007	Integer	16 Bit (Word)	Tape Days Remaining
40049	Numeric Decimal	Real	Alarm Level 1 – Pt 1
40051	Numeric Decimal	Real	Alarm Level 1 – Pt 2
40053	Numeric Decimal	Real	Alarm Level 1 – Pt 3
40055	Numeric Decimal	Real	Alarm Level 1 – Pt 4
40065	Numeric Decimal	Real	Alarm Level 2 – Pt 1
40067	Numeric Decimal	Real	Alarm Level 2 – Pt 2
40069	Numeric Decimal	Real	Alarm Level 2 – Pt 3
40071	Numeric Decimal	Real	Alarm Level 2 – Pt 4
40081	Numeric Decimal	Real	Concentration – Pt 1
40083	Numeric Decimal	Real	Concentration – Pt 2
40085	Numeric Decimal	Real	Concentration – Pt 3
40087	Numeric Decimal	Real	Concentration – Pt 4
40097	Numeric Decimal	Real	Full Scale – Pt 1
40099	Numeric Decimal	Real	Full Scale – Pt 2
40101	Numeric Decimal	Real	Full Scale – Pt 3
40103	Numeric Decimal	Real	Full Scale – Pt 4
40113	Numeric	16 Bit (Word)	Pt 1 - Gas ID
40114	Numeric	16 Bit (Word)	Pt 2 - Gas ID
40115	Numeric	16 Bit (Word)	Pt 3 - Gas ID
40116	Numeric	16 Bit (Word)	Pt 4 - Gas ID
40121	Numeric	16 Bit (Word)	Pt 1 - Gas Units
40122	Numeric	16 Bit (Word)	Pt 2 - Gas Units
40123	Numeric	16 Bit (Word)	Pt 3 - Gas Units
40124	Numeric	16 Bit (Word)	Pt 4 - Gas Units
40129	Numeric	16 Bit (Word)	Pt 1 - Gas Alarm 1
40130	Numeric	16 Bit (Word)	Pt 2 - Gas Alarm 1
40131	Numeric	16 Bit (Word)	Pt 3 - Gas Alarm 1
40132	Numeric	16 Bit (Word)	Pt 4 - Gas Alarm 1
40137	Numeric	16 Bit (Word)	Pt 1 - Gas Alarm 2
40138	Numeric	16 Bit (Word)	Pt 2 - Gas Alarm 2

4x MODBUS Address	Format	Size	Description
40139	Numeric	16 Bit (Word)	Pt 3 - Gas Alarm 2
40140	Numeric	16 Bit (Word)	Pt 4 - Gas Alarm 2
40145	Numeric	16 Bit (Word)	Pt 1 - Enabled
40146	Numeric	16 Bit (Word)	Pt 2 - Enabled
40147	Numeric	16 Bit (Word)	Pt 3 - Enabled
40148	Numeric	16 Bit (Word)	Pt 4 - Enabled
40153	Numeric	16 Bit (Word)	Pt 1 - Flow Fault
40154	Numeric	16 Bit (Word)	Pt 2 - Flow Fault
40155	Numeric	16 Bit (Word)	Pt 3 - Flow Fault
40156	Numeric	16 Bit (Word)	Pt 4 - Flow Fault
40161	Numeric	16 Bit (Word)	Pt 1 - High Flow
40162	Numeric	16 Bit (Word)	Pt 2 - High Flow
40163	Numeric	16 Bit (Word)	Pt 3 - High Flow
40164	Numeric	16 Bit (Word)	Pt 4 - High Flow
40169	Numeric	16 Bit (Word)	Pt 1 - Low Flow
40170	Numeric	16 Bit (Word)	Pt 2 - Low Flow
40171	Numeric	16 Bit (Word)	Pt 3 - Low Flow
40172	Numeric	16 Bit (Word)	Pt 4 - Low Flow
40177	Numeric	16 Bit (Word)	Pt 1 - Optics Fault
40178	Numeric	16 Bit (Word)	Pt 2 - Optics Fault
40179	Numeric	16 Bit (Word)	Pt 3 - Optics Fault
40180	Numeric	16 Bit (Word)	Pt 4 - Optics Fault
40185	Numeric	16 Bit (Word)	SelectedGasFamilyCode
40186	Numeric	16 Bit (Word)	MachineOutput
40187	Numeric	16 Bit (Word)	MachineSerial
40188	Numeric	16 Bit (Word)	Month
40189	Numeric	16 Bit (Word)	Year
40190	Numeric	16 Bit (Word)	Day
40191	Numeric	16 Bit (Word)	Hour
40192	Numeric	16 Bit (Word)	Minute
40193	Numeric	16 Bit (Word)	Second
40194	Numeric	16 Bit (Word)	Watchdog
40195	Numeric	32 Bit (2 Words)	WatchDogTime
40197	Numeric Decimal	Real	WebserverVersion
40199	Numeric Decimal	Real	CLXRVersion
40201	Numeric Decimal	Real	PlcVersion

Gas ID	Range Label
100	AsH3(0-500)ppb
101	B2H6(0-1000)ppb
104	PH3(0-1500)ppb
105	SiH4(0-50)ppm
108	H2S(0-25)ppm
115	COCl2(0-1000)ppb
116	COCl2(0-4000)ppb
129	AceticAcid(0-50)ppb
131	AsH3(0-500)ppb
132	B2H6(0-1000)ppb
133	PH3(0-1500)ppb
134	MIC(0-10)ppm
136	H2S(0-20)ppm
139	NH3(0-75)ppm
140	DMDC(0-500)ppb
201	SG_HCL(0-15)ppm
202	SG_HF(0-10)ppm
203	SG_BF3(0-3200)ppb
204	SG_HBR(0-20)ppm
303	SG_H2Se(0-500)ppb
309	HCL(0-15)ppm
310	HF(0-10)ppm
311	BF3(0-3200)ppb
312	HBR(0-20)ppm
319	AsH3(0-50)ppb
320	HCL(0-15)ppm
321	HF(0-10)ppm
322	BF3(0-3200)ppb
323	HBR(0-20)ppm
330	COCl2(0-1000)ppb
331	COCl2(0-300)ppb

Gas ID	Range Label
332	COCl2(0-3250)ppb
337	CL2(0-5000)ppb
339	CL2(0-3200)ppb
340	C5F8(0-15)ppm
341	Br2(0-1000)ppb
342	MIC(0-100)ppm
344	N2H4(0-500)ppb
345	NO2(0-30)ppm
346	F2(0-3200)ppb
350	NF3(0-20)ppm
351	NF3(0-20)ppm
353	HCN(0-2500)ppb
354	COS(0-20)ppm
356	NO2(0-100)ppm
357	PH3(0-300)ppb
358	H2S(0-5)ppm
359	CL2(0-30)ppb
403	SbH3(0-500)ppb
404	CL2(0-2000)ppb
405	SiH4(0-50)ppm
406	NF3(0-15)ppm
408	COCl2(0-5000)ppb
417	PH3(0-3000)ppb
422	NH3(0-150)ppm
429	C4F6(0-40)ppm
435	SG_CL2(0-5000)ppb
436	SG_CL2(0-2000)ppb
438	HCL(0-3250)ppb
441	SiH4(0-15000)ppb
444	F2(0-3200)ppb

Appendix C – System Specifications

Physical Dimensions	
Height	8.625" (219 mm)
Width	17" (432 mm)
Depth	17.75" (451 mm)
Weight	Approx. 45 lbs. (20.4 kg), 53 lbs. (24 kg) with pyrolyzer
Tubing	
Exhaust Line (1)	1/4" OD x 3/16" ID x polyethylene, polypropylene or Teflon, 50 ft. (15m) max length
Sample Lines (1-4)	1/4" OD x 3/16" ID Teflon FEP tubing, 400 ft. (122m) max length
Power	
A/C Power	100-115 VAC (+/- 10), 50/60 HZ 230 VAC (+/- 10), 50/60 HZ
Amperage	Full load rating 0.6A
Operation / Environment	
Operating temperature	40°F to 104°F / 4°C to 40°C
Relative Humidity	Should not exceed 50% at max temp of 104°F (40°C). Higher RH is permitted at lower temperatures (i.e. 90% at 20°C).
Altitude	Capable at altitudes up to 3,280 feet (1,000m) above mean sea level
Operating Noise	Maximum noise level for this equipment was less than 70db(A)

