VX500

PHOTOIONIZATION DETECTOR

Instruction Manual

OUR MISSION

Design - Manufacture - Sell:
Highest quality products
for the preservation of
life and property.

Provide:
Best customer service
available.

Dear Valued Customer,

Thank you for buying and using Industrial Scientific's VX500 PhotoIonization Detector.

Your VX500 can be relied upon for dependable service, day after day. It has been designed, manufactured, tested and proven under the most scrutinizing conditions possible. With the minimal care and maintenance described in this Instruction Manual, it will provide you with years of reliable monitoring.

I am most concerned that you be pleased with the performance of your VX500 in the months and years ahead. I urge you to call us with any questions or comments you may have. Often times a phone call and a question can save you hours of frustration. Please never hesitate to contact me at 1-800-DETECTS (338-3287).

All of us at Industrial Scientific appreciate the opportunity to serve you.

Sincerely,

Kent D. McElhattan
President & CEO
Industrial Scientific Corporation

VX500 PhotoIonization Detector

Table of Contents

WARNINGS AND CAUTIONARY STATEMENTS

Failure to perform certain procedures or note certain conditions may impair the performance of the instrument. For maximum safety and performance, please read and follow the procedures and conditions outlined below.

⚠ Recharge battery only in a non-hazardous location.

⚠ Instrument tested for intrinsic safety in explosive gas/air (21.% oxygen) mixtures only.

⚠ UV lamp requires periodic cleaning to function properly. The frequency of cleaning is dependent upon the environment in which the VX500 is used. Industrial Scientific recommends cleaning the UV lamp after every 40 hours of use.

⚠ Any new or freshly cleaned 10.6 eV lamp requires a burn-in period of 24 hours in order for the lamp's output to stabilize. This is done by placing the lamp into the lamp conditioner found on the charger/datalink accessory.

⚠ Always check the ionization potential of the target gas prior to sampling to ensure proper lamp selection. For example, a 10.6 eV lamp can only detect gases with an ionization potential below 10.6 eV.

⚠ The presence of water vapor in the sample stream can cause quenching of the detector signal due to UV absorption.

Oxygen and methane are UV absorbers. Significant changes in their concentration can cause a change in the PID signal.

⚠ Ammonia gas causes degradation of the VX500 PID module's performance.

⚠ Ethylene gas does not provide a consistent signal therefore the VX500 should not be relied upon to provide consistent readings when monitoring ethylene.

⚠ A 5 minute warm-up time is required for VOC readings to fully stabilize after power-up of the VX500.

⚠ EC TYPE EXAMINATION CERTIFICATE IS DEMKO 02ATEX 0228447X, WITH MARKING CODE EEx ia IIC T4, FOR EQUIPMENT GROUP AND CATEGORY II 1 G.

⚠ WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY AND MAY CAUSE AN UNSAFE CONDITION.

⚠ CAUTION: FOR SAFETY REASONS, THIS EQUIPMENT MUST BE OPERATED AND SERVICED BY QUALIFIED PERSONNEL ONLY. READ AND UNDERSTAND MANUAL COMPLETELY BEFORE OPERATING OR SERVICING.

Model VX500 must only be used with battery pack P/N 1708-9376 or 1708-8618EC

INTRODUCTION

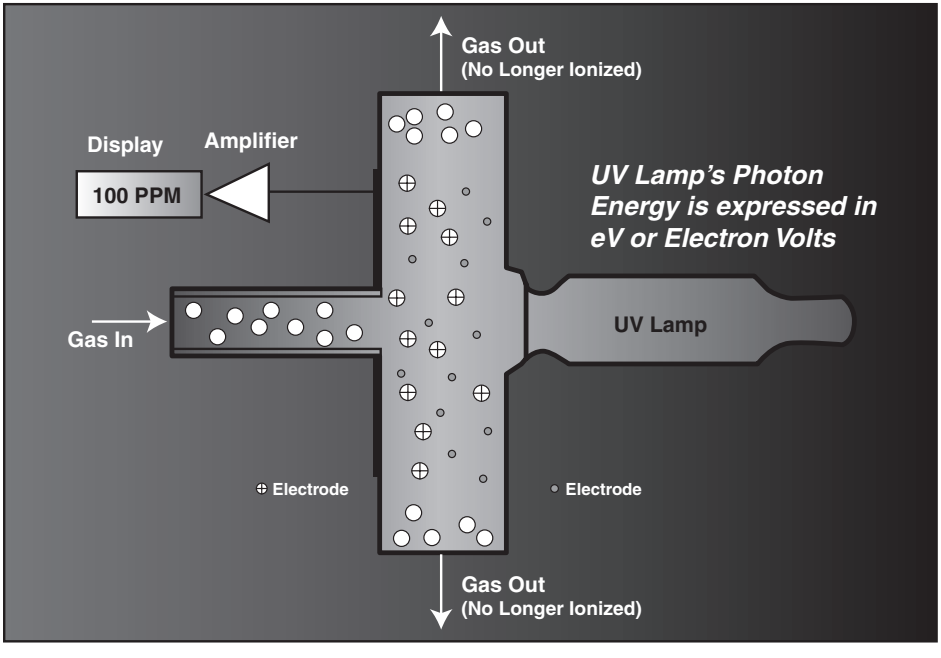
PhotoIonization detectors (PIDs) are a proven and reliable means of detecting volatile organic compounds (VOCs) in a variety of applications. Although the PID in general is not capable of distinguishing one gas species from another, it is a useful tool for detecting potentially hazardous gas vapors such as benzene, toluene, xylene and hundreds of other compounds at parts per million (ppm) or sub-ppm levels. The low resolution of the PID makes this instrument ideal for detecting traces of hydrocarbon gases in confined spaces, hazardous materials sites, areas under arson investigation, locations prone to releasing fugitive emissions or in environments where prolonged gas exposures may present a threat to workers' health and safety.

When used within the guidelines set forth in this manual the VX500 PhotoIonization Detector can be relied on to provide years of dependable service. These instructions will guide you through the set-up, operation, maintenance and calibration necessary for you to be assured that your VX500 is operating properly.

THEORY OF OPERATION

The VX500 PhotoIonization Detector operates on the principle of absorption of ultraviolet light energy by a target gas. The internal sampling pump of the VX500 draws a gas stream into the instrument's ionization chamber. This chamber holds an ultraviolet light source with a known energy potential. This potential is referred to as the photon energy of the lamp. If the energy from the lamp is at a level greater than the amount of energy required to excite the gas (the ionization potential) it will cause it to ionize, or release electrons. These electrons gather on the electrodes within the PID module and the instrument's electronics interpret them as a quantitative concentration of gas. The number of electrons released is proportional to the concentration of the gas in the chamber.

For example: A PID with an energy source or lamp with a 10.6 electron-volt (eV) photon energy is capable of detecting any compound which has an ionization potential less than or equal to 10.6 eV. Once the gas exits the ionization chamber it reclaims its lost electrons, returns to its original state and is returned to the atmosphere.



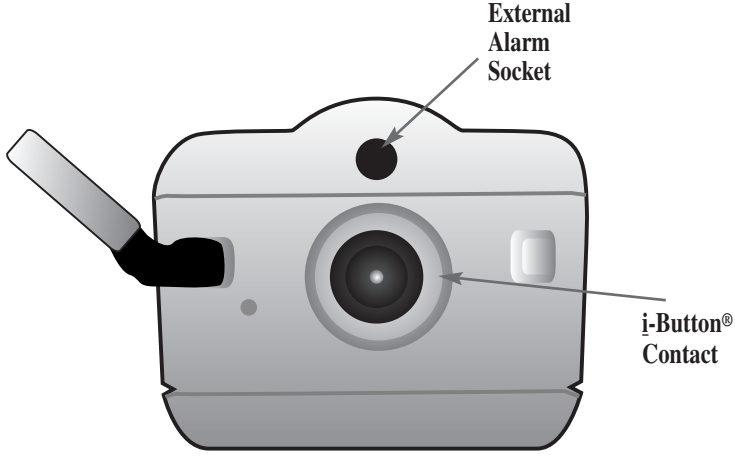
Graphic representation of PID theory of operation

UNPACKING THE INSTRUMENT

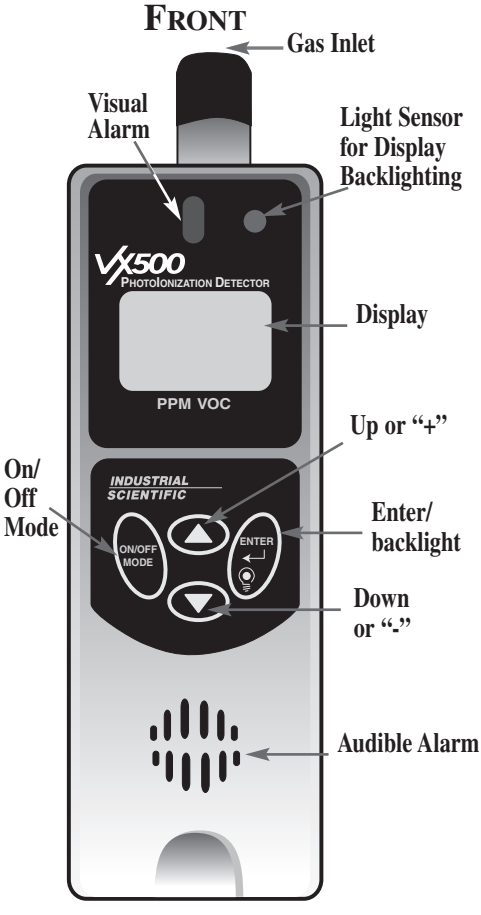
The shipping box should contain the following items. Account for each item before discarding the box.

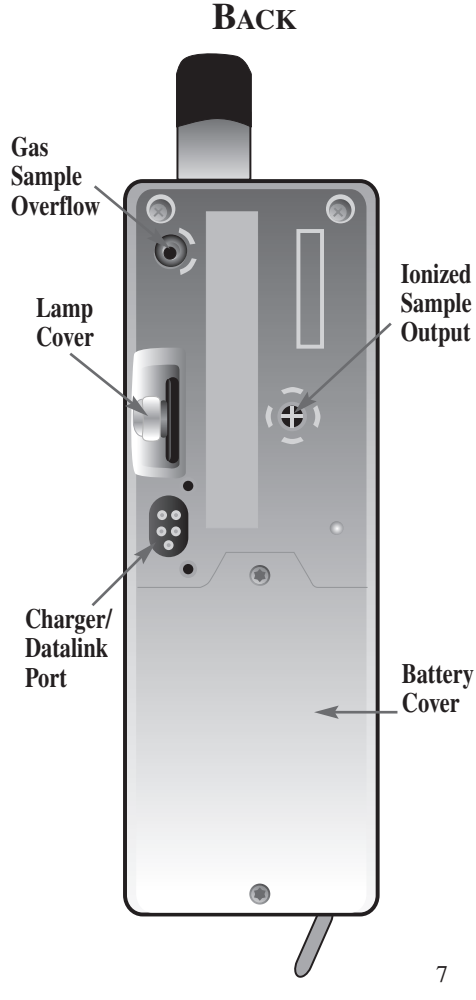
QUANTITY	PART NUMBER	DESCRIPTION
1	18104034	VX500 PID Monitor
1	17098773	VX500 Instruction Manual
1	17095746	Maintenance Tool
1	17104407	Start-Up Card
1	18104364	Nylon Carrying Case
1	17065970	Urethane Tubing for Calibration

After unpacking, if any listed item is missing, contact either your local distributor of Industrial Scientific products, or call Industrial Scientific Corporation at 1-800-DETECTS (338-3287) in the United States and Canada, or 412-788-4353.



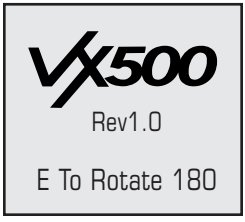
BOTTOM


FRONT
Gas Inlet
Visual Alarm
Light Sensor for Display Backlighting
VX500
PHOTOIONIZATION DETECTOR
Display
PPM VOC
Up or "+"
On/ Off Mode
INDUSTRIAL SCIENTIFIC
ON/OFF MODE
ENTER
Enter/ backlight
Down or "-"
Audible Alarm

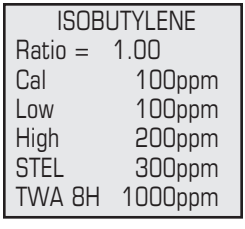

BACK
Gas Sample Overflow
Lamp Cover
Ionized Sample Output
Charger/ Datalink Port
Battery Cover

INSTRUMENT OPERATION

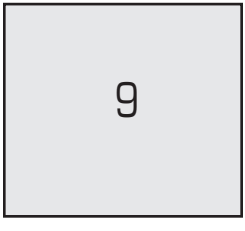
TURNING THE VX500 ON AND OFF



To turn the VX500 on, press and hold ON/OFF MODE on the unit's membrane keypad until the instrument emits a short beep and the VX500 welcome screen appears on the instrument display. The current revision of instrument operating software is shown below the instrument model name. Pressing ENTER while this screen is shown will rotate the display 180 degrees to make viewing easier in applications where the VX500 may be hung upside-down.



