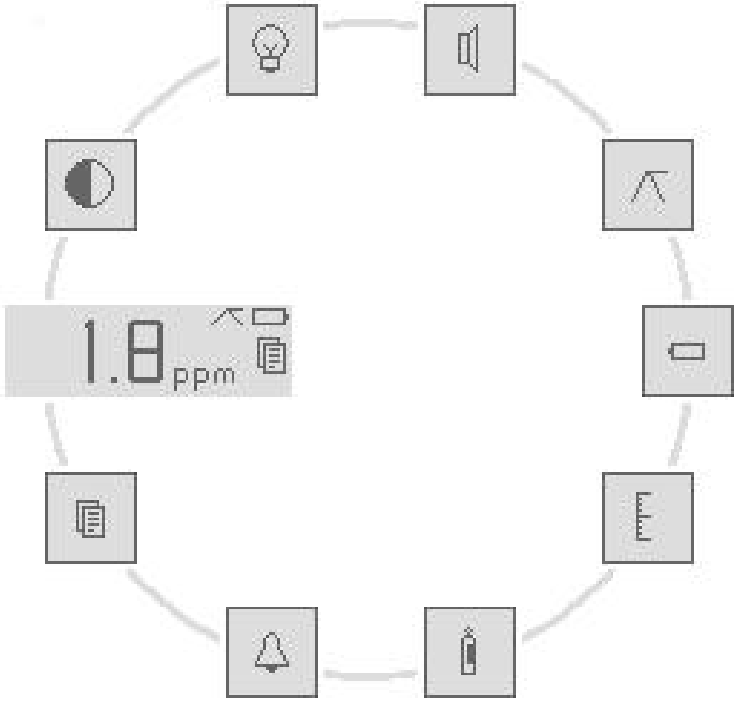
PhoCheck 1000 User Manual V2.0



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24 Baretta Rd
Wangara Western Australia 6065
Tel 1800 999 902
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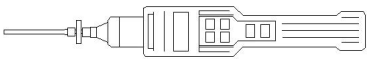
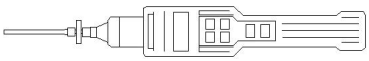




Declaration of conformity

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

Product: PhoCheck 1000

Product description: Hand held detector comprising of a photo-ionisation detector

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

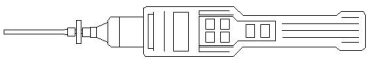
BS EN ISO 9001:2000	Quality Management Systems – Requirements
BS EN 61010-1:2001	Safety requirements for electrical equipment or measurement, control and Laboratory use – General requirements

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.

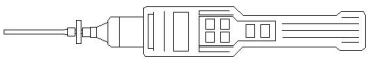
Name: Mark Stockdale **Position:** Technical Director

Signature: 

Date: 20th November 2008



Contents Page



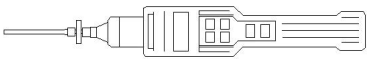
Principle of Operation
PhoCheck is a portable PID gas-detector operating by photoionisation and ion current measurement of Volatile Organic Compound (VOC) gases such as hydrocarbon fuels, solvents and semiconductor gases.

Quality Assurance
PhoCheck has been designed in compliance with ISO9002. This ensures that the equipment supplied to our customers has been assembled reproducibly, and from traceable components.

Disposal
Dispose of the PhoCheck, its components and any used batteries safely, in accordance with all local and national safety and environmental requirements.
The PhoCheck field case material is recyclable polypropylene. Lamps should be disposed of with care due to possible breakage of glass.

Calibration Facility
Ion Science Ltd offers a calibration service, including the issue of certification using equipment which is NAMAS traceable. Additionally, using the Calibration Kit that is available from Ion Science, a two-point calibration can be carried out on-site.

Responsibility For Use
PhoCheck instruments detect a large range of Volatile Organic Compound (VOC) gases which are dangerous from both a toxicological and explosive perspective. PhoCheck instruments have many adjustable and selectable features allowing them to be used in a variety of ways. Ion Science Ltd accepts no responsibility for the incorrect adjustment of features that cause harm or damage to persons or property.



