

PhoCheck+ 1, 2, 3 & 5000Ex User Manual V2.3



Part No 845221

www.ionscience.com

Advanced Gas Sensing Technologies

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Declaration of conformity

Manufacturer: Ion Science Ltd, The Way, Fowlmere, Cambridge, England. SG8 7UJ

Product: PhoCheck+ 1000, 2000, 3000 and 5000

Product description: Intrinsically safe photo-ionisation detector for detecting volatile organic compounds

Directive 94/9/EC **ATEX**

Identification:  II 2 G Ex ia IIC T4 (-20°C ≤ Ta ≤ +60°C)

Notified Body: Baseefa Ltd, 1180, Buxton, UK

EC Type Examination Certificate(s)

Baseefa03ATEX742 latest supplement Baseefa03ATEX742/7X issued 19th November 2008

IECEx BAS 04.0033 latest revision no.4 issued 20th November 2008

Standards

BS EN 60079-0:2006 Electrical Apparatus for Potentially Explosive Atmospheres—General Requirement

BS EN 60079-1:2007 Explosive Atmospheres – Equipment Protection by Flameproof Enclosures 'd'

BS EN 60079-11:2007 Explosive Atmospheres – Equipment Protection by Intrinsic Safety 'i'

BS EN 61010-1:2001 Safety requirements for electrical equipment for measurement, control and Laboratory use—General requirements

Directive 2004/108EC Electrical Equipment— Electromagnetic Compatibility (EMC)

BS EN 61326-1:2006 Electrical equipment for measurement, control and laboratory use— EMC Requirements (Class B and General Immunity)

Other Standards

BS EN ISO 9001:2000 Quality Management Systems – Requirements

BS EN 13980:2002 Potentially Explosive Atmospheres – Application of Quality Systems

On behalf of Ion Science Ltd, I declare that, on the date this product accompanied by this declaration is placed on the market, the product conforms to all technical and regulatory requirements of the above listed directives.

Name: Mark Stockdale

Position: Technical Director

Signature:

Date: 20th November 2008



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Statements

Responsibility for Use

PhoCheck+ instruments detect a large range of gases, which are potentially dangerous from both a poisoning and/or an explosive perspective. PhoCheck+ instruments have many adjustable and selectable features allowing the detector to be used in a variety of ways.

Ion Science Ltd can accept no responsibility for the incorrect adjustment of features that cause harm or damage to persons or property.

PhoCheck+ can be used as a personal safety device. It is the users responsibility to respond appropriately to an alarm situation.

! WARNINGS!

1. For reasons of Intrinsic Safety, batteries MUST NOT be charged or replaced within potentially flammable areas. Ensure you are in a SAFE area before carrying out any type of maintenance on the PhoCheck+ instrument.
2. Substitution of components may impair intrinsic safety and result in unsafe conditions.
3. For safety reasons, the PhoCheck+ must only be operated and serviced by qualified personnel.
4. Please read and understand this User Manual fully before operating or servicing the PhoCheck+.

! CAUTION!

It is essential that the PhoCheck+ is always used with a supplied PTFE 0.5 micron filter fitted to the front of the instrument. The PhoCheck+ internal pump draws over 200 ml/min of air into the instrument and without a filter; particles of debris and dust will be drawn into the cell inhibiting the correct function of the instrument. These filters are consumable and should be changed every 100 hours of use. The frequency of replacement should be increased for dusty or moisture laden environments. Filters are available for purchase from Ion Science; see our accessories page (pg 46) for more information.



Statements

Quality Assurance

PhoCheck+ has been manufactured in compliance with ISO9001:2000, which ensures that the equipment supplied to our customers has been designed and assembled reproducibly, from traceable components, and leaves Ion Science calibrated to stated standards.

Disposal

Dispose of PhoCheck+, its components and any used batteries in accordance with all local and national safety and environmental requirements. This includes the European WEEE (Waste Electrical and Electronic Equipment) directive. Ion Science Ltd offers a take back service. Please contact us for more information. The PhoCheck+ field case material is recyclable polypropylene.

Calibration Facility

Ion Science Ltd offers a calibration service including the issue of certification confirming calibration with equipment traceable to UK national standards.

A PhoCheck+ Calibration Kit is available from Ion Science to allow a two-point calibration to be carried out in the field as a custom calibration. However Ion Science does recommend the annual return of all instruments for a yearly service and calibration.

Contact Ion Science Ltd

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Introduction to PhoCheck+

PhoCheck+ is a portable gas detector, suitable for the detection of a large range of Volatile Organic Compounds (VOC's), which are dangerous from both a poisoning and explosive perspective. Total VOCs are detected using PID (Photo Ionisation Detection) technology.

The PhoCheck+ versions are fully upgradeable in the field (i.e. PhoCheck+ 1000 to a 5000 or a 2000 to a 3000 etc). Also available is the option to upgrade to the FirstCheck+ multigas range of instruments upon return of your instrument to Ion Science. Please see page 48 for more details relating to upgrade options.

PhoCheck+ has two principle modes of operation, Health & Safety and Survey mode.

Health & Safety mode is used to check for conformity of short-term exposure levels (STEL) or time-weighted averages (TWA) that are specific for particular hazardous environments (for example EH40 in the UK and OSHA in the USA). In this mode of operation STEL's and TWA's are continually calculated and compared to levels set in the instrument's gas table.

Survey is the default mode of operation whenever the Health & Safety mode is NOT selected. This mode is often used in applications where several areas (or Zones) are to be monitored and readings data logged. All sensor readings are real time measurements and alarm levels are set manually.

For more information on these modes of operation please see page 25.

PhoCheck+ versions 2000, 3000 and 5000 automatically data log the instrument's readings every second. These readings are stored in the instrument's memory with a date and time stamp. For more information please see page 17.



Getting started

Packing List

Please take a little time to check the contents in the PhoCheck+ case.

Item	Description	Qty.
1.	PhoCheck+ instrument	1
2.	PID lamp (fitted)	1
3.	Probe - 100mm (fitted)	1
4.	PTFE filter - 50 micron (fitted)	1
5.	Battery charger (if rechargeable type)	1
6.	Battery clip (if non-rechargeable)	1
7.	Screw driver (if non-rechargeable)	1
8.	Manual	1
9.	IonPC software CD	1
10.	IS Protective Cover	1
11.	Cal Kit Sample containing:	
	• PID lamp cleaning Kit (Includes alumina powder and 2 applicators for 1 clean)	1
	• Carbon canister	1
	• PTFE filter – 0.5 micron	1
	• Cal adaptor*	1
	• Lamp removal tools (neoprene sleeves)	2
	• Secondary Probe Filter	5

* Please note that the Cal adaptor is to be used in conjunction with a PhoCheck+ Calibration Kit accessory (part number A-845213). **WARNING:** when fitting the Cal adaptor onto the gas tube (part of the Calibration kit) ensure that the small breather hole of the Cal adaptor is not covered as this will cause the instruments internal pump to be damaged beyond repair. Your warranty will be invalidated if the pump is damaged in this way.



Removing the PhoCheck+ from its case

Carefully remove the PhoCheck+ instrument from its case being careful not to damage the filter and probe assembly. 'Luer' type connectors are used to connect the PhoCheck+, filter and probe together and require a quarter-turn ONLY to connect / disconnect them. Do not over tighten.

To avoid drawing dust or particulate matter into the detector cell we suggest always fitting the filter with the Ion Science logo facing away from the instrument, therefore dust only collects on the same one side of the filter and is not inadvertently drawn into the instrument if the filter is attached the other way round.



Getting started

1. Turn the instrument on by pressing the  key.
2. Press and hold the  key and check the correct gas, alarm levels and zero mode are selected.
3. The screen will flash for 1 minute while the detector warms up– check for a reading on the display Between 0.2ppm and 2ppm.
4. Replace the probe and filter with the blue carbon filter – check for a reading from 0.0 to 0.2ppm.
5. Remove the carbon filter and replace the probe and filter.
6. If the results are not as expected, perform a custom calibration first ensuring the correct gas is selected.

Setting alarm levels

We recommend that alarm levels are set to user specifications as soon as possible before being used for the first time. Please see page 19 for details of how to set alarm levels.

Setting date and time

We recommend that the correct local date and time be set to the instrument as soon as possible before being used for the first time. Please see page 23 for details on how to set the date and time.

Selecting a gas from the internal gas table

PhoCheck+ instruments leave Ion Science pre-set for gas type TVOC (total volatile organic compounds). Instruments are factory calibrated against isobutylene and all response factors are equivalent to this. By changing the gas from the gas table all readings will be given using that gases response factor. To change the selected gas please see pages 23 & 24.

Rechargeable Batteries

Although PhoCheck+ instruments leave the factory fully charged, prolonged periods of storage may result in the battery pack discharging. We recommend charging the instrument for 12 hours before use. See the battery section of this manual page 38.

Alkaline Batteries

Fit the battery pack supplied with the PhoCheck+. For more information please see the battery section of this manual page 38.



Instrument Functions

Keypad function descriptions



On/Off.

To switch the PhoCheck+ instrument 'ON' - Press the 'ON/OFF' key.

To switch the PhoCheck+ instrument 'OFF' - Ensure you are on the 'Display/Function Selection screen' or a Display screen. Press and hold the 'ON/OFF' key. A 'Timer' symbol will appear and a line will travel across the bottom on the screen, release the 'ON/OFF' button once the line has travelled the length of the screen. The 'Delay' symbol will briefly appear before the instrument turns 'OFF' completely. This procedure has been designed to avoid accidental switch OFF.



Delay
Symbol



ENTER

This key selects options and confirms settings.



ESCAPE

This key is used to return the display to the previous screen and to abort an adjustment. Repeated pressing of this key will return the display to the 'Display/Function Selection screen'.