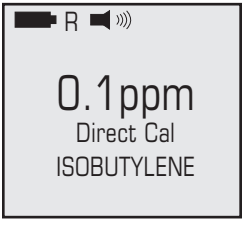
After the welcome screen, the VX500 configuration screen will be displayed. This screen shows all parameters currently set in the instrument including the calibration gas concentration and all current alarm level settings.



Following the configuration screen, the instrument will display a brief countdown timer while the VX500 completes the automatic warm-up cycle. During this countdown, if ▲ and ▼ are pressed simultaneously, the VX500 will enter into the configuration mode giving you the opportunity to change the instrument's custom settings. If no keys are pressed during warm-up, the display will time out and begin detecting gas in the normal operation mode.

To turn the VX500 off, press and hold ON/OFF MODE at any time during operation until the instrument display shows RELEASE. After releasing ON/OFF MODE the instrument's display will blank and all instrument operation will cease.

VX500 Gas Reading Mode



Once the VX500 enters the Gas Reading Mode the instrument display will show the concentration of gas currently being detected along with the corresponding gas type. For general VOC detection this gas type will be isobutylene. You may select another gas in the configuration mode by editing the "favorites" list (see page 16). Gases selected from the favorites list will use response factors to determine actual gas concentrations. These response factors are referenced to isobutylene unless the VX500 is directly calibrated to the specific gas.

If the monitored concentration of gas exceeds a preset limit for low alarm, high alarm, STEL, or TWA the VX500 will alert you by sounding an audible tone in conjunction with flashing an ultra bright red LED. Alarm conditions are also activated whenever a sensor fails calibration, the pump fails or becomes blocked, or the battery power is too low to operate the VX500.

Configuration Icons

The top line of the instrument display will show a series of icons which identify the instrument's current operating configuration. These icons are identified below and are explained in greater detail in later sections of this manual.

 Datalogging On

 Battery Type and charge status (Shading indicates charge status) R = rechargeable A = alkaline

 Tick Mode

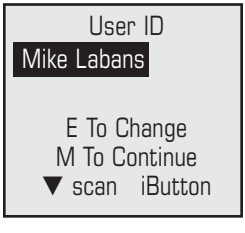
 Snapshot Mode

VIEWING THE VX500 OPERATING MODES

CHANGING GAS TYPE:

If changing gas type in the field is enabled, pressing ON/OFF MODE one time during the normal operating screen will advance the instrument into the change gas type screen. This operating mode allows the user to select a response factor from either the Favorites List or the entire list of preprogrammed response factors. Using the arrow keys, scroll until the desired gas type is highlighted. Once highlighted, press the enter key. The instrument will enter into a gas set up screen where the calibration gas and alarm set points can be changed. Use the arrow keys to scroll to the desire field to be modified. Once highlighted, press ENTER to highlight the value. Using the arrow keys increase or decrease the value until desired setting is reached. Press ENTER to accept the new value. Once all changes are made, press ON/OFF MODE to enter the gas readings screen. The display will now show the new response factor that the VX500 is set to. For a complete list of available response factors, refer to the table on page XX.

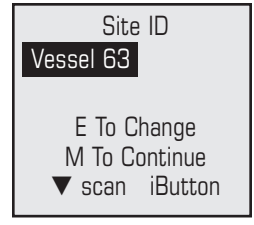
USER ID:



Press ON/OFF MODE until "User ID" appears. The display will show the current user id that is entered into the instrument. If "Change Site and User ID in the Field" is enabled in the configuration, pressing enter will allow you to change to current user. If enter is pressed, the VX500 will look for the presence of an iButton on the iButton contact. If an iButton is detected, the user information will automatically be loaded into the instrument. If no iButton is detected, the user is prompted to select a user from the user id list, or manually enter the user name using the arrow keys and ENTER.

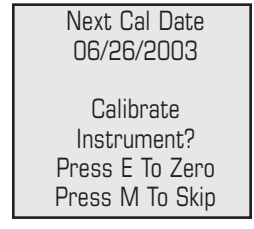
SITE ID:

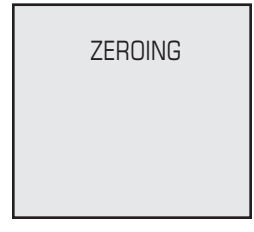
Press ON/OFF MODE until "Site ID" appears. The display will show the current site id that is entered into the instrument. If "Change Site and User ID in the Field" is enabled in the VX500 configuration modes, pressing enter will allow you to change to current site. If enter is pressed, the VX500 will look for the presence of an iButton on the iButton contact. If an iButton is detected, the site information will automatically be loaded into the instrument. If no iButton is detected, the user is prompted to select a site from the site id list, or manually enter the site name using the arrow keys and ENTER .



ZEROING AND CALIBRATION:

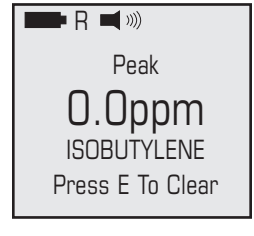
If field calibration is enabled in the set up menus, press ON/OFF MODE until the Calibration Screen is reached. This screen shows you the last/next time calibration has occurred/is to occur. Pressing ENTER will enter the instrument into the zeroing sequence. Once zeroing is complete, pressing the ENTER key will allow the user to perform a calibration. (see Calibrating the VX500). If no buttons are pressed after the zeroing sequence, the instrument will return to normal operation.



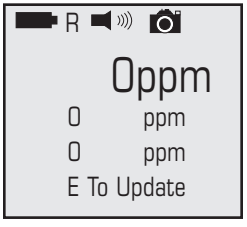


PEAK READINGS:

If the Peak Hold feature is enabled, press ON/OFF MODE until "Peak" appears. The peaking reading displayed represents the highest VOC concentration measured since the peak reading was last cleared. In the instrument configuration menus, if clearing peaks in the field is enabled, pressing the ENTER key will clear the peaks. If this mode is not enabled, the peaks will not be able to be cleared.

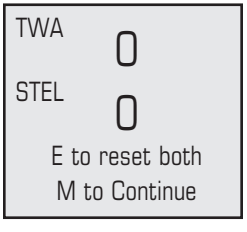


SNAPSHOT MODE:



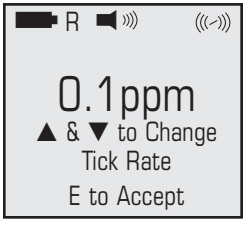
If the Snapshot mode is enabled, press ON/OFF MODE until the Snapshot menu screen appears. The Snapshot operating mode allows the user to capture the current instrument reading and store it in the datalogging memory along with the current time and date stamp. Pressing ENTER at any time while this mode is displayed will automatically result in the reading, time and date to be recorded into the instrument memory. When datalogging is turned off, the snapshot mode can be enabled. For more information on setting up the snapshot mode, refer to the Datalog Configuration section on page 20.

TWA/STEL READINGS



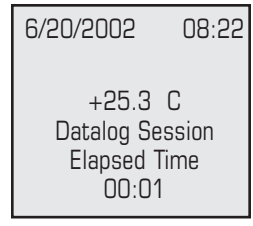
If the STEL and TWA features are enabled, press ON/OFF MODE until the TWA/STEL screen appears. This screen will display the current 8-hour time weighted average (TWA) and 15 minute short term exposure limit (STEL) average readings measured since these readings were last cleared and reset. Pressing ENTER while in this mode will reset the current TWA and STEL readings to zero. Resetting the STEL and TWA readings will automatically create a new datalogging session if the VX500's datalogging feature is enabled.

TICK MODE



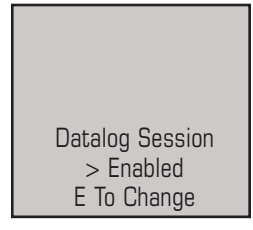
If the Tick mode feature is enabled, press ON/OFF MODE until the tick screen appears. With the tick mode enabled the VX500 will sound an audilble tick which increases in rate as the gas concentration detected is increased. This function may be useful in tracking leaking gas concentrations or while detecting fugitive emissions.

Datalogging Session Indicator



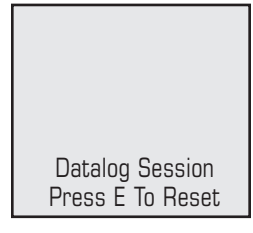
If the Datalogging feature is enabled press ON/OFF MODE until the "Datalog Session" screen appears. The datalogging session indicator displays the elapsed time that has passed since the datalogging session was last reset along with the current date and time. At one minute recording intervals the VX500 is capable of storing up to 150 hours of gas readings.

Datalog Session Pause



If the Datalogging Pause feature is enabled, press ON/OFF MODE until the "Datalog Session Enabled/Paused" screen appears. Pressing ENTER during this mode will toggle the datalogger from paused to enabled, allowing the user to control when the VX500 is datalogging. When paused, the datalogging icon flashes.

Reset Datalogging Session



If the Datalogging feature is enabled, press ON/OFF MODE until the "Reset Datalog Session" screen appears. Pressing ENTER during the mode will start a new datalogging session and reset the elapsed session timer to 00:00. Pressing ON/OFF MODE one time from the datalogging session indicator will return the instrument to the normal operating screen.

Clear Datalogging Memory:

If the Clear Datalogging feature is enabled, press ON/OFF MODE until "Clear All Data" appears. Pressing the ENTER during this mode will clear all of the current datalogging memory. Pressing ON/OFF MODE will return the instrument to the normal operating screen.

CALIBRATING THE VX500

Gas detection instruments are potential life saving devices. Recognizing this fact, Industrial Scientific Corporation recommends that a functional "bump" test be performed on every instrument prior to each days use. A functional test is defined as a brief exposure of the monitor to a concentration of gas(es) in excess of the lowest alarm set-point for the sensor for the purpose of verifying sensor and alarm operation and is not intended to be a measure of the accuracy of the instrument.

Industrial Scientific Corporation further recommends that a full instrument calibration be performed using a certified concentration(s) of Industrial Scientific branded calibration gas(es) monthly to ensure maximum accuracy.

Use of calibration gases from manufacturers other than Industrial Scientific may void product warranties and limit liability claims against the manufacturer.

If an instrument fails to operate properly following any functional "bump" test, a full instrument calibration should be performed prior to use.

ZERO
COMPLETE

Apply Cal Gas
To Instrument
Press E to Span
Press M to Skip

Instrument
is Calibrating

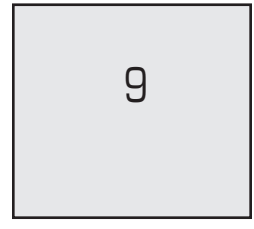
Calibration
Complete

62 Span

To calibrate the VX500 press ON/OFF MODE in the Gas Reading mode once to advance to the calibration screen. Press ENTER to begin the zeroing process. During the zeroing process, the words "Zero in progress" appear on the display. When the zeroing process is complete, the instrument will display "Apply XXX PPM" of the gas selected to be monitored. If you wish to perform the span calibration, apply the calibration gas thru a demand flow regulator and press ENTER to begin calibration. The VX500 will automatically recognize the presence of the calibration gas and the instrument will be calibrated automatically when the sensor response to the calibration gas becomes stable. Upon completion of calibration the VX500 will display a full span value and calibration status. A full span value that is greater than 70% of the applied gas concentration is considered good. A full span value that falls between 70% and 50% of the applied gas value is considered marginal.

A full span value below 50% of the applied gas value will fail calibration. For marginal or failed calibration the PID lamp may need to be cleaned (refer to Cleaning and Replacing the PID Lamp). If a VX500 fails either zero or span functions, the VX500 notes this condition on the display and the unit will not operate until the condition is corrected.

CONFIGURING THE VX500'S CUSTOM SETTINGS



The VX500 has many user configurable options and features. These features may be accessed through the configuration software utility and a PC, or adjusted by pressing ▲ and ▼ simultaneously during the warm-up cycle when the count down timer is displayed.

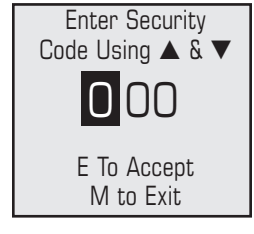
Configuring your VX500 is very intuitive. Every option is highlighted on the display. In general:

Pressing ▲ or ▼ will step you through the modes.

Pressing ENTER selects a function or accepts (saves) a value.

Pressing ON/OFF MODE moves you backward in the configuration or steps you completely out of set up to the "Gas Reading Mode."

SECURITY CODE



Once the configuration mode has been entered, the instrument will prompt you to enter a three digit security code access code (if this feature is enabled). If the security code feature is activated on the VX500, no configuration changes can be made without entering the proper code. The security code is entered by using ▼ and ▲ to scroll through the values. When the desired security code is reached, press ENTER to accept the value. The VX500's display will step to the next availble configuration screen if the proper code has been entered.

Change Security Code

Change
Security Code

E to configure
▲ for next menu
▼ for prev menu
M to exit config

The "Security Features" screen allows you to establish a security code to protect your custom configurations. The security code is a three digit number that once established cannot be bypassed unless entered correctly. It is important that you record your security code and keep it in a safe location in the event you need recall the number.