Getting started

Packing List

Please check the contents of the PhoCheck case before removing components.

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.	Lamp extraction tool - Rubber tube	2
6.	Power supply (if rechargeable)	1
7.	Rechargeable battery pack (if rechargeable)	1
8.	User manual	1

Removing the PhoCheck from its case

Carefully remove the PhoCheck instrument from its case so as 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 (clockwise) ONLY to connect or disconnect them. DO NOT OVER TIGHTEN!

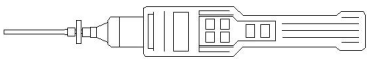
To avoid drawing dust or particulate matter into the detector cell, we suggest always fitting the filter with the Ion Science logo facing away from the instrument.

Rechargeable Battery PhoCheck's

Although PhoCheck instruments leave the factory fully charged, prolonged periods of storage will result in the battery pack discharging. We suggest charging the instrument for 12 hours before use. See Batteries (Page 18).

Alkaline Battery PhoCheck's

Fit the battery pack supplied with the PhoCheck (Page 18).



Keypad Functions

On/Off
To switch the PhoCheck instrument 'ON' - Press the 'ON/OFF' key.
To switch the PhoCheck instrument 'OFF' - Ensure the Main Display screen is shown, press and hold the 'ON/OFF' key for 2 seconds. A bar along the left side of the display screen indicates the time required to hold the ON/OFF key. This procedure has been designed to avoid accidental switch OFF.

ENTER
This key selects options, confirms settings and is also used when 'Data Logging' - See 'Data log indicator' and 'View data sections'. (Pages 11)

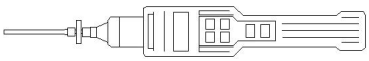
ESCAPE
This key is used to return the display to the previous screen and to abort an adjustment. Repeated pressing of this key will return the display to the 'Main screen'.

UP
Use to scroll up or change selection.

DOWN
Use to scroll down or change selection.

ZERO
Zero's peak readings when on 'Display Screen'.

Caution: If the PhoCheck instrument is taken from a cold to warm environment, condensation may form on internal parts of the detector cell. Under these conditions prolonged measurement errors may appear as unusually high background levels, even in a clean air environment. To compensate for this error, press and hold the 'ZERO' key for at least two seconds.



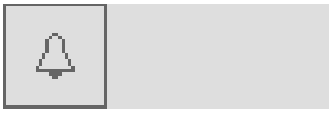
Instrument Function Concept

How the PhoCheck's menus work

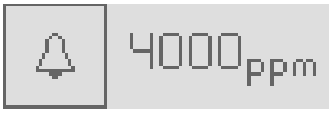
From the Main Display screen (page 10), use the 'UP' and 'DOWN' keys to view the various function symbols.

Example: - To adjust the Alarm level

Access the Alarm function-symbol by using the up-down keys, then on the screen press the 'Enter' key to select it.



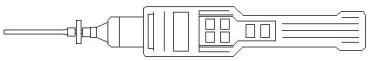
Sub-menu options or variable parameters will appear. Use the UP and DOWN keys to adjust the parameter and then press the ENTER key.