Appendix D – System Event Messages

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

Event Code	Message	Corrective Action
30000	System Communication Failure	Service required
30001	All Points Are Disabled	Enable 1 or more points - sections 4.2.a
30002	Low flow multiple points	Check pump, gate, or adjust flow
30003	Gate Close Fault	Gate home switch stuck or gate not moving
30004	Gate open Fault	Check gate home switch and/or mechanism
30005	High background Fault	Check/replace tape
30006	I/O Failure - Check wiring	Check RS-485 wiring
30007	No Gas Family Selected	Service required
30008	Pump failure	Check pump wiring/flow
30009	Tape Advance Fault	Tape switch not activated before timeout
30010	Optic 1 Communication Error	Check Wiring or Optic 1
30011	Optic 2 Communication Error	Check Wiring or Optic 2
30012	High Background Tape Advance Fault	Check/replace tape
30013	LED Failure Optic 1	Possible Tape alignment problem
30014	Warning : Default values restored	Reconfigure & Calibrate
30015	Pump Timeout Error	Pump failure or system problem
30016	Tape Advance Problem	Service required
30017	Optic 1 LED Failure	Service required
30018	Optic 2 LED Failure	Service required
30019	Optic Supply Voltage Failure	Service required
30020	Optic reference validation fault	Service required
30021	LED Failure Optic 2	Service required
30022	Complete Optic Low Flow all Pt 1-4	Check gate closure
30023	Complete Optic Low Flow all Pt 5-8	Check gate closure
30024	LED Calibration error	
50000	Chemlogic tape supply low	Change Tape
50001	Pt X High Flow	Flow Adjustment - Section 4.2.d
50009	Pt X Low Flow	Flow Adjustment - Section 4.2.d
60000	8 Hour - conc. detected	
60010	Last analysis - Conc. detected	
60011	Alarms & Faults Reset	
60012	Error Transferring TWA/Analysis Summary	
60013	Flow Fluctuation	
60014	Maximum # of Ref fluctuations	

Event Code	Message	Corrective Action
60015	LED Fluctuation fault	
60016	Temperature fluctuation - O1	
60017	Temperature fluctuation - O2	
60018	K Factor - all pts = 1.000	
60019	K Factor - some pts <> 1.000	
60020	Reference fluctuation point X	
60028	Power UP Time	
60029	PT X Disabled	
60030	Tape Counter Reset	
60031	Simulation Mode	
60032	Simulation Enabled Point 1	
70000	DIAGNOSTIC STATUS OK	
70001	8 Hour - no conc. all points.	
70002	Analysis Start Time	
70003	Last analysis - no Conc. found	

Appendix E – Gas Specifications

Name	Gas	Units	LDL	FS	TLV	Alarm 1 Default	Alarm 2 Default	ChemLogic Cassette #	Response Time TLV (T100)*secs
Acetic Acid	CH ₃ CO ₂ H	ppb	0.7	50	10000	10000	20000	-	120
Ammonia	NH ₃	ppm	1.2	75	25	25	50	1-700-052	12
Arsenic Pentafluoride [^]	AsF ₅ (HF)	ppm	0.2	10	0.5	2	4	-	20
Arsenic Trichloride ^{^^}	AsHCl ₃ (HCl)	ppm	0.2	15	2	5	10	-	12
Arsenic Trifluoride [^]	AsF ₃ (HF)	ppm	0.2	10	0.5	2	4	-	12
Arsine	AsH ₃	ppb	2.2	500	5	50	100	1-300-052	16
Arsine	AsH ₃	ppb	4.7	500	5	50	100	1-300-052	
Arsine	AsH ₃	ppb	0.3	50	5	5	10	1-300-052	84
Boron Tribromide ^{^^^}	BBr ₃ (HBr)	ppm	0.1	20	2	3	6	-	12
Boron Trichloride ^{^^}	BCl ₃ (HCl)	ppm	0.2	15	2	5	10	-	12
Boron Trifluoride	BF ₃	ppb	40.3	10000	100	1000	2000	1-420-052	12
Boron Trifluoride	BF ₃	ppb	72.1	3200	100	1000	2000	1-420-052	
Boron Trifluoride	BF ₃	ppb	40.3	3200	100	100	200	1-420-052	
Bromine	Br ₂	ppb	72.2	3200	100	100	200	-	88
Carbonyl Fluoride [^]	COF ₂ (HF)	ppm	0.2	10	0.5	2	4	-	20
Carbonyl Sulfide	COS							-	
Chlorine	Cl ₂	ppb	44.6	5000	100	500	1000	1-560-052	20
Chlorine	Cl ₂	ppb	50.1	3200	100	500	1000	1-560-052	20
Chlorine	Cl ₂	ppb	6.9	2000	100	500	1000	1-560-052	20
Chlorine	Cl ₂	ppb	44.6	5000	100	500	1000	1-560-052	
Chlorine	Cl ₂	ppb	1	30	100	500	1000	1-560-052	20
Chlorine Trifluoride [^]	ClF ₃ (HF)	ppm	0.2	10	0.5	2	4	-	20
Cyclohexane Diisocyanate	CHDI							-	
Cynogen Chloride ^{**}	NCCl	ppm	0.1	10	0.3	0.3	0.6	-	200
Diborane	B ₂ H ₆	ppb	6	1000	100	100	200	1-300-052	12
Diborane	B ₂ H ₆	ppb	31.5	1000	100	100	200	1-300-052	
Dichlorosilane ^{^^}	SiH ₂ Cl ₂ (HCl)	ppm	0.2	15	2	5	10	-	12
Fluorine	F ₂	ppb	49.8	3200	100	1000	2000	-	40
Fluorine	F ₂	ppb	59	10000	100	1000	2000	-	
Fluorine	F ₂	ppb	41.6	10000	100	1000	2000	-	
Fluorosilicic acid [^]	H ₂ SiF ₆ (HF)	ppm	0.2	10	0.5	2	4	-	20
Germane	GeH ₄	ppb	62.1	2000	200	200	400	1-300-052	180
Germane	GeH ₄	ppb	62.1	2000	200	200	400	1-300-052	
Germanium Tetrafluoride [^]	GeF ₄ (HF)	ppm	0.2	10	0.5	2	4	-	20
Hexachlorodisilane ^{^^}	SiCl ₂ (HCl)	ppm	0.2	15	2	5	10	-	12
Hexafluorocyclobutene ^{**}	C ₄ F ₆	ppm	1.5	40	5	5	10	1-420-052	16
Hydrazine	N ₂ H ₄							1-D11-052	

Name	Gas	Units	LDL	FS	TLV	Alarm 1 Default	Alarm 2 Default	ChemLogic Cassette #	Response Time TLV (T100)*secs
Hydrogen Chloride	HCl	ppm	0.1	15	2	5	10	1-420-052	12
Hydrogen Chloride	HCl	ppm	0.2	15	2	5	10	1-420-052	
Hydrogen Chloride	HCl	ppb	20	3250	2	500	1000	1-420-052	12
Hydrogen Bromide	HBr	ppm	0.1	20	2	3	6	1-420-052	12
Hydrogen Cyanide	HCN	ppb	298.2	2500	4700	500	1000	-	16
Hydrogen Fluoride	HF	ppm	0.2	10	0.5	2	4	1-420-052	20
Hydrogen Fluoride	HF	ppm	0.2	20	0.5	3	6	1-420-052	
Hydrogen Selenide	H ₂ Se	ppb	5.1	500	50	50	100	1-300-052	40
Hydrogen Sulfide	H ₂ S	ppm	0.2	20	1	1	2	1-300-052	20
Hydrogen Sulfide	H ₂ S	ppm	0.1	25	1	10	20	1-300-052	
Hydrogen Sulfide	H ₂ S	ppm	0.1	5	1	1	2	1-300-052	20
Nitric Acid	HNO ₃							-	
Nitrogen Dioxide	NO ₂	ppm	1.3	30	0.2	3	6	1-550-052	24
Nitrogen Trifluoride**	NF ₃	ppm	0.3	20	10	10	20	-	24
Octafluorocyclopentene**	C ₅ F ₈	ppm	0.5	15	2	2	4	-	24
Phenyl Trichlorosilane^^	SiCl ₃ Ph (HCl)	ppm	0.2	15	2	5	10	-	12
Phosgene	COCl ₂	ppb	8.9	1000	100	100	200	1-200-052	
Phosgene	COCl ₂	ppb	8.9	4000	100	100	200	1-200-052	12
Phosgene	COCl ₂	ppb	6.6	900	100	100	200	1-200-052	12
Phosgene	COCl ₂	ppb	5.2	3000	100	100	200	1-200-052	12
Phosgene	COCl ₂	ppb	8.8	1000	100	100	200	1-200-052	
Phosgene	COCl ₂	ppb	3.9	300	100	100	200	1-200-052	12
Phosgene	COCl ₂	ppb	8.8	5000	100	100	200	1-200-052	
Phosphine	PH ₃	ppb	4.8	300	50	50	100	1-300-052	16
Phosphine	PH ₃	ppb	4.9	1500	50	50	100	1-300-052	16
Phosphine	PH ₃	ppb	8.4	1500	50	300	600	1-300-052	
Phosphorus Oxychloride^^	POCl ₃ (HCl)	ppm	0.2	15	2	5	10	-	12
Phosphorus Pentachloride^^	PCl ₅ (HCl)	ppm	0.2	15	2	5	10	-	12
Phosphorus Pentafluoride^	PF ₅ (HF)	ppm	0.2	10	0.5	2	4	-	20
Phosphorus Tribromide^^^	PBr ₃ (HBr)	ppm	0.1	20	2	3	6	-	12
Phosphorus Trichloride^^	PCl ₃ (HCl)	ppm	0.2	15	2	5	10	-	12
Phosphorus Trifluoride^	PF ₃ (HF)	ppm	0.2	10	0.5	2	4	-	20
Silane	SiH ₄	ppb	40	15000	5000	5000	10000	1-300-052	16
Silane	SiH ₄	ppm	0.7	50	5	5	10	1-300-052	
Silicon Tetrachloride^^	SiCl ₄ (HCl)	ppm	0.2	15	2	5	10	-	12
Stibine	SbH ₃	ppb	14.6	500	100	100	200	-	16
Sulfur Tetrafluoride^	SF ₄ (HF)	ppm	0.2	10	0.5	2	4	-	20
Sulfuric Acid	H ₂ SO ₄	ppb	100	3200	50	100	200	-	
Tetrafluorosilane^	SiF ₄ (HF)	ppm	0.2	10	0.5	2	4	-	20