Change Gas Data

Change
Gas Data

E to configure
▲ for next menu
▼ for prev menu
M to exit config

The "Change Gas Data" screen allows you to edit gas specific setpoints such as calibration gas values and low, high, STEL, and TWA gas concentration alarm values. This screen also allows you to configure the gas range giving you control over whether your VX500 reads in tenths of a ppm or whole ppm's.

Edit Favorite Response Factors List

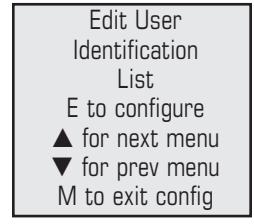
Edit Favorite
Response
Factors List
E to configure
▲ for next menu
▼ for prev menu
M to exit config

The "Edit Favorites Response Factors List" screen allows you to add/subtract gases on your favorite list of response factors. Response factors allow you to accurately monitor a gas, other than the gas the VX500 was calibrated to. Response factors are preprogrammed into the VX500 and are created by comparing the PID module's response to the target gas versus the previously used calibration gas.

Using the Response Factors List

Once selected, the response factor will automatically do the math and reference the signal to the specific compound of choice. For example, if you calibrated your VX500 using isobutylene and you wish to accurately monitor benzene, you would press ▲ and ▼ in the Gas Reading Mode, then choose between the Favorites List or the list of 100 preprogrammed compounds until you highlight benzene. Pressing ENTER here would select benzene and automatically use the associated response factor. For a list of available compound specific response factors refer to page 32 of this manual.

Edit User Identification List

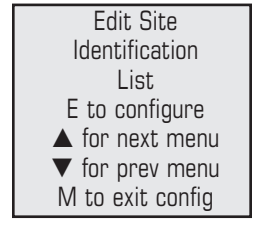


The "Edit User Identification List" screen allows you to manually enter instrument user information with up to 16 alpha/numeric characters. This list can then be used to imprint the datalogger with the current user as selected in the User ID screen in the Gas Readings Mode.

Press ENTER to modify the user ID. ▲ allows changes to be made to the user list while ▼ allows changes to the current user. When making changes to the user list, use the arrow keys to scroll through current users to select a name to delete. When prompted, pressing ▲ allows users to be added to the current user lists. User names can be added automatically via an iButton, or manually entered using the arrow keys to select letters and ENTER key to accept. A maximum of 5 users can be stored on the current user list.

When making changes to the current user, the VX500 will initially look for an iButton. If an iButton is not detected on the iButton reader, the VX500 will allow a new user name to be manually entered using the arrow keys to select letters and ENTER key to accept, or by using the iButton.

Edit Site Identification List



The"Edit Site Identification List" screen allows you to manually enter instrument site (location) information with up to 16 alpha/numeric characters. This list can be used to imprint the datalogger with the current location as selected in the Site ID screen in the Gas Readings Mode.

Press ENTER to modify the site ID. ▲ allows changes to be made to the site list while ▼ allows changes to the current site. When making changes to the site list, use the arrow keys to scroll through current sites to select a site to delete. When prompted, pressing ▲ allows sites to be

added to the current site lists. Site names can be added automatically via an iButton, or manually entered using the arrow keys to select letters and 

key to accept. A maximum of 5 sites can be stored on the current site list.

When making changes to the current Site, the VX500 will initially look for an iButton. If an iButton is not detected on the iButton reader, the VX500 will allow a new site name to be manually entered using the arrow keys to select letters and 

key to accept, or by using the iButton.

Allow Viewing of Peak Reading in the Field

Allow Viewing
of Peak Reading
in the Field
E to Configure
▲ for next menu
▼ for prev menu
M to exit config

The "Allow Viewing of Peak Reading in the Field" screen gives you control over whether the peak (highest concentration of VOC's monitored since the peaks were last reset) readings will be viewed by users in the field. Choosing "no" blocks this display for the Gas Readings Mode while "yes" permits it to be viewed.

STEL/TWA Configuration:

Allow Viewing
of STEL/TWA
in the Field
E to Configure
▲ for next menu
▼ for prev menu
M to exit config

Pressing 

allows the STEL/TWA to be configured. This mode allows the user to have control over displaying and reseting the STEL (short term exposure limit: a 15 minute running average of VOC concentrations) and TWA (time weighted average: a user defined average, usually 8 hours, of VOC concentrations) values in the field. The arrow keys toggle between turning these modes on and off, while the 

key accept the changes. The TWA time base can be changed using the arrow keys to increase or decrease the time base value and using 

to accept the new value.

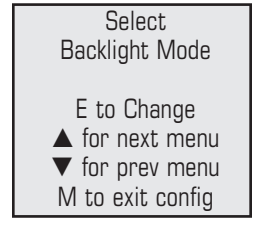
Allow Viewing of Ticks Screen in the Field

Allow Viewing
of Ticks Screen
in the Field
E to Change
▲ for next menu
▼ for prev menu
M to exit config

The "Allow Viewing of Ticks Screen in the Field" screen gives you control over whether the ticks mode screen will be viewed in the field. Choosing "no" in this situation blocks the user for having control over turning on or off

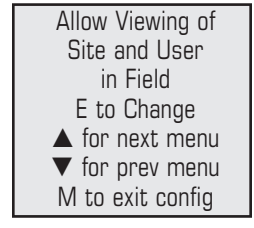
the tick feature of the VX500. The ticks mode sounds an audible tick that increases in frequency as the concentration of VOC's detected increases. This is a useful tool when using the VX500 to detect leaks.

Select Backlight Mode



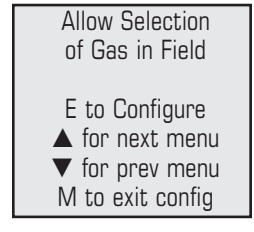
The "Select Backlight Mode" screen allows you to control whether your display backlight will be manually or automatically activated. If you choose manual, your backlight will only activate whenever ENTER is pressed. Choosing automatic backlight control will activate the display backlight whenever ambient light conditions diminish. This is accomplished through the use of a light sensor located on the VX500's faceplate.

Allow Viewing of Site and User in Field



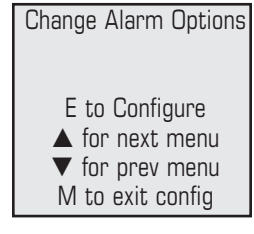
The "Allow Viewing of Site and User in Field" screen gives you control over whether the Site and User ID screens will be viewed in the field.

Allow Selection of Gas in Field



The "Allow Selection of Gas in Field" screen gives you control over whether the user will be able to access the "Favorites Response Factors" list from the Gas Readings Mode. Using response factors is explained in the "Edit Favorite Response Factors List" section of this manual.

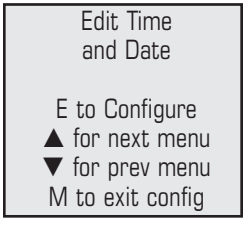
Change Alarm Options:



The change alarm options menu allows control over muting the alarms and latching the alarms. The audible alarm on the VX500 can be turned on and off. Using the arrow keys to toggle this feature between "on" and "off".

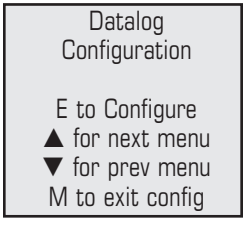
When the alarms are muted, a message will be displayed across the screen of the VX500 to alert the user that the alarms are off. The alarm latching option allows the VX500's alarms to be latching or non-latching. A latching alarm alarm is an alarm that once activated, is not automatically cleared when the gas concentration drops below the alarm setpoint. To clear a latching alarm you must press ENTER once the gas concentration drops below the alarm setpoint.

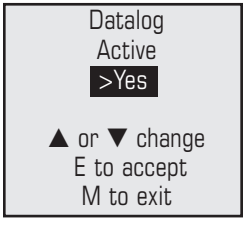
Edit Time and Date



The "Edit Time and Date" screen allows you to set the current time and date in your VX500. Accurate setting of the time and date are important for datalogging and calibration records. Use the arrow keys to increase or decrease the values for the time and date. Once a desired value is reached, use ENTER to move to the next value to be changed.

Datalog Configuration





The "Datalog Configuration" screen gives you control over the operation of your datalogger. If you choose to make your datalogger inactive then the VX500 continues on with the custom configuration. If you choose to activate the datalogger, then a subloop appears giving you control over the following:

- **Datalog Interval:** Allows you to control the amount of time (in seconds) the unit will accumulate data before averaging and writing it to the datalogger. The range is 1 to 300 seconds.
- **Allow Datalog Reset in Field:** Allows you to reset a logging session in the field.
- **Allow Datalog Pause in Field:** Allows you to pause/resume datalogging in the field.
- **Allow Datalog Clear in Field:** Allows you to purge logged data in the field.

If datalogging is not activated, the VX500 can have the "log on alarm" feature activated or be put into the Snapshot mode. The log on alarm feature allows the VX500 to automatically start logging gas readings whenever the instrument goes into an alarm condition. This feature is useful in capturing data only when the VX500 is in alarm.

The Snapshot operating mode allows the user to capture the current instrument reading and store it in the datalogging memory instantly along with the current time and date. Pressing 

at anytime while this mode is active will result in a reading, time and date to be recorded into the instrument's memory.

CALIBRATION CONFIGURATION:

The "Calibration Configuration" screen gives the user control over the calibration of the VX500. When entered, the following sub-menus are availble:

- **Allow Calibration in Field:** The “Allow Calibration in Field” screen gives you control over whether the VX500 can be calibrated in the field
- **Vielw Calibration Date in Field:** The “View Calibration Date in Field” screen allows you to choose whether last or due calibration dates are able to be viewed in the field.
- **Choose Next/Last Calibration Date:** The “Choose Next/Last Calibration Date” screen allows you to choose whether your calibration dates are expressed as the last time the VX500 was calibrated or when the calibration is due. You have two options for this screen: last and next.
- **Edit Interval of Calibration:** The “Edit Interval of Calibration” screen activates if you chose to display the calibration date in field. This screen allows you to choose the duration. The range is from 0-365 days.

Allow
Calibration
In Field
E to Configure
▲ for next menu
▼ for prev menu
M to exit config

View Calibration
Date In Field

E to Configure
▲ for next menu
▼ for prev menu
M to exit config

Choose
next/last
Calibration Date
E to Configure
▲ for next menu
▼ for prev menu
M to exit config

MAINTENANCE

With just normal routine maintenance the VX500 can be depended upon to provide years of reliable service. The following guidelines should be followed when performing maintenance on the VX500.

CHARGING THE BATTERIES

The lithium-ion battery pack should be fully charged before using the VX500. To charge the battery pack, plug the flying lead from the VX500 battery charger into the socket on the back of the instrument. The VX500 battery pack will be fully charged within 5 hours. With a fully charged lithium-ion battery pack, the VX500 should function for up to 18 hours of continuous operation. As battery life decreases, the shaded area of the battery icon will also decrease. With a minimum of 15 minutes of battery life remaining the VX500 will emit a periodic beep alerting you to charge or replace the battery.

DO NOT REPLACE OR CHARGE INSTRUMENT BATTERIES IN HAZARDOUS LOCATIONS!

CAUTION

A replaceable cell alkaline battery pack (7 hours run-time) is also available for use with the VX500. To remove the battery pack and replace the 3 AA battery cells, loosen the two screws from the battery cover on the back of the instrument. Remove the battery pack and replace the AA battery cells with fresh alkaline batteries. Replace the battery pack and battery cover in the same fashion.

CHANGING THE INTERNAL FILTER

The VX500 sample inlet is protected by an internal dust filter/water stop. When this filter becomes obstructed the VX500 will display a PUMP FAULT condition and the alarm will sound continuously to indicate that inadequate

sample flow is being delivered to the instrument. To replace the filter, unscrew the sample inlet housing from the top of the instrument. Remove the dust filter/water stop and replace it with a new, fresh one. During replacement, ensure that the filter is inserted with the clear end down. Replace and tighten the sample inlet fitting on the top end of the VX500. If the VX500 still shows PUMP FAULT, the filter is not properly seated, the inlet cap is not tight, or the pump has failed.

Cleaning and Replacing the PID Lamp

The function of the PID's detector is dependent upon exposure of the gas sample to UV light via a precision lamp. A critical component of this lamp is its wavelength filter, or window. This window is the portion of the lamp directly exposed to the gas sample, and is therefore potentially exposed to water vapor, dirt, debris and oil residues. Because this lamp is used as a UV light source, it is critical to understand that degradation of the lamp's output will cause the detector to lose sensitivity, and in extreme cases can limit the range of the detector. In order to retain peak performance of the VX500 PID detector, it is vital that the unit's UV lamp window remain free of dirt debris and oil residues. When the window is contaminated you must periodically remove these contaminants. Refer to Figure 1 detailing the lamp's window.

The first step to preventing or decreasing lamp window contamination is repetitive replacement of the VX500's sampling filter (part number 17058157). Also be careful when storing a spare lamp to avoid finger contact with the window and do not attempt to clean the lamp with compressed air (unless air source is oil and contaminant free). It is virtually impossible to prevent all factors that obstruct or degrade the UV lamp's window surface, therefore as a recommendation a 10.6 eV lamp should be cleaned after every 40 hours of use, at any time when readings are suspect, or if a calibration failure occurs.