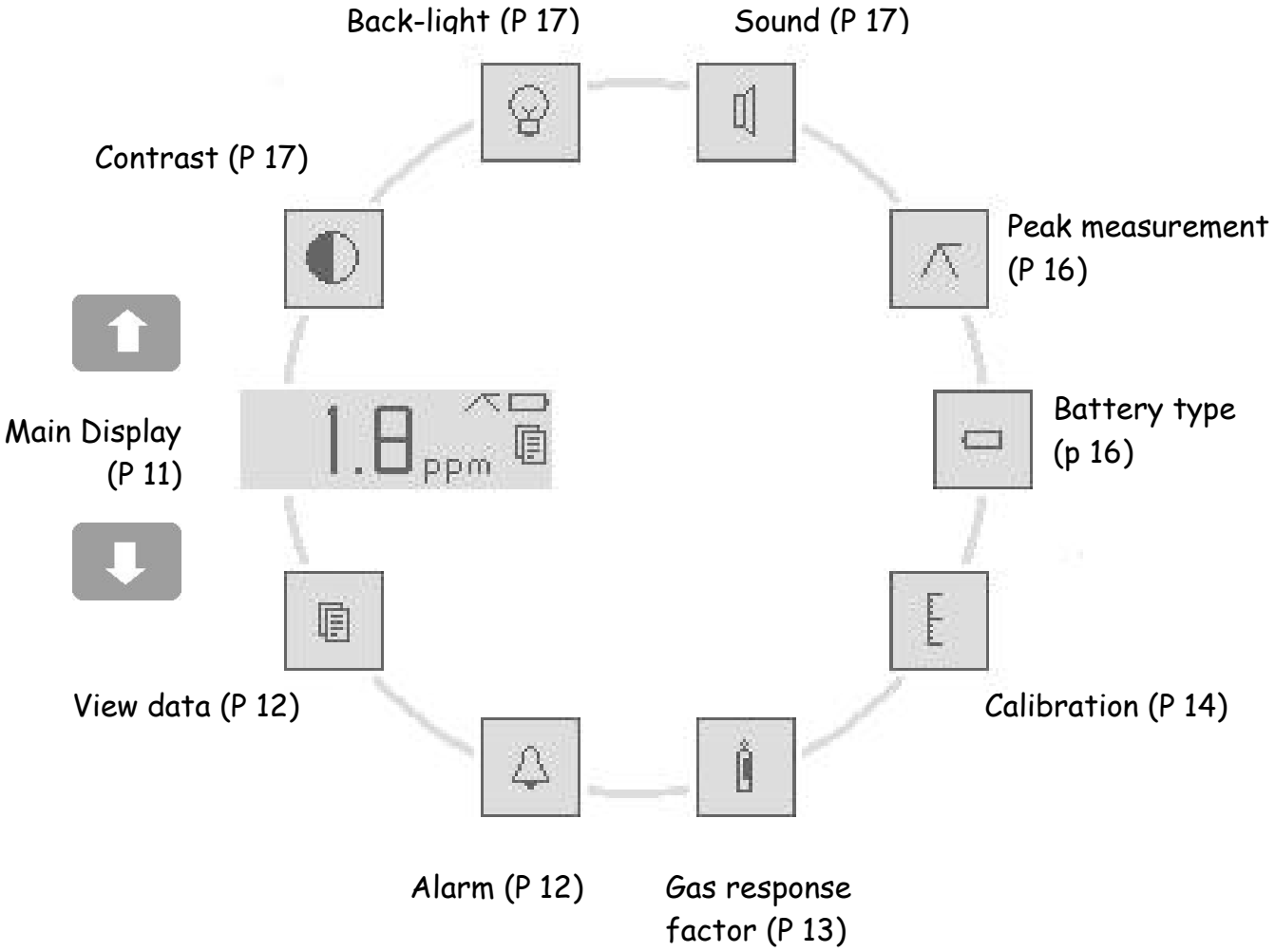
In most cases a tick (✓) will appear to confirm the action, at this point the parameter has been accepted and will be used by the PhoCheck.

Although there is a degree of 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.

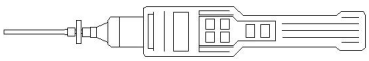


Function location



From the 'Main Display' screen, use the 'Up/Down' keys to view the available functions then press 'Enter' to select the function options

The 'Backlight', 'Sound' and 'Peak Measurement' function symbols will have a cross-overlaid when unselected.



Quick reference

Main Display **(Page 11)**
Displays the measured level in ppm, battery status, the selection of the Peak Hold function and the presence of logged data within the instruments memory.