Name	Gas	Units	LDL	FS	TLV	Alarm 1 Default	Alarm 2 Default	ChemLogic Cassette #	Response Time TLV (T100)*secs
Tin Tetrachloride ^{^^}	SnCl ₄ (HCl)	ppm	0.2	15	2	5	10	-	12
Trichlorosilane ^{^^}	SiHCl ₃ (HCl)	ppm	0.2	15	2	5	10	-	12
Tungsten Hexafluoride [^]	WF ₆ (HF)	ppm	0.2	10	0.5	2	4	-	20
Trichlorosilane ^{^^}	SiHCl ₃ (HCl)	ppm	0.2	15	2	5	10	-	12
Tungsten Hexafluoride [^]	WF ₆ (HF)	ppm	0.2	10	0.5	2	4	-	20
Velcorin	DMDC	ppb	8.9	200	40	40	80	-	12

* Additional ranges may be available and are subject to change. Please see specific product brochure or contact DOD Technologies.

** Requires pyrolyzer option for detection

[^] Compounds which hydrolyze to HF

^{^^} Compounds which hydrolyze to HCl

^{^^^} Compounds which hydrolyze to HBr

Appendix F – ChemLogic Cassettes

ChemLogic Cassettes are designed for use in colorimetric-based gas monitoring systems. Since this is a particular end-use function that does not release or result in exposure to hazardous chemicals under normal use, Material Safety Data Sheets (MSDS) are not required.

ChemLogic cassettes are non-toxic and require no special precautions for protection.

However, contact with skin may cause the cassette to react, change color, and no longer be useful in your gas monitoring system. We therefore recommend that rubber gloves be worn at all times while handling, including removal and installation. Always wash hands as a precaution after handling ChemLogic Cassettes.

Appendix G – Optic Block Cleaning Procedure

The CL4R may require periodic cleaning of the optics block when the instrument is used in environments with a high level of airborne particulate or a “High Background” Fault has been reported.

There are two methods for cleaning the optics. One is a basic cleaning using canned air and the other is a more in-depth cleaning that requires the fiber optics to be cleaned with alcohol.

In most cases the basic cleaning will be enough to clear an optics fault and return the DAC to normal operating levels.

G.1 Basic Optics Cleaning

- 1) Exit Analysis mode and go to the Load Tape screen.
- 2) Open the gate and remove the cassette.
- 3) Remove the optic block covers and the four screws holding in the optic blocks (Figure 1).



Figure 1

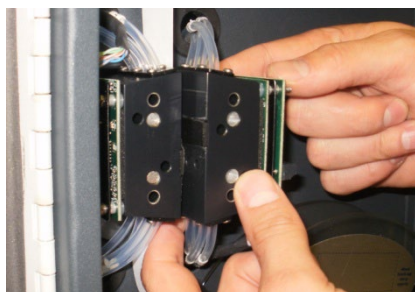


Figure 2

- 4) Pull the block towards you until the pins holding the block are loose (Figure 2).
- 5) Without removing any tubes, turn the block so the bottom is facing out. (Figure 3).



Figure 3

- 6) Using canned air, blow out the channels on the block with high DAC values (Figure 3).
- 7) Re-install the blocks and close the gate.
- 8) Select the Load Tape option until the enter password screen appears.

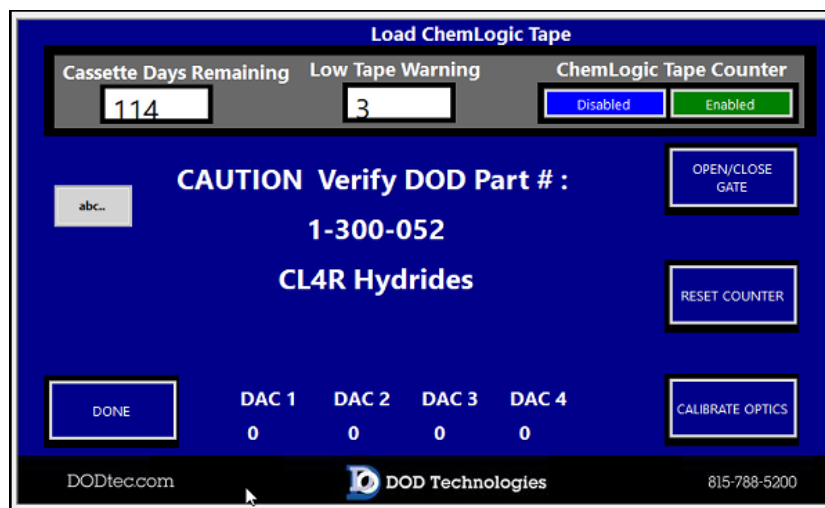


Figure 4

- 9) When the password screen appears, enter "1225" for the password then press Enter.
- 10) When you see the Calibrate Optics button (Figure 4), make sure the gate is closed and select that button.
- 11) If the DAC values are 140 or below you are done. Go to the "Main Menu" and clear the original faults and re-enter analysis.
- 12) If the DAV values are not lower than 140, follow the advanced cleaning instructions below.

G.2 Advanced Optics Cleaning

- 1) Repeat above steps 1-5.
- 2) Using a cotton swab and alcohol (you may have to trim the cotton swab to fit) clean each channel that has a DAC above 140. (Figure 6)



Figure 6

- 3) Repeat above steps 7-11
- 4) If the DAC values still have not improved contact DOD Technologies Technical Service at 815-788-5200.

Appendix H – 4-20mA + Relay Option Installation

WARNING : Options 2-510-007-SA, 2-510-013-4, and 2-510-013-14 are only intended for use in specific setups. Those that procure these options are not using the CL4R in a rack-mounted or tabletop setup/installation. The location of the options that are utilized is under specific condition that the CL4R is retrofitted into an existing enclosure. Existing enclosures are protected with doors and covers. As such, the electrical connections with these options are not exposed.

H.1 4-20mA + Relay Option Overview

Materials required with this option include:

Qty 1: Coupler Terminal for EtherCAT Extension Hot Connect (2-200-070)

Qty 2: 2-Channel Analog Output Terminal 0-20 mA (2-200-099)

Qty 2: Output Module, 8-Point 24 VDC Sink EtherCAT, 0.5A individual 3.0A max (2-200-068)

Qty 14: Form C Relays

Screw terminals: max torque 0.5 Nm, strip length 10mm, max wire size 14)

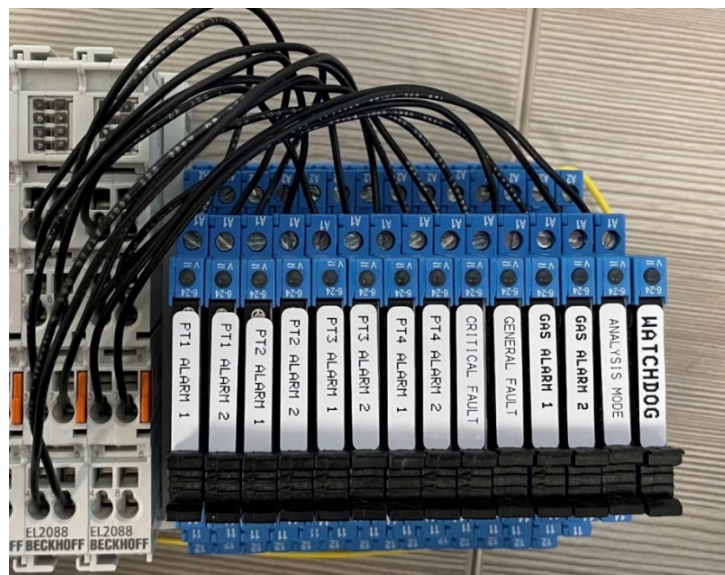
Screwless terminals: max wire size 14 AWG)

The termination points are implemented in spring force technology. Connect the cables as follows:

1. Open a terminal point by pushing a screwdriver straight against the stop into the square opening above the terminal point. Do not turn the screwdriver or move it alternately (don't toggle).
2. The wire can now be inserted into the round terminal opening without any force.
3. The terminal point closes automatically when the pressure is released, holding the wire securely and permanently.