Industrial Scientific Corporation recommends an abrasive lamp cleaning, which will restore the lamp's window to a pristine condition. A lamp cleaning kit is available (part number 17090721). Because the output of a freshly cleaned lamp is not fully stable until after a 24 hour burn-in, please use a VX500, or one of the built in lamp conditioners contained in an Industrial Scientific charger or Docking Station™ to burn-in the lamp. If the unit is calibrated with a freshly cleaned lamp, sensitivity of the detector will gradually decrease until the lamp's output stabilizes. This should occur within 24 hours.

Lamp Removal

To remove the lamp from the VX500, unthread the unit's lamp cap (cap is a right hand thread). After removing the lamp cap, grasp the bulb's tubing grip, and pull the lamp straight out of its compartment. Inspect the lamp's window for dirt, debris or oil residue. **DO NOT TOUCH THE LAMP'S WINDOW !!!**

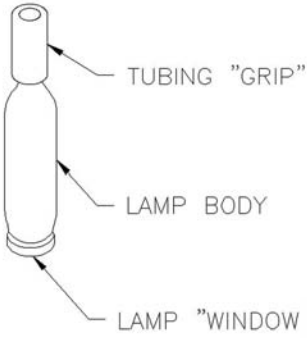
Lamp Cleaning Procedure

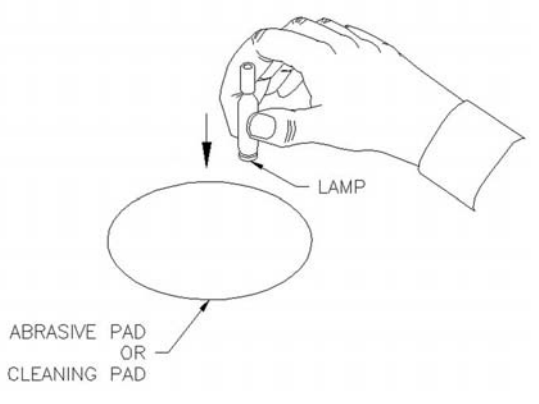
To clean the lamp, grasp the lamp by its body, not its tubing grip. Place a grey abrasive pad from cleaning kit 17090721 on a flat surface. (The adhesive on the back of the gray abrasive pad may be exposed via removal of its protective covering to affix the pad if desired). Position the UV lamp on the abrasive surface of the pad so that the window is flat against the surface of the abrasive pad. Apply light pressure to the lamp. Turn the lamp and lift. Reseat the lamp in a fresh position on the pad, and repeat this process 10-12 times to fully clean the lamp.

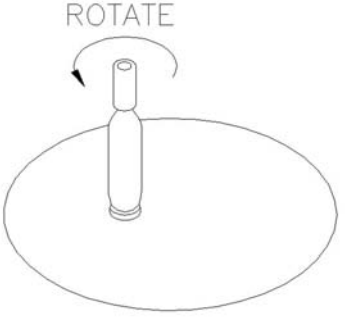
To remove any abrasive residue from the lamp, grasp the lamp by its body again. Please use the brown felt cleaning pad from cleaning kit 17090721 on a flat surface, exactly like the abrasive pad. The adhesive on the back of the

brown cleaning pad may also be exposed via removal of its protective covering to affix the pad also if desired. As with the abrasive pad, position the UV lamp on the felt surface of the pad and make sure it is flat. Apply light pressure to the lamp and turn. Lift the lamp from the pad and reseat in a fresh position. Repeat this process 5-6 times.

The lamp should be burned-in for a 24 hour period after cleaning. The VX500 should then be recalibrated once the lamp is re-installed in the unit. During lamp installation, insure that the lamp is fully seated in the VX500.







SPECIFICATIONS

SIZE:	(Maximum dimensions including case filter extension): 10"L x 2.9"W x 1.9"H (253mm x 75mm x 50mm)
CASE:	EMI/RFI static resistant, nickel plated, composite case.
WEIGHT:	with Li-Ion rechargeable battery pack -- 26 oz. (737 g) with AA disposable cell battery pack -- 23.8 oz. (675.9 g)
DISPLAY:	128 X 64 Graphic Dot-Matrix LCD with built-in backlighting for low light conditions.
AUDIBLE ALARM OUTPUT:	90 dB typical @ 12 inches/ 1 foot.
VISUAL ALARM:	Two (2) Red Ultra-bright LED's (Light Emitting Diodes)
TEMPERATURE RANGE OF OPERATION:	-10 deg. C to 40 deg. C (14 deg. F to 104 deg. F)
HUMIDITY RANGE OF OPERATION:	15 to 90% Relative Humidity (noncondensing).

CONTINUOUS NON-ALARM RUN TIME AT ROOM TEMPERATURE

Fully charged Li-Ion battery, in good condition	18 hours
Three (3) fresh AA cell Alkaline batteries	7 hours

Maximum recommended power down storage time for fully charged Li-Ion before recharging < 50 days.

SAMPLE PUMP GAS FLOW RATE	1.0 SCFH (.5 LPM)

Ionization Potentials for Common Industrial Gases

Many compounds not appearing in this list with an ionization potential of 10.6 eV or less may be detected.

Other sources of ionization potential data:
CRC Handbook of Chemistry and Physics
NIOSH Pocket Guide to Chemical Hazards
HYPERLINK http://webbook.nist.gov/

Chemical Name	IP (eV)
Acetaldehyde	10.22
Acetone	9.69
Acetylene	11.40
Acrolein	10.13
Allene	9.83
Allyl Alcohol	9.63
Allyl Chloride	10.05
Aminoethanol	9.87
2-Amino Pyridine	8.00
Ammonia	10.18
Aniline	7.70
Arsine	9.89
Benzaldehyde	9.53
Benzene	9.24
Benzenethiol	8.33
Bromobenzene	8.98
1-Bromobutane	10.13
2-Bromobutane	9.98
1-Bromobutanone	9.54
1-Bromo-2-Chloroethane	10.63
Bromoethane	10.28
Bromoethene	9.80
Bromoform	10.48
1-Bromo-3-Hexanone	9.26
Bromomethane	10.53
Bromomethyl Ethyl Ether	10.08
1-Bromo-2-Methylpropane	10.09
2-Bromo-2-Methylpropane	9.89
1-Bromopentane	10.10
1-Bromopropane	10.18

Chemical Name	IP (eV)
2-Bromopropane	10.08
1-Bromo8propene	9.30
2-Bromopropene	10.06
3-Bromopropene	9.70
2-Bromothiophene	8.63
o-Bromotoluene	8.79
m-Bromotoluene	8.81
p-Bromotoluene	8.67
1,3-Butadiene	9.07
2,3-Butadione	9.23
n-Butanal	9.83
s-Butanal	9.73
n-Butanol	10.04
s-Butanol	10.23
t-Butanol	10.25
2-Butanone	9.54
1-Butene	9.58
cis-2-Butene	9.10
3trans-2-Butene	9.13
n-Butyl Acetate	10.00
s-Butyl Acetate	9.91
t-Butyl Acetate	9.90
n-Butyl Alcohol	10.04
n-Butylamine	8.71
s-Butylamine	8.70
t-butylamine	8.64
n-Butylbenzene	8.69
t-Butylbenzene	8.68
Butyl Cellusolve	8.68
n-Butyl Mercaptan	9.15

Chemical Name	IP (eV)
t-Butyl Mercaptan	9.03
p-tert-Butyltoluene	8.28
1-Butyne	10.10
82-Butyne	9.85
n-Butyraldehyde	9.83
Carbon Disulfide	10.08
Chlorobenzene	9.07
1-Chlorobutanone	9.54
1-Chloro-2,3-Epoxypropane	10.60
Chloroethene	9.99
1-Chloro-2-Fluorobenzene	9.16
1-Chloro-3-Fluorobenzene	9.21
cis-1-Chloro-2-Fluoroethene	9.87
trans-1-Chloro-2-Fluoroethene	9.87
o-Chloroiodobenzene	8.35
Chloromethylethyl Ether	10.08
Chloromethylmethyl Ether	10.25
3-Chloropropene	10.04
2-Chlorothiophene	8.68
o-Chlorotoluene	8.83
m-Chlorotoluene	8.83
p-chlorotoluene	8.70
o-Cresol	8.93
m-Cresol	8.98
p-Cresol	8.97
Crotonaldehyde	9.73
Cumene	8.75
3-Cyanopropene	10.39
Cyclobutane	10.50
Cyclohexane	9.88
Cyclohexanol	10.00
Cyclohexanone	9.14
Cyclohexene	8.95
Cyclo-Octatetraene	7.99
Cyclopentadiene	8.56
Cyclopentane	10.52
Cyclopentanone	9.26
Cyclopentene	9.01

Chemical Name	IP (eV)
Cyclopropane	10.06
2-Decanone	9.40
Dibromochloromethane	10.59
1,1-Dibromoethane	10.19
Dibromomethane	10.49
1,2-Dibromopropane	10.26
Dibutylamine	7.69
1,2-Dichlorobenzene	9.07
cis-1,2-Dichloroethene	9.65
trans-1,2-Dichloroethene	9.66
1,1-Dichloropropanone	9.71
2,3-Dichloropropene	9.82
Dicyclopentadiene	7.74
Diethoxymethane	9.70
Diethylamine	8.01
Diethylamino Ethanol	8.58
Diethyl Ether	9.53
Diethyl Ketone	9.32
Diethyl Sulfide	8.43
1,2-Difluorobenzene	9.31
1,4-Difluorobenzene	9.15
Difluoromethylbenzene	9.45
Diiodomethane	9.34
Diisobutyl Ketone	9.04
Diisopropylamine	7.73
1,1-Dimethoxyethane	9.65
Dimethoxymethane	10.00
Dymethylamine	8.24
Dimethylaniline	7.14
2,3-Dimethylbutadiene	8.72
2,2-Dimethylbutane	10.06
2,3-Dimethylbutane	10.02
2,2-Dimethylbutan-3-one	9.18
3,3-Dimethylbutanone	9.17
2,3-Dimethyl-2-Butene	8.30
Dimethyl Disulfide	8.46
Dimethyl Ether	10.00
3,5-Dimethyl-4-Heptanone	9.04

Chemical Name	IP (eV)
1,1-Dimethylhydrazine	8.05
2,2-Dimethyl-3-Pentanone	8.98
2,2-Dimethylpropane	10.35
Dimethyl Sulfide (DMS)	8.69
Di-n-Propylamine	7.84
Di-n-Propyl Disulfide	8.27
Di-n-Propyl Ether	9.27
Di-i-Propyl Ether	9.20
Di-n-Propyl Sulfide	8.30
Epichlorohydrin	10.60
Ethanethiol (Ethyl Mercaptan)	9.29
Ethanolamine	9.87
Ethene (Ethylene)	10.52
Ethyl Acetate	10.01
Ethylamine	8.86
Ethyl Amyl Ketone	9.10
Ethylbenzene	8.76
Ethyl Bromide	10.29
Ethyl Butyl Ketone	9.02
Ethyl Chloroacetate	10.20
Ethyl Disulfide	8.27
Ethyl Ethanoate	10.10
Ethyl Ether	9.41
Ethylene Dibromide	9.45
Ethylene Oxide	10.56
Ethyl Iodide	9.33
Ethyl Isothiocyanate	9.14
Ethyl Methyl Sulfide	8.55
Ethyl Propanoate	10.00
Ethyl Trichloroacetate	10.44
mono-Fluorobenzene	9.20
mono-Fluoroethene	10.37
o-Fluorotoluene	8.92
m-Fluorotoluene	8.92
p-Fluorotoluene	8.79
Furan	8.89
n-Heptane	9.90
2-Heptanone	9.33

Chemical Name	IP (eV)
4-Heptanone	9.12
n-Hexane	10.18
2-Hexanone	9.44
1-Hexene	9.46
Hydrogen Selenide	9.88
Hydrogen Sulfide	10.46
Hydrogen Telluride	9.14
Iodobenzene	8.73
1-Iodobutane9.212-Iodobutane	9.09
Iodoethane (Ethyl Iodide)	9.33
Iodomethane (Methyl Iodide)	9.54
1-Iodo-2-Methylpropane	9.23
1-Iodopentane	9.19
1-Iodopropane	9.26
2-Iodopropane	9.17
o-Iodotoluene	8.62
m-Iodotoluene	8.61
p-Iodotoluene	8.50
Isoamyl Acetate	9.90
Isoamyl Alcohol	10.16
Isobutanol	10.12
Isobutyl Acetate	9.97
Isobutyl Alcohol	10.12
Isobutylamine	8.70
Isobutylbenzene	8.68
Isobutylene	9.43
Isobutyl Ethanoate	9.95
Isobutyl Formate	10.46
Isobutyl Mercaptan	9.12
Isobutyl Methanoate	10.46
Isobutyraldehyde	9.74
Isopentane	10.32
Isoprene	8.85
Isopropyl Acetate	9.95
Isopropyl Alcohol	10.10
Isopropylamine	8.72
Isopropylbenzene	8.75
Isopropyl Ether	9.20