UP

Use to scroll up or changes selection



DOWN

Use to scroll down or changes selection



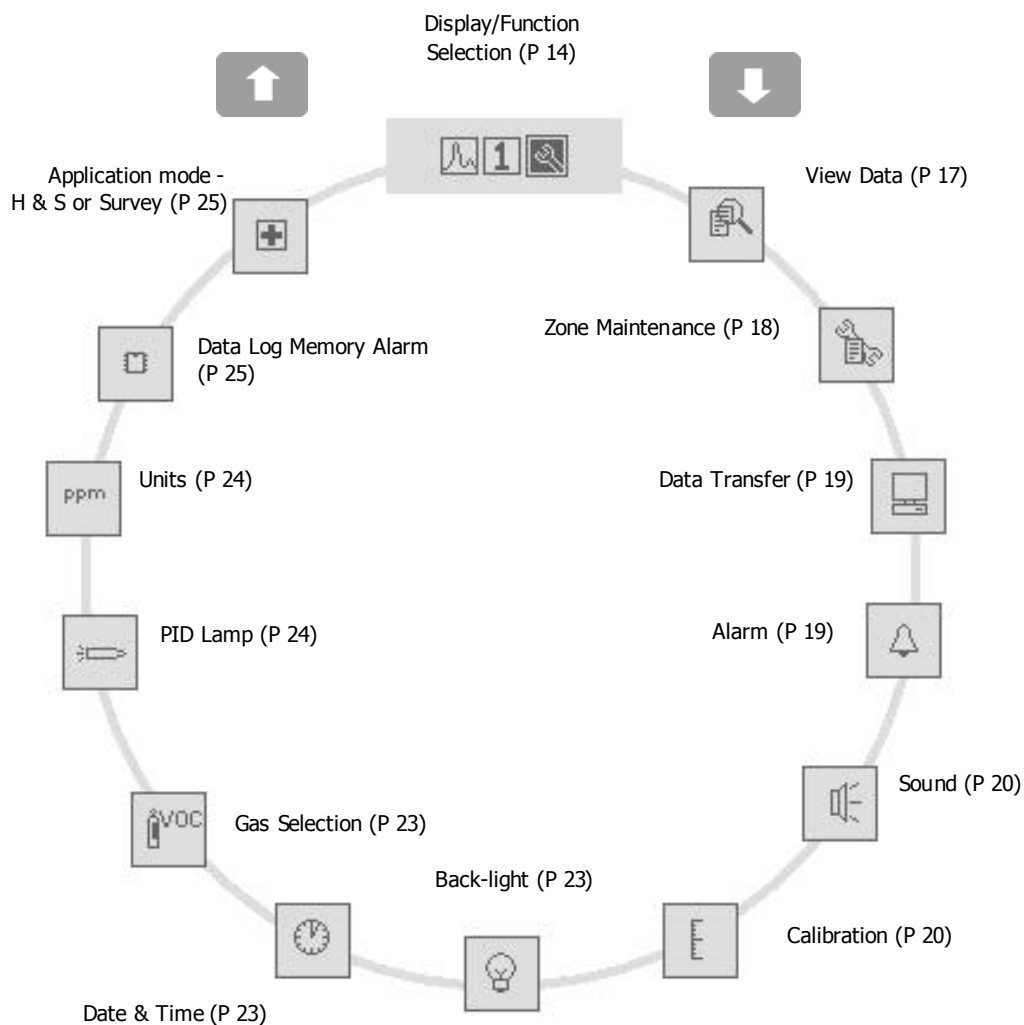
ZERO

Pressing the Zero key Zeros-out background readings. See the 'Instrument Displays' section of this manual for more detail (Page 15)



Instrument Functions

Function locations



From the 'Display/Function Selection' screen highlight the function menu icon then press 'Enter', use the 'Up/Down' keys to view the available functions then press 'Enter' to select the function options



Instrument Functions

How the PhoCheck+ Menu Works

Once in the function menu with the function-symbol you require on the screen press the 'Enter' key to select it. (See Figure 1)



Fig 1

A cursor (highlighted symbol or number) can be moved from one selection to another by using the 'UP' and 'DOWN' keys. (See Figure 2.) Pressing 'Enter' will cause the selection to flash.

When flashing use the 'UP' and 'DOWN' keys to adjust it.



Fig 2

When you have adjusted the parameter to an acceptable level press the 'Enter' key. The adjusted parameter will be stored. In many cases a tick (✓) will appear to confirm the action.

Although there is a variation in complexity of some functions, this basic concept of selection, adjustment and confirmation is common throughout this instrument.

You can abort a selection by pressing the 'Escape' (Esc) key.



Quick Reference

This quick reference indicates which functions are relevant to which instruments.

1 = PhoCheck+ 1000 2 = PhoCheck+ 2000 3 = PhoCheck+ 3000 5 = PhoCheck+ 5000



Display / Function Selection 1, 2, 3, & 5 (Page 14)

Allows the user to view detected VOC levels in either graph or number format and to adjust the instrument functions and parameters.



View Data 2, 3 & 5 (Page 17)

Allows viewing of stored data in the instruments internal memory.



Zone Maintenance 2, 3 & 5 (Page 18)

Allows the creation, selection and deletion of Zone names.



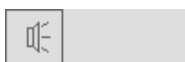
Data Transfer 1, 2, 3 & 5 (Page 19)

Enables data transfer between instrument and PC/laptop.



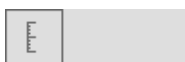
Alarm 1, 2, 3 & 5 (Page 19)

Allows the adjustment of upper and lower Alarm levels in survey mode.



Sound 1, 2, 3 & 5 (Page 20)

Allows the selection of audible indicators including a confidence beep.



Calibration 1, 2, 3 & 5 (Page 20)

Allows the selection of Factory or Custom calibration



Quick Reference



Back-light **1, 2, 3 & 5** **(Page 23)**
Allows the selection of back-light options.



Date / Time **2, 3 & 5** **(Page 23)**
Allows the adjustment of the date and time.



PID Gas Selection **1, 2, 3 & 5** **(Page 23)**
Allows the selection of gases from the internal gas table.



PID Lamp **2, 3 & 4** **(Page 24)**
Allows the selection of different PID lamps.



Units **1, 2, 3 & 5** **(Page 24)**
Allows the selection of ppb, ppm or mg/m³ as measurement units.



Data log Memory Alarm **2, 3, & 5** **(Page 25)**
Allows the setting of an alarm to warn the user when the data logging memory is full.



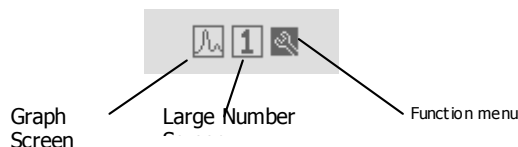
Application **3 & 5** **(Page 25)**
Allows the selection of modes of operation, 'Health and Safety' for STEL and TWA monitoring or 'Survey' for general use. The PhoCheck+ 1000 & 2000 instruments do not have Health & Safety mode as standard and are Survey instruments only, however Health and Safety mode is an upgradeable feature.



Instrument Displays

Display/Function Selection Screen

The 'Display/Function Selection screen' is shown when the PhoCheck+ is switched on and can always be located by repeatedly pressing the 'Esc' (Escape) key. The 'Display/Function screen' allows the user to view detected gas levels in a variety of formats or to adjust the instruments functions and parameters. The symbols shown on this screen can be selected using the UP and DOWN keys. The highlighted symbol appears as shown in the example below for the function menu.



Instrument Symbols Explained

A number of symbols are used to indicate various features when in the viewing screens. Please see an explanation of each below.

Bump test



This symbol of a gas bottle can be set via the IonPC software to be displayed once a week when the instrument is turned on. This is to remind the user to test the instrument responses accurately when it is supplied with gas. See page 32 of the software section for more information.

Battery Status



The battery status indicator can be accessed by pressing and holding Enter on the graph and the large number screens.

Peak Hold



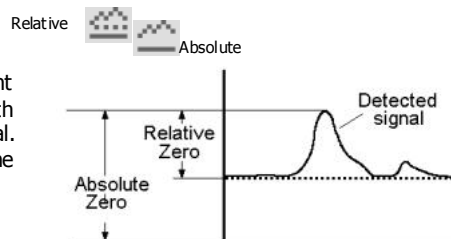
The numerical measurement to the right of this symbol indicates the highest gas concentration reached by the instrument since being switched ON. This 'Peak' reading can be reset by pressing and holding the 'Enter' key for 5 seconds.



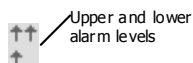
Instrument Displays

Background Zero Reference

When in 'Survey' mode pressing the 'Zero' key alternates between 'Relative' and 'Absolute' modes. There is a constant level of detectable gas in ambient air, which is detectable with PhoCheck+. 'Absolute mode' displays the entire sensor signal. 'Relative' mode 'removes' the background signal and sets the 'Zero' point at an artificial level.



Alarm arrows



The arrows represent the importance level of the alarm. The single arrow represents the lower alarm and the two arrows represent the upper alarm.

Application



Indicates that 'Health & Safety' mode is selected

```

voc ppm  +  [battery icon]
Benzene
STEL  n/a  0.0
TWA   0.0  1.0
  
```

When the symbol is present the instrument is in 'Health & Safety' mode. When it is absent the instrument reverts to 'Survey' mode. Please see Application section of this manual for more information (page 25).

Display Screens Explained

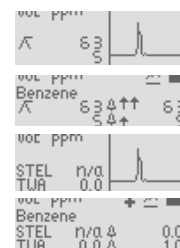
Graph Screen

Allows the viewing of real-time measurements in graph format relative to the set alarm levels.

When in 'Survey' mode (see page 25) the type of gas being detected, the measured units, the peak hold and real-time readings are also displayed.

Additional information such as alarm levels and battery status can be viewed by pressing and holding the Enter key.