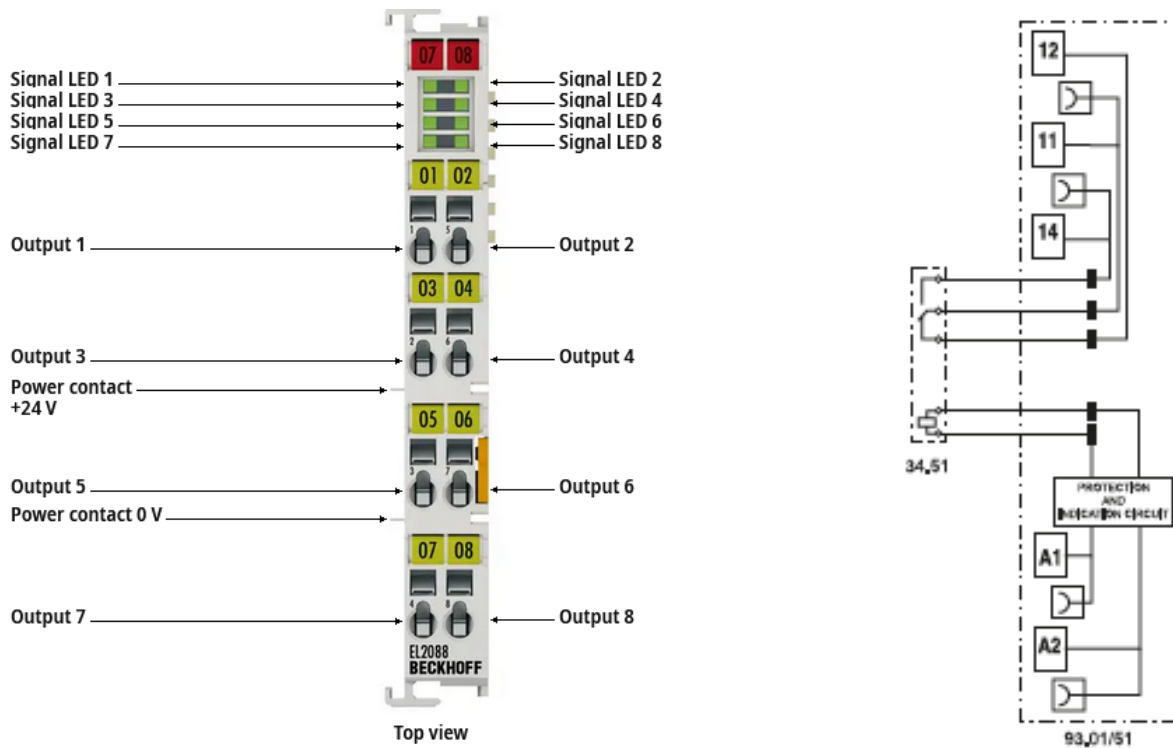
H.2 Wiring and Setup

1. Wire the outputs of the output module to the A1 terminals on the Form C Relays as shown below:

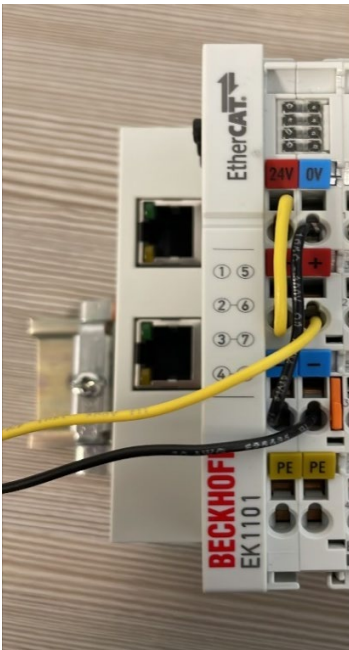


Relay 1	Relay 2	Relay 3	Relay 4	Relay 5	Relay 6	Relay 7	Relay 8	Relay 9	Relay 10	Relay 11	Relay 12	Relay 13	Relay 14
Ouput 1	Ouput 2	Ouput 3	Ouput 4	Ouput 5	Ouput 6	Ouput 7	Ouput 8	Ouput 1	Ouput 2	Ouput 3	Ouput 4	Ouput 5	Ouput 6
Point 1 Alarm 1	Point 1 Alarm 2	Point 2 Alarm 1	Point 2 Alarm 2	Point 3 Alarm 1	Point 3 Alarm 2	Point 4 Alarm 1	Point 4 Alarm 2	Critical Fault	General Fault	General Alarm1	General Alarm2	Analysis Mode	Watchdog

2. The following diagrams shows where to terminate each relay into the output modules and the purpose of those outputs.



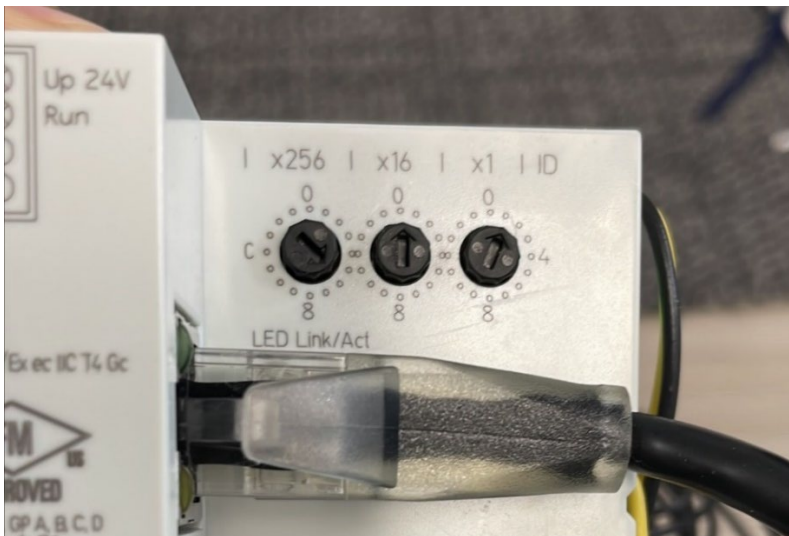
3. 24V needs to be brought to the coupler terminal, terminating as shown below:



4. The black and yellow wires will tie into the 24V terminal blocks on the inside of the CL4R.
5. One more 24V yellow wire needs to be brought to the A2 terminal on a Form C Relay, the rest of the relays being jumped together on that terminal.



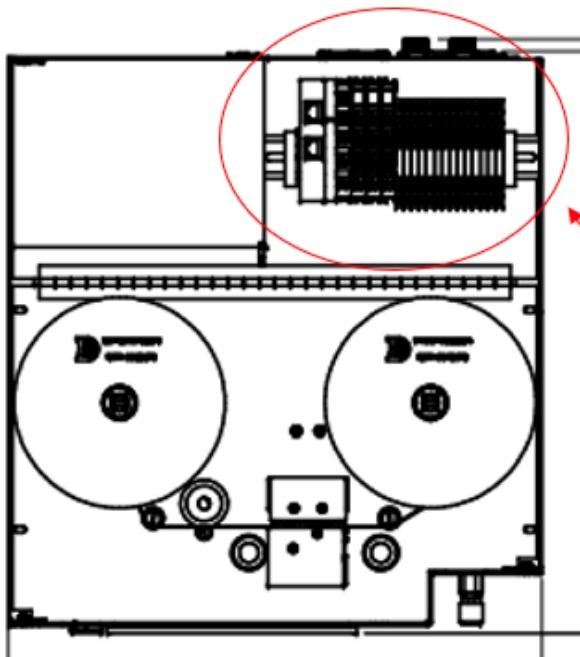
6. Once this is done, an ethernet cable needs to be brought to the port labeled "X1 In" on the coupler terminal, and the switches on the side of the coupler terminal need to be set as follows:



7. X256: 6, X16:0, X1:1
8. Once this is done, the relay option is now installed and ready to be configured on the CL4R.

H.3 4-20mA + Relay Tabletop Installation

1. For a CL4R installed as a desktop unit, the relay bus will be mounted to the top plate of the CL4R itself as shown below:



Top View, Relay Bus

2. The ethernet cable and 24V wires routing around the back, and through a grommet.
3. The CL4R is then wired as shown in section 1.