Chemical Name	IP (eV)
Isovaleraldehyde	9.71
Ketene	9.61
Mesitylene	8.40
Mesityl Oxide	9.08
Methyl Acetate	10.27
Methylamine	8.97
Methyl Bromide	10.54
2-Methyl-1,3-Butadiene	8.85
2-Methylbutanal	9.71
2-Methylbutane	10.31
2-Methyl-1-Butene	9.12
3-Methyl-1-Butene	9.51
3-Methyl-2-Butene	8.67
Methyl n-Butyl Ketone	9.34
Methyl Butyrate	10.07
Methyl Chloroacetate	10.35
Methylcyclohexane	9.85
Methylcyclohexanol	9.80
Methylcyclohexanone	9.05
4-Methylcyclohexene	8.91
Methylcyclopropane	9.52
Methyl Dichloroacetate	10.44
Methyl Ethanoate	10.27
Methyl Ethyl Ketone	9.53
Methyl Ethyl Sulfide	8.55
2-Methyl Furan	8.39
Methyl Iodide	9.54
Methyl Isobutyl Ketone	9.28
Methyl Isobutyrate	9.98
Methyl Isopropyl Ketone	9.32
Methyl Mercaptan	9.44
Methyl Methacrylate	9.70
2-Methylpentane	10.12
3-Methylpentane	10.08
2-Methylpropanal	9.74
2-Methylpropane	10.56
2-Methylpropene	9.23
Methyl n-Propyl Ketone	9.39

Chemical Name	IP (eV)
Methyl Styrene	8.35
Napthalene	8.12
Nitric Oxide	9.27
Nitrobenzene	9.92
p-Nitrochlorobenzene	9.96
5-Nonanone	9.10
3-Octanone	9.19
4-Octanone	9.10
1-Octene	9.52
cis-1,3-Pentadiene	8.59
trans-1,3-Pentadiene	8.56
n-Pentanal	9.82
n-Pentane	10.34
2,4-Pentanedione	8.87
2-Pentanone	9.39
3-Pentanone	9.32
1-Pentene	9.50
Perfuoro-1-Heptene	10.48
n-Perfuoropropyl Iodide	10.36
n-Perfuoropropyl-Iodomethane	9.96
n-Perfuoropropyl-Methyl Ketone	10.58
Phenol	8.50
Phenyl Ether	8.09
Phenyl Isocyanate	8.77
Phosphine	9.96
Pinene	8.07
Propadiene	10.19
n-Propanal	9.95
1-Propanethiol (n-Propyl Mercaptan)	9.20
n-Propanol	10.51
Propanone	9.69
Propene	9.73
Prop-1-ene-2-ol	8.20
Prop-2-ene-1-ol	9.67
Propionaldehyde	9.98
n-Propyl Acetate	10.04
n-Propyl Alcohol	10.15
n-Propylamine	8.78

Chemical Name	IP (eV)
n-Propylbenzene	8.72
Propylene	9.73
Propylene Imine	9.00
Propylene Oxide	9.81
n-Propyl Ether	9.27
n-Propyl Formate	10.54
Propyne	10.36
Pyridine	9.27
Styrene	8.40
Tetrachloroethylene (PCE)	9.32
Tetrafluoroethene	10.12
Tetrahydrofuran	9.45
Thioethanol	9.29
Thiomethanol	9.44
Thiophene	8.86
1-Thiopropanol	9.20
Toluene	8.82
o-Toluidine	7.44
Tribromoethene	9.27
1,1,1-Trichlorobutanone	9.54
Trichloroethylene (TCE)	9.45
Trichloromethyl Ethyl Ether	10.08
Triethylamine	7.50

Chemical Name	IP (eV)
1,2,4-Trifluorobenzene	9.37
1,3,5-Trifluorobenzene	9.32
Trifluoroethene	10.14
1,1,1-Trifluoro-2-Iodoethane	10.10
Trifluoroiodomethane	10.40
Trifluoromethylbenzene	9.68
Trifluoromethylcyclohexane	10.46
Trimethylamine	7.82
2,2,4-Trimethyl Pentane	9.86
2,2,4-Trimethyl-3-Pentanone	8.82
n-Valeraldehyde	9.82
Vinyl Acetate	9.19
Vinyl Bromide	9.80
Vinyl Chloride	10.00
4-Vinylcyclohexene	8.93
Vinyl Ethanoate	9.19
Vinyl Fluoride	10.37
Vinyl Methyl Ether	8.93
o-Vinyl Toluene	8.20
o-Xylene	8.56
m-Xylene	8.56
p-Xylene	8.45
2,4-Xylidine	7.65

VX500 Response Factors List

The response factors listed below in italics were derived from experimental data and are considered accurate +/- 25%. All other response factors are theoretical and no accuracy is published. All response factors are for the 10.6 eV lamp. Whenever possible, calibrate to the same gas being monitored.

Abbreviated Name	Chemical Name	Response Factor
1,4-BUTANEDIOL	1,4-BUTANEDIOL	37.20
1,4-DIOXANE	1,4-DIOXANE	1.48
124(CH3)C6H5	1,2,4-TRIMETHYLBENZENE	0.43
123(CH3)C6H5	1,2,3-TRIMETHYLBENZENE	0.49
12C2H2BR2	1,2-DIBROMOETHANE	2.03
12CL2C6H6	1,2-DICHLOROBENZENE	0.50
135(CH3)C6H5	1,3,5-TRIMETHYLBENZENE	0.34
1-BUTANOL	1-BUTANOL	4.09
1MTH02PROPOL	1-METHOXY-2-PROPANOL	1.85
1-PROPANOL	***1-PROPANOL***	***4.91***
1XACETATE	METHYLACETATE	6.44
1XACRYLAC	***METHYLACRYLATE***	***3.40***
1XACTOACETAT	METHYLACETOACETATE	1.30
1XBENZOATE	METHYLBENZOATE	0.93
1XMTHACRYLAT	METHYMETHACRYLATE	1.57
2-BUTANONE	2-BUTANONE	0.90
2-METHYLFORMAMIDE	DIMETHYLFORMAMIDE	0.81
2MTHOXYETOH	2-METHOXYETHANOL	2.22
2-PENTANONE	2-PENTANONE	0.87
2-PICOLINE	2-PICOLINE	0.72
2-PROPANOL	***2-PROPANOL***	***5.53***
2XFORMAMIDE	N,N-DIMETHYLFORAMIDE	0.81
2XMTACETAMID	N,N-DIMETHYLACETAMIDE	0.66
3-PICOLINE	3-PICOLINE	0.92
4HYD4MTH2PNT	4-HYDROXY-4-METHYL-2-PENTANONE	0.73
ACETALDEHYDE	ACETALDEHYDE	5.14
ACETONE	***ACETONE***	***1.24***
ACETOPHENONE	ACETOPHENONE	0.59
ALLYL ALCOHOL	ALLYL ALCOHOL	2.92
AMMONIA	AMMONIA	12.80
AMYL ACETATE	AMYL ACETATE	1.92
BENZENE	***BENZENE***	***0.55***

Abbreviated Name	Chemical Name	Response Factor
BROMOMETHANE	BROMOMETHANE	2.72
BUTADIENE	***BUTADIENE***	***0.73***
BUTOXYETHANOL	BUTOXYETHANOL	1.44
BUTYLACETATE	BUTYLACETATE	2.38
C2CL4	***TETRACHLOROETHYLENE***	***0.60***
(C2H5)C6H5	***ETHYLBENZENE***	***0.53***
C2HCL3	***TRICHLOROETHYLENE***	***0.51***
C6H1003	ETHYLACETOACETATE	1.14
CHLOROBENZEN	CHLOROBENZENE	0.49
CUMENE	CUMENE	0.54
CYCLOHEXANE	***CYCLOHEXANE***	***1.44***
CYCLOHEXANON	CYCLOHEXANOE	0.82
DECANE	DECANE	1.24
DIETHYLAMINE	DIETHYLAMINE	0.89
DIMETHOXMETH	DIMETHOXYMETHANE	1.51
EPICHLOROHYDRIN	EPICHLOROHYDRIN	7.70
ETHANOL	***ETHANOL***	***10.70***
ETHYGLYCOL	ETHYLENEGLYCOL	15.30
ETHYLACETATE	***ETHYLACETATE***	***4.10***
ETHYLENE	***ETHYLENE***	***10.20***
ETHYLENE OXIDE	***ETHYLENE OXIDE***	***12.20***
G-BUTYROLACTONE	GAMMA BUTYROLACTONE	3.01
H2S	HYDROGEN SULFIDE	3.30
HEPTANE	***HEPTANE***	***2.35***
HEXANE	HEXANE	4.06
HYDRAZINE	HYDRAZINE	2.60
IAMYLACETATE	ISOAMYLACETATE	1.79
IPROPYLAMINE	ISOPROPYLAMINE	1.28
IPROPYLETHER	***ISOPROPYLETHER***	***0.84***
ISOBUTANOL	ISOBUTANOL	4.99
ISOBUTYLENE	ISOBUTYLENE	1.00
ISOOCTANE	ISOOCTANE	1.21
ISOPHORONE	ISOPHORONE	0.74
ISOPROPANOL	***ISOPROPANOL***	***5.93***
JET A FUEL	JET A FUEL	1.06
JET A 1 FUEL	JET A 1 FUEL	1.06
JP 5 & JP 8	JP 5 & JP 8 FUEL	1.06

Abbreviated Name	Chemical Name	Response Factor
MEK	***METHYL ETHYL KETONE***	***0.97***
MESITYLOXIDE	MESITYLOXIDE	0.54
MIBK	***METHYLISOBUTYLKETONE***	***1.14***
MONOMETHYLAMINE	MONOMETHYLAMINE	1.64
MTBE	***METHYLTERTIARYBUTYLETHER***	***0.89***
MTHLBENZLALCOHOL	METHYL BENZYL ALCOHOL	7.12
M-XYLENE	META-XYLENE	0.45
N-METHLPYROLIDONE	N-METHYL PYRROLIDONE	1.02
OCTANE	OCTANE	2.10
O-XYLENE	ORTHO-XYLENE	0.54
PHENLETHLALCOHOL	PHENYL ETHYL ALOCHOL	9.04
PHENOL	PHENOL	1.10
PHOSPHINE	PHOSPHINE	3.02
PROPYLENE	PROPYLENE	1.41
PROPYOX	PROPYLENE OXIDE	6.30
P-XYLENE	PARA-XYLENE	0.47
PYRIDINE	PYRIDINE	0.78
QUINOLINE	QUINOLINE	0.97
STYRENE	STYRENEMONOMER	0.47
T-BUTYLAMINE	TERTIARBUTYLAMINE	1.01
T-CLC2H2CL	TRISDICHLOROETHENE	0.45
TERTBUTLMERCAPTAN	TERT BUTYL MERCAPTAN	0.61
TERBUTYLALCOHOL	TERTIARY BUTYL ALCOHOL	3.24
THF	TETRAHYDROFURAN	1.53
THIOPHENE	THIOPHENE	0.41
TOLUENE	***TOLUENE***	***0.53***
TURPENTINE	TURPENTINE PURE GUM SPIRITS	0.50
VCH	VINYLCYCLOHEXONE	0.54
VINYL ACETATE	VINYL ACETATE	1.17
VINYL CHLORIDE	***VINYL CHLORIDE***	***1.90***
BENZENE TUBE	BENZENE TUBE	0.60