When in 'Health & Safety' mode (see page 25) the on screen information is slightly different as STEL and TWA calculations are displayed in figures and the graph remains in real time. Again additional information can be viewed by pressing and holding the Enter Key.





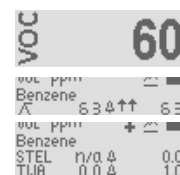
Instrument Displays

Large Number Screen

Enables the viewing of real time measurements in large numerical format for easy viewing in difficult conditions.

Additional information such as alarm levels, battery status and a peak hold reading can be viewed by pressing and holding the ENTER key.

When in 'Health & Safety' mode the STEL and TWA alarm levels and calculated values are shown when holding the Enter key.



Function Menu

Once selected use the 'UP' and 'DOWN' keys to highlight the function you require and press 'ENTER' to select. Many features can be adjusted in this section including gas selection, zone maintenance, data transfer and alarm levels. Details of these and other functions are to be found on the following pages.



Function menu

The instrument has 8Mb of memory, which is divided into 1Mb segments. When a segment becomes full, data is then stored in the next segment.

Each time the user starts data logging, a new file is created. So, for example, six data logging sessions will create six data files.

When a data logging session records data which spans across two or more 1Mb segments, a corresponding number of files will be created and stored within the instrument and will apply to that particular data logging session only. So, for example, two 1Mb segments spanned will result in two files created.

When the data is to be downloaded via the IonPC software, any files that have spanned two or more 1Mb segments (i.e. two or more files) will be recognised and downloaded as a single file.



Instrument Menu

General

In the function menu use the 'Up' and 'Down' keys to find the function you require. To enter the function, press the 'Enter' key.

Data Logging, Zones & Files

PhoCheck+ versions 2000, 3000 and 5000 automatically data log the instruments readings every second. These readings are stored in the instrument's memory with a date and time stamp. The instrument has been designed to continuously store data; once the memory has reached its full capacity (8 Mb) it will automatically begin to over write previous readings. An alarm can be set (see page 25) to inform the user that this is due to happen giving time to download any data that may be over written.

Data logged measurements are stored in files created automatically and issued a number that is incremented each time a new file is opened. Stored data can be viewed on the PhoCheck+ instrument or it can be downloaded to a PC for analysis and to be archived. Ion Science recommends downloading saved readings once a week.

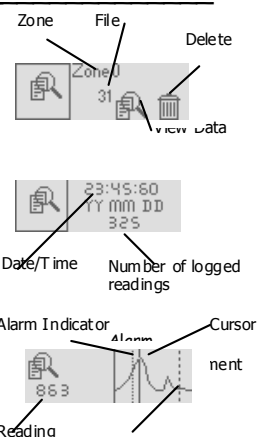
In some applications readings need to be recorded in many different locations leading to many hundreds of stored files. PhoCheck+ was designed with these requirements in mind and has the facility to store files into 'Zones'. The PhoCheck+ has a default Zone called Zone 0 (which can not be deleted), unless specified all readings will automatically be stored under this Zone. The PhoCheck+ has an additional 199 Zones which the user can name themselves, either direct via the instrument or by using the IonPC software.

View Data (2, 3 & 5)



This function allows the viewing and detection of Data Logged Files within the PhoCheck+ memory.

First select the Zone of interest by moving the cursor using the 'up' and 'down' keys, press 'enter' to select it. Then select the required File in the same way. Now select the View Data symbol, this will show the first reading logged with a date and time stamp and the number of logged readings within the selected file. To view the stored data in a graphical form press the 'enter' key. A graph representing the stored readings within the selected file will be displayed. The flashing cursor can be moved along the graph to a reading of interest. When the cursor stops the reading will be displayed in the units selected, press the enter key to see the date and time stamp of that reading if required.





Instrument Menu

View Data (Continued)

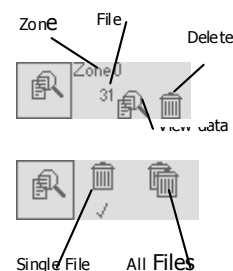
The Alarm Indicator dotted line is present on a graph to show that this is the exact point at which an alarm was set off. The instrument will continue to alarm until the alarm is acknowledged by the user by pressing the 'Enter' key, this is shown on the graph as a dashed line (Alarm acknowledgement).

Deleting a File

Should you wish to delete a File, select the Zone and file to be deleted as if you were about to view the data. Now select the delete symbol (Trash can) in the View Data screen. Options are given to delete the currently selected File or All Files.

WARNING: Selecting All Files will delete all files stored in all Zones.

A tick '✓' confirms the function has been carried out.



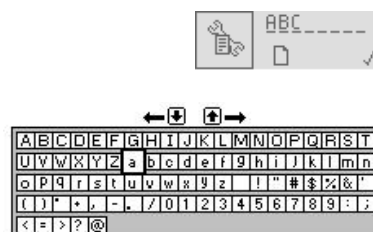
Zone Maintenance (2, 3 & 5)



Zones can be created, selected or deleted in this function. Select the 'New' symbol to create a new zone name, the 'List' symbol to select an existing zone and the Delete symbol to delete an existing zone name.



Selecting the 'New' symbol allows the creation of Zone names made up of 8 characters consisting of letters, numbers and symbols. Use the up and down keys to choose the characters and press enter to confirm your selection. Letter order on the instrument is shown on the right, the highlighted 'a' is the start letter. Incorporating a useful memory recall the following character will always start as the previous selected aiding your navigation through the letters, numbers and symbols.



Selecting the 'List' symbol allows you to view existing Zone names, and to select the zone under which you wish to save data.

Selecting the 'Delete' symbol allows the previously created Zone names to be deleted. A tick '✓' confirms a Zone has been deleted.





Instrument Menu

Zone Maintenance (Continued)

Please note that when deleting a zone all data saved under this zone will be deleted. If you wish to keep the data ensure you download it to a PC before it is deleted.

Zones can also be added, edited and deleted via the IonPC software, see pg 35

Data Transfer (1, 2, 3 & 5)



Allows the transfer of data between a PhoCheck+ instrument and an IonPC software enabled PC.

To begin communication between the instrument and the computer select the Data Transfer option. When the instrument is communicating with a PC a 'v' will be displayed in the data transfer symbol and when not communicating an 'X' will be shown. Place the instrument on its side with its infrared window approximately 40 mm from the PC's IRDA link. To exit the data transfer option press 'Esc', the delay symbol will appear for a few seconds before returning to the function menu



Alarm (1, 2, 3 & 5)



When in 'Survey' mode, upper and lower alarm levels can be set by the user to indicate particular levels of detection specific to their needs.



Both alarms give an audible and visible output (flashing LED) but with increased urgency with the upper alarm. An alarm state indicates that PhoCheck+ has detected the user set alarm level has been exceeded. The alarm will continue to sound and flash until the user acknowledges the alarm by pressing Enter. **Please note that it is the user's responsibility to respond appropriately to an alarm condition**

Upper and lower alarm levels in survey mode are simple to set via the instrument. Use the up and down keys to select the Alarm graphic in the function menu and press Enter. Then select the alarm you wish to adjust (Upper or Lower), press enter then again use the up and down keys to change the alarm setting. These alarms can also be easily adjusted on a PC via the Gas Table in the IonPC software that is then downloaded to the instrument via the IRDA link (see page 31 for more details). Please note that for safety reasons the lower alarm cannot be set above the upper alarm and the upper alarm cannot be set below the lower alarm.

When in Health and Safety mode, alarms are triggered by STEL and TWA alarm levels preprogrammed into the instruments gas table. An Alarm in Health & Safety mode indicates the user has been exposed to levels exceeding those set within the PhoCheck+ gas table. When PhoCheck+ alarms in Health and Safety mode, the relevant TWA or STEL figure shown on the display will flash. These values cannot be changed.



Instrument Menu

Alarm (Continued)

Either via the instrument or the PhoCheck+ software. However additional entries can be entered into the gas table via the PhoCheck+ software with their own STEL and TWA values see page 31 for more information.

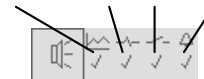
Sound (1, 2, 3 & 5)

Signal Confidence Key Alarm



Audible outputs can be selected to indicate functions. When Signal is selected, the rate at

which the instrument 'Beeps' increases with the detected gas. When Confidence is selected the instrument 'Beeps' every 15 seconds to indicate it is functioning. This feature can be useful if the instrument is out of sight. When Key is selected the instrument 'Beeps' when a key on the keypad is pressed. Alarm can only be adjusted using the IonPC software to avoid the accidental switch off.



Calibration (1, 2, 3 & 5)



'Factory calibration' is set by Ion Science during instrument manufacture. 'Custom calibration' can be set by the instrument user.



Factory

General description

Due to the linear output of the Ion Science PID detector cell, PhoCheck+ instruments only require a two point calibration. The PhoCheck+ scales its linear output across a 'Zero' level (clean air reference) and the 'Span' (a user defined gas concentration).

Factory Calibration

When 'Factory' calibration is selected the PhoCheck+ will measure according to the factory set fixed points and display the selected signal reading according to this reference.

'Factory' calibration offers a constantly repeatable reference, however prolonged use may mean these reference points become less accurate. It is recommended that the PhoCheck+ be returned to Ion Science once a year for an annual calibration and service.



Instrument Menu

Calibration (continued)

Custom calibration

When 'Custom Calibration' is selected a 'Zero' and 'Span' can be set by the user. This allows the user to calibrate the PhoCheck+ PID to an alternative gas (other than Isobutylene). Ion Science provide a Calibration kit accessory (Part number A-845213) which is recommended for use with PhoCheck+, however other gases specific to your needs can also be used.

If performing a custom calibration using the Ion Science Calibration Kit accessory you will need you use the Cal Adaptor supplied with your PhoCheck+ in the Cal Kit sample box. **WARNING:** when fitting the Cal adaptor onto the gas tube (part of the Calibration kit) ensure that the small breather hole of the Cal adaptor is not covered as this will cause the instruments internal pump to be damaged beyond repair. Failure to adhere to this warning will invalidate your warranty should your instrument pump become damaged.