H.4 4-20mA + Relay Rack Mount Installation

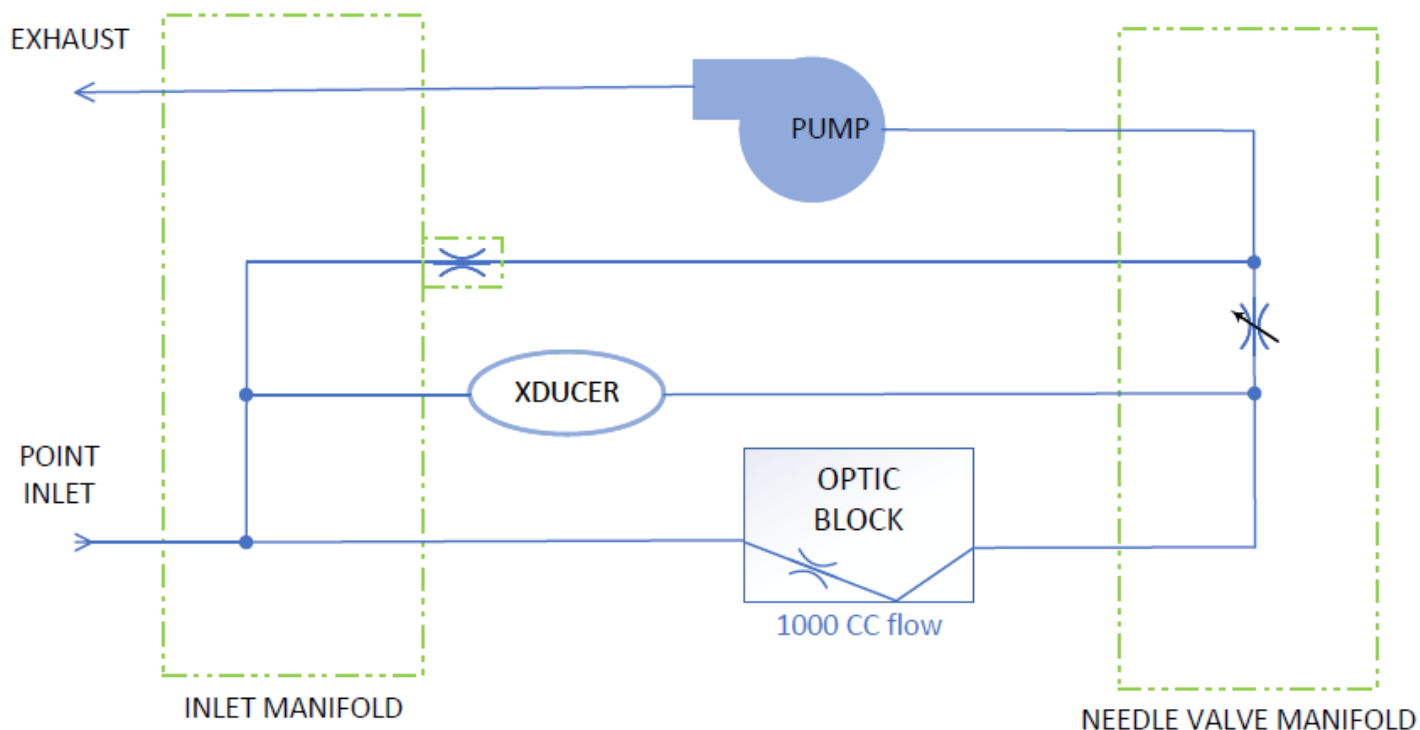
1. To install the CL4R into a legacy rack, the relay bus should be secured to the same legacy CM4 relay board back plate. See example below.



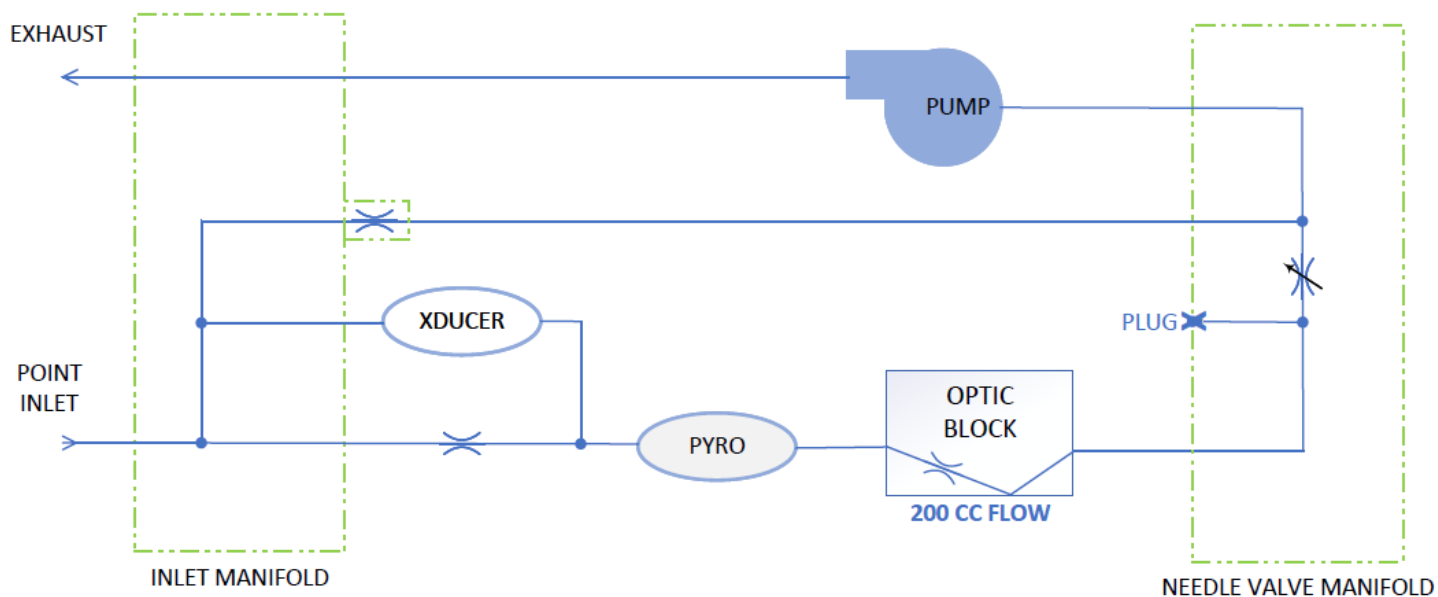
2. In this scenario, the ethernet cable, and the 24V power will run from the coupler terminal along the tubing and power cable casing into the back of the CL4R.
3. It is then wired as described in Section I.2, using the side rail marked wire routing.

