

DOD Technologies, Inc.

Innovative Life Safety Systems & Services

ChemLogic 8

8 Point Continuous Gas Monitor

User's Manual



ChemLogic 8 User's Manual

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DECLARATION OF CONFORMITY

DOD TECHNOLOGIES INC.
740 McArdle DR. Unit C
Crystal Lake, Illinois 60014

We declare under our sole responsibility that the product described as:

ChemLogic 8 (CL8)

Complies with the requirements of the Directives:

- Machinery Directive 98/37/EC (amended);
- Low Voltage Directive 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC

Standards considered:

EN 12100-1, EN 12100-2, EN 60204-1, EN 61000-6-2, EN 61000-6-4

Date: 12 / 3 / 2007 **At:** 10:00 am

Daniel O'Donnell

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Chapter 1 - Overview

1.1 Introduction

The DOD Technologies ChemLogic 8 (CL8) simultaneously monitors eight locations (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 CL8 triggers relays 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 point may be up to 250feet (93 m) from the CL8 location. This allows operators to monitor gas concentrations in an area removed from the location where gas may actually be leaking.

The CL8 provides a fast response to a wide range of gases. It was designed for maximum uptime, so routine maintenance and service can be performed quickly and easily.

The CL8 uses DOD Technologies ChemLogic paper tape technology for fast and accurate gas detection.

1.2 Sampling and Monitoring

The system draws sample flow simultaneously from all eight points. Part of the sample flow is diverted across the ChemLogic tape. All 8 channels exhaust through a single port.

1.3 Flow Connections

Flow connections consist of “quick-connect” ports on the top or side of the CL8 UNIT. There are eight inlets, one for each monitored point, and an exhaust outlet.

1.4 Electrical Connections

“Knockout panels” for external electrical connections are provided on the top or right side of the CL8. The covers are exchangeable to provide top or right side flexibility.

1.5 Theory of operation

The system draws sample flow simultaneously from all eight points. Part of the sample flow is diverted across the ChemLogic Tape. The CHEMLOGIC 8 uses an advanced optical detection system to measure the light level reflected from the ChemLogic tape. As the target gas is detected, the color of the of the ChemLogic tape changes. This color change results in a loss of reflected light across the ChemLogic tape. This loss of reflected light is detected by the advanced optics system in the CHEMLOGIC 8. The CHEMLOGIC 8 will then report an appropriate gas concentration reading and/or a gas alarm.

1.6 Time Weighted Average (TWA)

During analysis the CL8 stores the TWA information every 8 hours* (referred to as a 'cycle'). The system retains the 5 most recent cycles in memory and will save all cycles to the Compact Flash(CF) card – if installed. The number of cycles capable of being stored on the CF card is only limited by the size of the CF card.

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

Chapter 2 - Features

2.1 External Layout

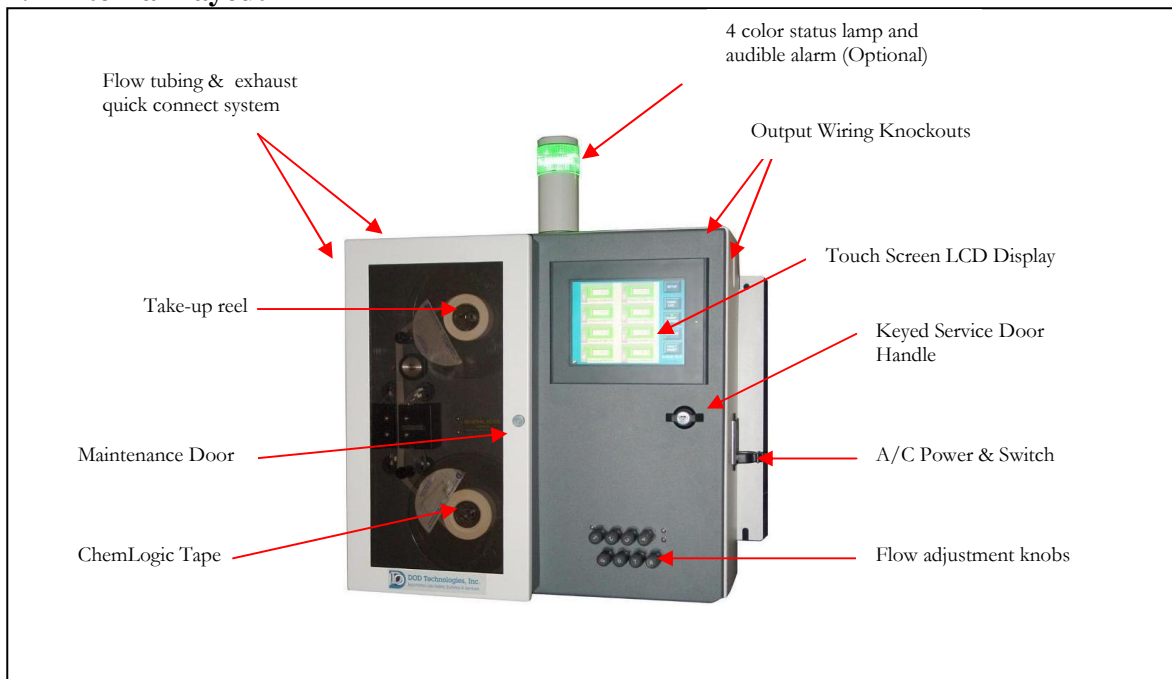


Figure 2.1

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

There are two knockouts available for output wiring located on the top panel near the right side and on the right side panel near the top.

2.1.3 Touch Screen Display

The CL8 uses a full color 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 8 points are located on the front panel. Refer to section 5.2.d regarding flow adjustment.

2.1.7 ChemLogic 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 tape. Do not open the door while in Analysis Mode.

2.1.9 Take-up reel

An empty take-up reel is 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 CL8 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 connections may be made on either the top or left side of the CL8. 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 sampling point to the CL8.

IMPORTANT: End of 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 CL8. 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 CL8 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 CL8 with the service door open.



DANGER: Turn off the unit and disconnect ~~unplug~~ A/C power to the unit before opening the Service Door.

The door should be opened by trained service personnel (See section 6.2)

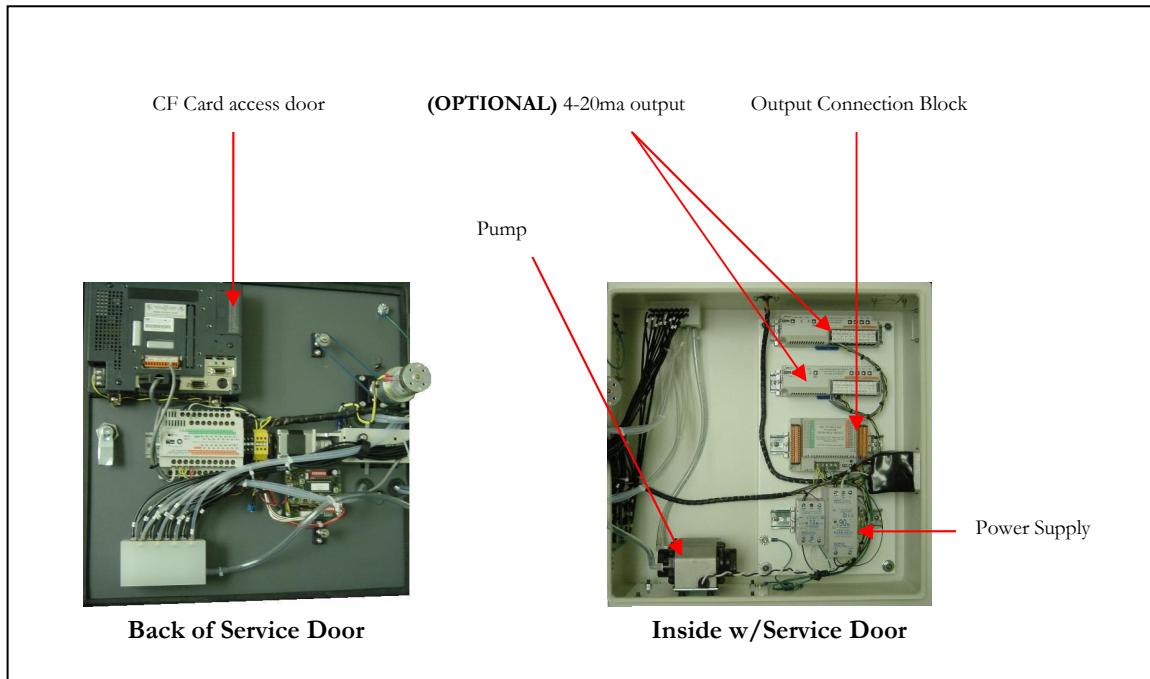


Figure 2.3

2.4 Password Security

Access to many of the features is controlled through password protection which is entered through the screen displayed in figure 2.5.

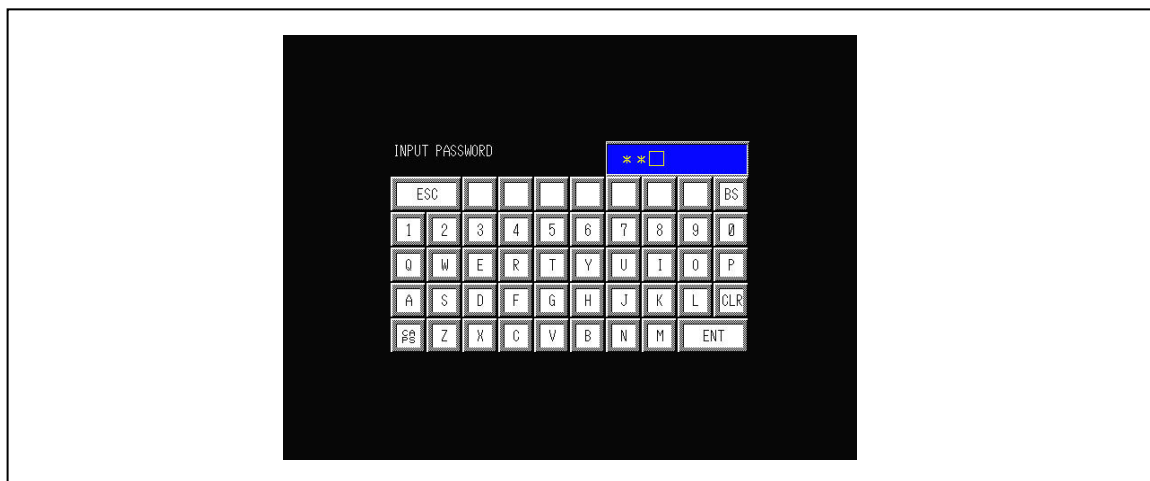


Figure 2.3

Whenever someone attempts to access a screen that is password protected, the screen shown in figure 2.2 will appear (see important note below). Several of the setup & configuration screens of the CL8 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 2 minutes after 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 the first page of this manual. It is suggested that you remove the page and keep in a safe and secure place. If you forget or lose your password please contact DOD Technologies, INC. See Chapter 7 for contact information.

2.5 Compact Flash (CF) card

The CL8 uses a CF card to store historical information including concentration logging, event history, configuration information, and TWA data. The use of higher speed CF cards (2x, etc) may not be compatible with the CL8. CF cards may be purchased through DOD Technologies – see Appendix A.

Chapter 3 - Installation

3.1 Selecting a location

The CL8 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 250 ft. Using the shortest possible sample line length will reduce transport times and increase the response time of the CL8. (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 CL8 requires stable temperature and humidity levels within range to operate properly.

Do not place in a location which will expose the CL8 to moisture, dust, corrosive gas, or any unusual environmental conditions which could damage the unit and/or cause it to operate inaccurately.