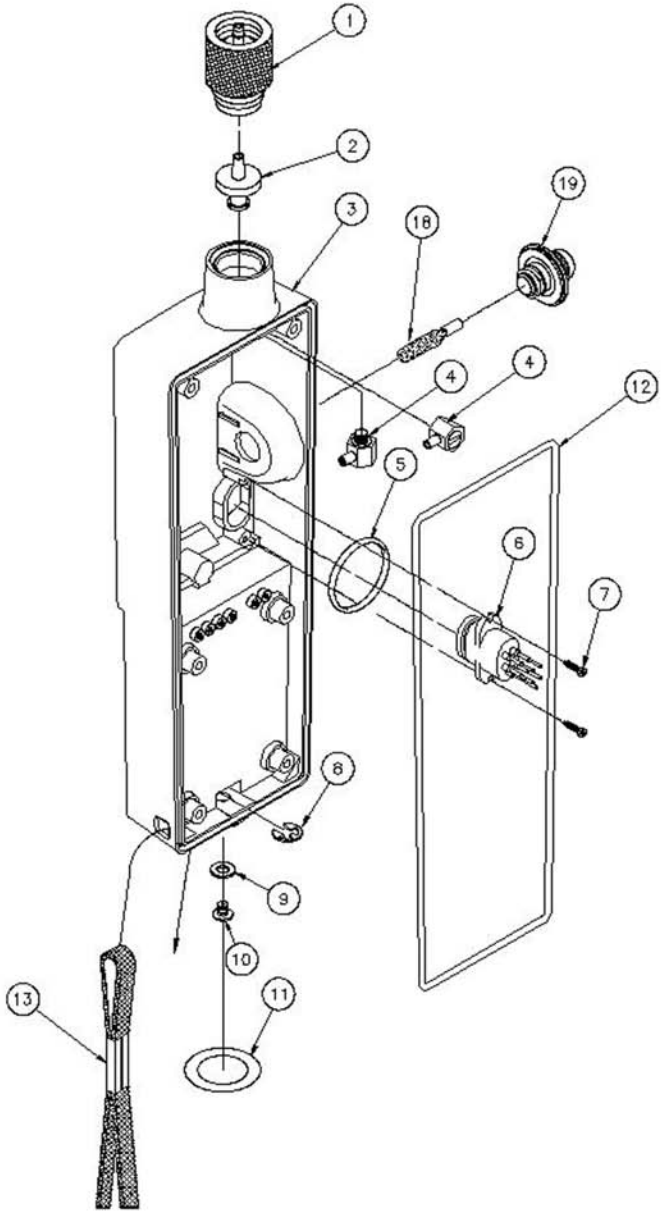


FIGURE 4

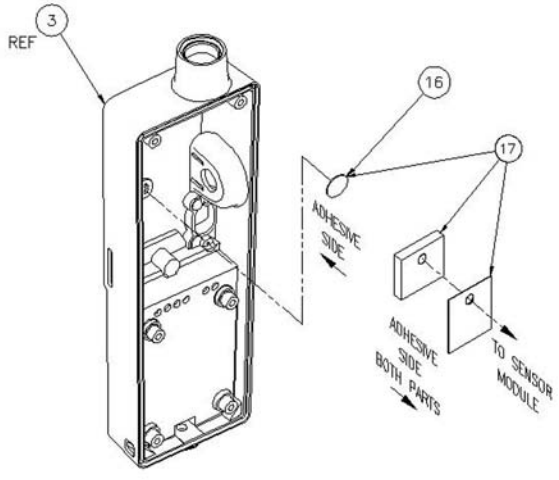


FIGURE 5

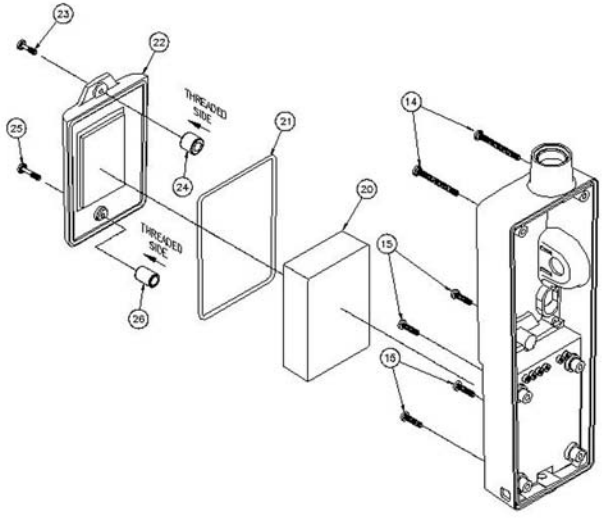


FIGURE 6

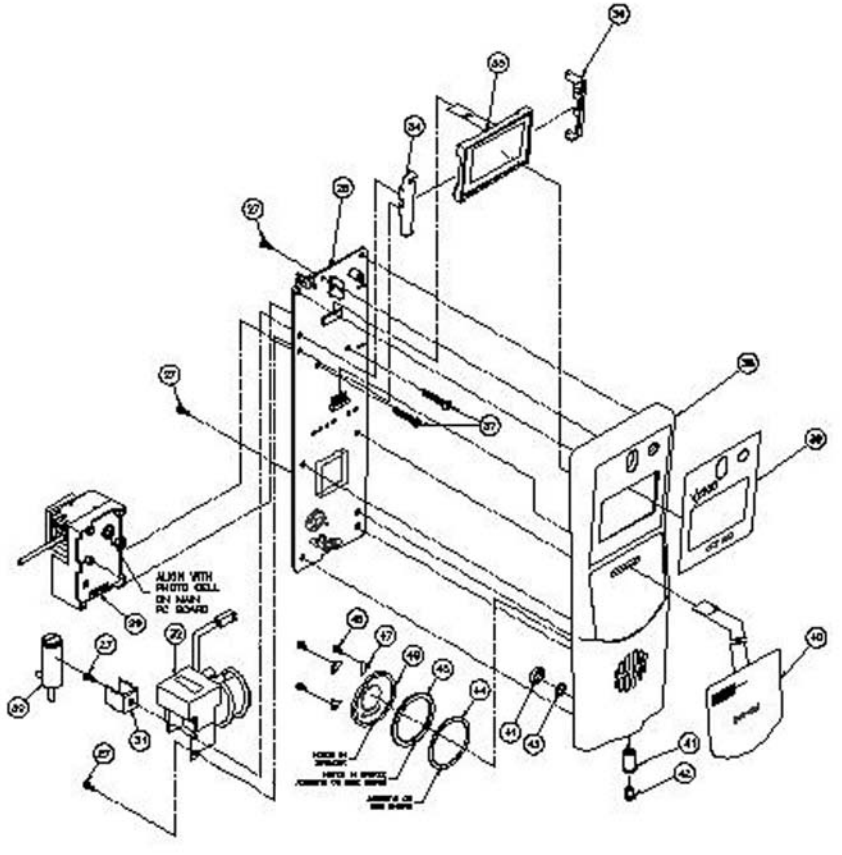
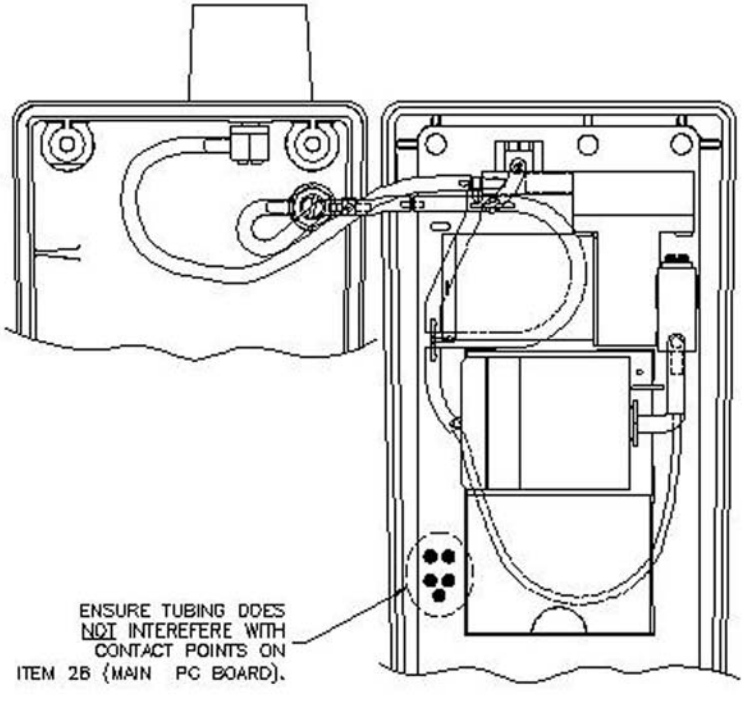


FIGURE 7



TUBING ROUTING

NOTE: NOT ALL COMPONENTS ARE SHOW, FOR SIMPLICITY

FIGURE 8

VX500 Replacement Parts List

NOTE: Refer to Figure 4, 5, 6, 7 And 8 for each Item number listed.

ITEM	PART NO.	DESCRIPTION
1	17090408	Filter Cap (Includes Item 2, Filter)
2	17058157	Replacement Dust/Water Stop Filter
3	17098971	Case Bottom, Basic (Includes Items 3 & 16 Must also order an Item 11 to re-use Items 8 - 10 in case bottom)
3	17098930	Case Bottom, Complete (Includes Items 3 - 17)
4	17051513	Fitting, Inlet, Swivel, 1/16" tube to 10-32 thread. (two required per VX500).
5	17089269	O-ring Seal, Input/Output Connector
6	17098948	Input/Output Connector (Includes Item 5)
7	17052628	Mounting Screws I/O connector (two required per VX500)
8	17089319	C-clip, i-Button® Contact
9	17089285	Seal, i-Button®, Contact
10	17087735	Contact, i-Button®
11	17092727	Case Insulator, i-Button®, Contact
12	17089004	Gasket, Instrument, Conductive
13	17049876	Instrument Strap
14	17115205	Case Screws, Long, VX500 (two required per VX500)
15	17089095	Case Screws, Short, VX500 (four required per VX500)
16	17050245	Barrier, PID Vent
17	17099011	PID Seal/Barrier Kit
18	17091380	UV Lamp, 10.6 eV
19	17098823	Lamp Cap, Replacement, VX500
20	17088618	Battery Pack, Rechargeable, Lithium-Ion
20	17089376	Battery Pack, Alkaline Replaceable
21	17089012	Gasket, Battery Cover, Conductive
22	17098815	Battery Cover, Replacement, VX500 (Includes Items 22 - 26)
23	17089079	Battery Cover, Screw, VX500, Short
24	17099565	Battery Cover Screw Compression Stop, Short

ITEM.	PART NO.	DESCRIPTION
25	17089053	Battery Cover, Screw, VX500, Long
26	17099581	Battery Cover Screw Compression Stop, Long
27	17050453	Screw, Pump/Display and Main PC Board Mount (two each required for Pump/Display Mounting (two each required for Main PC Board Mounting)
28	17082025	Main Board, VX500 with programmed EPROM
28	17094855	Programmed EPROM for VX500 (Not Shown)
29	17091141	Module, PID Detector
30	17095183	PID Flow Control Valve
31	17095233	Flow Control Mounting Bracket
32	17097122	PM-7000, VX500 Sampling Pump
32	17097304	PM-7000 Sampling Pump Repair Kit
33	17098831	Tubing, VX500 Replacement Assembly (Not Shown - See Figure 8 for placement)
34	17086695	Left Display Mounting Bracket
35	17094673	Display Assembly
36	17084377	Right Display Mounting Bracket
37	17051845	Screws, PID Detector Mounting (two required per VX500)
38	17098914	Case Top, Basic,VX500 (Includes Items 38 - 40, 44 & 45)
38	17098906	Case Top, Complete,VX500 (Includes Items 38 - 48)
39	17088998	Faceplate, VX500
40	17084435	Keypad, VX500
41	17028374	External/Vibrating Alarm Jack
42	17029273	External Alarm Cap Plug
43	17050277	O-ring Seal, External Alarm Jack
44	17058918	Alarm Water Barrier
45	17097296	Alarm Seal
46	17057118	Alarm
47	17057027	Alarm Retaining Clips (three required per VX500)
48	17083585	Screws, Alarm Retaining (three required per VX500)
MAINTENANCE ACCESSORIES:		
	17090721	Lamp Cleaning Kit
ADDITIONAL ACCESSORIES:		
	17096348	ISC i-Button® memory device with card mount
	18104729	ISC i-Button® programming kit with software, 120 VAC
	18105080	ISC i-Button® programming kit with software, 230 VAC

Warranty

Industrial Scientific Corporation portable gas monitoring instruments are warranted to be free from defects in material and workmanship for as long as the instrument is in service.

The above warranty does not include sensors, battery packs, internal pumps or filters, all of which are warranted to be free from defects in material and workmanship for 18 months from the date of shipment, or 1 year from the date of first use, whichever occurs first, except where otherwise stated in writing in Industrial Scientific literature accompanying the product.

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EC Declaration of Conformity

Manufacturer:	**Industrial Scientific Corporation**
Manufacturer's Address:	**1001 Oakdale Road** **Oakdale, Pennsylvania 15071** **United States of America**
Local Representative's Name:	**Industrial Scientific Corporation**
Local Representative's Address:	**Speelhuislaan 173** **4814 CD Breda** **The Netherlands**
Type of Equipment:	**Multi-Gas Monitor with optional Sample Pump**
Model:	**iTX Multi-Gas Monitor (P/N 1810-4307)** **iSP Sample Pump (P/N 1810-4646)**

DESCRIPTION: The iTX Multi-Gas Monitor is a hand held portable device capable of monitoring and recording data for combustible, oxygen and up to four toxic gases or vapors simultaneously. It is equipped with audio and visual alarms; preset and user defined. Recorded data can be downloaded for analysis and storage. The iSP Sample Pump is powered from the iTX and can be used to sample gases from remote locations.

DECLARATION: Industrial Scientific Corporation declares that the iTX Multi-Gas Monitor and iSP Sample Pump conforms to all of the relevant provisions of the EC Council ATEX Directive 94/9/EC dated 23 March 1994.

Quality Assurance Notification:	**SIRA 00 ATEX M080**
Issued by Notified Body:	**SIRA Certification Services (0518)**
EC-Type-Examination Certificate:	**02 ATEX 0147176X**
Issued by Notified Body:	**UL International DEMKO A/S (0539)** **LYSKAER 8, P.O. Box 514** **DK – 2730, HERLEV, DENMARK**
Standards:	**EN 50014:1997+A1:1999,+A2:1999, EN 50020:1994** **EN 50018:1998, EN 60529:1991**

Declarations to other relevant EC Community Directives: **EMC: 89/336/EEC, 92/31/EEC & 93/68/EEC**

Standards: **EN 50270:1999**

I, the undersigned, as authorized representative of Industrial Scientific Corp., declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Place: Oakdale, PA **Signature:**

Date: July 1, 2003

David D. Wagner
Product Manager

ISO9001 CERTIFIED

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CORPORATION

VX500 Manual (1709-8773) Addendum

(Rev. 1)

VOC Reference Chart for VX500

Software Version 4.2

When monitoring for volatile organic compounds (VOCs), end users are often looking for more specific technical data. The table below is a reference for common industrial VOCs. When the compound appears in the VX500's response factor library, the response factor is listed. This list reflects the latest values programmed into the VX500, software version 4.2.