Appendix I – CL4R Flow Diagrams

I.1 Single Point Flow Diagram

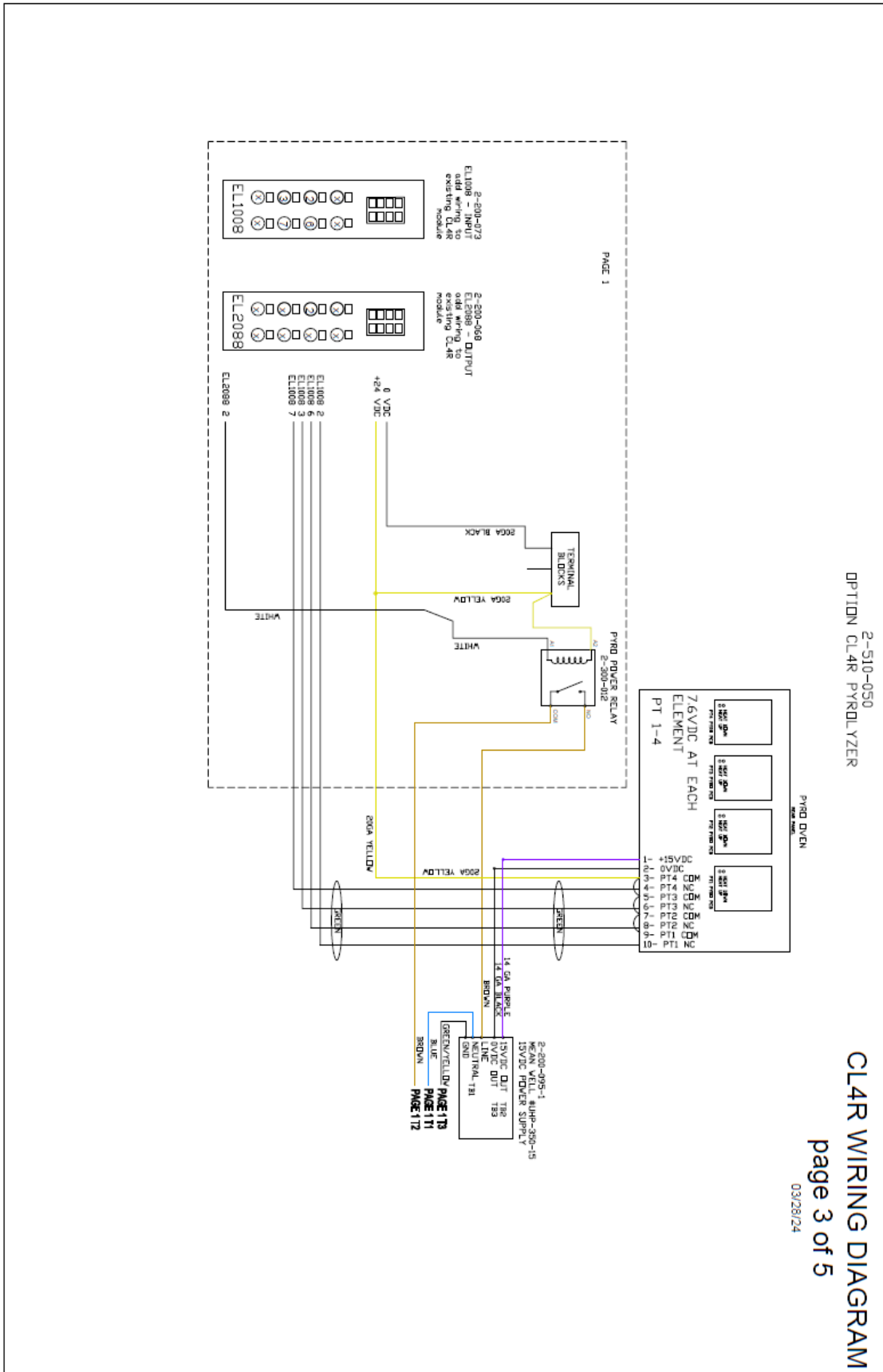


I.2 Single Point Flow Diagram - Pyrolyzer



WIRE COLOR	DESCRIPTION
RED	+5VDC
YELLOW	+24VDC
BLACK	DC COMMON
BLUE	NEUTRAL
BROWN	LIVE

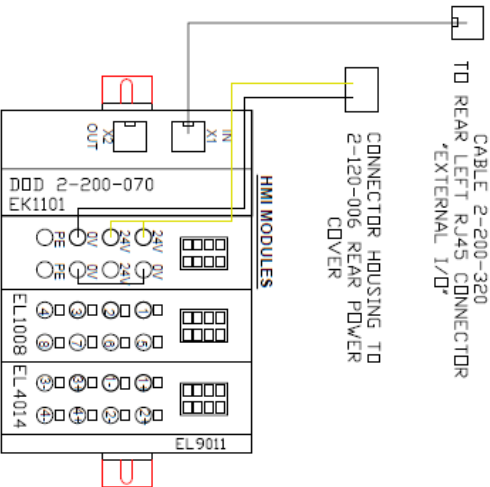




2-510-007-SA
OPTION CL4R 4-20mA STANDALONE
MOUNTED EXTERNALLY

CL4R WIRING DIAGRAM
page 4 of 5
03/28/24

NOTE: EK101 ID ROTARY SWITCHES STANDARD X256 '1', X16 '2', X1 '0'



4-20mA OUTPUT WIRING	
DESCRIPTION	EL4014 MODULE
4-20 PT1 +	1+
4-20 PT1 -	1-
4-20 PT2 +	2+
4-20 PT2 -	2-
4-20 PT3 +	3+
4-20 PT3 -	3-
4-20 PT4 +	4+
4-20 PT4 -	4-

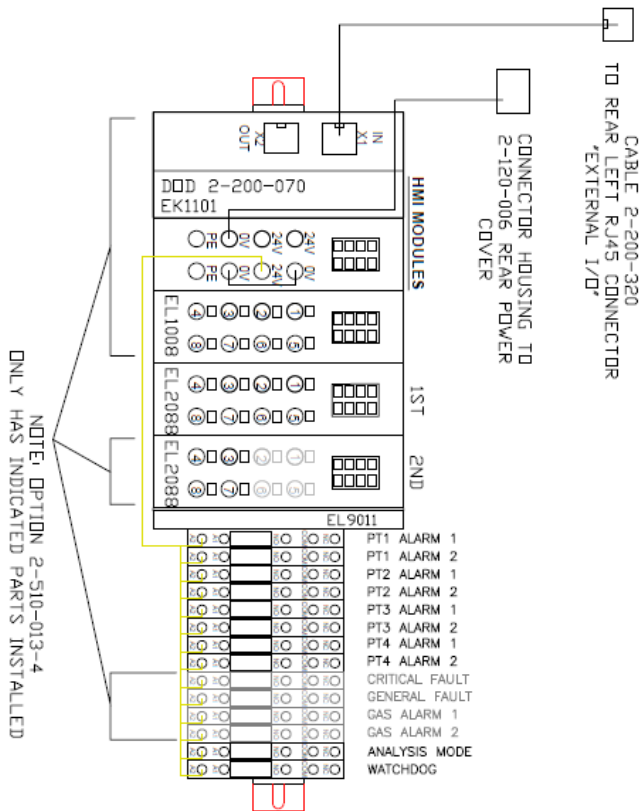
2-510-013-4
OPTION CL4R RELAYS (4) FORM C
2-510-013-14
OPTION CL4R RELAYS (14) FORM C
OPTIONS MOUNTED EXTERNALLY

CL4R WIRING DIAGRAM

03/28/24

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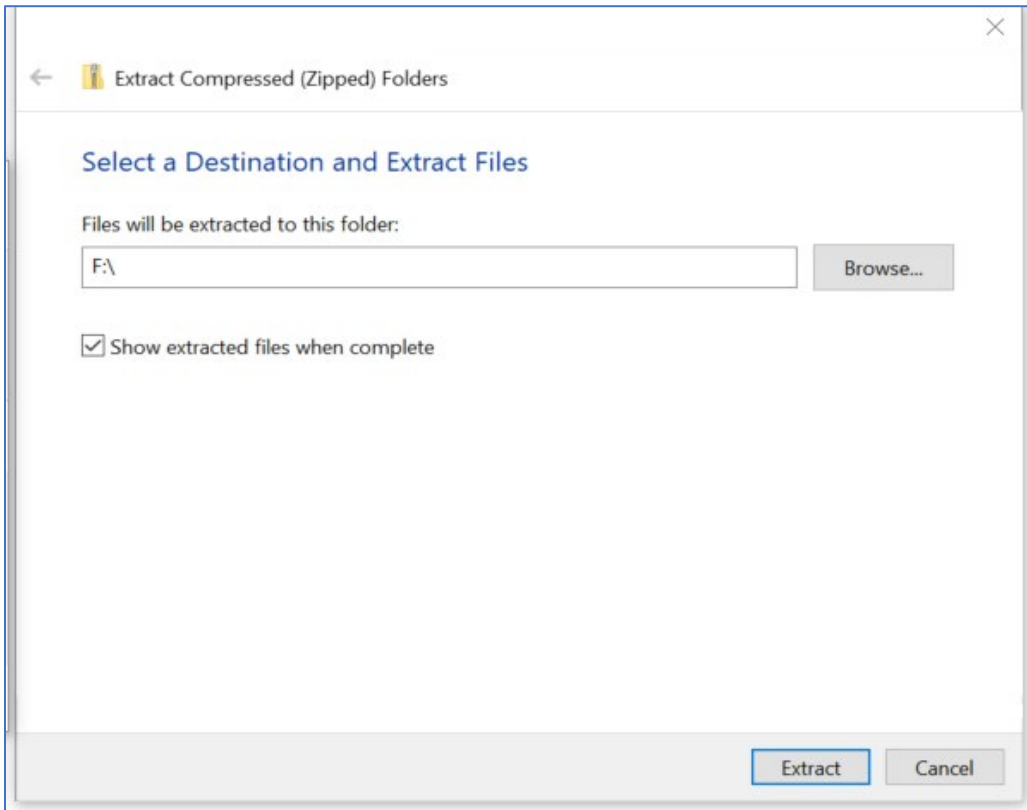
NOTE: EK1101 ID ROTARY SWITCHES STANDARD X256 '1', X16 '2', X1 '0'



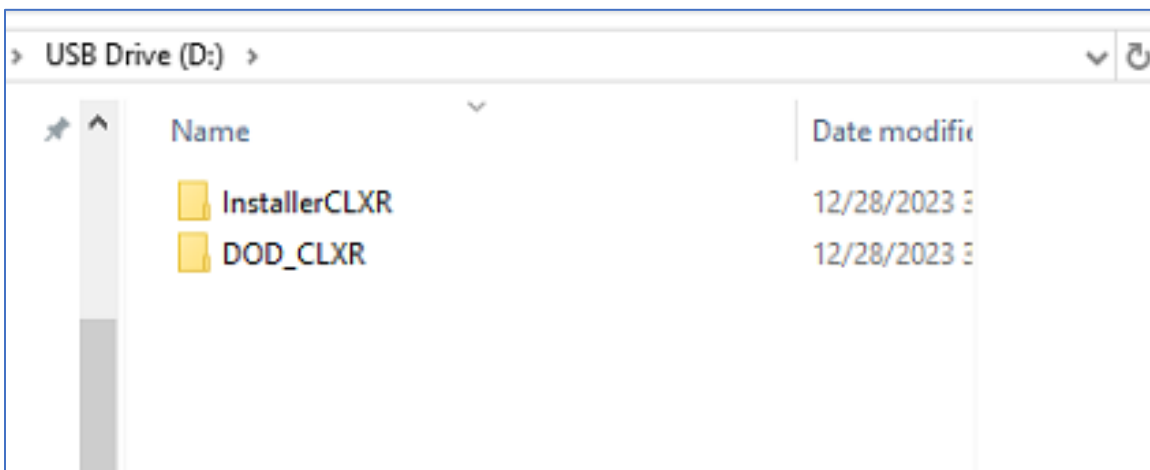
RELAY COIL WIRING			
RELAY DESIGNATION FOR AL	EL2088 1ST MODULE	EL2088 2ND MODULE	
PT1 ALARM 1	1	N/A	
PT1 ALARM 2	5	N/A	
PT2 ALARM 1	2	N/A	
PT2 ALARM 2	6	N/A	
PT3 ALARM 1	3	N/A	
PT3 ALARM 2	7	N/A	
PT4 ALARM 1	4	N/A	
PT4 ALARM 2	8	N/A	
CRITICAL FAULT	N/A	1	
GENERAL FAULT	N/A	5	
GAS ALARM 1	N/A	2	
GAS ALARM 2	N/A	6	
ANALYSIS MODE	N/A	3	
WATCHDOG	N/A	7	