3.2 Mounting

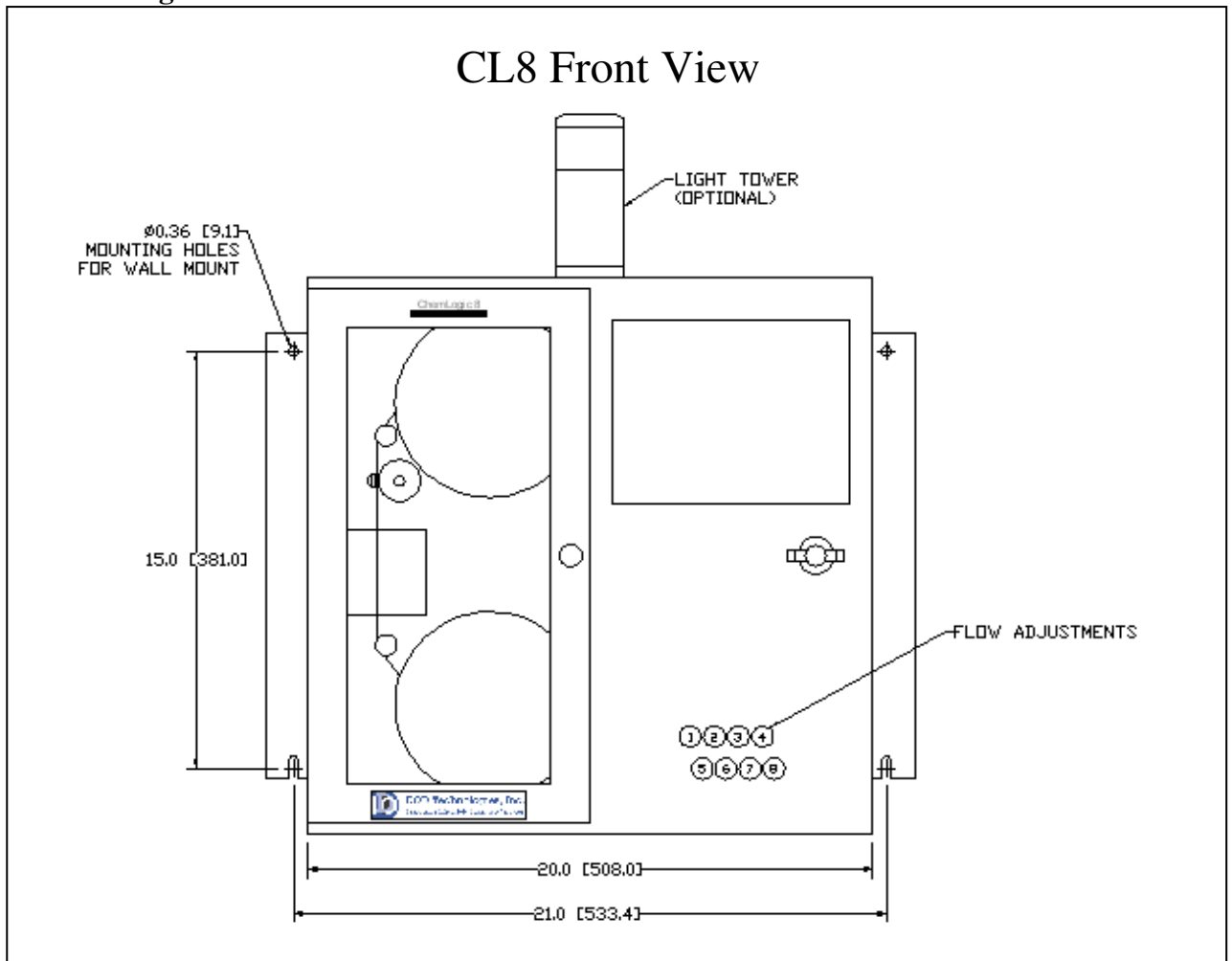


Figure 3.1

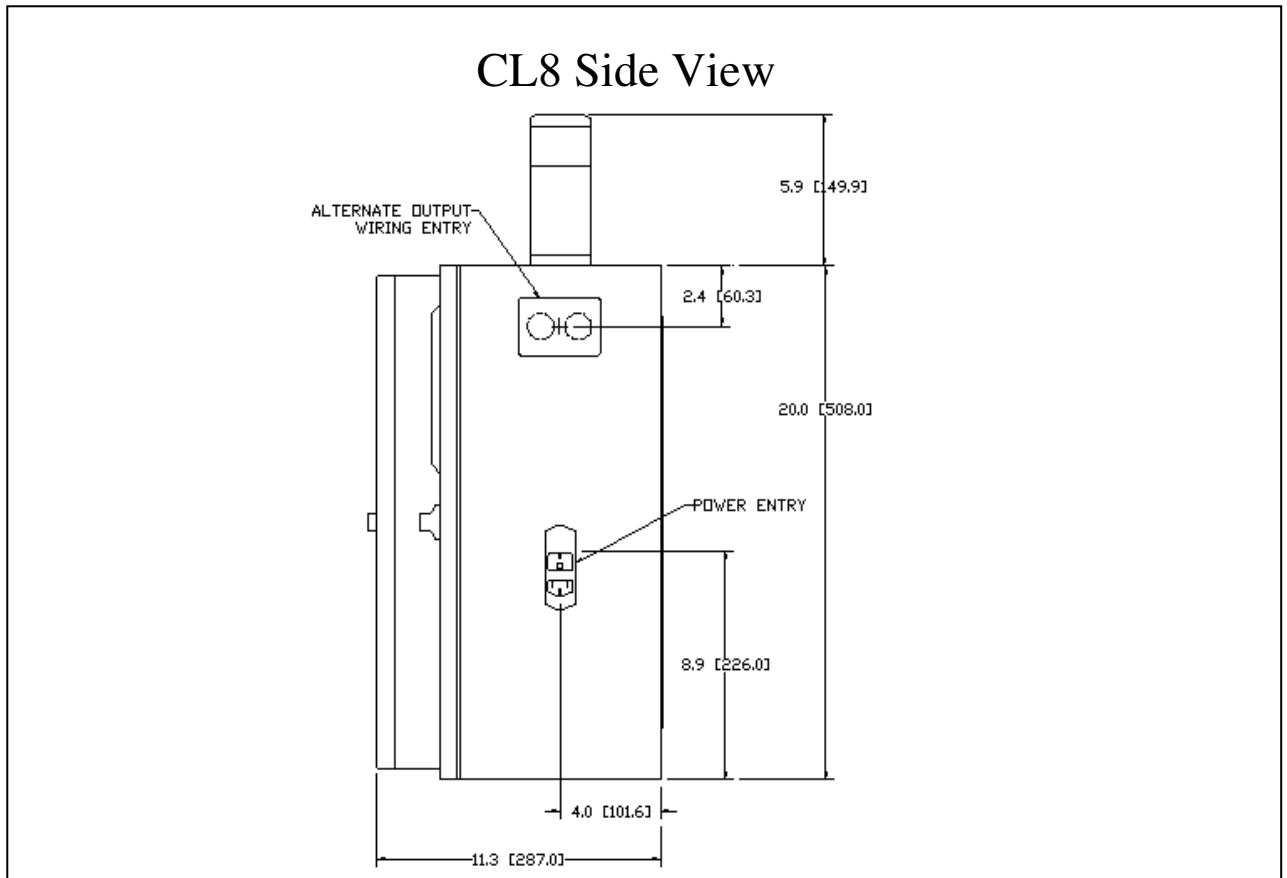


Figure 3.2

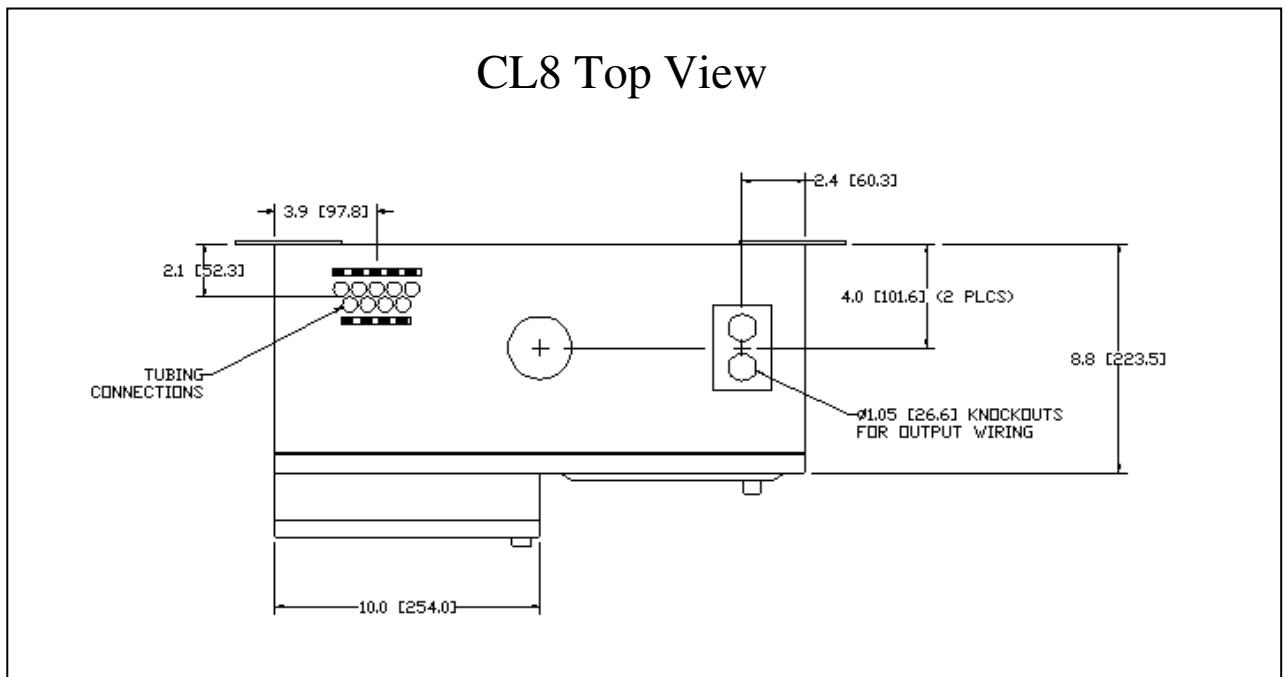


Figure 3.3

Refer to figure 3.1 for dimensional requirements for wall mount. Be sure the CL8 is properly secured to the wall.

3.3 Sample Tubing

Sample tubing may be connected to the CL8 on the top or left side of the CL8 (see section 3.3.1). All sample tubes are 1/4" OD x 3/16" ID Teflon FEP (250 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.

3.3.1 Sample Manifold Relocation

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

- ◆ Follow the procedures in section 6.2 to open the service door.
- ◆ Remove the four(4) mounting screws shown in figure 3.4 to detach the manifold.
- ◆ Remove the 4 lock nuts holding the cover plate over the unused manifold opening
- ◆ Remove the cover plate
- ◆ Align the manifold inside the CL8 with the holes in the new position
- ◆ Replace the screws holding the manifold in place and tighten accordingly.
- ◆ Replace the cover plate over the unused opening and secure with the four lock nuts.

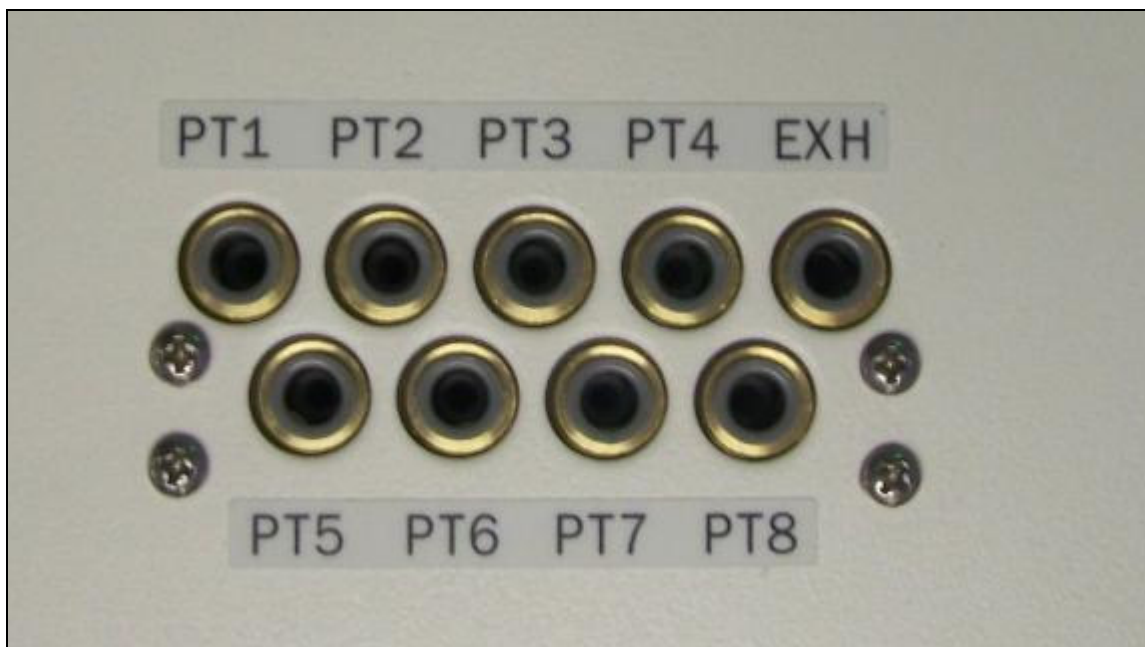


Figure 3.4

Sample tubing may be purchased from DOD technologies (see appendix A)

IMPORTANT: All sample tubing used with the CL8 must be 1/4"OD x 3/16" ID FEP Teflon. Use of any other tubing may damage the CL8 and/or cause inaccurate gas concentration readings.

3.3.2 End of line particulate filters

End of line particulate filters must be installed on all 8 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 CL8. 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 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

A 6ft power cord is included – **DO NOT** use extension cords with the CL8. Longer cords are available from most electrical supply stores.

3.6 Output Wiring

Figure 3.2 details the connection method for both the standard relay output module and the optional 4 to 20 ma module.

See Appendix B for a listing of output module connections.

3.6.1 Standard Output Relay Module Wiring

The standard output module requires an external 24V supply connected to V1+/- and V2+/- (see Appendix B). Outputs 0-15 are powered through V1 while outputs 16-31 are powered through V2. Each output can handle up to 0.2 Amps with a total maximum current of 1.6Amps to each group of 16 outputs at any time. See figure 3.3 for information on wiring the CL8 standard relay outputs.