10.6 eV PID Response Factor Database

Chemical name	Synonym	CAS #	Formula	IP, ev	VX500 Response Factor
Acetaldehyde		75-07-0	C2H4O	10.23	5.14
Acetaldehyde oxime					
Acetic acid	Ethanoic acid	64-19-7	C2H4O2	10.66	
Acetic Anhydride	Ethanoic acid Anhydride	108-24-7	C2H40	10.14	
Acetone	2 - Propanone	67-64-1	C3H6O	9.71	1.24
Acetophenone					0.59
Acetylene	Ethyne	74-86-2	C2H2	11.4	
Acrolein	Propenal	107-02-8	C3H4O	10.1	
Acrylic Acid	Propenoic Acid	79-10-7	C3H4O2	10.6	
Acrylonitrile	Propenenitril	107-13-1	C3H3N	10.91	
Allyl Alcohol		107-18-6	C3H6O	9.67	2.92
Allyl Chloride	3 - Chloropropene	107-05-1	C3H5CI	9.9	
Ammonia		7664-41-7	H3N	10.16	12.80
Amyl Acetate	mix of n-Pentyl acetate & 2-Methylbutyl acetate	628-63-7	C7H14O2	<9.9	1.92
Amyl Alcohol	1 - Pentanol	75-85-4	C5H12O	10	
Aniline	Aminobenzene	62-53-3	C7H7N	7.72	
Anisole	Methoxybenzene	100-66-3	C7H8O	8.21	
Arsine	Arsenic trihydride	7784-42-1	AsH3	9.89	
Benzaldehyde		100-52-7	C7H6O	9.49	
Benzene		71-43-2	C6H6	9.25	0.55
Benzonitrile	Cyanobenzene	100-47-0	C7H5N	9.62	
Benzyl Alcohol	a-Hydroxytoluene, Hydroxymethylbenzene, Benzenemethanol	100-51-6	C7H80	8.26	
Benzyl Chloride	a-Chlorotoluene, Chloromethylbenzene	100-44-7	C7H7CI	9.14	
Benzyl Formate	Fromic acid benzyl ester	104-57-4	C8H8O2		
Boron Trifluoride		7637-07-2	BF3	15.1	
Bromine		7726-95-6	Br2	10.51	
Bromobenzene		108-86-1	C6H5Br	8.98	
2-Bromoethyl methyl ether		6482-24-2	C3H7OBr	10	
Bromoform		75-25-2	CHBr3	10.48	
Bromomethane					2.72
Bromopropane, 1-	n - Propyl bromide	106-94-5	C3H7Br	10.18	
1,3-butadiene				9.07	
1,4-butanediol					37.20

Butadiene	1,3-Butadiene, Vinyl ethylene	106-99-0	C4H6		0.73
Butadiene diepoxide, 1,3-	1,2,3,4-Diepoxybutane	298-18-0	C4H4O2	10	
Butane		106-97-8	C4H10	10.53	
2-butanone					0.90
Butanol, 1-	Butyl alcohol, n-Butanol	71-36-3	C4H10O	9.99	4.09
Butanol, t-	tert-Butanol, t-Buty alcohol	75-65-0	C4H10O	9.9	3.24
2-Butanone					0.90
Butene, 1-	1-Butylene	106-98-9	C4H8	9.58	
Butoxyethanol, 2-	Butyl Cellosolve, Ethylene glycol monobutyl ether	111-76-2	C6H14O2	<10	1.44
Butyl acetate, n-		123-86-4	C6H12O2	10	2.38
Butyl acrylate, n-	Butyl 2-propenoate, Acrylic acid butyl ester	141-32-2	C7H1202		
Butylamine, n-		109-73-9	C4H11N	8.71	
Butylamine, t-	tert-butylamine				1.01
Butyl cellosolve	see 2-Butoxyethanol	111-76-2			
Butyl hydroperoxide, t-		75-91-2	C4H10O2	<10	
Butyl mercaptan	1-Butanethiol	109-79-5	C4H10S	9.14	.61
Butyrolactone	gama-butyrolctone				3.01
Carbon disulfide		75-15-0	CS2	10.07	
Carbon tetrachloride	Tetrachloromethane	56-23-5	CCI4	11.47	
Chlorine Dioxide		10049-04-4	CIO2	10.57	
Chloro -1,3- Butadiene, 2-	Chloroprene	126-99-8	C4H4CI		
Chlorobenzene	Monochlorobenzene	108-90-7	C6H5CI	9.06	0.49
Chloro -1,1- Difluoroethane	(R-142B)	75-68-3	C2H3CIF2	12	
Chlorodifluoromethane	HCFC-22, R-22	75-45-6	CHCIF2	12.2	
Chloroethane	Ethyl chloride	75-00-3	C2H5CI	10.97	
Chloroethanol	Ethylene chlrohydrin	107-07-3	C2H5CIO	10.52	
Chloroethyl ether, 2-	bis (2-chloroethyl) ether	111-44-4	C4H8CI2O		
Chloroethyl methyl ether, 2-	Methyl 2-chloroethyl ether	627-42-9	C3H7CIO		
Chloroform	Trichloromethane	67-66-3	CHCI3	11.37	
Chloropicrin			CCI3NO2		
Chlorotoluene, o-	o-Chloromethylbenzene	95-49-8	C7H7CI	8.83	
Chlorotoluene, p-	p-Chloromethylbenzene	106-43-4	C7H7CI	8.69	
Citral					
Crotonaldehyde	trans-2-Butenal	123-73-9	C4H6O	9.73	
Cumene	Isopropylbenzene	98-82-8	C9H12	8.73	0.54
Cyanogen bromide		506-68-3	CNBr	11.84	
Cyanogen chloride		506-77-4	CNCI	12.34	
Cyclohexane		110-82-7	C6H12	9.86	1.44
Cyclohexanol	Cyclohexyl alcohol	108-93-0	C6H12O	9.75	
Cyclohexanone		108-94-1	C6H10O	9.14	0.82
cyclohexene		110-83-8	C6H10	8.95	
cyclohexylamine		108-91-8	C6H13N	8.62	
Cyclopentane		287-92-3	C5H10	10.33	
Decalin					
Decane		124-18-5	C10H22	9.65	1.24
Diacetone alcohol	4-Methyl-4-hydroxy-2-pentanone	123-42-2	C6H12O2	9.65	0.73
Dibromochloromethane	Chlorodibromomethane	124-48-1	CHBr2CI	10.59	
Dibromochloropropane					
Dibromoethane, 1,2-	EDB, Ethylene dibromide, Ethylene bromide	106-93-4	C2H4Br2	10.37	2.03
Dibutyl amine					
Dichlorobenzene, o-	1,2-Dichlorobenzene	95-50-1	C6H4CI2	9.08	0.50
Dichlorobenzene, m-					
Dichlorobenzene, p-					
Dichlorofluoromethane	CFC-12	75-71-8	CCI2F2	11.75	

Dichloroethane, 1,2-	EDC, 1,2-DCA, Ethylene dichloride	107-06-2	C2H4CI2	11.04	1.09 (11.7)
Dichloroethene, 1,1-	1,1-DCE, Vinylidene chloride	75-35-4	C2H2CI2	9.79	
Dichloroethene, c-1,2-	c-1,2-DCE, cis-Dichloroethylene	156-59-2	C2H2CI2	9.66	
Dichloroethene, t-1,2-	t-1,2-DCE, tris-Dichloroethylene	156-60-5	C2H2CI2	9.65	0.45
1,1-dichloroethylene					
Dichloro-1-fluoroethane, 1,1-	R-141B	1717-00-6	C2H3CI2F		
Dichloropentafluoropropane	AK-225, mix of ~45% 3,3-	442-56-0	C3HCI2F5		
Dichloropropane, 1,2-		78-87-5	C3H6CI2	10.87	
Dichloro-1-propene, 1,3-		542-75-6	C3H4C12	<10	
Dichloro-1propene, 2,3-		78-88-6	C3H4CI2	<10	
Dichlorvos	Vapona: O,O-dimethyl O-dichlorovinyl phosphate	62-73-7	C4H7CI2O4P	<9.4	
Dicyclopentadiene	DCPD, Cyclopentadiene dimer	77-73-6	C10H12		
Diesel Fuel #1		68334-30-5	m.w. 226		
Diesel Fuel #2		68334-30-5	m.w. 216		
Diethylamine		109-89-7	C4H11N	8.01	0.89
Diethylaminopropylamine, 3-		104-78-9	C7H18N2		
Diethylmaleate		141-05-9	C8H12O4		
Diethyl sulfide	see Ethyl sulfide				
Diisopropylamine		108-18-9	C6H15N	7.73	
Diketene	Ketene dimer	674-82-8	C4H4O2	9.6	
Dimethoxymethane					1.51
Dimethylacetamide, N,N-	DMA	127-19-5	C4H9NO	8.81	0.66
Dimethylamine		124-40-3	C2H7N	8.23	
Dimethyl carbonate	Carbonic acid dimethyl ester	616-38-6	C3H6O3	10.5	
Dimethyl disulfide	DMDS	624-92-0	C2H6S2	7.4	
Dimethylethylamine	DMEA	598-56-1	C4H11N	7.74	
Dimethylformamide, N,N-	DMF	68-12-2	C3H7NO	9.13	.81
Dimethylhydrazine, 1,1-	UDMH	57-14-7	C2H8N2	7.28	
Dimethyl sulfate		77-78-1	C2H6O4S		
Dimethyl sulfoxide	DMSO, Methyl sulfoxide	67-68-5	C2H6OS	9.1	
Dioxane, 1,4-		123-91-1	C4H8O2	9.19	1.48
Dioxolane 1,3-	Ethylene glycol formal	646-06-0	C3H6O2	9.9	
DS-108F Wipe Solvent	Ethyl lactate/Isopar H/	97-64-3	m.w. 118		
Epichlorohydrin	ECH Chloromethyloxirane, 1-chloro2,3-epoxypropane	106-89-8	C2H5CIO	10.2	7.70
Ethane		74-84-0	C2H6	11.52	
Ethanol	Ethyl alcohol	64-17-5	C2H6O	10.47	10.70
Ethanolamine	MEA, Monoethanolamine	141-43-5	C2H7NO	8.96	
Ethene	Ethylene	74-85-1	C2H4	10.51	10.20
Ethoxyethanol, 2-	Ethyl cellosolve, Ethylene glycol monoethyl ether	110-80-5	C4H10O2	9.6	
Ethyl acetate		141-78-6	C4H8O2	10.01	4.10
Ethylacetoacetate			C6H10O3		1.14
Ethyl acrylate		140-88-5	C5H8O2	<10.3	
Ethylamine		75-04-7	C2H7N	8.86	
Ethylbenzene		100-41-4	C8H10	8.77	0.53
Ethylene glycol	1,2-Ethanediol	107-21-1	C2H6O2	10.16	15.30
Ethylene glycol dimethyl ether	1,2-Dimethoxyethane, Monoglyme	110-71-4	C4H10O2	9.2	
Ethylene oxide	Oxirane, Epocyethane	75-21-8	C2H4O	10.57	12.20
Ethyl ether	Deithyl ether	60-29-7	C4H10O	9.51	
Ethyl 3-ethoxypropionate	EEP	763-69-9	C7H14O3		
Ethyl hexyl acrylate, 2-	Acrylic acid 2-ethylhexyl ester	103-11-7	C11H20O2	10	
Ethyl (S)-(-)- lactate	Ethyl lactate, Ethyl (S)-(-)-	687-47-8	C5H10O3		
Ethyl (S)-(-)- lactate	Ethyl lactate, Ethyl (S)-(-)-	687-47-8	C5H10O3		
Ethyl sulfide	Diethyl sulfide	352-93-2	C4H10S	8.43	
Formic acid		64-18-6	CH2O2		