Appendix K – CL4R Software Update Procedure

1. Unzip the CL4R_Update_23.0522.zip file to the root of a USB drive.

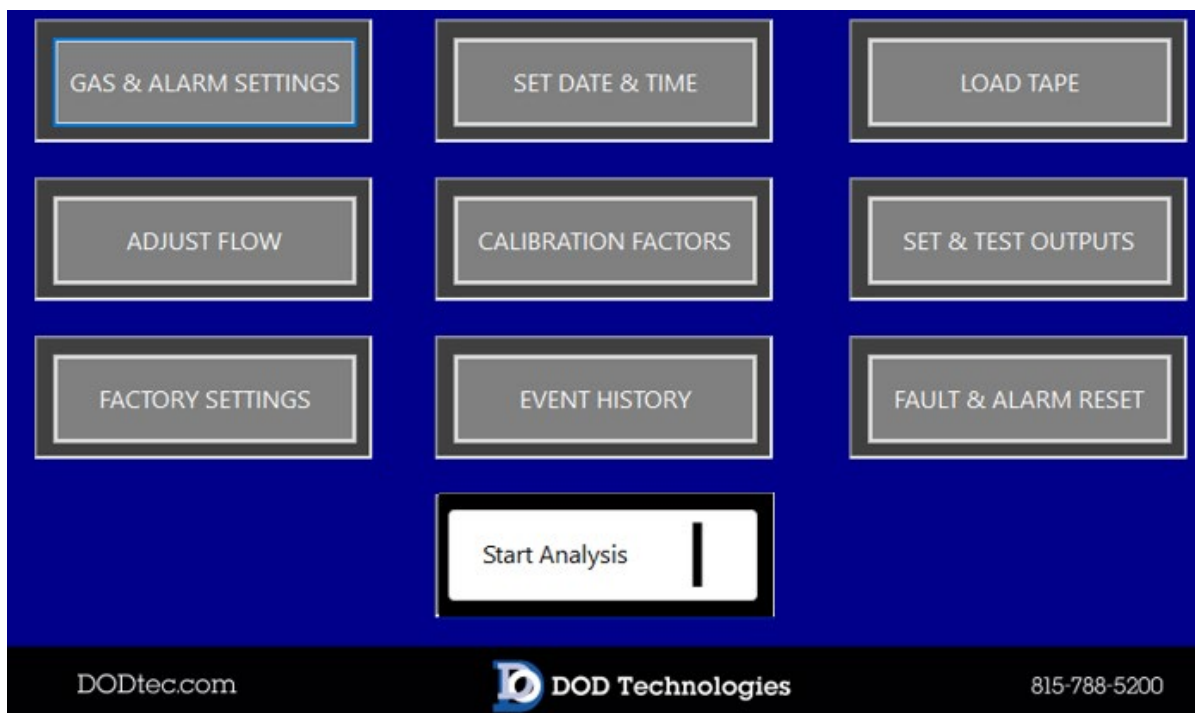


2. The USB should have the correct files on it and look like the picture below.

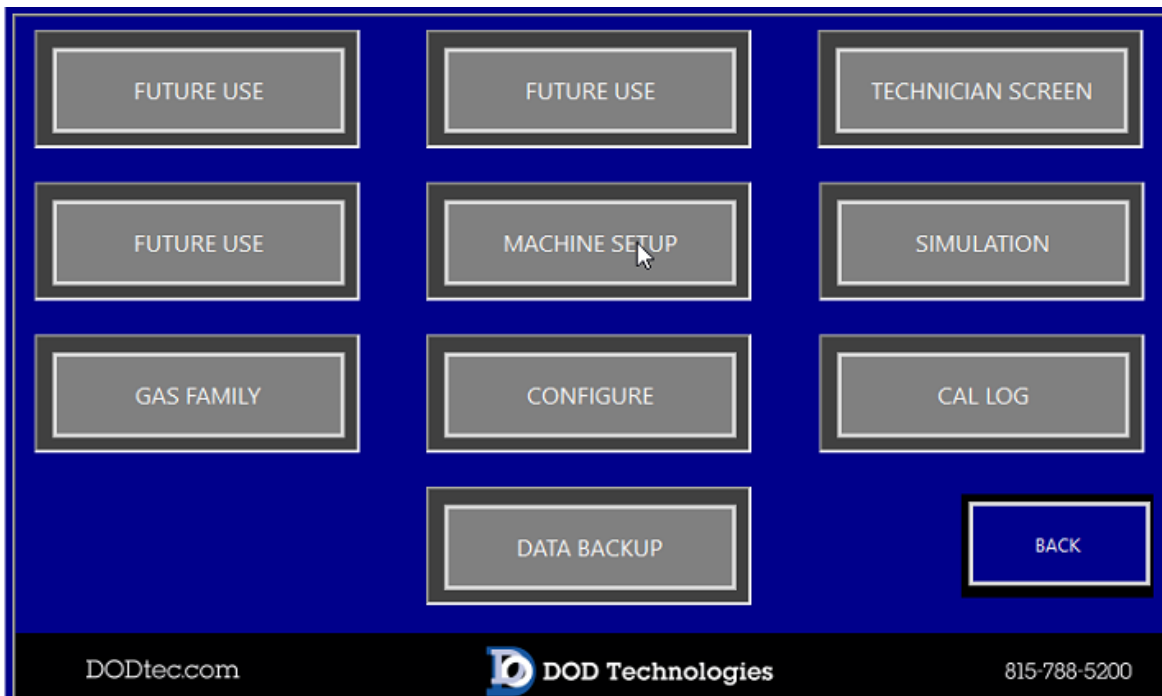


3. Take the USB and insert it into the USB port on the front of the CL4R.

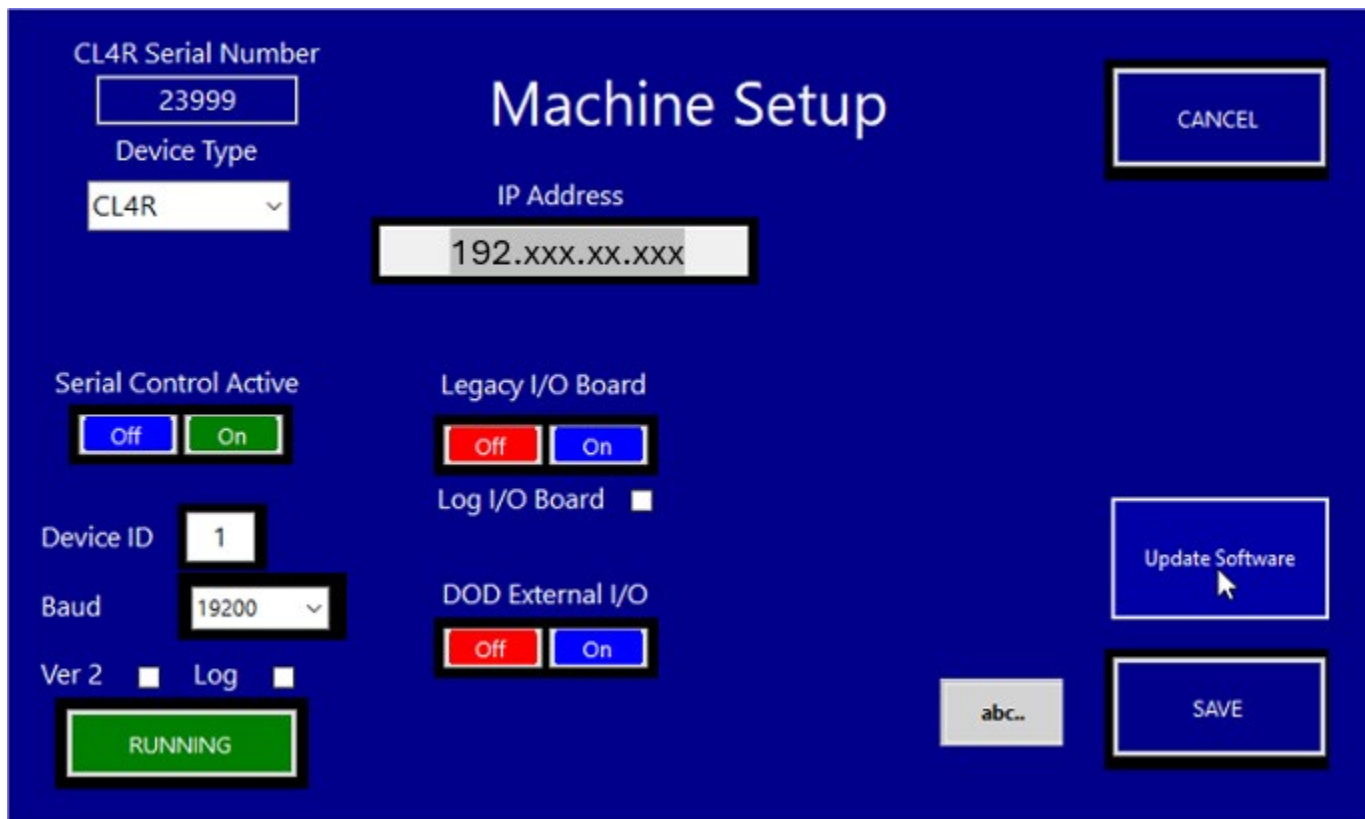
4. On the CL4R main menu, press “Factory Settings” and enter password “740047” when prompted.