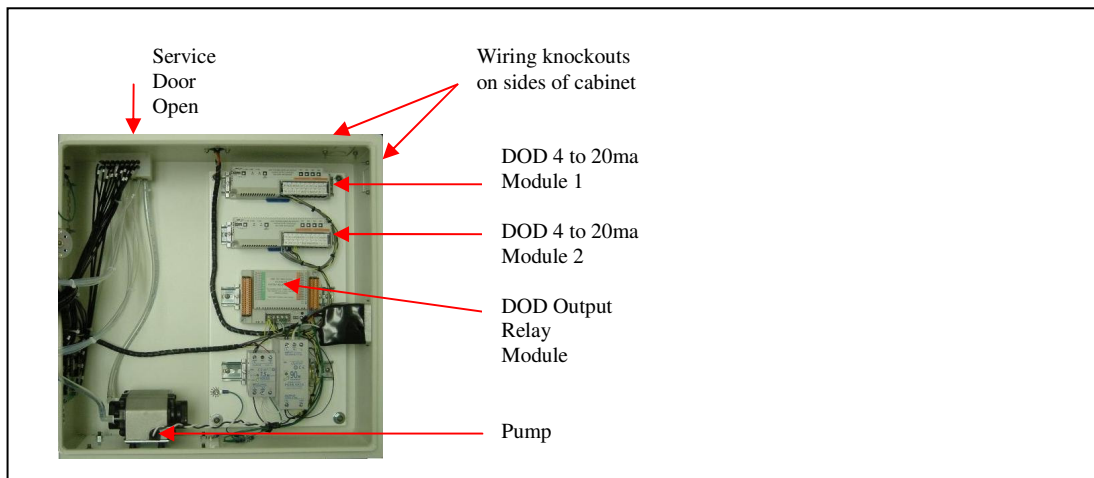


Figure 3.2

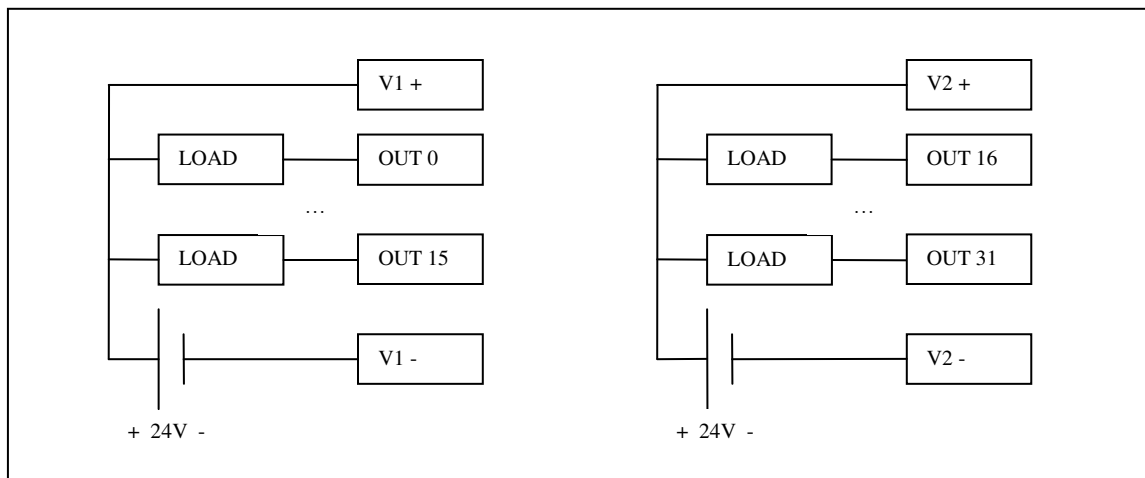


Figure 3.3



DANGER: Before performing any wiring modifications, be sure that power to the CL8 is disconnected and remove the output connector from the output relay block.

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:

- 1) Insert the screwdriver into the square shaped hole which will open the round hole for the wire.
- 2) Continue to hold the screwdriver while inserting the wire into the round shaped hole.
- 3) While holding the wire in place remove the screwdriver which closes the clamp onto the wire.
- 4) **IMPORTANT : Be sure the wire is inserted completely into the hole. Failure to do so could result in system failure, electrical shock.**

- 5) 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.

3.6.2 Optional 4 to 20ma Output Module Wiring

Figure 3.4 details a typical connection to one of the eight(8) 4 to20ma output connections. See Appendix B for a complete list of terminal connections on the optional 4 to 20ma output block.

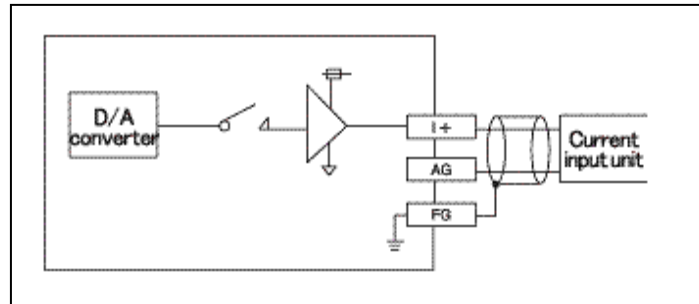


Figure 3.4



DANGER: Before doing any wiring modifications be sure that power to the CL8 is disconnected.

IMPORTANT : Verify that all I/O unit terminal screws are securely tightened even if they are not used.

3.6.3 Optional 8 Point Relay Module (Item #2-500-012)

See Appendix B for a complete list of terminal connections on the optional output block.

IMPORTANT : Verify that all I/O unit terminal screws are securely tightened even if they are not used.



DANGER: Before doing any wiring modifications be sure that power to the CL8 is disconnected.

Chapter 4 - Setup & Configuration

4.1 Set system date and time

See section 5.2.b

4.2 Gas Selection

Each point on the CL8 must be setup for the appropriate gas and configured accordingly. See section 5.2.a for information on selecting the gas for each point.

4.3 Alarm Settings

See section 5.2.a for information on how to adjust the alarm settings after the gas has been selected for each point.

4.4 Output Relays

The CL8 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. See section 5.2.f . When the power is ON, the Power Loss relay is always in the normally high state.

When latched outputs are selected (section 5.2.f), 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 CL8.

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 8 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. (is this true?, if so further explain (does the point continue to log zeros). See section 5.3

4.6 Install new tape

See section 6.3 for installation instructions.

4.7 Compact Flash (CF) card

The use of a compact flash card is highly recommended to retain historical and performance information including events, alarms, and gas concentrations. Compact flash cards are available from DOD technologies (see Appendix A) and at most retail electronic stores. See section 6.4 for information on inserting and replacing a Compact Flash (CF) card. See also Appendix F for information on the data stored on the CF card.

4.8 Setup Complete

Enter analysis.

Chapter 5 – Basic Operation

CL8 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
 - ii. Points 5-8
- 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 (1-8)

V. CF Card Log (sec. 5.5)

VI. Time weight average (sec. 5.6)

Legend

User Screens
(No Password Required)

*Administrative Screens
(Administrator Password Required)

**Service Screens
(Service Password Required)

5.1 Initialization

When the CL8 is powered on it will begin with an initialization screen (figure 5.2) which is followed by the restart screen (figure 5.3).

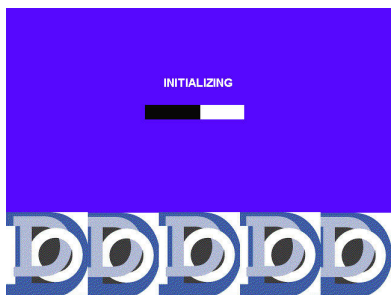


Figure 5.2

Automatic
→

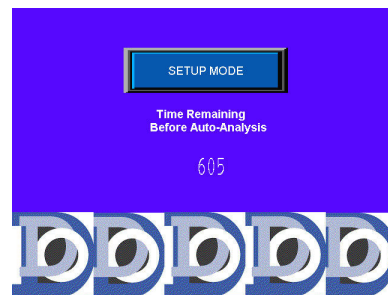


Figure 5.3

If the operator touches the 'SETUP MODE' button before the timer reaches 0 the Setup screen appears (section 5.2) otherwise after a timeout the system will start analysis (section 5.4)

5.2 Setup / Main Menu

The setup menu is accessed either by touching the 'SETUP MODE' button on power up (section 5.1) or by touching 'SETUP' from the analysis screen (section 5.5). Figure 5.4 below shows the setup screen and explains the various buttons.

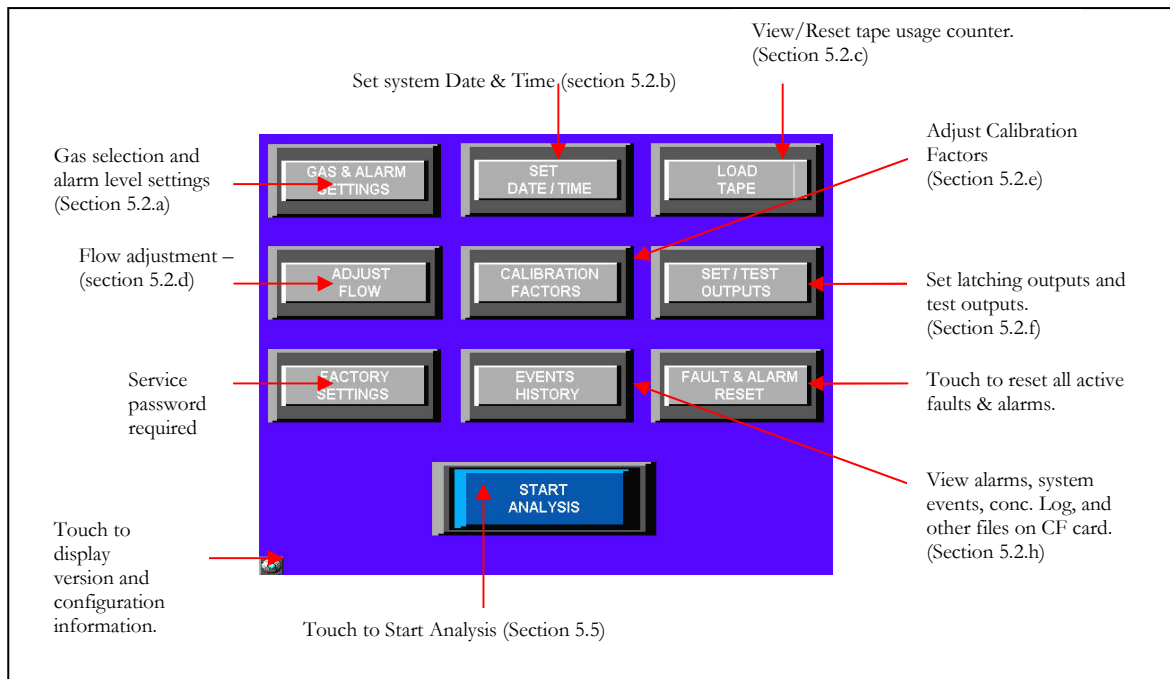


Figure 5.4

5.2.a Gas & Alarm Settings Menu

Touching the 'GAS & ALARM SETTINGS' button on the setup screen brings up the screen shown on the left in figure 5.5 which displays the configuration of points 1-5. Touching the 'NEXT' button will bring up the screen shown on the right of figure 5.5 which displays the

configuration of points 5-8. Touching the 'BACK' button will then return to the SETUP screen.

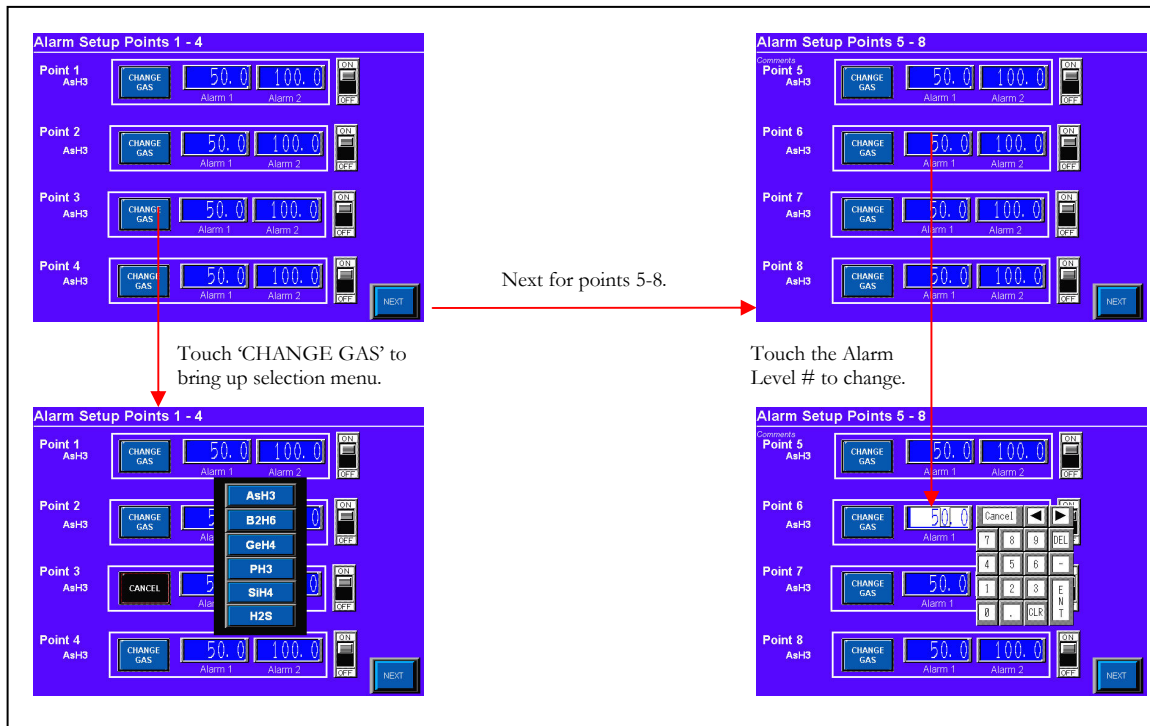


Figure 5.5

Touching the 'CHANGE GAS' button brings up the gas selection menu from which you may either select a new gas or touch the 'Cancel' button. Touching any of the alarm level numeric displays will bring up the keypad to change the alarm level. The valid alarm levels are listed in Appendix X for each gas. An invalid alarm level entry will bring up an error message.