Furfural	2- Furaldehyde	98-01-1	C5H4O2	9.21	
Furfuryl alcohol		98-00-0	C5H6O2	<9.5	
Gasoline #1		8006-61-9	m.w. 72		
Gasoline #2, 92 octane		8006-61-9	m.w. 93		
Glutaraldehyde	1,5-Pentanedial	111-30-8	C5H8O2		
Heptane, n-		142-82-5	C7H16	9.92	2.35
Hexamethyldisilazane, 1,1,1,3,3,3-	HMDS	999-97-3	C6H19NSi2	8.6	
Hexane, n-		110-54-3	C6H14	10.13	4.06
Hexanol, 1-	Hexyl alcohol	111-27-3	C6H14O	9.89	
Hexene, 1-		592-41-6	C6H12	9.44	
Hydrazine		302-01-2	H4N2	8.1	2.60
Hydrogen	Synthesis gas	1333-74-0	H2	15.43	
Hydrogen cyanide	Hydrocyanic acid	74-90-8	HCN	13.6	
Hydrogen peroxide		7722-84-1	H2O2	10.54	
Hydrogen sulfide		7783-06-4	H2S	10.45	3.30
Iodine		7553-56-2	I2	9.4	
Iodomethane	Methyl iodide	74-88-4	CH3I	9.54	
Isoamyl acetate	Isopentyl acetate	123-92-2	C7H14O2	<10	1.79
Isobutane	2-Methylpropane	75-28-5	C4H10	10.57	
Isobutanol	2-Methyl-1propanol	78-83-1	C4H10O	10.02	4.99
Isobutene	Isobutylene, Methyl butene	115-11-7	C4H8	9.24	
Isobutyl acetate		110-19-0	C6H12O2		
Isobutyl acrylate	Isobutyl 2-propenoate, Acrylic acid Isobutyl ester	106-63-8	C7H12O2		
Isobutylene					1.00
Isooctane	2,2,4-Trimethylpentane	540-84-1	C8H18	9.86	1.21
Isopar E Solvent	Isoparaffinic hydrocarbons	64741-66-8	m.w. 121		
Isopar G Solvent	Photocopier diluent	64742-48-9	m.w. 148		
Isopar K Solvent	Isoparaffinic hydrocarbons	64742-48-9	m.w. 156		
Isopar L Solvent	Isoparaffinic hydrocarbons	64742-48-9	m.w. 163		
Isopar M Solvent	Isoparaffinic hydrocarbons	64742-47-8	m.w. 191		
Isopentane	2- Methylbutane	78-78-4	C5H12		
Isophorone		78-59-1	C9H14O	9.07	0.74
Isoprene	2-methyl-1,3-butadiene	78-79-5	C5H8	8.85	
Isopropanol	Isopropyl alcohol, 2-propanol	67-63-0	C3H8O	10.12	5.93
Isopropylamine					1.28
Isopropyl acetate		108-21-4	C5H10O2	9.99	
Isopropyl ether	Diisopropyl ether	108-20-3	C6H14O	9.2	0.84
Jet fuel JP-4	Jet B, Turbo B,	8008-20-6	m.w. 115		
Jet fuel JP-5 &JP-8	Jet 5, Kerosene type aviation fuel	8008-20-6	m.w. 167		1.06
Jet A	Jet A-1, Kerosene type	8008-20-6	m.w. 165		1.06
Jet A1 fuel					1.06
Limonene, D-	(R) - (+) - Limonene	5989-27-5	C10H16	8.2	
Mesityl oxide					0.54
Mesitylene	1,3,5-Trimethylbenzene	108-67-8	C9H12	8.41	
Methane	Natural gas	74-82-8	CH4	12.61	
Methanol	Methyl alcohol, carbinol	67-56-1	CH4O	10.85	
Methoxyethanol, 2-	Methyl cellosolve, Ethylene glycol monomethyl ether	109-86-4	C3H8O2	10.1	2.22
Methoxyethoxyethanol, 2-	2-(2-methoxyethoxy) ethanol Diethylene glycol monomethyl ether	111-77-3	C7H16O	<10	3.64
1- Methoxy-2-propanol		107-98-2			1.85
Methyl acetate		79-20-9	C3H6O2	10.27	6.44
Methylacetoacetate					1.30
Methyl acrylate	Methyl 2-propenoate, acrylic acid methyl ester	96-33-3	C4H6O2	9.9	3.40
Methylamine	Aminomethane	74-89-5	CH5N	8.97	1.64
Methylbenzoate					0.93
Mthyl benzyl alcohol					

Methyl bromide	Bromomethane	74-83-9	CH3Br	10.54	2.72
Methyl t-butyl ether	MTBE, tert-Butyl methyl ether	1634-04-4	C5H12O	9.24	.89
Methyl chloride	Chloromethane	74-87-3	CH3CI	11.22	
Methylcyclohexane		107-87-2	C7H14	9.64	
Methylene chloride	Dichlormethane	75-09-2	CH2CI2	11.32	
Methyl ether	Dimethyl ether	115-10-6	C2H6O	10.03	
Methyl ethyl ketone	MEK, 2-Butanone	78-93-3	C4H8O	9.51	.97
Methyl hydrazine	Monomthylhydrazine, Hydrazomethane	60-34-4	C2H6N2	7.7	
Methyl isobutyl ketone	MIBK, 4-Methyl-2-pentanone	108-10-1	C6H12O	9.3	1.14
Methyl isocyanate	CH3NCO	624-83-9	C2H3NO	10.67	
Methyl isothiocyanate	CH3NCS	551-61-6	C2H3NS	9.25	
Methyl mercaptan	Methanethiol	74-93-1	CH4S	9.44	
Methyl methacrylate		80-62-6	C5H8O2	9.7	1.57
Methyl nonafluorobutyl	HFE-7100DL	163702-08-7	C5H3F9O		
Methyl-1,5- pentane-diamine, 2- (coats lamp)	Dytek-A amine, 2-Methyl pentamethylenediamine	1552-10-2	C6H16N2	<9	
Methyl propyl ketone	MPK, 2-Pentanone	107-87-9	C5H12O	9.38	0.87
Meth-2-pyrrolidinone, N-	NMP, N-Methylpyrrolidone, 1-Methyl-2-pyrrolidinone, 1-Methyl 2-pyrrolidone	872-50-4	C5H9NO	9.17	1.02
Methyl salicylate	Methyl 2-hydroxybenzoate	119-36-8	C8H8O3	9	
Methylstyrene, a-	2-Propenylbenzene	98-83-9	C9H10	8.18	
Methyl sulfide	DMS, Dimethyl sulfide	75-18-3	C2H6S	8.69	
Mineral spirits	Stoddard Solvent, Varsol 1	8020-83-5	m.w. 144		
Mineral Spirits - Viscor 120B	Calibration Fluid, b.p. 156-207*C	8052-41-3	m.w. 142		
Mustard	HD, Bis (2-chloroethyl) sulfide	505-60-2	C4H8CL2S		
Naphthalene	Mothballs	91-20-3	C10H8	8.13	
Nickel carbonyl (in CO)	Nickel tetracarbonyl	13463-39-3	C4NiO4	<8.8	
Nitric oxide		10102-43-9	NO	9.26	
Nitrobenzene		98-95-3	C6H5NO2	9.81	
Nitrogen dioxide		10102-44-0	NO2	9.75	
Nonane		111-84-2	C9H20	9.72	
Octane, n-		111-65-9	C8H18	9.82	2.10
Pentane		109-66-0	C5H12	10.35	
2-Pentanone					0.87
Peracetic/Acetic acid mix	Peroxyacetic acid, Acetyl hydroperoxide	79-21-0	C2H4O3		
Perchloroethene	PCE, Perchloroethylene, Tetrachloroethylene	127-18-4	C2CI4	9.32	
PGME	Propylene glycol methyl ether, 1-Methoxy-2-propanol	107-98-2	C6H12O3		1.85
PGMEA	Propylene glycol methyl ether acetate 1-methoxy-2-acetoxypropane, 1-Methoxy-2-propanol acetate	108-65-6	C6H12O3		
Phenol	Hydroxybenzene	108-95-2	C6H6O	8.51	1.10
phenylethylalcohol	Phenol Ethyl alcohol				9.04
Phosgene in Nitrogen	Dichlorocarbonyl	75-44-5	CCI2O	11.2	
Phosphine		7803-51-2	PH3	9.87	3.02
Photocopier Toner	Isoparaffin mix				
Picoline, 2-	2-Methylpyridine				0.72
Picoline, 3-	3-Methylpyridine	108-99-6	C6H7N	9.04	0.92
Pinene, a-		2437-95-8	C10H16	8.07	
Pinene, b-		18172-67-3	C10H16	8	
Piperylene, isomer mix	1,3-Pentadiene	504-60-9	C5H8	8.6	
Propane		74-98-6	C3H8	10.95	
Propanol, n-	Propyl alcohol	71-23-8	C3H8O	10.22	4.91

Propanol, 2-	Propyl alcohol		C3H8O		5.53
Propene	Propylene	115-07-1	C3H6	9.73	1.41
Propionaldehyde	Propanal	123-38-6	C3H6O	9.95	
Propyl acetate, n-		109-60-4	C5H10O2	10.04	
Propylene carbonate		108-32-7	C4H6O3	10.5	
Propylene glycol	1,2-Propanediol	57-55-6	C3H8O2	<10.2	
Propylene oxide	Methyloxirane	75-56-9	C3H6O	10.22	6.30
Propyleneimine	2-Methylaziridine	75-55-8	C3H7N	9	
Propyl mercaptan, 2-	2-Propanethiol, Isopropyl mercaptan	75-33-2	C3H8S	9.15	
Pyridine		110-86-1	C5H5N	9.25	0.78
Pyrrolidine (coats lamps)	Azacyclohexane	123-75-1	C4H9N	8	
RR7300 (PGME/PGMEA)	70:30 PGME:PGMEA (1-Methoxy-2-propanol:1-Methoxy-2-acetoxypropane)	107-98-2	C4H10O2 / C6H12O3		
quinoline					0.97
Sarin	GB, Isopropyl	107-44-8	C4H10FO2P		
Styrene		100-42-5	C8H8	8.43	0.47
Sulfur dioxide		7446-09-5	SO2	12.32	
Sulfur hexafluoride		2551-62-4	SF6	15.3	
Sulfuryl fluoride	Vkane	2699-79-8	SO2F2	13	
Tabun	Ethyl N, N-dimethylphosphoramidocyanidate	77-81-6	C5H11N2O2P		
Tetrachloroethane, 1,1,2,2-		79-34-5	C2H2CI4	11.1	
Tetracholoethylene		116-14-3	C2Cl4		.60
Tetraethyllead	TEL	78-00-2	C8H20Pb	11.1	
Tetraethyl orthosilicate	Ethyl silicate, TEOS	78-10-4	C8H20O4Si	9.8	
Tetrafluoroethane, 1,1,1,2-	HFC-134A	811-97-2	C2H2F4		
Tetrafluoroethylene	TFE, Tetrafluoroethylene, Perfluoroethylene	116-14-3	C2F4	10.12	
Tetrafluoromethane	CFC-14, Carbon tetrafluoride	75-73-0	CF4	>15.3	
Tetrahydrofuran	THF	109-99-9	C4H8O	9.41	1.53
Tetramethyl orthosilcate	Methyl silicate, TMOS	681-84-5	C4H12O4Si	10	
Therminol VP-1	Dowtherm, 3:1Diphenyl oxide:	101-84-8	C12H10O		
Thiophene					0.41
Toluene	Methylbenzene	108-88-3	C7H8	8.82	0.53
Tolylene-2,4-diisocyanate	TDI, 4-Methyl-1,3-phenylene-2,4-diisocyanate	584-84-9	C9H6N2O2		
Trichlorobenzene, 1,2,4-	1,2,4-TBC	120-82-1	C6H3CI3	9.04	
Trichloroethane, 1,1,1-	1,1,1-TCA, Methyl chloroform	71-55-6	C2H3CI3	11	
Trichloroethane, 1,1,2-	1,1,2-TCA	79-00-5	C2H3CI3		
Trichloroethylene	TCE, Trichoroethylene	79-01-6	C2HCI3	9.47	0.51
Trichlorotrifluoroethane, 1,1,2-	CFC-113	76-13-1	C2CI3F3	11.36	
Triethylamine	TEA	121-44-8	C6H15N	7.3	
Triethyl borate	TEB; Boric acid triethyl ester, Boron ethoxide	150-46-9	C6H15O3B	10	
Triethyl phosphate	Ethyl phosphate	78-40-0	C6H15O4P	9.79	
Trimethylamine		75-50-3	C3H9N	7.82	
Trimethylbenzene, 1,2,3					0.49
Trimethylbenzene, 1,2,4		108-67-8			0.43
Trimethylbenzene, 1,3,5	1,3,5-(CH3)3C5H6				0.34
Trimethyl borate	TMB; Boric acid trimethyl ester, Boron methoxide	121-45-9	C3H9O3B	10.1	
Trimethyl phosphate	Methyl phosphate	512-56-1	C3H9O4P	9.99	
Trimethyl phosphite	Methyl phosphate	121-45-9	C3H9O3P	8.5	
Turpentine	Pinenes (85%) + other diisoprenes	8006-64-2	C10H16	8	0.50
Undecane		1120-21-4	C11H24	9.56	

Vinyl actetate		108-05-4	C4H6O2	9.19	1.17
Vinyl bromide	Bromoethylene	593-60-2	C2H3Br	9.8	
Vinyl chloride	Chloroethylene, VCM	75-01-4	C2H3CI	9.99	1.90
Vinyl Cyclohexone	VCH				1.40
Vinylidene chloride - see 1,1-Dicholorethene					
Vinyl-2-pyrrolidinone, 1-	NVP, N-vinylpyrrolidinone, 1-ethenyl -2-pyrrolidinone	88-12-0	C6H9NO		
Xylene, m-	1,3- Dimethylbenzene	108-38-3	C8H10	8.56	0.45
Xylene, o-	1,2- Dimethylbenzene	95-47-6	C8H10	8.56	0.54
Xylene, p-	1,4- Dimethylbenzene	106-42-3	C8H10	8.44	0.47