5. Then, enter Machine Setup.



- Select Update Software, and confirm. The update will now run.



Machine Setup

CL4R Serial Number: 23999

Device Type: CL4R

IP Address: 192.xxx.xx.xxx

Serial Control Active: Off (blue) On (green)

Legacy I/O Board: Off (red) On (blue)

Log I/O Board: ☐

Device ID: 1

Baud: 19200

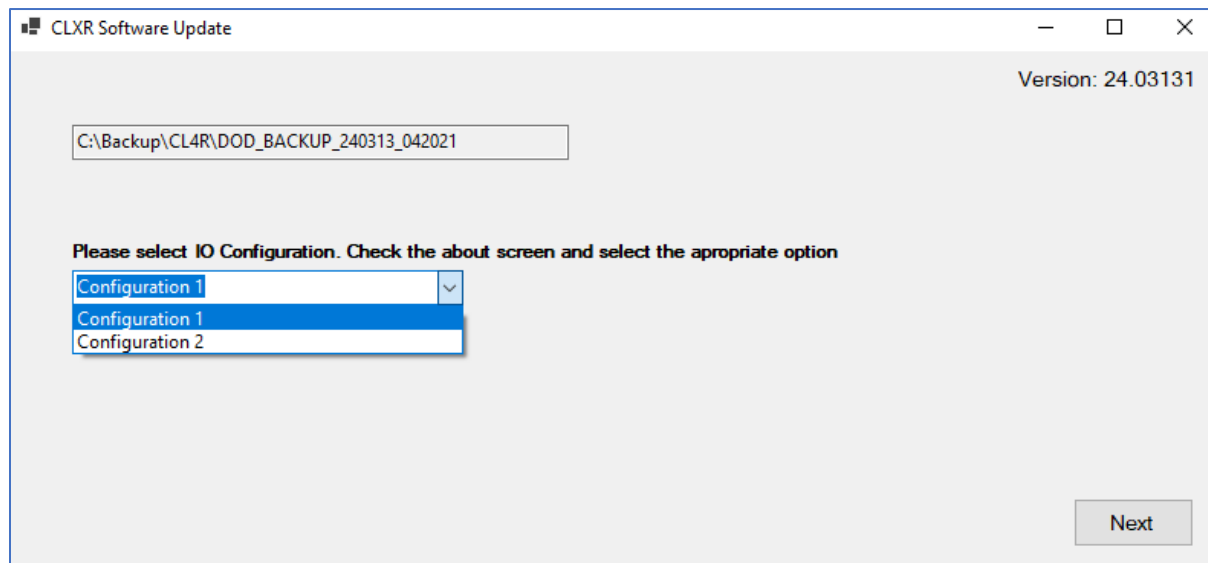
DOD External I/O: Off (red) On (blue)

Ver 2: ☐ Log: ☐

RUNNING

Buttons: CANCEL, Update Software, SAVE, abc..

- Select the appropriate Configuration (found on the About screen) and select Next.



CLXR Software Update

Version: 24.03131

C:\Backup\CL4R\DOD_BACKUP_240313_042021

Please select IO Configuration. Check the about screen and select the appropriate option

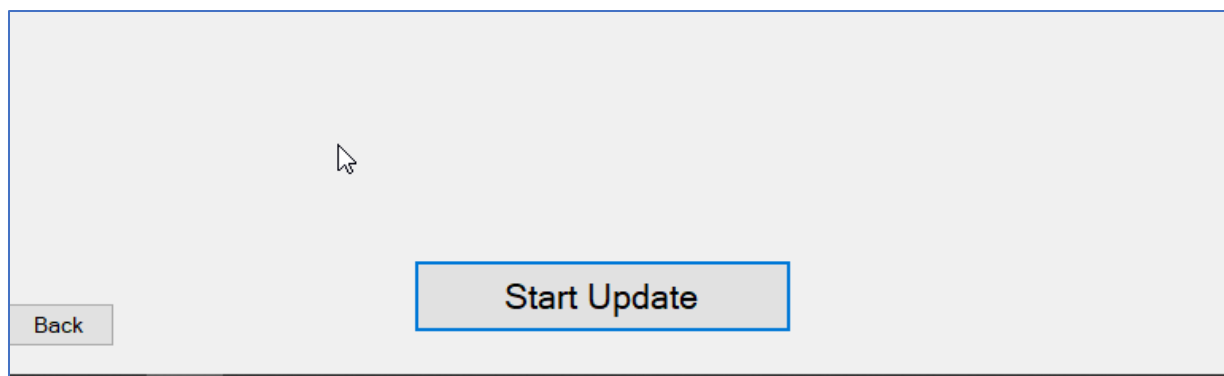
Configuration 1 (selected)

Configuration 1

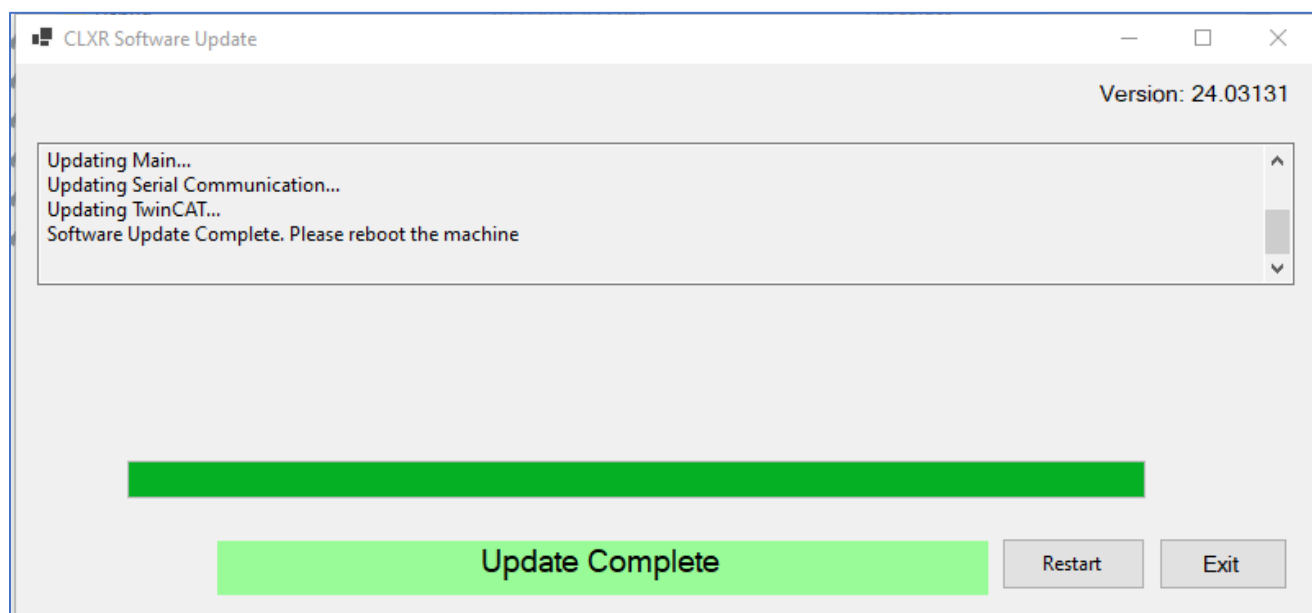
Configuration 2

Next

8. You may now press “Start Update”.



9. Allow the update to Complete, then restart the CL4R.



10. The CL4R is now updated and correctly configured.