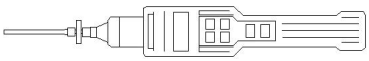
View Data **(Page 12)**
Allows viewing of previously stored data from the instrument's internal memory.

Alarm **(Page 12)**
Allows adjustment of the PhoCheck alarm level.

Gas Response Factor **(Page 13)**
Adjustment of the response factor allows the instrument to calculate and display readings of gases other than Isobutylene.

Calibration **(Page 14)**
Allows the selection of either Factory or Custom calibration. Custom calibration allows the instrument to be calibrated to a customer specified gas.

Battery Type Selection **(Page 16)**
Alkaline or Nickel Metal Hydride rechargeable batteries can be used to power the PhoCheck 1000. Accuracy of the battery power indicator shown on the Main Display screen relies on this setting.



Quick reference

Peak Hold **(Page 16)**

When selected the peak measurement is held on the PhoCheck's display. Pressing the ZERO key clears the reading from the display. Pressing the ENTER key stores the reading in the PhoCheck memory and then clears the display.

Sound **(Page 17)**

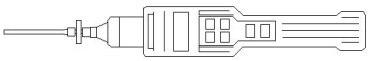
The frequency of an audible 'Beep' the level of detected gas relative to the Alarm level.

Back light **(Page 17)**

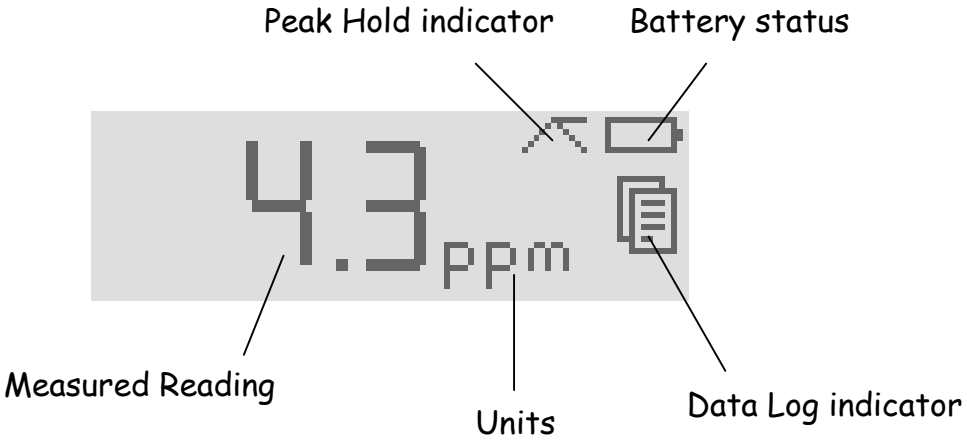
The PhoCheck back light aids viewing when in areas with restricted light.

Contrast **(Page 17)**

Allows the manual adjustment of the screen's contrast.



Main Display



Battery status

Discharged
Charged

The battery status indicator is present on the 'Main Display' screen only.

Data log indicator

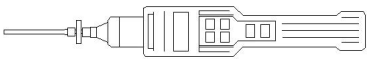
The 'Data log' symbol is only displayed when data is held within the PhoCheck 1000 memory. Pressing the ENTER key when viewing the 'Main display' causes the displayed measurement to be logged / stored in the PhoCheck 1000 memory. Up to 50 measurements can be logged and then viewed via the 'View data' function. (Page 12)
The Data log symbol will flash when the memory is full.

Units

The PhoCheck 1000 only displays measured values in ppm (parts per million by volume).

Peak reading

When selected, the peak measurement is held on the PhoCheck's display. Pressing the ZERO key clears the reading from the display. Pressing the ENTER key stores the reading in the PhoCheck memory and then clears the display.



Instrument Functions

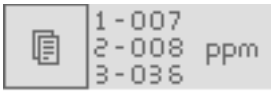
General

From the 'Main Display' screen, use the 'Up' and 'Down' keys to find the function you require. To enter the function press the 'Enter' key.