In order to carry out a custom calibration the appropriate parameters need to first be set via the PhoCheck+ Ion PC software and downloaded to the instrument. Please see the PhoCheck+ software calibration section (pg 30) for details on how this can be achieved. Once these parameters have been set a custom calibration can be completed, please see the recommended procedure below.

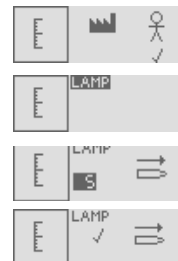
Ion Science suggests Custom calibrating when detection in ppb is required or when high accuracy is needed for a specific gas other than Isobutylene.

Custom Calibration Procedure

Please read ALL of this procedure before attempting a custom calibration and ensure this procedure is carried out in a clean air environment. Steps 24 should only be carried out by an experienced service engineer. If you are not in a clean environment or not confident removing the lamp please move straight from point 1 to point 5.

The 'lamp' calibration is only really necessary if the instrument is to be used for ppb applications.

1. Select Custom Calibration procedure – a tick '✓' will appear to confirm the selection. Pressing Enter allows the user to enter the Custom calibration menu.
2. Select the flashing 'LAMP' by pressing Enter.
3. The screen will then show the image to the right with a flashing number and a lamp with an arrow. This is asking you to remove the instruments lamp then select Enter. The flashing number will then count down once complete the delay symbol will appear briefly before a tick symbol to show that the test has been completed successfully.

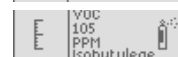




Instrument Menu

Calibration (continued)

4. Refit the lamp and select Escape.
5. Scroll down and select the flashing ZERO
6. Remove the caps from both ends of the carbon canister included in the Cal Kit Sample supplied with your PhoCheck+, remove the probe and filter from the instrument and fit the carbon canister. Alternatively a known clean air supply can be used. Note– the carbon canister simply pushes onto end fitting - do not force and no turning is required.
7. Press the Enter key to start the 'Zero' process. A counter will count down showing how long the canister needs to remain connected.
8. At the end of the count down a tick '✓' will appear, indicating that the Zero has been accepted. Press Escape.
9. Disconnect the carbon canister and replace the cap ends. The useful life of the carbon canister will be shortened if the canister is open to atmosphere for prolonged periods.
10. Scroll down and select the flashing VOC.
11. The next screen shows the gas and gas concentration you have previously set up via the IonPC software. Select Enter.
12. A screen will show VOC, a gas bottle and a flashing highlighted number.
13. Present the instrument with the calibration gas and press enter, the number will begin to count down showing how long the instrument needs to be presented with the gas. A tick '✓' will appear indicating that the calibration has been accepted. Escape out of the calibration menu.
14. Now replace the instruments filter and probe ready for use.
15. Carry out a Bump Test to ensure calibration was successful. Instrument is now ready for use.



If you are not successful in calibrating the instrument check the following points:

- The carbon canister may be contaminated
- The calibration gas canister may be low or empty
- If using a connector pipe there may be a kink restricting the flow of gas
- PID lamp may require cleaning
- PID lamp may need replacing

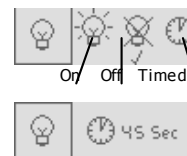


Instrument Menu

Back-light (1, 2, 3 & 5)



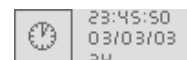
The instrument display can be illuminated when in low light conditions. When On is selected the backlight is on when ever the instrument is switched on. When Off is selected the back-light is permanently off. When Timed is selected the back-light illuminates for a pre-set time after every key press. When timed is selected pressing enter allows the user to adjust the on time from 1 to 60 seconds.



Date / Time (2, 3 & 5)



The Date / Time function allows the adjustment of the time and date used within the PhoCheck+ internal clock. The internal clock is used for the data logging date / time stamp. When readings are being stored for download and future use and record keeping ensure that the clock and date are accurately set. The 12/24 hour time format is also adjustable. Ion Science recommends that you set your date and time before using your instrument for the first time.



PID Gas Selection (1, 2, 3 & 5)



The PhoCheck+ photoionisation detector (PID) is nonselective. Although many VOC gases are detectable, the PhoCheck+ PID cannot differentiate between the gases. When you select the VOC gas you wish to measure from the PhoCheck+ internal gas list, the instrument will calculate the equivalent level for that selected gas against an isobutylene calibration.

Please note that there may be other detectable gases present that may effect the measurement.

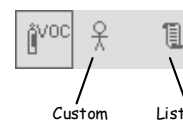
WARNING: Ion Science Ltd makes every effort to ensure the gas tables held within the PhoCheck+ memory and supplied on CD are accurate at the time of manufacture. In critical applications alarm levels must be checked, compared and adjusted to local legislation before use.



Instrument Menu

PID Gas Selection (continued)

Custom offers a quick route to the last 10 selected gases. When selected, use the UP and DOWN keys to change the gas then press ENTER to select.



List allows selection of any gas from within the gas table held in the PhoCheck+ memory.

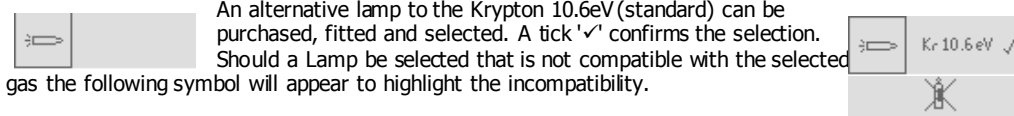
After selecting the List symbol, select the first letter of the gas you wish to select and press ENTER. The PhoCheck+ will then list all gases starting with that letter. WMD gases are prefixed with the letters WMD.

Alarm levels that are set in the Gas table will be automatically selected. Should a gas be selected that is not compatible with the selected lamp the following symbol will appear to highlight the incompatibility.



PID Lamp (2, 3 & 5)

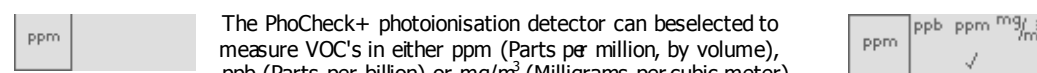
An alternative lamp to the Krypton 10.6eV (standard) can be purchased, fitted and selected. A tick '✓' confirms the selection. Should a Lamp be selected that is not compatible with the selected gas the following symbol will appear to highlight the incompatibility.



Unit Selector (1, 2, 3 & 5)

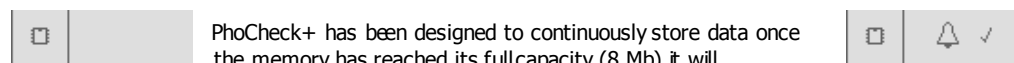
The PhoCheck+ photoionisation detector can be selected to measure VOC's in either ppm (Parts per million, by volume), ppb (Parts per billion) or mg/m³ (Milligrams per cubic meter).

NB: the ppb option is available on the PhoCheck+ 5000 and is upgradeable on the 1, 2 and 3000 versions.



Data Log Memory Alarm (2, 3 & 5)

PhoCheck+ has been designed to continuously store data once the memory has reached its full capacity (8 Mb) it will automatically begin to over write previous readings. An alarm can be set to inform the user that this is due to happen giving the user time to download any data that may be over written if they wish to do so.

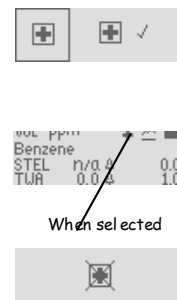




Instrument Menu

Application - Health & Safety Mode (3 & 5)

Modes of operation are selected to suit how the instrument is being used. Health & Safety mode is used to check for conformity of short-term exposure levels (STEL) or time-weighted averages (TWA) that are specific for particular hazardous environments (for example EH40 in the UK and OSHA in the USA). In this mode of operation STELs and TWAs are continually calculated and compared to levels set in the instrument's gas table. You can not adjust settings or parameters of the instrument while in Health & Safety mode as these could effect the ongoing calculations. Should you want to proceed with an adjustment a WARNING screen will appear. You have the option to continue with the adjustment by pressing Enter or abort and continue monitoring by pressing the 'Esc' key. Continuing with the adjustment will reset the instrument, calculations will begin again from 0 once back in Health & Safety mode.



Application - Survey Mode

'Survey' is the default mode of operation whenever the 'Health & Safety' mode is NOT selected. All functions can be adjusted or selected in this mode unless the 'Security mode' is set via the IonPC software. 'Survey' mode is often used in applications where several areas (or Zones) can be monitored and readings data logged. Saved data can then be downloaded to a PC for longterm storage and review. High and low alarm levels can be set.

Security

When the PhoCheck+ is connected to a PC via the PhoCheck+ software package (see pg 33), the instrument can be locked in the Menu Settings area of the software package. This facility allows the instrument to be set-up by a qualified or competent person locked and then handed to an operator for use. When in secure mode the PhoCheck+ functionality cannot be changed or adjusted. The user can only view the display screens and switch the instrument On and Off.



IonPC Software

PC Requirements

PhoCheck+ Software must be used in conjunction with a PC/laptop using Windows XP. An IRDA port is required for communication with the instrument. Many laptops are supplied with this facility. Alternatively IRDA modules can be purchased from most computer retailers for use with your instrument. Before connecting your PhoCheck+ to a PC for the first time confirm that the PC's IRDA works correctly with another device.

Installation of IonPC Software

1. Insert Ion Science software CD into your CD rom drive
2. The CD will automatically start up
3. Click on the Download Software button
4. The PhoCheck+ setup wizard will start.
7. Follow the instructions on screen.
8. The installer will automatically create a folder in your C drive to save IonPC into if you do not want to save it there Browse for the location you would like it to be saved in and click Next
9. Select Next again and on to install the software
10. The software will take a few seconds to install then click Finished
11. You will now be able to open your IonPC software from the Icon on your desk top or from your Start Menu/Programs/IonPC



IonPC Software Features

Connecting PhoCheck+ with a PC

Switch on your PhoCheck+ instrument, enter the function menu and select the Data Transfer symbol by pressing the enter key. When communicating with a computer the PhoCheck+ displays a '✓' within the data transfer symbol. When not communicating an 'X' will appear.