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

5.2.b Set Date/Time

Touching the 'SET DATE/TIME' button on the setup screen brings up the screen shown in figure 5.6.

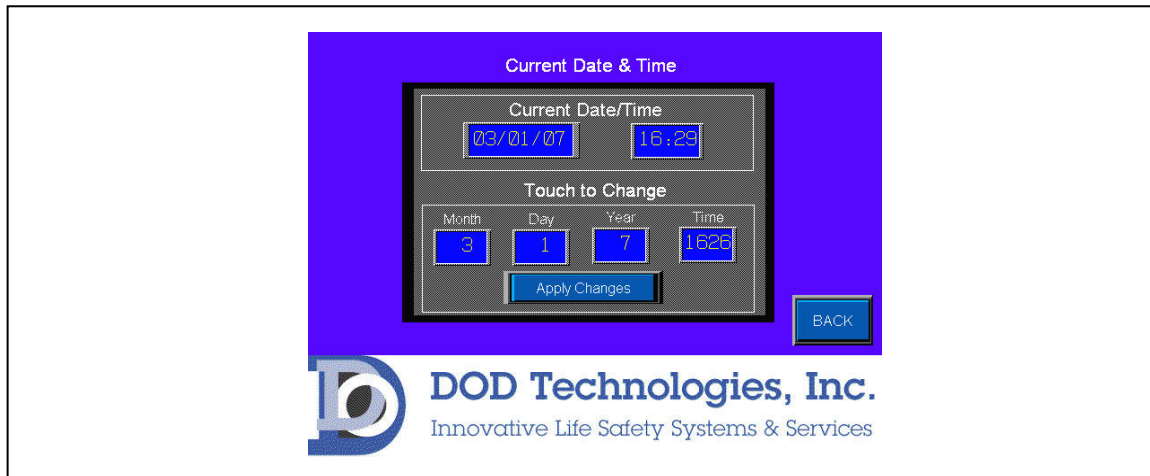


Figure 5.6

Touching any of the numeric displays for Month, Day, Year, and Time will bring up the numeric entry keypad. The time must be entered in 24 hour (Military) time format. Touch the 'BACK' button to return to the setup menu.

IMPORTANT : After entering the new date & time you must touch the "Apply Changes" button to update the system date/time.

5.2.c Load Tape

Touching the 'LOAD TAPE' button on the setup screen brings up the screen shown in figure 5.7.

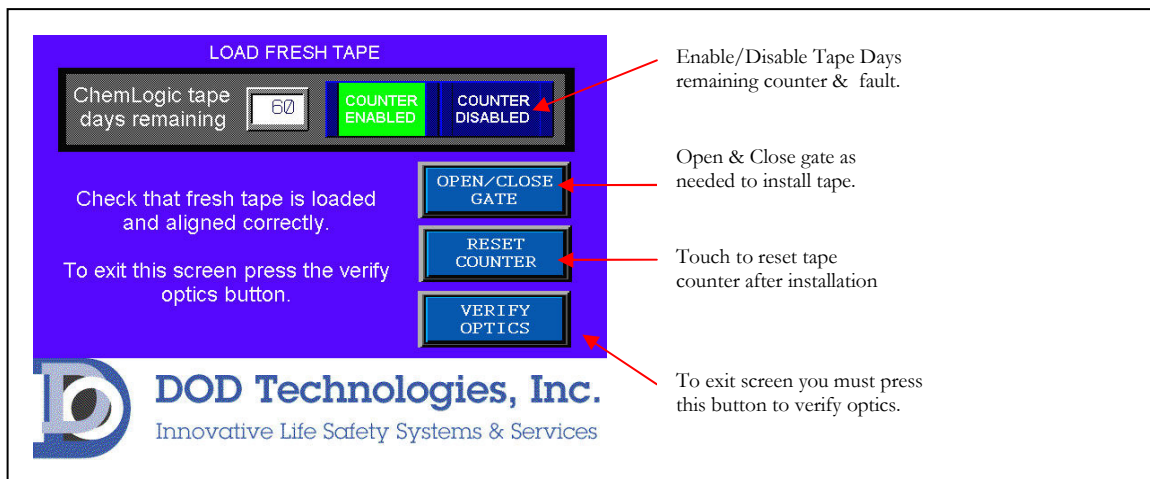


Figure 5.7

IMPORTANT: Each time a new tape is loaded into the CL8 the 'RESET COUNTER' button must be touched to accurately track tape usage.

Each time the 'OPEN/CLOSE GATE' 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.

To Exit the screen optics verification is required. When the 'Verify Optics' button is touched the machine will verify the tape is aligned correctly and the optics are calibrated appropriately. During this time a 'ONE MOMENT PLEASE' window will appear. When verification is complete one of the two screens in figure 5.8 will appear.

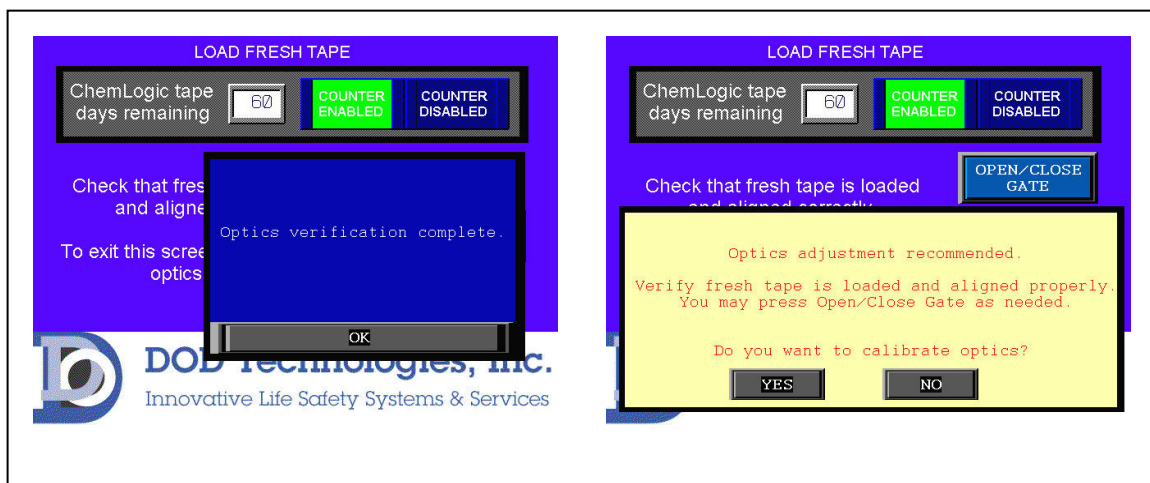


Figure 5.8

If successful touch the "OK" button to return to the setup menu. If unsuccessful verify that the tape is installed and aligned correctly by using the 'OPEN/CLOSE GATE' button as needed. Once you have verified that the tape is installed correctly you can touch the 'YES' button to recalibrate the optics for the new tape or press 'NO' to return to the setup menu.

IMPORTANT : If you choose 'NO' when asked to calibrate the optics as shown to the right of figure 5.8 the CL8 may not function properly. Contact DOD Technologies for more information.

5.2.d Flow Adjustment

Touching the 'ADJUST FLOW' button on the setup screen brings up the screen shown in figure 5.9 along with advancing the tape 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.

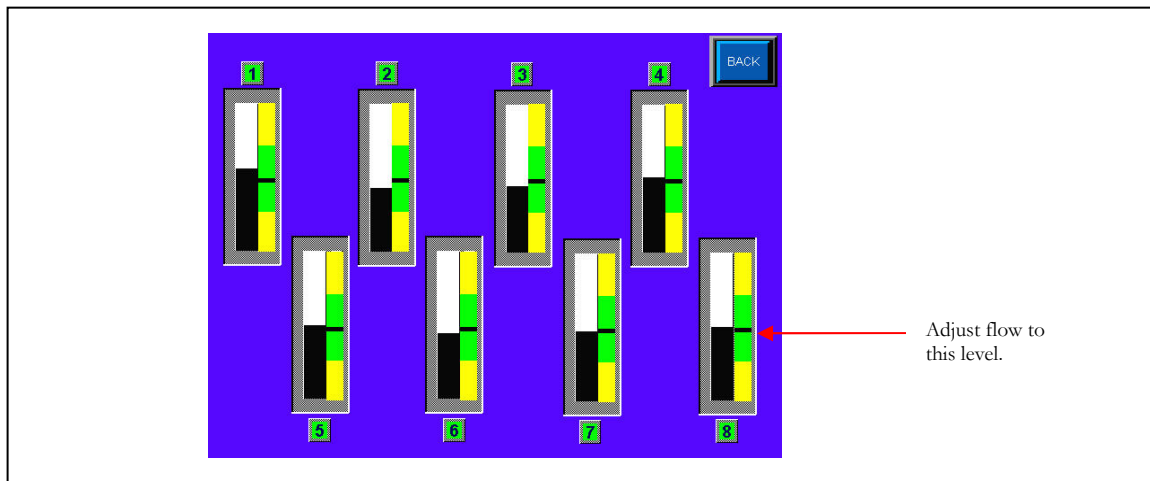


Figure 5.9

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

5.2.e Calibration Factors

Touching the 'CALIBRATION FACTORS' button on the setup screen brings up the screen shown in figure 5.10. This screen requires administrator password access. Contact DOD (see chapter 7) for information on the use of Calibration Factors.

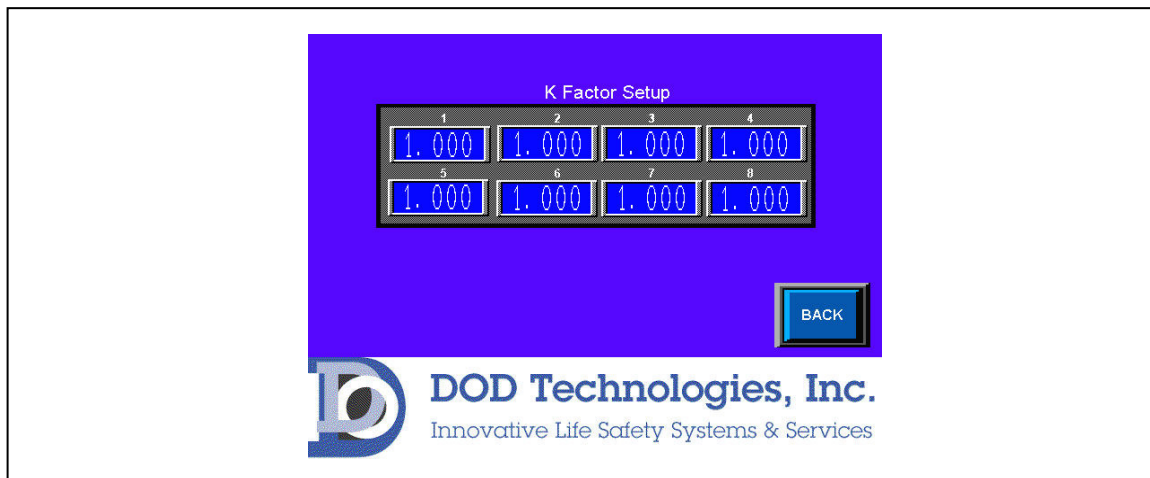


Figure 5.10

Touching any of the numeric displays for any of the channels will bring up the numeric entry keypad. The value entered must be between 0.5 and 2.000 for each channel.

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

5.2.f Set & Test Outputs

Touching the 'SET/TEST OUTPUTS' button on the setup screen brings up the screen shown in figure 5.11. 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 in idle. Setting this to 0 minutes disables the fault.