View data

When the Data Log symbol is on the screen press the ENTER key to view the stored readings.

Use the UP and DOWN keys to view up to 50 stored readings. A reference number to the left of each reading indicates the sample order.

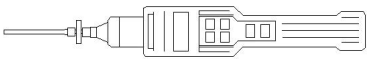


To clear the stored results press the 'ENTER' key. A bin icon will appear. Press the ENTER key again to delete all stored readings. After the memory has been cleared a '✓' appears to confirm the action.

Alarm

The PhoCheck 1000 has an alarm level that can be adjusted to a desired level. With the Alarm symbol on the screen press the ENTER key to view the current setting.

Adjust the Alarm level using the UP and DOWN keys then press the ENTER key to confirm the setting. A '✓' will appear to confirm the action.



Instrument Functions

Response Factor

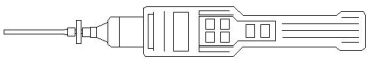
This instrument has been calibrated on 100 ppm Isobutylene as standard; this has a response factor of 1.0.
Adjusting the response factor allows the PhoCheck to calculate equivalent levels of other detectable gases.

With the Gas Bottle symbol on the screen press ENTER to view the current factor. Use the UP and DOWN keys to adjust the response factor. When adjusted to the desired level press the ENTER key to accept the adjustment. A '✓' will appear to confirm the action.

The table below shows some common gases and with response factors.

Gas Name	Response factor
Acetone	0.7
Ammonia	8.5
Benzene	0.5
Diesel Fuel	0.8
Ethanol	8.7
Isobutene (Isobutylene)	1.0
Isopropanol	4.4
Methyl Bromide	1.9
Petrol	0.8

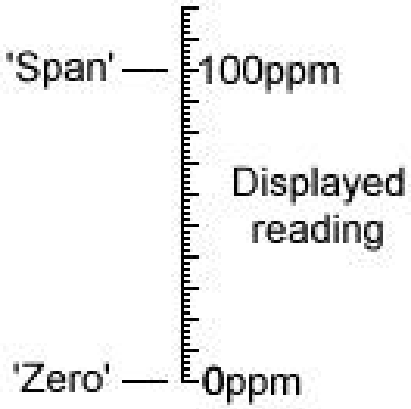
Other response factors are available on request from:
gastyperequest@ionscience.com
or tel. +44 (0) 1763 208503



Instrument Functions

Calibration - General Description
The PhoCheck 1000 is a simple instrument that only requires two points of reference to calibrate. The PhoCheck scales its linear output across a 'Zero' level (clean air reference) and the 'Span' (known detectable level). As the name suggests 'Factory calibration' levels are set after instrument manufacture and can not be adjusted by the user.

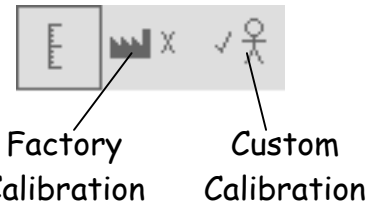
Factory Calibration
When the 'Factory calibration' symbol is selected, fixed points mentioned above are used to scale the detected signal. Although 'Factory' calibration offers a constantly good reference, prolonged use may mean these reference points become less dependable.



Custom Calibration
When 'Custom Calibration' is selected a 'Zero' and 'Span' level can be set by the user.

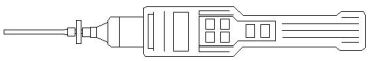
Please read ALL of this procedure before attempting a calibration.
Ensure that this procedure is carried out in a clean air environment.

1. Select 'Custom Calibration' procedure on the PhoCheck's menu. A symbol of a carbon canister will appear.



2. Remove the caps from both ends of the carbon canister.

3. Remove the Probe and filter from the PhoCheck and fit the carbon canister.
Note - Do not force the carbon canister fitting.