Place the PhoCheck+ on its side with the instruments infrared window approximately 40 mm from the PC IRDA, then start the PhoCheck+ software.

Starting PhoCheck+ Software

Start the IonPC software either from your desktop via the shortcut or from the Start menu/Programs/Ion PC.

The instrument has 8Mb of memory, which is divided into 1Mb segments. When a segment becomes full, data is then stored in the next segment.

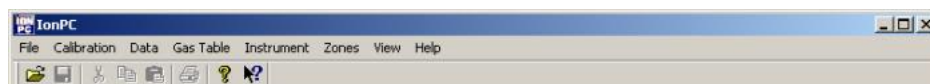
Each time the user starts data logging, a new file is created. So, for example, six data logging sessions will create six data files.

When a data logging session records data which spans across two or more 1Mb segments, a corresponding number of files will be created and stored within the instrument and will apply to that particular data logging session only. So, for example, two 1Mb segments spanned will result in two files created.

When the data is to be downloaded via the IonPC software, any files that have spanned two or more 1Mb segments (i.e. two or more files) will be recognised and downloaded as a single file.



IonPC Software Features



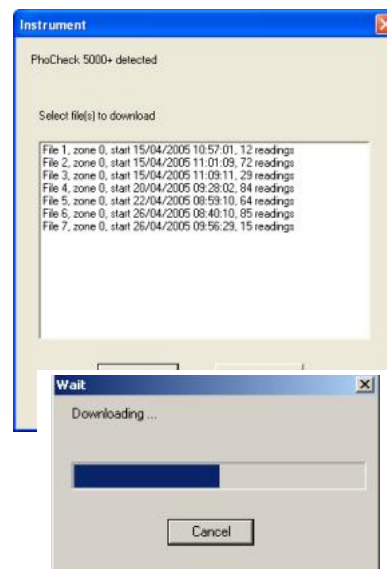
IonPC software has many features allowing the transfer for data and function specifications to and from the instrument and the PC.

Downloading data logged readings

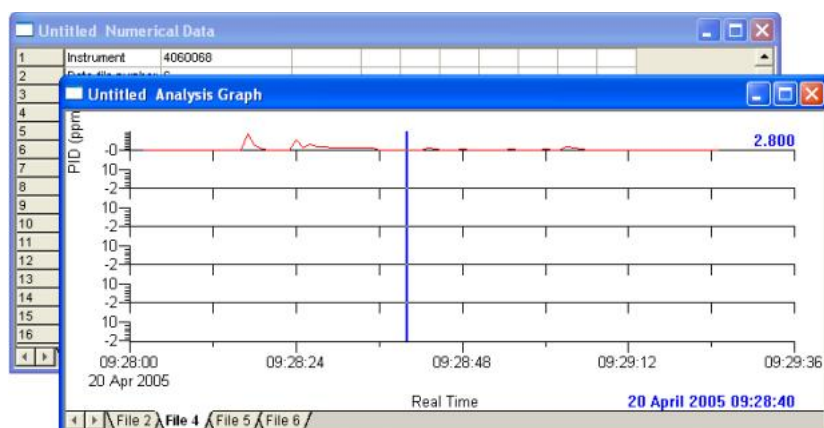
PhoCheck+ should always be presented to the IRDA port before the PhoCheck+ software is run. When the software is opened like this it will immediately begin communicating with the instrument and will give you the option to download data logged readings, as shown here.

Select 'Finished' if you do not wish to download the data.

If you do wish to download data, highlight the files you require, and then select Download data. The screen on the right will appear.



The data will then download from your PhoCheck+ to your PC in numerical and graph format once the download is complete select Finished. You then have the ability to zoom in on the graph data for a closer look by double clicking anywhere on the graph. You can also store the data for future reference.

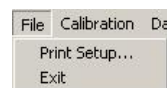




IonPC Software Features

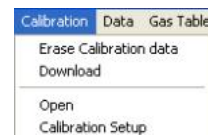
File

Allows the printing of files downloaded from your PhoCheck+ instrument.

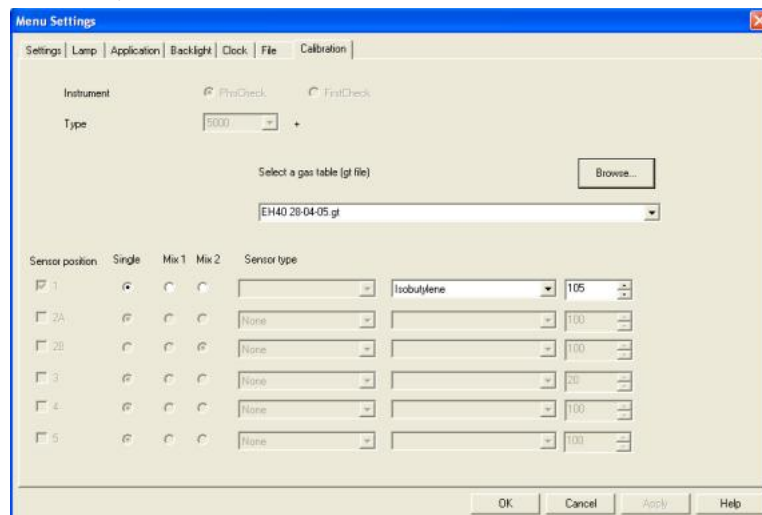


Calibration

Refers to the 'Custom' calibration of PhoCheck+. Enables the download of calibration data from the instrument to a PC, the erasing of the Custom calibration settings, the opening of previously saved calibration settings and the adjustment of the 'Custom' Calibration Setup.



Calibration Setup



The gas table provided with the software will be shown. However if you wish to use a different gas table previous selections will be shown on the drop down menu or click 'Browse' and search for and select the table you require.

You can now choose to set up your Custom calibration to your specific gas and concentration requirements. Click 'Apply' to send your specifications to the instrument. You are now ready to calibrate your PhoCheck+, see page 21 for details. The greyed out areas apply to the FirstCheck software, required if you upgrade your instrument.



IonPC Software Features

Data

Data logged information can be cleared from your instrument or downloaded from the instrument to your PC.

Once downloaded to your PC files can be saved for future reference and exported as CSV files.



Gas Table (Including setting alarm levels)

Select a gas table stored in the PhoCheck+ directory. You are able to modify this table and then download it to your instrument.

If you wish to add new gases to the table ensure you use the next available line, leaving no spaces as shown below.

Upper and lower alarm levels in Survey mode can be adjusted via the gas table. Type the desired alarm level in the appropriate column (either high or low alarm) against the gas you wish to change.

Use the tick boxes beside each gas to select / deselect the gases to be downloaded to your PhoCheck+ then select 'Send to Instrument' from the dropdown menu shown above.

Always save modified gas tables under a different file name, keeping the original complete.

Select	Gas Name	Abbreviation	Formula	Molecular weight	11.7eV (Ar) Factor	10.6eV (Kr) Factor	10.2eV (D2) Factor	8.4eV (Xe) Factor
<input checked="" type="checkbox"/>	Xylene, o-		C8H10	106	0.69	0.6	0.57	ZR
<input checked="" type="checkbox"/>	Xylene, p-		C8H10	106	0.62	0.46	1	4
<input checked="" type="checkbox"/>	Xylidine, all		C8H11N	121	NA	0.7	NA	ZR
<input checked="" type="checkbox"/>	WMD Arsine		AsH3	78	NA	2	ZR	ZR
<input checked="" type="checkbox"/>	WMD Lewisite		CICN	62	NA	1.2	ZR	ZR
<input checked="" type="checkbox"/>	WMD Mustard Gas		C2H2AsCl3	159	NA	1	ZR	ZR
<input checked="" type="checkbox"/>	WMD N-Mustard Gas		C4H18SCl2	172	NA	1.1	ZR	ZR
<input checked="" type="checkbox"/>	WMD Phosgene		COCl2	99	2.1	ZR	ZR	ZR
<input checked="" type="checkbox"/>	WMD Sarin		C4H10PO2F	140	NA	3.1	ZR	ZR
<input checked="" type="checkbox"/>	WMD Soman		C7H16PO2F	182	NA	3.2	ZR	ZR
<input checked="" type="checkbox"/>	WMD Tabun		C5H11PN2O2	162	NA	1.2	ZR	ZR
<input checked="" type="checkbox"/>	WMD VX		C11H26PNSO2	267	NA	1	ZR	ZR
<input checked="" type="checkbox"/>	WMD GF		C7H14PO2F	180	NA	3.3	ZR	ZR
<input checked="" type="checkbox"/>	WMD DMMP		C3H9BP3	124	NA	5	ZR	ZR
<input checked="" type="checkbox"/>	WMD Triethyl phosphate		C6H15PO3	182	NA	3.5	ZR	ZR
<input checked="" type="checkbox"/>	WMD Methyl salicylate		C8H19O4	152	NA	1	ZR	ZR
<input checked="" type="checkbox"/>	New gas	Mix	C14H12	101	1	1.2	3	10



IonPC Software Features

Instrument

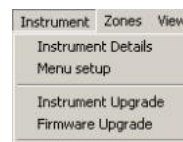
Instrument details such as serial number and data logged memory used can be downloaded from your PhoCheck+ to your PC.

Instrument upgrade allow the upgrade of your instrument to other

PhoCheck+ variants once you have purchased the pass code from ISL.

Firmware upgrade allows you to upgrade your actual instrument software directly should an upgrade be made available.

'Menu Set-up' allows you to change PhoCheck+ settings from your PC. These settings can be saved for future use.