Caution: Activating these outputs will trigger any connected alarms

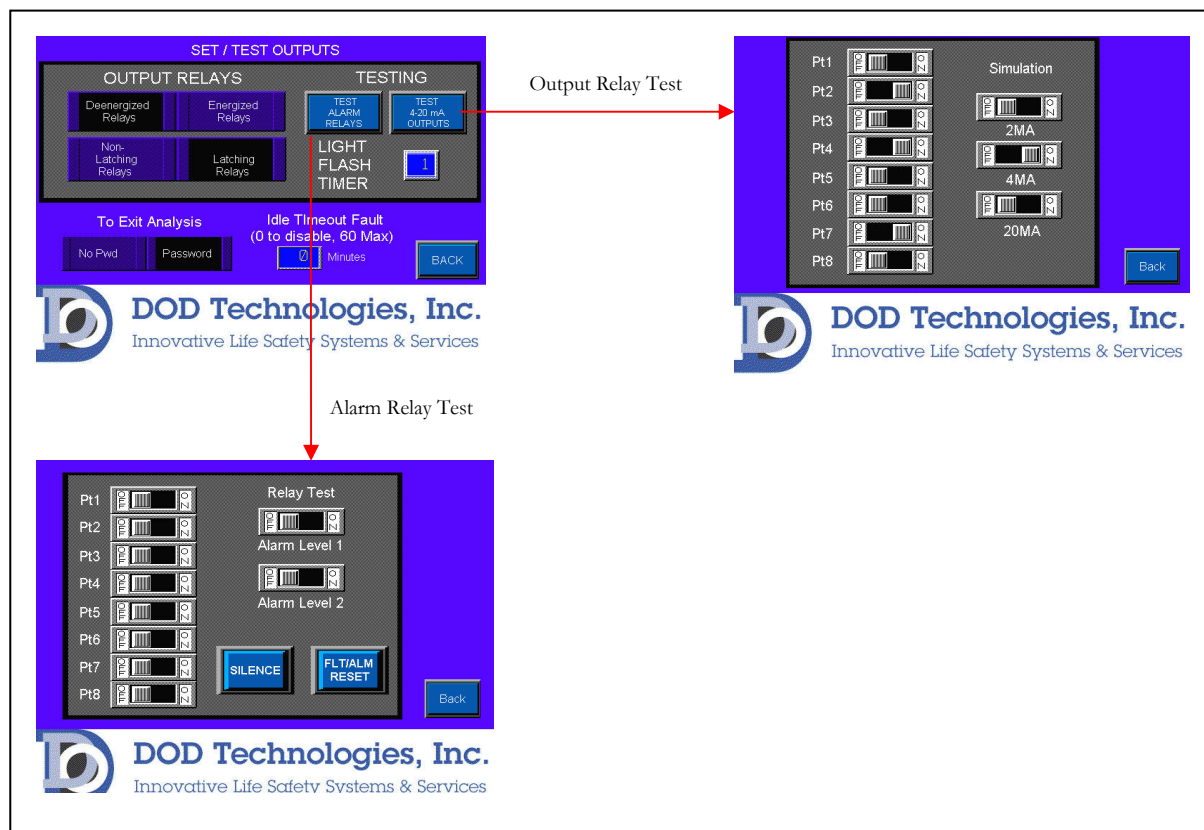


Figure 5.11

5.2.g Factory Settings

This button is reserved for technical service and requires a service password. Contact DOD Technologies, INC (section 7) for service information.

5.2.h Event History

Touching the 'EVENT HISTORY' button on the setup screen brings up the screen shown in figure 5.11.

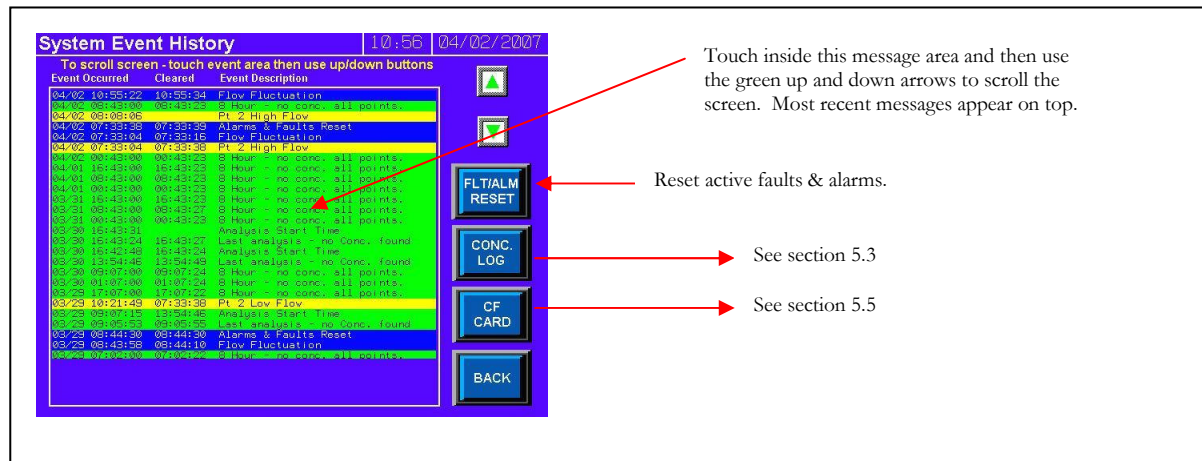


Figure 5.11

The event history is display with the most recent event/alarm at the top using the color coding listed in table 5.1

Table 5.1

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

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

5.3 Concentration Log

Touching the 'CONC LOG' button on the Event History screen (section 5.2.i) will bring up the screen shown in figure 5.12.

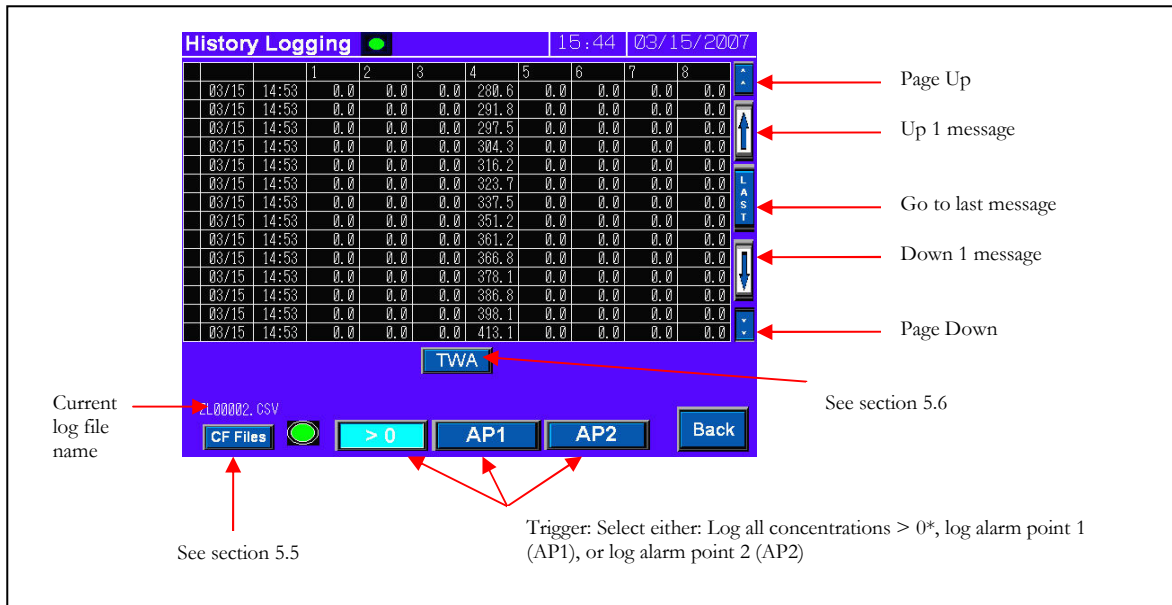


Figure 5.12

The log displays the concentration on each point when the trigger criteria is met. If you select >0 the system will log all 8 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.

5.4 Analysis Mode

Figure 5.13 shows the main analysis screen which is entered either automatically during power on or by touching the 'START ANALYSIS' button on the setup screen. Figure 5.14 shows the main analysis screen with a detailed view of the information on point 3.

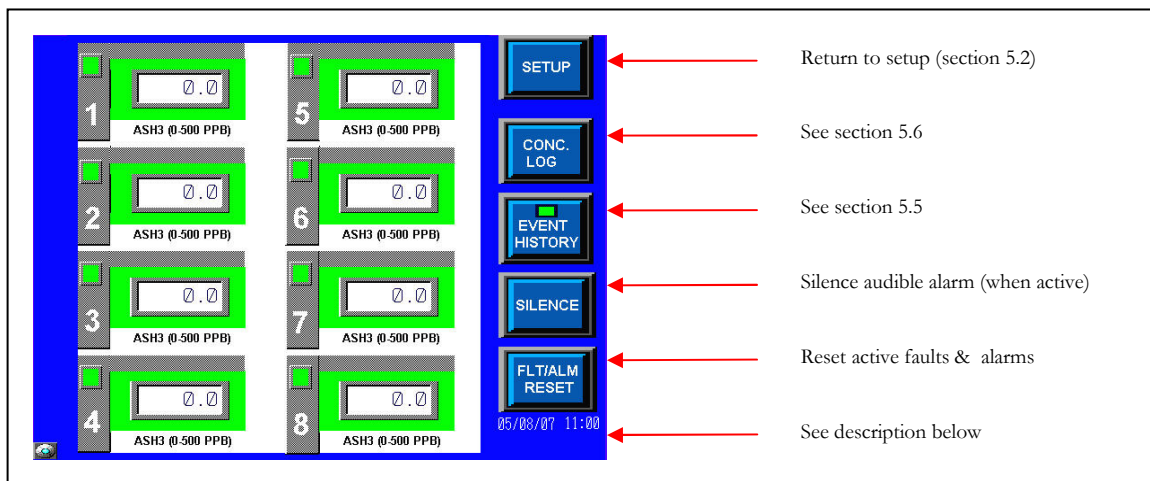


Figure 5.13

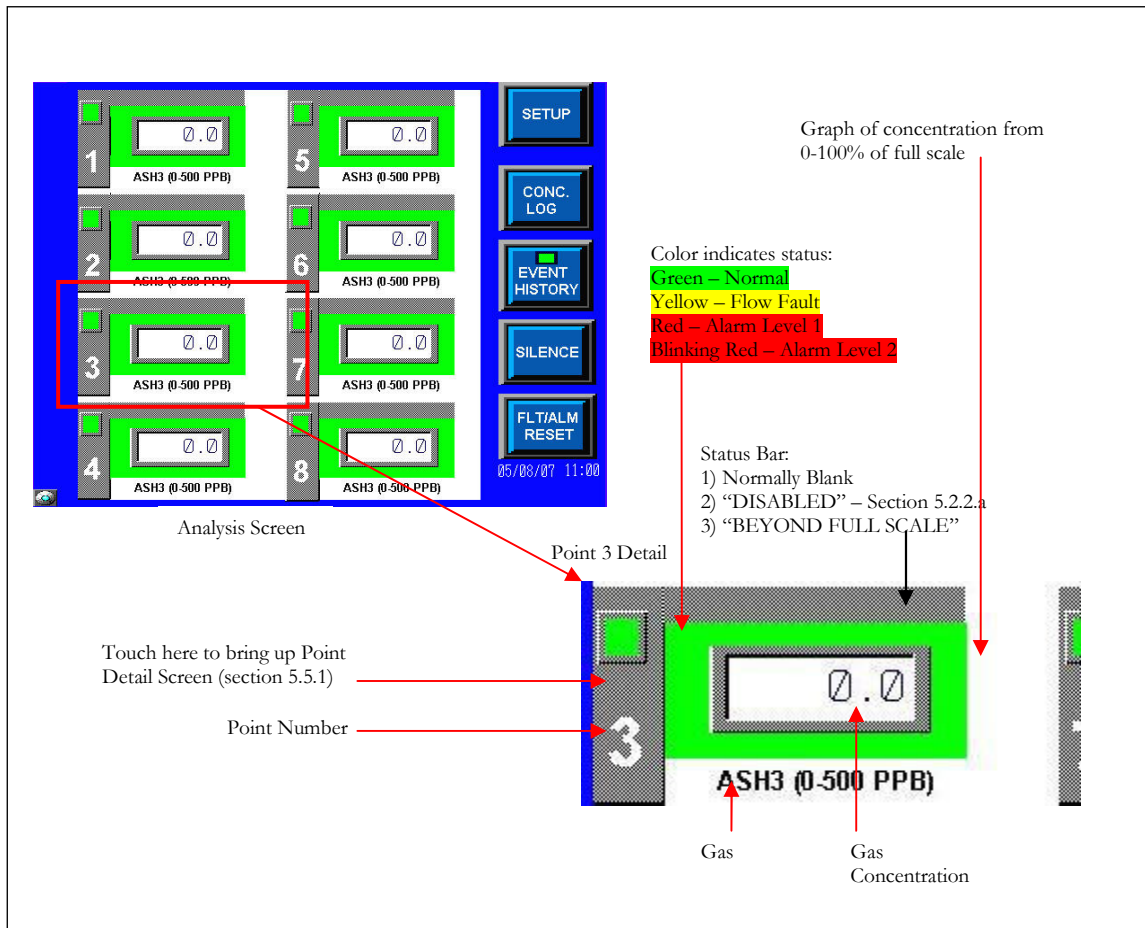


Figure 5.14

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 CF CARD’ or will be blank if a compact flash (CF) card is inserted in the machine. (See section 2.5.)