Instrument Functions

Custom Calibration (Continued)

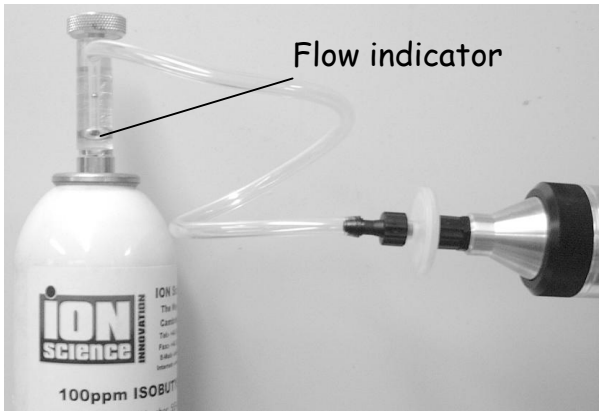
4. Press the ENTER key to start the ZERO countdown process. The counter indicates the time remaining until the next stage.

5. At the end of the countdown a gas symbol will appear indicating that the calibration gas is to be connected.

6. Disconnect the carbon canister and replace the end caps. The useful life of the carbon canister will be shortened if the canister is exposed to ambient air for prolonged periods.

7. Ensure the valve on the Flow indicator assembly is turned 'Off' (as indicated on the valve cap) before it is screwed to the gas canister. This will avoid any unnecessary waste of gas.

8. Connect the flexible pipe of the 'Flow Indicator' assembly to the PhoCheck instrument as seen in the photograph. The canister must remain upright (vertical) during the calibration procedure.



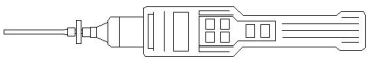
You are now ready to calibrate your PhoCheck's 'Span' level.

9. Open the 'Flow Indicator Valve' and immediately press the'ENTER' key on the instrument to start the 'Span' calibration process. Flow of gas from the canister can be viewed via the flow indicator. (See above photograph)
The PhoCheck needs to detect a steady and constant supply of gas before it will set the 'Span' point at the detected level. We suggest that the instrument is held still until a '✓' appears, to indicate a successful calibration.

10. Turn 'Off' the valve immediately to avoid wasting gas.

11. Replace filter and probe as necessary. Carry out a Bump Test to ensure calibration was successful. Instrument is now ready for use.

Note: The 'Flow Indicator Assembly' is not guaranteed leak-tight so we suggest removing it from the canister before storage.



Instrument Functions

Custom Calibration (Continued)

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

* The carbon canister may be contaminated.
* The gas canister may be low or empty.
* The flexible connector pipe may have a 'kink' (restricting flow of gas).
* The lamp may require cleaning.
* The lamp may need replacement.

CAUTION: Taking your PhoCheck instrument from a cold to warm environment may cause condensation to form on internal parts of the detector cell. Prolonged errors in reading may appear as unusually high background levels even with a carbon canister fitted.
To compensate for this error, press and hold the 'ZERO' key for at least 2 seconds.

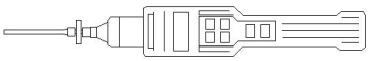
Battery Type Selection

Press the ENTER key to adjust the battery type to match the type fitted.
Although this setting will not affect the performance of the PhoCheck 1000 it will optimise the accuracy of the battery status symbol shown on the main display screen.

Peak Hold

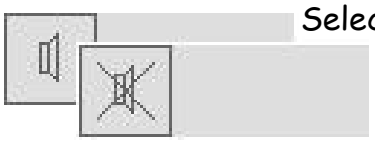
Selected
De-selected

From the main display screen use the UP and DOWN keys to select the PEAK HOLD symbol from the menu, then press the ENTER key to select or de-select the function. When de-selected a cross overlays the menu graphic.
When using the PEAK HOLD function on the main display screen, the highest (Peak) value reading is held on the screen until it is cleared. Pressing the ZERO key clears the reading from the display only. Pressing the ENTER key stores the reading in the PhoCheck memory and then clears the display.