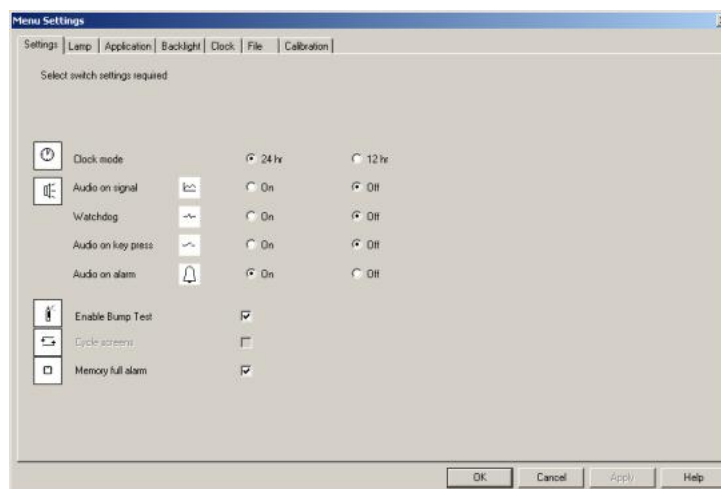
Menu Set-up

Adjustable features found on your PhoCheck+ instrument can also be changed via your PC along with some additional features. These features can be adjusted and then downloaded to your instrument by selecting Apply.

Settings

Within this tab there are a number of additional features including the clock (24 hr or 12 hr), sound controls on signal, confidence (a beep sounds every 15 seconds), on key press and on alarm.

When selected the Enable Bump Test sets the instrument to show a gas bottle image once a week when the instrument is turned on as a reminder to test the instruments response. Memory full alarm will ensure an alarm sounds if the PhoCheck+ data log memory is full to enable you to download the data or continue and overwrite previously saved data. Cycle screen is blocked out as this is an upgrade feature on the FirstCheck.

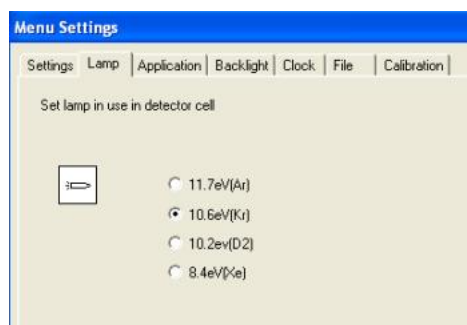




IonPC Software Features

Lamp

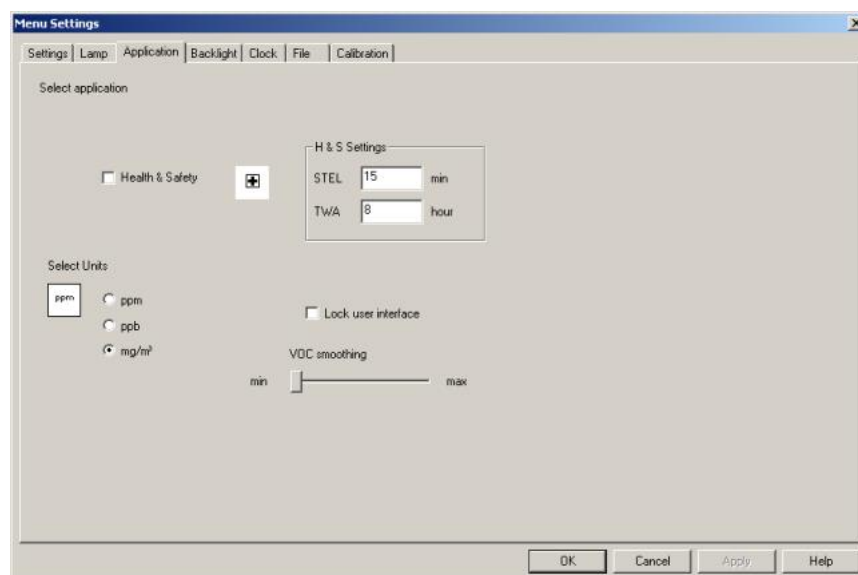
Enables the selection of different lamp types you may have purchased to use with your instrument.



Application

Enables the selection and de-selection of Health & Safety mode and the selection of ppm, ppb or mg/m^3 . In Health & Safety mode STEL and TWA timings can be adjusted to reflect the changes in legislation between the US and Europe.

The instrument can be set to security mode which enables the locking of the user interface so that the instrument functions can not be changed manually. To deselect security mode, switch the instrument Off then On, you then have 2 minutes from 'switch on' to connect your instrument to a PC and select Instrument / Menu set up. This will automatically place your instrument in PC mode ready for download or further adjustment. VOC smoothing relates to the PID reading and is used to have a dampening effect on the measurements for high gain factor gases. In effect increasing the T90 time to create a smoother graph. This affect can only be applied when in 'Survey' mode it does not apply in Health & Safety.

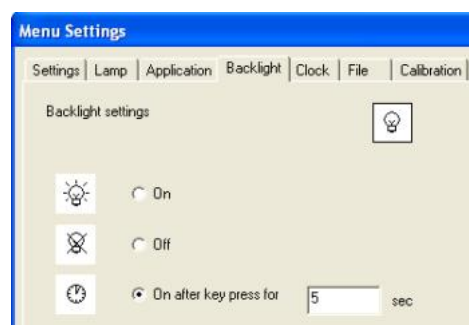




IonPC Software

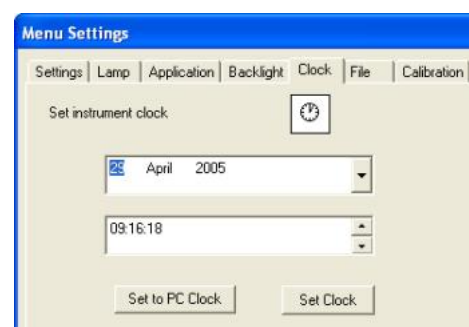
Backlight

Gives you the option of turning the back light on or off permanently or setting it on a timer after every key press.



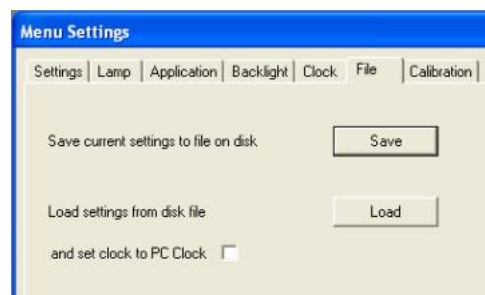
Clock

Set the instruments dock and date for the purposes of data logging. Either set it manually or if your PC clock is correct you can simply set your instrument to the same time as your PC clock.



File

Allows you to save the settings you have created to your PC for future use. It also enables you to open previously saved settings to then download to your instrument.





IonPC Software Features

Calibration

The calibration settings can also be adjusted under the Menu Settings and it is the same layout as described on page 30.

Once you have selected all of your settings you can either choose to 'Apply' them, which will download the information straight to the instrument and leave the screen open, or select OK, and they will be transferred to the instrument and the screen will close automatically.

Zones

Clear / Delete existing Zones from your instrument or create new Zones for download to your PhoCheck+. Please note data files stored within a Zone to be deleted will be lost. Always download Data from your instrument before deleting Zones.

Zone	
	Zone name
1	Zone 1
2	Zone 2
3	Zone 3
4	Zone 4
5	
6	
7	
8	
9	

Zones	View	Window	H
Clear Zones New Open... Close Save Save As... <hr/> Send to Instrument			

View

Select or hide the PhoCheck+ software toolbar or status bar.

View	Help
<input checked="" type="checkbox"/> Toolbar <input checked="" type="checkbox"/> Status Bar	

Help

Offer advice on the use of PhoCheck+ software.

Help
Help Topics <hr/> About FirstCheck...



IonPC Software

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PhoCheck+ is a portable gas-detector suitable for the detection of; volatile organic compounds (VOC's) using PID (Photo Ionisation Detection) technology.

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As the only warranty under this Agreement, Ion Science Ltd warrants, to the original Licensee only, that the CD(s) on which the software is recorded is free from defects in materials and workmanship under normal use and service for a period of ninety (90) days from the date of delivery as evidenced by a copy of the Receipt. This limitation will apply where allowed.

Replacement of Defective CD

Ion Science Ltd entire liability and the original Licensee's exclusive remedy under this agreement are at Ion Science Ltd discretion, to either (a) return of payment as evidenced by a copy of the Receipt, or (b) replacement of the disk that does not meet Ion Science Ltd limited warranty and which is returned to Ion Science Ltd with a copy of the Receipt. If failure of the disk has resulted from accident, abuse, or misapplication, Ion Science Ltd will have no responsibility to either replace the disc



IonPC Software

or refund payment. Any replacement disk will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer. This warranty gives you limited, specific legal rights. You may have other rights in some places.

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Governing Law

The laws of the United Kingdom govern this Agreement.



Batteries

WARNING:

For reasons of Intrinsic Safety, batteries MUST NOT be charged or replaced within potentially flammable areas. Ensure you are in a SAFE area before carrying out any type of maintenance on your PhoCheck+ instrument.

Instrument battery type identification

Non-rechargeable PhoCheck+ instruments have a removable battery cover on the rear of the handle area. A security tool is required to remove it.

Rechargeable PhoCheck+ instruments have no removable battery cover but have a charging socket on the instruments end.

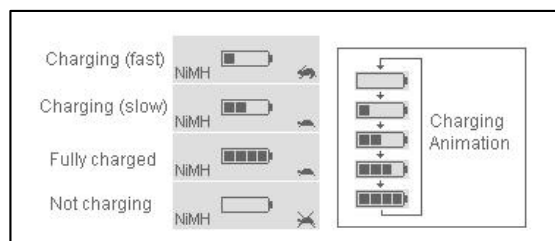
Non-rechargeable battery types to be used

For Intrinsic Safety of T4 rating and reduced risk of explosion you must only use Duracell Standard, Procell Alkaline, Zinc Carbon R6, R6B, R6PP or an ION SCIENCE APPROVED battery pack. DO NOT mix old / used batteries or batteries from different manufacturers.