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 (Section 5.4) will bring up the point detail screen shown in figure 5.15

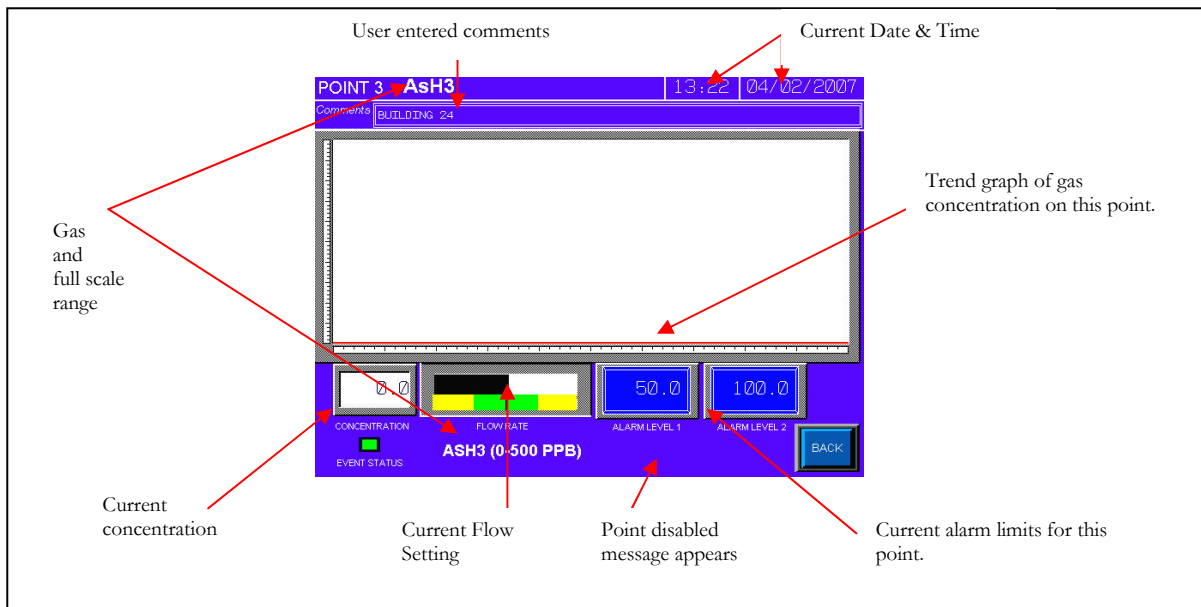


Figure 5.15

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

NOTE: The display of the current flow may not be immediately displayed on this screen. It is recommended that the flow adjustment screen (section 5.2.d) be used for all flow

5.5 Compact Flash (CF) card log

Figures 5.16 shows the 'CF Log' which is displayed by touching the 'CF Files' button on the concentration log (Section 5.3). This screen allows the user to browse everything contained on the CF card currently inserted. (Note – if no CF card is present or there is an error reading the card, the left selection screen will appear blank). To initiate the display touch 'DISP'.

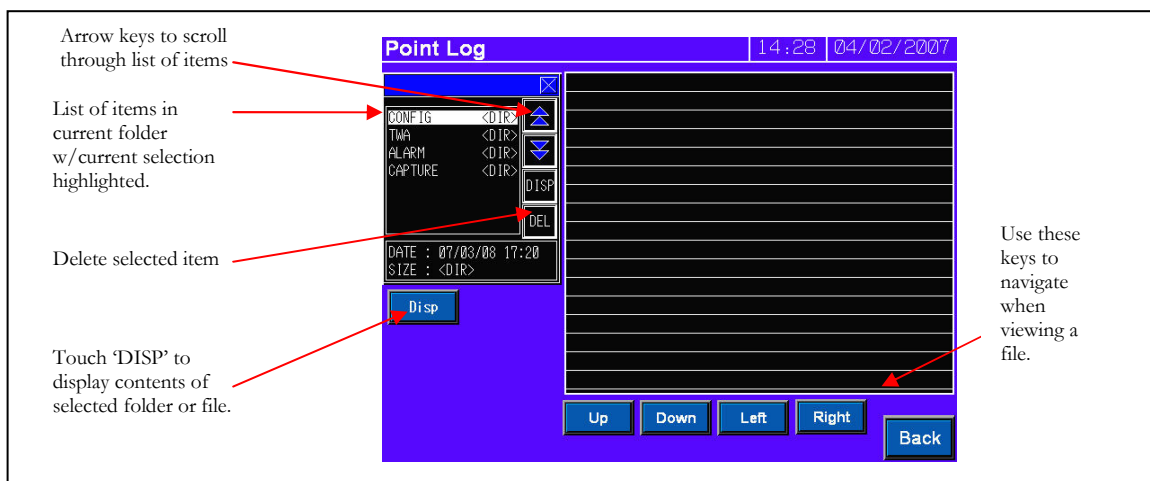


Figure 5.16

5.6 Time Weighted Average (TWA)

Touching the 'TWA' button on the concentration log screen (section 5.3) brings up the TWA screen shown in figure 5.17.

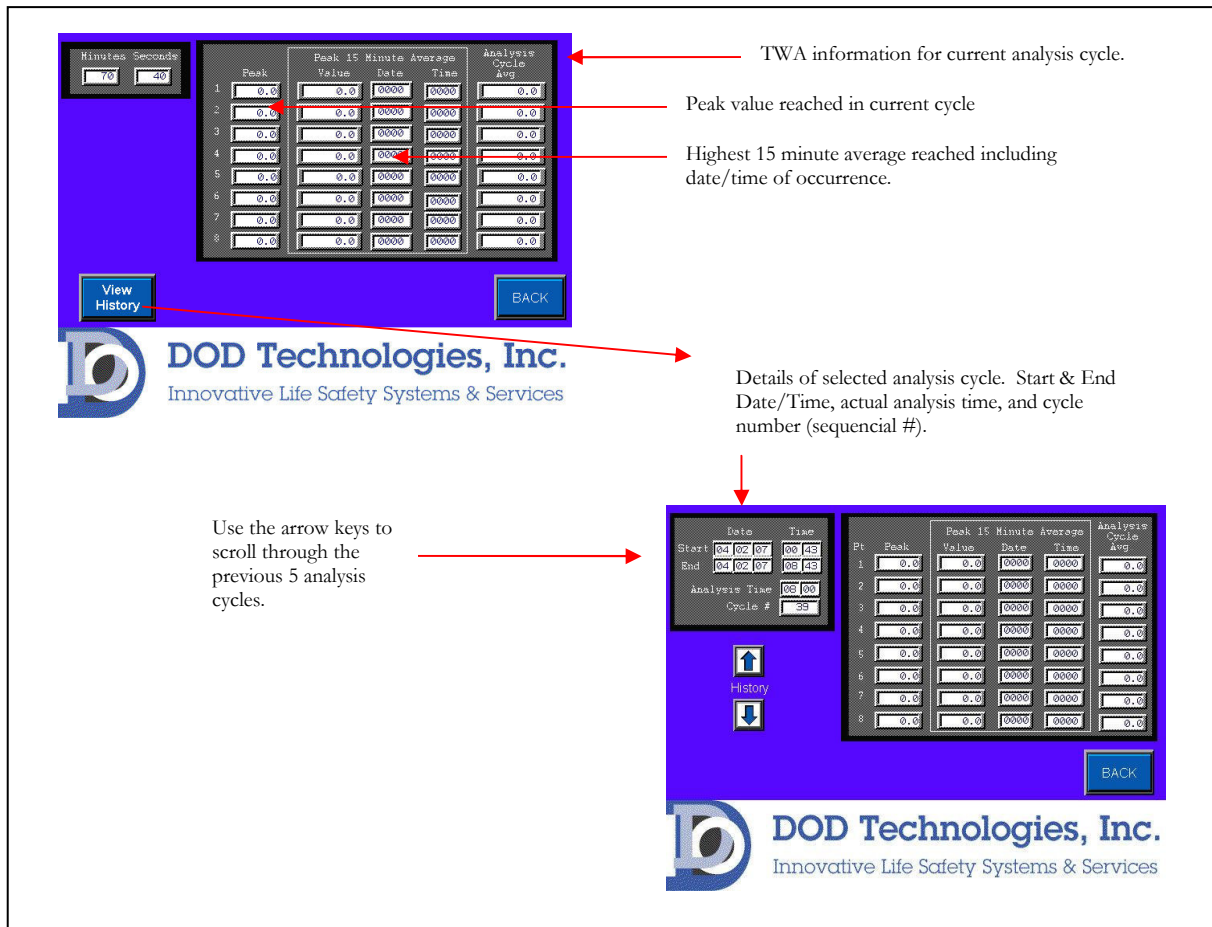


Figure 5.17

The first screen displays the current TWA information including the minutes and seconds elapsed since the cycle started. The CL8 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 5.17. Use the up and down arrows to review the previous 5 cycles in this screen.

Chapter 6 - Maintenance

6.1 Maintenance Door Access

The maintenance door is used to access the ChemLogic tape. To open the maintenance door simply turn the maintenance door locking knob counterclockwise until it is unscrewed from the main panel. The door can then be opened.

When maintenance is complete be sure to close the maintenance door and hand tighten the maintenance door locking knob (clockwise) to secure the door.

Important: The maintenance door should remain securely latched at all times except when servicing the ChemLogic tape.

6.2 Service Door Access



DANGER: Turn off the unit and unplug A/C power to the unit before opening the Service Door.

To open the door:

1. Insert the key provided into the slot and rotate counter clockwise 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 at all times when not servicing the unit. Verify that the latch is secure and use the keyed lock to prevent unauthorized access.

6.3 ChemLogic Paper tape

The ChemLogic 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 cartridges will last for 60 days under normal usage. See Appendix A for ordering information.

ChemLogic Paper Tape Installation Procedure

- A. From the setup menu touch the 'Load Tape' button (section 5.2.c)
- B. Open the maintenance door. (Section 6.1)

- C. On the screen touch the 'OPEN/CLOSE GATE' button to open up the gate
- D. Remove the old take-up reel by gently pulling and dispose of properly
- E. Remove the empty tape reel and install on top as the new take-up reel.
- F. Secure the new ChemLogic tape reel on the bottom as shown in figure 6.1. The tape should be around the bottom in a clockwise direction as shown.
- G. Feed the tape as shown with the arrows in figure 6.1.
 - 1. From the bottom reel
 - 2. Around the bottom tape guide
 - 3. Through the opening between the optic blocks
 - 4. Between the rubber roller and the capstan
 - 5. Around the top of the upper tape guide
 - 6. 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.

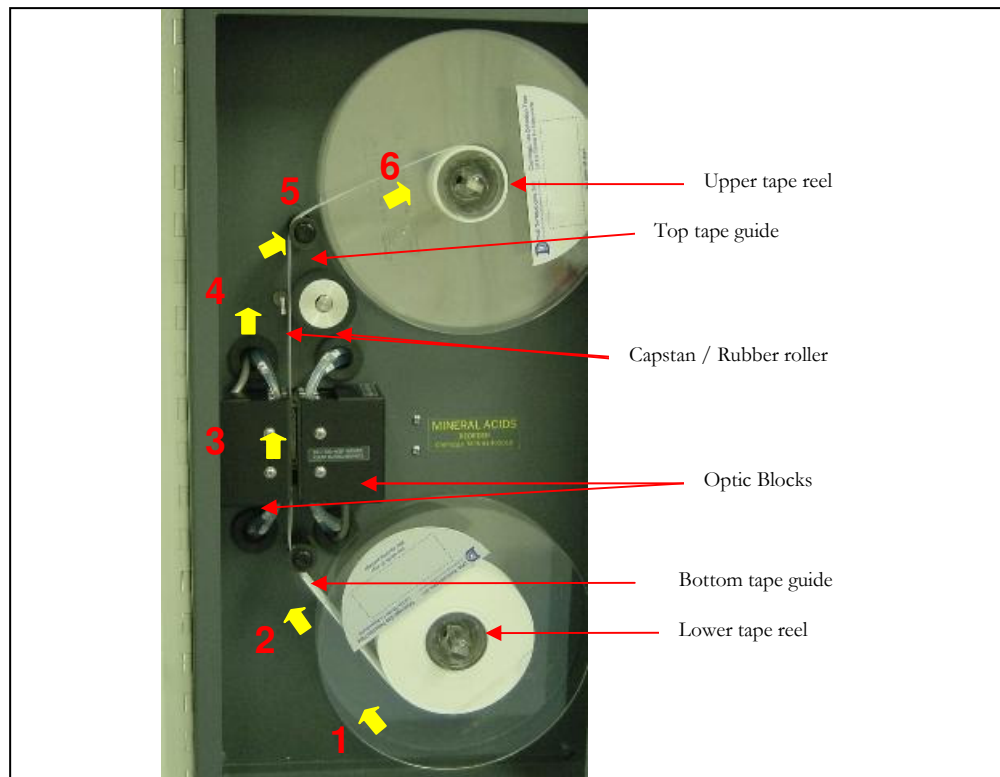


Figure 6.1

- H. Turn the upper wheel clockwise at least 2 full turns to secure the tape
- I. On the screen touch the 'OPEN/CLOSE GATE' button to close the gate
- J. On the screen touch the 'Reset Counter' button. (See section 5.2.c)

Warning : Keep fingers clear during tape advance.