Instrument Functions

Sound



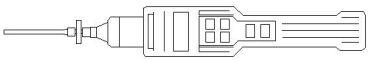
From the main display screen use the UP and DOWN keys to select the SOUND symbol from the menu, then press the ENTER key to select or de-select the function. When de-selected a cross overlays the menu graphic.
When using the PhoCheck an audible "Beep" indicates signal strength in relation to the alarm level set.
Note: The 'Alarm' function works independent of this feature.

Back-light

From the main display screen use the UP and DOWN keys to select the BACK-LIGHT symbol from the menu, then press the ENTER key to select or deselect the function. When de-selected a cross overlays the menu graphic.

Contrast

From the main display screen use the UP and DOWN keys to select the CONTRAST symbol from the menu, then press the ENTER key to adjust this option. By using the UP and DOWN keys you can set the preferred level of contrast and then confirm this by again pressing the ENTER key.



Batteries

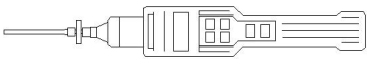
PhoCheck 1000 is operable using Alkaline or rechargeable batteries.
The user can change the batteries types. However the following points must be
Note: * Only use the Ion Science battery charger
* Never recharge Alkaline batteries
* Check for correct battery polarity

Ensure rechargeable PhoCheck instruments are charged for at least 12 hours before use for the first time. Rechargeable instruments use NiMH batteries are expected to offer charge and running times as indicated below: -

Charge time	Expected use
8 hours	9 hours
12 hours	11 hours
16 hours	14 hours

The PhoCheck may be left on charge permanently with no detrimental effects to the PhoCheck or batteries. However we advise the charger be switched Off and then On after 60 hours to reset the charger circuit.

Open the battery compartment via the clip on the battery cover.



Maintenance

1. Keep the detector lamp window clean (see below).

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.

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;

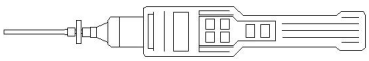
   a) Using an 11mm (7/16") spanner unscrew the probe fitting from the end of the PID detector nozzle.

   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

   <u>CAUTION</u>: DO NOT OVERTIGHTEN THE PROBE FITTING



Cleaning the PhoCheck Lamp

PhoCheck instruments rely on exposing sample gas to ultraviolet light emitted through the UV lamp. This process may result in very slow but progressive contamination of the UV lamp window, which 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!

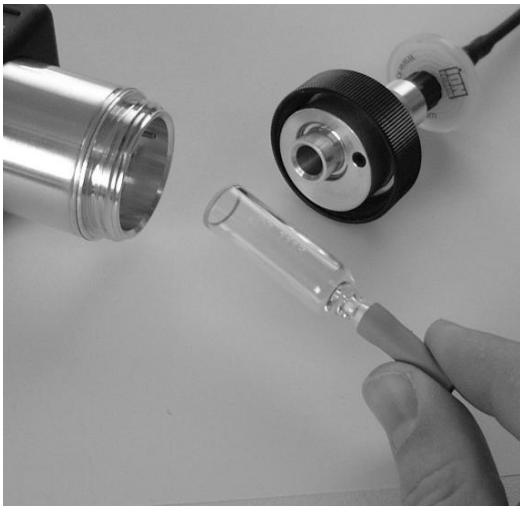
1. Ensure the PhoCheck is switched OFF.

2. Remove the probe and filter.

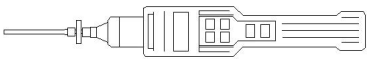
3. Unscrew the black knurled ring to expose the detector lamp.

4. Push a lamp-removing sleeve over the end of the Photec lamp. This allows the user to grip the lamp.

5. Extract the lamp from its socket. (Moderate force may be necessary)



WARNING!
NEVER REFIT A DAMAGED LAMP!