Rechargeable battery instruments*

Ensure rechargeable PhoCheck+ instruments are charged for at least 12 hours before using it for the first time. To ensure optimum charging the charger should be attached to the PhoCheck+ when the instrument is switched off.

When the instrument is on charge the screen will display the instruments charging status.



When the battery power is very low the following symbol will appear.



NB: Only use the charger supplied with your PhoCheck+ to charge your instrument.

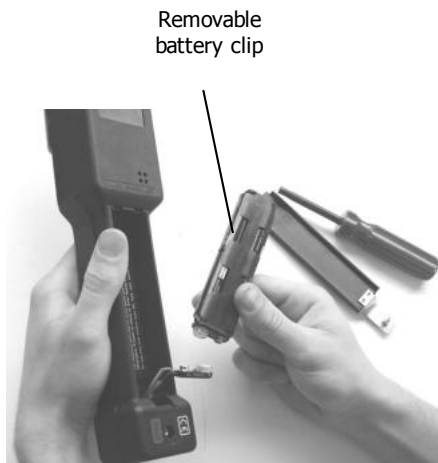
***Note:** Ion Science recommends keeping your PhoCheck+ on charge at all times when not in use, as batteries can lose power over time. Loss of battery power can result in the instrument's charge indicator showing a 'non-charging' status when trying to charge the unit. If this occurs, leave the charger connected for two minutes, then remove and reconnect the charger as soon the timer symbol disappears. You will now see the instrument charge as normal.



Batteries

Replacement of Non-rechargeable batteries

1. Ensure the PhoCheck+ is switched Off.
2. Using the battery cover removal tool provided, remove the battery cover at the rear of the instrument casing. This reveals a set of 4 x AA cells contained in a removable battery clip.



3. Remove the battery clip.
4. Replace the exhausted batteries using the guidelines stated above.
5. Check all batteries have the correct polarity before reconnecting the clip to the instrument.

WARNING: Fitting batteries or connecting the clip with the wrong polarity may result in damage to the instrument!

NB: When loading batteries check for correct battery polarity before connecting batteries.



Diagnostics

Basic faults or diagnostics are presented as symbols with a more detailed description of the fault indicated by the number in the top right hand corner of the display. Should a fault occur correct the issue and then press 'Enter' or 'Esc' to clear the fault message.

General fault



1. Main PCB failure.
Return the instrument to manufacturer.

Pump



1. Pump failure
Check the probe, filter and cell cap are fitted.
If the error persists return the instrument to the manufacturer.
- 2 & 3. Sample gas flow is low.
Check the probe and filter for signs of blockage.
If the error persists return the instrument to the manufacturer.

Battery



Battery is low or:

1. Not charging.
Check charger is connected and switched ON at supply.
2. Slow charge current is low.
Check the battery settings.
3. Slow charge current is high.
Disconnect the charger immediately and contact ISL.
4. Fast charge current is low
Check the battery settings.
5. Fast charge current is high.
Disconnect the charger immediately and contact ISL.

With all battery related faults, if the fault persists return the instrument to the manufacturer.



Diagnostics

Sensor



1. Detector cell fuse failure
If the error persists return the instrument to the manufacturer.
2. Contaminated detector cell
If the PhoCheck+ is used without its filter or filters are not replaced on a regular basis, particles of dust or dirt can cause a range of effects. Remove the detector lamp as shown on page 43 and use low pressure oil free compressed air to blow out the contamination via the small pipe. Replace cleaned lamp and try again. If the error persists return the instrument to the manufacturer.

Gas Selection



The gas being selected is not compatible with the selected lamp.
The lamp being selected is not compatible with the selected gas.
Press Esc and select a compatible gas and lamp.

Health & Safety



When in Health & Safety mode the selected gas has no STEL or TWA alarm values.
This provides a warning in Health & Safety mode that the change you are making could effect the ongoing calculations. You can proceed with the adjustment by pressing enter or return to the display screens by pressing Esc.

Memory Alarm



The data logging memory is full and will begin to write over previous readings.
Will only show if the data logging memory alarm has been set to ON (see pg 25 & 32).
Press Esc and either continue and previous readings will be over written or down load saved data to a PC before continuing.



Diagnostics

Clock



The internal clock has failed.
Return the instrument to the manufacturer.

Delay



This symbol will appear during the manual adjustment and selection of functions of the instrument. It indicates that data within the memory is being moved. Please wait and the symbol will disappear after a few seconds depending on the change being made.

Bump test



This symbol will appear on switch on if the Enable Bump Test setting has been selected via the PC software (see pg 32). The symbol is a prompt that will appear once a week to remind the user to test the instrument responds accurately when supplied with gas.



Maintenance

1. Keep the PID detector lamp window clean.
2. Replace the sample filters on a regular basis. Frequency of cleaning the detector lamp and replacement of the filter depends on the type of gas being detected and the quality of the background air. See page 51 for details of parts expected life time.
3. The secondary probe filter is designed to strengthen the instrument response, even in condensing environments.

If the instrument background reading is high, change the main probe filter first. If the readings remain high it will be necessary to change the secondary probe filter as follows;

- a) Using an 11mm (7/16") spanner unscrew the probe fitting from the end of the PID detector nozzle.
- b) Remove and discard the secondary probe filter
- c) Insert a new secondary probe filter into the probe fitting
- d) Screw the probe fitting back onto the nozzle and tighten using the 11mm (7/16") spanner



CAUTION: DO NOT OVERTIGHTEN THE PROBE FITTING

Cleaning the PhoCheck+ Lamp

The PhoCheck+ PID relies on an ultraviolet light source ionising VOC gases as they pass across the lamp window. This process may result in a very fine layer of contamination appearing on the detector window that must be removed on a regular basis.

CAUTION!

The PhoCheck+ is a sensitive detector. Internal components must be handled with clean hands and clean tools. The PhoCheck+ lamp is fragile. Handle with great care!

1. Ensure that the PhoCheck+ is switched OFF.
2. Remove the probe and filter.
3. Unscrew the black knurled ring to expose the detector lamp.
4. Push a lamp-removing sleeve over the end of the lamp. This allows the user to grip the glass.





5. Extract the lamp from its socket by pulling it in a straight line away from the PID cell. Force is only required when pulling the lamp past the O ring. Once past the O ring the lamp will move freely.



Passed the
O-ring

WARNING!
NEVER REFIT A DAMAGED LAMP!



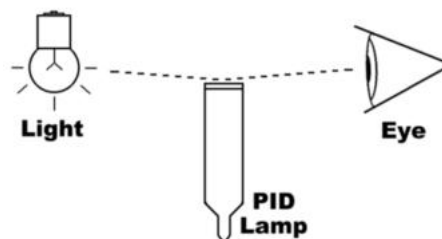
Move freely in
a straight line



Maintenance

Cleaning the PhoCheck+ Lamp(Continued)

6. Inspection of the lamp may reveal a layer of contamination on the detection window that presents itself as a 'blue hue.' To check for contamination, hold the lamp in front of a light source and look across the window surface.



USE of PID lamp cleaning kit A-31063

1. The vial of cleaning compound contains Aluminium Oxide as a very fine power (CAS Number 134428-1). A full material safety data sheet MSDS is available on request from Ion science ltd. The key issues are listed below:

Hazard identification:

- May cause irritation of respiratory tract and eyes.

Handling:

- Do not breathe vapour/dust. Avoid contact with skin, eyes and clothing
- Wear suitable protective clothing
- Follow industrial hygiene practices: Wash face and hands thoroughly with soap and water after use and before eating, drinking, smoking or applying cosmetics.
- The Compound has A TVL(TWA) of 10 mg/m³

Storage:

- Keep container closed to prevent water adsorption and contamination.

2. Open the vial of Aluminium Oxide polishing compound.
With a clean cotton bud collect a small amount of compound



3. Use this cotton bud to polish the PID lamp window. Use a circular action applying light pressure to clean the lamp window. Never touch the lamp window with fingers.



4. Continue polishing until an audible "squeaking" is made by the cotton bud with compound moving over the window surface. (usually within 15 seconds)



Maintenance

- 5 Remove the residual powder with a clean cotton bud. Care must be taken not to touch the tips of cotton buds that are to be used to clean the lamps as this may contaminate them with finger oil.
6. Ensure the lamp is completely dry and any visible signs of contamination are removed before refitting.
7. The instrument MUST now be re-calibrated.

Blowing out the PID Cell

When using the PID instrument in conditions of high ambient humidity, the PID may show unexpected readings appearing to increase. This occurs due to dust or other small particles within the detector becoming hydrated with humidity. This causes these particles to conduct a signal between the electrodes. This issue can be resolved by the user in the field using the following procedure and a can of computer duster air.

First remove the lamp, following the instructions on lamp removal from the cleaning the lamp section above (steps 1 – 5). Using a can of computer duster, spray air down the small metal tube. Replace the lamp and cap and test the instrument.



Accessories

Ion Science Ltd has developed an exclusive range of high quality accessories to compliment the PbCheck+. Please see a selection of these below.