6.4 End of line particulate filters

End of line (point of detection) particulate filters which protect the CL8 from damage are required on all 8 points including points not being monitored. Table 6.1 details the type of filter required for each gas – see also figure 6.2. Filters must be replaced on a regular basis as shown in the table. Filter orientation is not critical in either application.

IMPORTANT: All points require filtration to prevent dust accumulation in tubing and internal damage to the CL8. Dust that collects in the tubing or the internal system may cause sample loss and inaccurate gas concentration readings.

Gas	Description	Suggested Replacement	DOD Filter Part #
AsH3	Arsine	6 Months	780248
B2H6	Diborane	6 Months	780248
GeH4	Germane	6 Months	780248
H2SE	Hydrogen Selenide	6 Months	780248
PH3	Phosphine	6 Months	780248
SiH4	Silane	6 Months	780248
TBA	Tertiary-Butyl-Arsine	6 Months	780248
H2S	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)
BF3	Boron Triflouride	1 Month (membrane)	60009 (Housing) 60010 (membrane)
HBR	Hydrogen Bromide	1 Month (membrane)	60009 (Housing) 60010 (membrane)
COCL2	Phosgene	6 Months	780248

Table 6.1

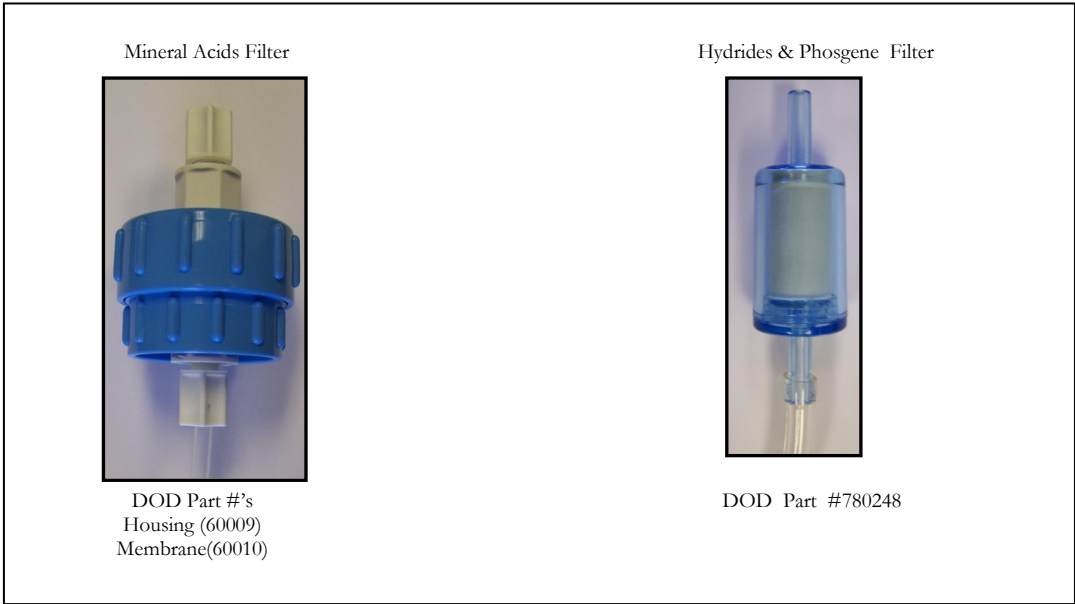


Figure 6.2

6.5 Flow adjustment

Each channel should be adjusted whenever a new ChemLogic tape or particulate filter is installed. See section 5.2.d

6.6 CF Card replacement

It is highly recommended to keep a compact flash card inserted in the unit at all times. The lower right corner of the analysis screen will show when a card is properly inserted (see section 5.4) To insert or replace a CF card follow these steps as illustrated in figure 6.3.

1. Turn off the unit AND unplug the A/C power cord.
2. Follow the procedures from section 6.2 to open the service panel for access to the CF card.
3. Lift the CF card cover
4. Removal:
 - a. Press the Ejector button to eject the CF card
 - b. Grasp the card with two fingers and remove
5. Insertion
 - a. Push the CF card into the slot until the ejector button is pushed forward. Be sure the card is oriented correctly in the unit.
6. Close the card cover

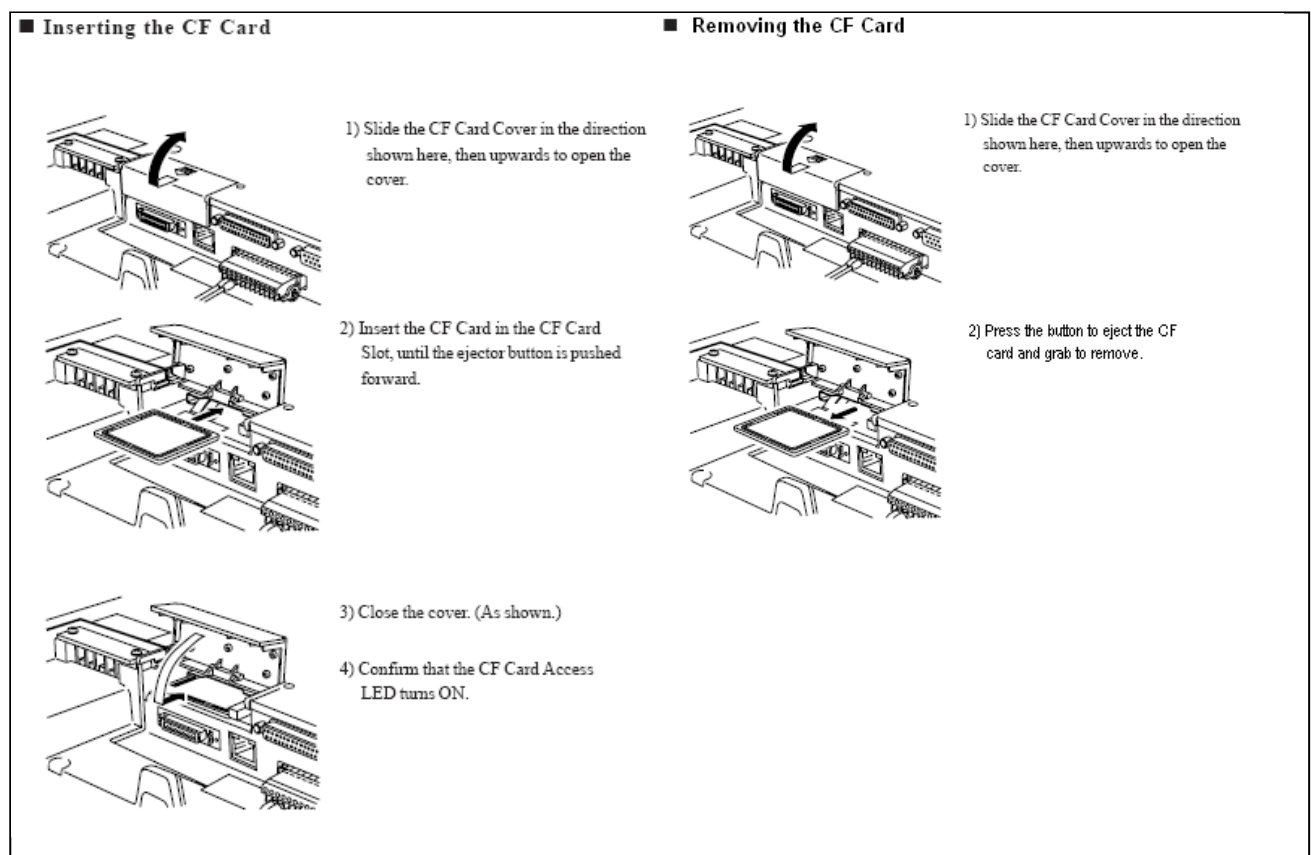
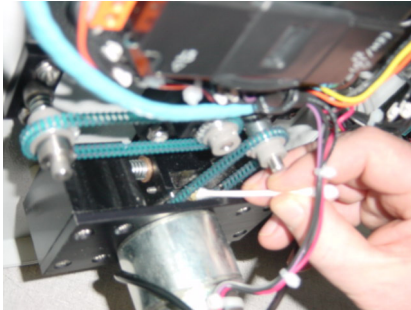


Figure 6.3

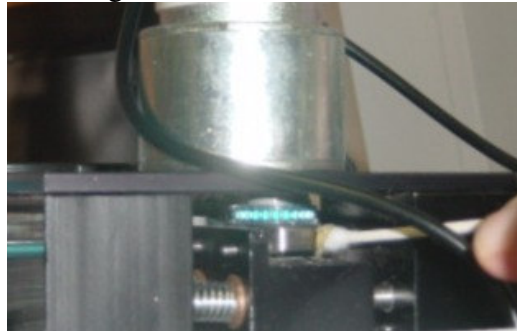
Section 5.5 describes viewing the files stored on the CF card on the touch screen. Appendix F details the data stored on the CF card and how to access it on a personal computer.

6.7 Apply grease periodically

The cam attached to the gate motor should be greased every 6 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.

6.8 Fuse Replacement

The system power is fused with a 2 amp fast-acting (5x20mm) fuse.

Chapter 7 – Service & Support

For information on service and support for your CL8 contact DOD Technologies, INC. using the information below.

Phone Support

M-F 8am – 5pm (Central Time Zone)

815.788.5200

Service Center

740 McArdle Dr. Unit C

Crystal Lake, IL 60014

Visit our website

www.dodtec.com

Appendix A – Accessories

For ordering information
DOD Technologies, Inc Sales
 M-F 8am – 5pm (Central Time Zone)
815.788.5200

DOD Part #	Description
2-500-011	4 Channel 4 to 20 milli amp Output Module 2 required for 8 points of detection
2-500-010	4 Color LED light with audible alarm
14249	250 ft. roll of ¼" X 3/16" FEP Teflon tubing
2-500-500	1000 ft. roll of ¼" X 3/16" FEP Teflon tubing
1-300-010	ChemLogic Tape – Hydrides (60 days)
1-400-010	ChemLogic Tape – Mineral Acids (60 days)
1-200-010	ChemLogic Tape – Phosgene (60 days)
1-500-010	ChemLogic Tape – Chlorine (60 days)
780248	Disposable non-corrosive end of line filters – Hydrides & Phosgene 8 required for 8 points of detection
60009	Filter housing for use with Teflon membranes for Mineral Acid units 8 required for 8 points of detection
60010	Teflon Membranes – 100 pieces – 47mm (replacement membrane for use with Part #60009)
2-500-502	Teflon Membranes – 10 pieces – 47mm (replacement membrane for use with Part #60009)
2-500-501	DOD OPC Server Software Site License

Appendix B – I/O Connection Detail

B.1 Standard Output Relay Module

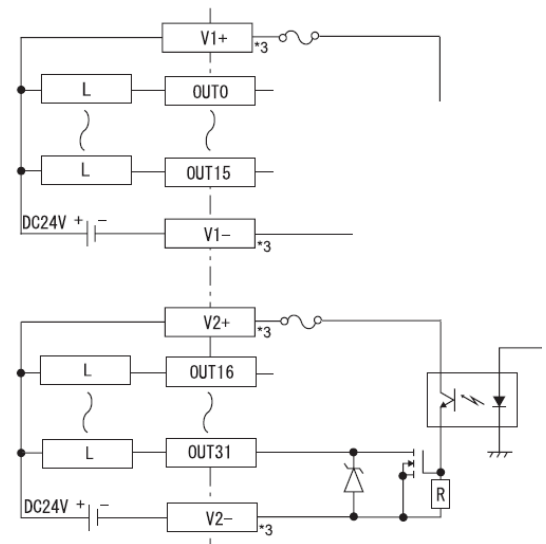
Description	Output
Point 1 Alarm Level 1	0
Point 1 Alarm Level 2	1
Point 2 Alarm Level 1	2
Point 2 Alarm Level 2	3
Point 3 Alarm Level 1	4
Point 3 Alarm Level 2	5
Point 4 Alarm Level 1	6
Point 4 Alarm Level 2	7
Point 5 Alarm Level 1	8
Point 5 Alarm Level 2	9
Point 6 Alarm Level 1	10
Point 6 Alarm Level 2	11
Point 7 Alarm Level 1	12
Point 7 Alarm Level 2	13
Point 8 Alarm Level 1	14
Point 8 Alarm Level 2	15
Critical Fault	16
Watchdog	17
Power On	18
Analysis Mode	19
General Fault	20
Gas Alarm Level 1	21
Gas Alarm Level 2	22
Blue Light	27
Audible Alarm	28
Green Light	29
Orange Light	30
Red Light	31

Output Relay Connector

0	1	Output
2	3	
4	5	
6	7	
8	9	
10	11	
12	13	
14	15	
V1 +	V1 -	
16	17	
18	19	
20	21	
22	23	
24	25	
26	27	
28	29	
30	31	
V2 +	V2 -	

Notes

- 1) Connect 24 Volt supply to V1 +/- and V2 +/-.
(See Connector diagram.)
- 2) Outputs 0-15 use common ground (V1 -)
Outputs 16-31 use common ground (V2 -)
- 3) 0.2 Amp per output max current
Outputs 0-15 Max current 1.6A
Outputs 16-31 Max current 1.6A

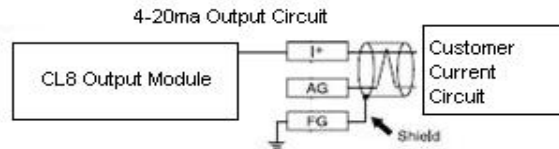


B.2 4 to 20ma Module (part # 2-500-011)

TR+	SLD	+24V	AG1	V2+	I2+	V3+	I3+	AG4	FG*
TR-	0V	V1+	I1+	AG2	FG*	AG3	V4+	I4+	GND

Labeled connector on each 4 to 20ma Module. *Each 'FG' terminal may be used for 2 points.

IMPORTANT: Use only connections above shown in grey. Other connections are pre-wired in the CL8.



4-20 ma Output Circuit Wiring.

Description	Module	Connection	Symbol
Point 1 4 to 20 ma	1	I1+	I+
	1	AG1	AG
	1	FG*	FG
Point 2 4 to 20 ma	1	I2+	I+
	1	AG2	AG
	1	FG*	FG
Point 3 4 to 20 ma	1	I3+	I+
	1	AG3	AG
	1	FG*	FG
Point 4 4 to 20 ma	1	I4+	I+
	1	AG4	AG
	1	FG*	FG
Point 5 4 to 20 ma	2	I1+	I+
	2	AG1	AG
	2	FG*	FG
Point 6 4 to 20 ma	2	I2+	I+
	2	AG2	AG
	2	FG*	FG
Point 7 4 to 20 ma	2	I3+	I+
	2	AG3	AG
	2	FG*	FG
Point 8 4 to 20 ma	2	I4+	I+
	2	AG4	AG
	2	FG*	FG

Module	Address
Module 1	9
Module 2	D

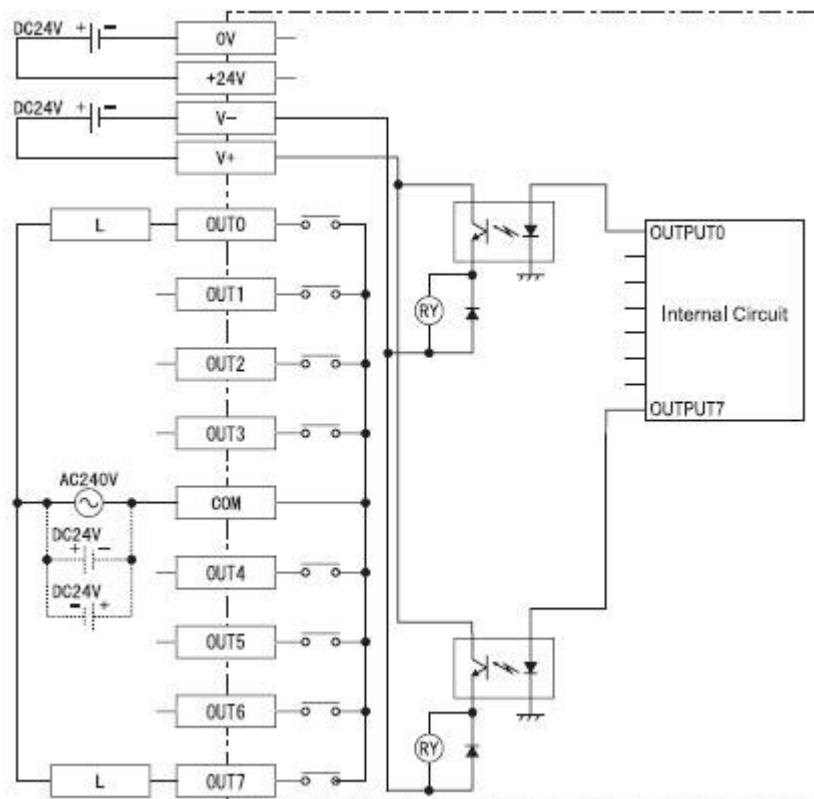
B.3 8 Point Relay Module (part # 2-500-012)

TR+	SLD	+24V	V+					COM				
TR-	0V	V-			0	1	2	3	4	5	6	7

Labeled connector on each 8 Point Relay Module. See drawing below.

IMPORTANT: Use only connections above shown in grey. Other connections are pre-wired in the CL8.

Module	Address
8 Point Relay Module	7



B.4 Optional mechanical relays (part # XXXXXX)

Description	Output
Point 1 Alarm Level 1	0
Point 1 Alarm Level 2	1
Point 2 Alarm Level 1	2
Point 2 Alarm Level 2	3
Point 3 Alarm Level 1	4
Point 3 Alarm Level 2	5
Point 4 Alarm Level 1	6
Point 4 Alarm Level 2	7
Point 5 Alarm Level 1	8
Point 5 Alarm Level 2	9
Point 6 Alarm Level 1	10
Point 6 Alarm Level 2	11
Point 7 Alarm Level 1	12
Point 7 Alarm Level 2	13
Point 8 Alarm Level 1	14
Point 8 Alarm Level 2	15
Critical Fault (Fault)	16
SPARE (UNUSED)	17
Power On	18
Analysis Mode (Out of Analysis)	19
General Fault (Maintenance)	20
Gas Alarm Level 1	21
Gas Alarm Level 2	22

Picture of relay box?

Notes

- 1) 240 VAC max per relay
- 2) Xx Amps max current per relay

B.4 OPC Interface (part # 2-500-501)

Use the RJ-45 connector pictured below to connect the CL8 to the I/P:network when the optional OPC Interface (OPC I/F) is specified. The connector is located on the inside of the machine next to the DIN-rail.



Appendix C – System Specifications

A. Physical Dimensions

1. Height 20"
2. Width 20"
3. Depth 11.3"
4. Weight approx. 70 pounds

B. Tubing

1. Exhaust line(1) 3/8"OD x 5/16" ID Polypropylene (25 ft max length)
2. Sample lines(8) 1/4" OD x 3/16" ID Teflon FEP (250 ft max length)

C. A/C Power 100–120VAC 50/60Hz, 220/240 VAC 50/60 Hz

D. Standard Output Relays

1. Rated Output Voltage DC 24V
2. Rated Output Voltage Range DC 20.4V to 28.8V
3. Maximum Load Voltage 0.2A/Connection (1.6A maximum pts 0-15 & pts 16-
4. Output Protection None

E. Transport Times approximately 36 seconds @ 250', 18 seconds @ 125'

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	
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

					Full		Alarm 1	Alarm 2	Chemlogic
Gas	Description	Units	TLV	LAL	Scale	LDL	Default	Default	Part #
AsH3	Arsine	ppb	50	2.5	500	2.5	50	100	1-300-010
B2H6	Diborane	ppb	100	25	1000	11	100	200	1-300-010
GeH4	Germane	ppb	200	150	2000	126	200	400	1-300-010
H2SE	Hydrogen Selenide	ppb	50	25	500	25	50	100	1-300-010
PH3	Phosphine	ppb	300	75	1500	11	300	600	1-300-010
SiH4	Silane	ppm	5	1.2	50	0.7	5	10	1-300-010
TBA	Tertiary-Butyl-Arsine	ppb	50	12	500	10	50	100	1-300-010
H2S	Hydrogen Sulfide	ppm	10	2.5	25	0.1	10	20	1-300-010
HCL	Hydrogen Chloride	ppm	5	1.2	15	0.2	5	10	1-400-010
HF	Hydrogen Flouride	ppm	3	0.7	10	0.7	3	6	1-400-010
BF3	Boron Triflouride	ppb	1000	250	5000	72	1000	2000	1-400-010
HBR	Hydrogen Bromide	ppm	3	0.7	20	0.2	3	6	1-400-010
Cl2	Chlorine	ppb	500	125	5000	50	500	1000	1-500-010
COCl2	Phosgene	ppb	100	25	4000	9	100	200	1-200-010

TLV = Threshold Limit Value

LAL = Lowest Allowable Alarm Level

LDL = Lower Detectable Limit

Appendix F – Compact Flash Data

To ensure that historical and performance information is stored properly be sure to insert a CF card in the proper slot at all times. See section 6.6 for installation instructions.

The CF card stores all information in standard comma separated values (*.CSV) format for easy access with any computer. Remove the CF card from the CL8 as described in section 6.6 and transfer the files to your personal computer*. The files are best viewed with programs that convert CSV format to rows and columns (Microsoft Excel, OpenOffice, etc) but could be viewed with any standard text editor.

Figure B.1 below shows the folders and files found on the CF card depending on the configuration or your CL8 and the use of the CF cards.

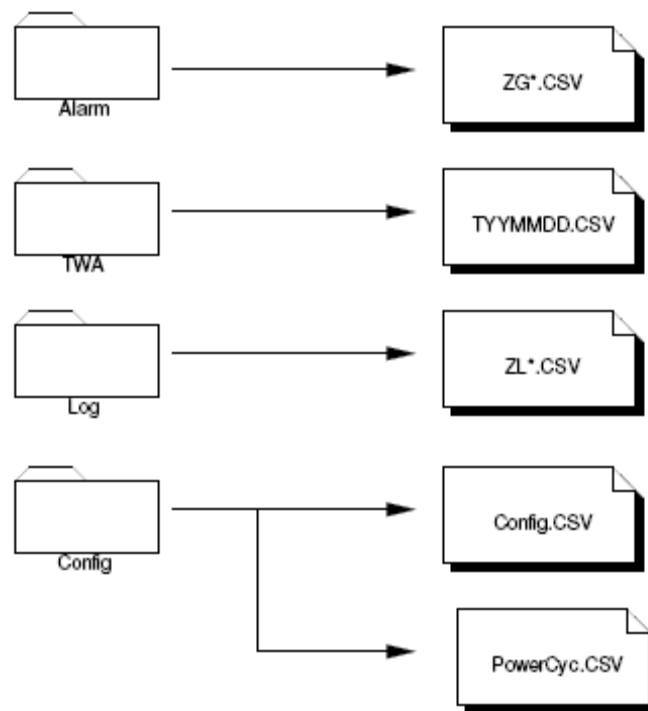


Figure B.1

F.1 Alarm & Event files (ZG*.CSV)

A portion of a typical event file when viewed with a spreadsheet program is shown below. Since the messages are written in reverse chronological order the recovery time shown is above the time of occurrence of the message.

Note : The columns labeled 'Acknowledge Time', 'No. of Occ', and 'Acc Time' are for DOD use only.

Trigger Date	Trigger Time	Message(s)	Acknowledge Time	Recovery Time	No. of occ.	Acc. time	Level
11/7/2006	17:32:00	8 Hour - no conc. all points.			36	0:14:17	7
		8 Hour - no conc. all points.		9:32:20	36	0:14:17	7
11/7/2006	9:32:00	8 Hour - no conc. all points.			36	0:14:17	7
		8 Hour - no conc. all points.		1:32:21	36	0:14:17	7
11/7/2006	1:32:00	8 Hour - no conc. all points.			36	0:14:17	7
		8 Hour - no conc. all points.		17:32:32	36	0:14:17	7
11/6/2006	17:32:00	8 Hour - no conc. all points.			36	0:14:17	7
11/6/2006	9:32:01	Analysis Start Time			13	35:13:06	7

F.2 TWA Data Logs (TYMMDD.CSV)

The time weighted average information is stored on the CF Card in the TWA folder. A new file is started each day (named with the year, month, and day) for easy retrieval. Below is a sample of one cycle stored in a file.

DOD Technologies INC									
http://www.dodtec.com									
Analysis Cycle	4								
Start Date/Time	4/11/2007	22:58							
End Date/Time	4/12/2007	6:58							
Analysis Time	8:00								
Point	1	2	3	4	5	6	7	8	
Gas	AsH3	AsH3	AsH3	AsH3	AsH3	AsH3	AsH3	AsH3	AsH3
Avg Conc.	0	0	0	0	0	0	0	0	0
Peak Conc.	0	0	0	0	0	0	0	0	0
Peak 15 Min Avg.									
Conc.	0	0	0	0	0	0	0	0	0
Peak 15 Min Avg.									
Date	0	0	0	0	0	0	0	0	0
Peak 15 Min Avg.									
Time	0	0	0	0	0	0	0	0	0

F.3 Concentration Log Files (ZL*.CSV)

When gas is detected a log file is written to the Compact Flash card (if installed) based on the configuration settings – see section 4.5. Below is a sample of the file format stored on the CF Card – all 8 points are logged regardless of where the gas is detected.

Date	Time	1	2	3	4	5	6	7	8
07/03/09	07:26:11 PM	0	0	1.2	0	0	0	0	0
07/03/09	07:26:13 PM	0	0	1.2	0	0	0	0	0
07/03/10	12:19:40 AM	0	0	1.2	0	0	0	0	0
07/03/10	12:19:42 AM	0	0	1.2	0	0	0	0	0
07/03/10	12:19:44 AM	0	0	1.6	0	0	0	0	0
07/03/10	12:19:46 AM	0	0	1.6	0	0	0	0	0
07/03/10	12:19:48 AM	0	0	2	0	0	0	0	0

F.4 Config File

A configuration file is created on the CF card each time the ChemLogic 8 is powered on. The config file stores basic information about the machine including version information, serial number, customer name (if entered), etc. All of the information is stored in CSV format for easy viewing.