Part Number	Accessory Description
A-830206	IS Protective Cover II 1 G EEx ia IIC T4/ II 2 G EEx iad IIC T4 Baseefa 02ATEX0093X, Baseefa 03ATEX0742X PK of 10
A-845213	Calibration Kit
A-31064	25mm (1") diameter 0.5 micron probe filter PK of 5
A-31066	Std probe attachment PK of 5
A-31063	PID Lamp Cleaning Kit (20 Cleans)
A-30555	5 m (16 ft) flexible extension hose
A-30556	10 m (33 ft) flexible extension hose
A-31146	Secondary Probe Filters (pack of 5)
A-31153	Exhaust barb, Tedlar bag connector
A-31057	Carbon filter
30618	PID lamp, type 8.4 eV Xenon
30619	PID lamp, type 10.2 eV Deuterium
30620	PID lamp, type 10.6 eV Krypton
30621	PID lamp, type 11.7 eV Argon
31052	Leather instrument jacket
40052	Leather instrument jacket with magnetic attachment
4/VH-01	Instrument chest harness for hands free operation
1/VS-18	Universal 9 volt power supply without plug
1/VS-16	9 V power supply UK moulded plug
1/VS-17	9 V power supply Euro moulded plug
1/VS-19	9 V power supply US moulded plug



Protective / Decontamination Cover

General Description

This unique accessory enhances the base intrinsically safe approval of Ion Science instruments, including FirstCheck and PhoCheck, from category 2 (Zone 1) to category 1 (Zone 0) classification. The cover also increases instrument's ingress protection rating to IP66 allowing the instruments to be used in applications where the instruments are likely to get wet such as arson investigation, emergency response and in heavy rainfall.

The cover being very low in cost has the advantage when used in HazMat applications, including possible WMD exposure, in that it is simply removed after use and replaced with a fresh one keeping both the user and instrument safe from exposure long after the event.

NB: the IS protective cover must be used only once. If it becomes torn or damaged the intrinsically safe certification and ingress protection ratings revert to that of the instrument inside it.

Technical Specifications

Made from anti-static material

Baseefa02ATEX0093X / Baseefa03ATEX0742X



II 1G, EEx ia IIC T4 (-20 °C ≤ Ta ≤ +60 °C)

Dimensions: 430 mm (L) x 126 mm (W)

Please note double sided sticker adhesive must be applied in a dry atmosphere which is > 5 °C, it will then remain effective down to -20 °C.



IS Protective Cover

Fitting Instructions

1. Insert instrument into the IS protective cover ensuring that the probe tip exits through the small slit at the top of the cover and that the cover labelling and stickers are on the reverse of the instrument.
2. Seal the cover at its base and lay the instrument on a flat surface with the label and stickers facing upwards.
3. Peel off the backing to the large section of double-sided tape in the middle of the instrument.
4. Gather the excess plastic on one side of the instrument and stick it on the midway point of the double-sided tape.
5. Gather the excess plastic on the other side of the instrument and stick it to the remainder of the double-sided tape.
6. Now remove the backing from one of the small pieces of tape and secure it to the side of the instrument.
7. Remove the final piece of backing and secure it to the other side of the instrument.
8. The instrument is now ready to use in Category 1 (zone 0) areas and in applications where it is likely to get wet.





Upgrade Options

All PhoCheck+ instruments have the ability to be upgraded in the field to the other variants within the PhoCheck+ range. This change can simply be achieved by contact Ion Science for a quote and placing an order. We will supply you with a unique security key code for your specific instrument which can be downloaded to the instrument via the Ion PC software to make the change:

It is also possible to upgrade any PhoCheck+ instrument to a FirstCheck+ instrument to incorporate the multigas sensors for O₂, H₂S, CO and LEL gas detection for the ultimate in gas detection. This upgrade will require the return of the instrument to Ion Science or an Ion Science approved service centre. Please do not hesitate to contact Ion Science if you require any more information or would like a quote.

	PhoCheck + 1000	PhoCheck+ 2000	PhoCheck+ 3000	PhoCheck+ 5000	FirstCheck+ 4000	FirstCheck + 6000
PhoCheck+ 1000		Upgrade	Upgrade	Upgrade	Upgrade	Upgrade
PhoCheck+ 2000			Upgrade	Upgrade	Upgrade	Upgrade
PhoCheck+ 3000				Upgrade	Upgrade	Upgrade
PhoCheck+ 5000						Upgrade
FirstCheck+ 4000						Upgrade
FirstCheck+ 6000						



Service Options

Ion Science is pleased to offer a number of service options on our PhoCheck+ product range. The options below allow you to choose the cover provided for your instrument that best suits your needs.

At Ion Science we recommend that all of our gas detection instruments be returned for recalibration on an annual basis to ensure optimal performance. For your convenience recalibration has been built into both service options. Choose between our Gold and Platinum Service levels giving you piece of mind in a fixed cost solution.

Gold Service

- Includes annual calibration after 12 months
- Includes all repair costs and required spare parts
- All calibrations and repairs will be carried out in 3 working days – if not a replacement instrument will be sent out of equal or greater specification.
- Instrument will be upgraded to the latest software versions upon return to Ion Science.

Platinum Service

- Never be without your instrument!
- Should your instrument fail or need to be returned for annual recalibration Ion Science will first ship you a replacement instrument, of equal or greater specification with the latest software, by courier who will also collect your returning instrument.
- Includes your annual calibration and any required spare parts.

Both Gold and Platinum options can be purchased on a yearly basis or on a 5 year service contract option. By entering into either service contract, this will entitle you to various accessories, discounts and promotions.

For more information please contact our service department:

Telephone:	+44 (0) 1763 207228
Fax:	+44 (0) 1763 208814
Email:	calibration@ionscience.com



Technical Specifications

Detector PID (VOC detector)	Range 1 ppb - 10,000 ppm (5000Ex) 0.1 ppm - 10,000 ppm (3000Ex) 0.1 ppm - 4,000 ppm (1000Ex and 2000Ex)	Response Time* T90 < 1 second
Accuracy	+/- 5% displayed reading +/- one digit**	
Linearity	+/- 5% displayed reading +/- one digit**	
Battery	4 x AA size	Specified Alkaline or 1.2V Rechargeable NiMH
Alarm	Flashing LED and 90 dBA (10 cm) audible sounder	
Flow Rate (Approx)	220 ml/min or 220 cc/min	
Temperature	Operating Storage	-20 to 60 °C (-4 to 140 °F) -25 to 60 °C (-13 to 140 °F)
Dimensions	Instrument Standard Carry Case:	340 x 60 x 50 mm 420 x 320 x 97 mm
Weight	Instrument Packed in case	0.640 kg (1.4 lb) 3.1 kg (6.8 lb)
Materials	Instrument Standard Carry Case	Conductive carbon-loaded polypropylene-based resin casing. Polypropylene, with a polyester foam insert

*Response time of the instrument is affected by the use of a length of tubing in applications such as confined space entry. The following response times show the affect on the PID detector based on 213 ml/min with a filter attached with a tube internal diameter of 1.6 mm at 20 °C:

Length of tube	Flow ml/ min	Response time in seconds
Standard probe	213	0.1
1 m	212	0.8
2 m	212	1.7
3 m	211	2.6
5 m	209	4.3
10 m	199	9.0
20 m	190	19.0
30 m	172	32.0

** Assumes constant environmental conditions



Technical Specifications

Expected lifetime of parts

Batteries

On the condition of normal use battery capacity will be reduced to approximately 70% after 250 full battery cycles or 1 year (whichever comes first).

New fully charged (rechargeable) batteries at 20°C > 10 hours normal use.

Affects on battery capacity:

10% less per 10 °C drop in temperature.

As the batteries age they may self discharge to half capacity from fully charged state.

At 25 °C – 50 days

37 °C – 25 days

48 °C – 5 days

60 °C – 1 day

The back light will consume an additional 50% power and significantly reduce the instrument 'on time'.

Filter

The filter should be changed every 100 hours of use. This frequency should be increased for dusty or moisture laden environments.

PID Lamps

10.6 eV, 10.2 eV and 8.4 eV expected life of 3 years and 11.7 eV 1 month. Lamps are very fragile please handle with care at all times, never touch the window and do not drop!

Lamp cleaning for normal use is every 100 hours of use (based on 30 ppm for 100 hours). Reduce this if used in heavily gas contaminated environments. Please note that some esters, amines and halogenated compounds may accelerate window fouling cleaning may be required for every 20 hours of use. Cleaning frequency will also depend upon alarm levels set and prevailing environmental conditions.

PID Cell

Electronic cell has an indefinite life however it may suffer contamination problems– it is essential that a clean filter is attached during use. Some gases such as methylene chloride in high concentrations may condense on to the walls of the cell. If condensing is severe and cannot be cleaned, then a replacement may be required.

NB: PID specifications relate to an isobutylene 100 ppm in air calibration at 20 °C and 90% RH.

LEL specifications relate to a methane (CH₄) calibration, other gases are available upon request.

Other gas sensors as specified at appropriate international alarm standards.



Update Log

Manual Version	Amendment	Date Updated	Instrument Firmware	PC Software
PhoCheck+ V1.6	Ion Science recommends keeping your PhoCheck fully charged at all times, in some circumstances batteries can loose power overtime while not in use.		V51	V1.24
PhoCheck+ V1.7	If batteries are extremely low the instrument will not turn on and indicates the battery is fully charged. To remedy this leave charger connected for 2 minutes, then remove charger and reconnect as soon as the hour glass disappears. You will now see the instrument charge as normal.	9/6/08	V51	V1.24
PhoCheck+ V1.7	Add information for IS Protective Cover and change version to 1.8	18/6/08	V51	V1.24
PhoCheck+ V1.8	Add new software installation routine and save as 1.9	24/10/08	V51	V1.24
PhoCheck_ V2.0	<ul style="list-style-type: none"> • Declaration of conformity updated • Include note regarding lamp cleaning ie. Blowing out the lamp will resove 95% of contamination issues • Additional bump test after custom calibration 	27/11/08	V51	V1.24
PhoCheck+ V2.1	Log added to back of manual	09/01/09	V51	V1.24
PhoCheck+ V2.2	<ul style="list-style-type: none"> • Secondary Probe Filters added to Packing List (pg8) • Secondary Probe Filter maintenance added to list (pg43) • Secondary Probe Filter added to Accessories List (pg 47) 	24/03/09	V51	V1.24