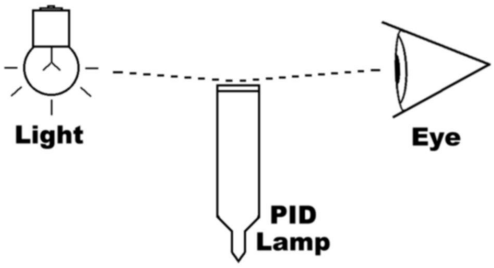


Maintenance

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.' This may be visible upon holding 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 1344-28-1). 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
- Ware 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/m^3

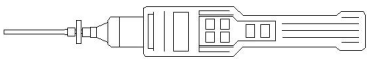
Storage:

- 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.

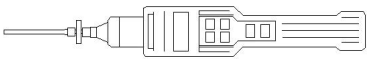
6. Ensure the lamp is completely dry and any visible signs of contamination are removed before refitting.

7. The instrument MUST now be re-calibrated.

Blowing out the PID Cell

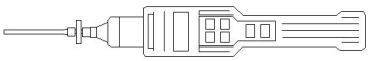
When using the PID instrument in conditions of high ambient humidity, the PID may show unexpected readings appearing to increase. This occurs due to dust or other small particles within the detector becoming hydrated with humidity. This causes these particles to conduct a signal between the electrodes. This issue can 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 (steps 1 – 5). Using a can of computer duster, spray air down the small metal tube. Replace the lamp and cap and rest the instrument.



Spare Parts

Part	Description	Order Number
Probes	100mm pack of 5	A-31066
Filters	PTFE pack of 5	A-31064
IPA Wipes	Pack of 10	A-31063
Lamp	10.6 eV Krypton	30620
Calibration Kit	Cleaning Kit, Gas Canister & Carbon Canister packed in a luxury case	A-31059
Secondary Probe Filters	Pack of 5	A-31146



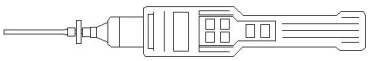
Technical Specification

Dimensions	PhoCheck instrument:	340 x 60 x 50 mm
Short Probe:	100 mm long	
Standard Carry Case:	420 x 320 x 97 mm	
Weight	PhoCheck	0.57 kg (1.3 lb)
	Standard Carry Case	1.75 kg (4.0 lb)
Materials	PhoCheck	Conductive carbon-loaded Polypropylene-based resin casing.
Standard Carry Case		Polypropylene, with a Polyester foam insert
Battery	4 x AA size	Specified Alkaline or 1.2V Rechargeable NiMH
Environmental Conditions	Operating temperature range:	-4°F to 140°F (-20°C to +60°C)
Storage Temperature Range:		-13°F to 158°F (-25°C to +70°C)
Instrument specification (short probe fitted)		
Response time:		< 1 s
Recovery time:		< 1 s
Operating lifetime		
Lamp: (10.6eV standard):		> 1500 hr*
Pump:		> 1500 hr*
Accuracy		+/- 5% Displayed reading and +/- one digit

Charging & Running times from fully discharged*

Charge in hours		Use in hours	
	8		9
	12		11
	16		14

*Quoted times based on use at ambient temperature of 20°C (68°F).



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 corner of the display. Should a fault occur, address the issue and then press the 'ENTER' or 'ESC' key to clear the fault message.

General fault

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

Zero

1 & 2. Instrument can not Zero at switch on.
Return instrument to manufacturer.

3, 4, 5 & 6. Instrument can not Zero at switch on.
Offer the instrument clean air, if the fault persists return the instrument to the manufacturer.

Battery

1. Not charging.
Check charger is connected and switched ON.

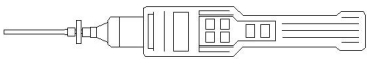
2. Slow charge current is low.
Check your battery settings.

3. Slow charge current is high.
Disconnect the charger immediately.

4. Fast charge current is low
Check your battery settings.

5. Fast charge current is high.
Disconnect the charger immediately.

If the fault persists return the instrument to the manufacturer.



Diagnostics

Pump

1. Sample gas flow is high
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.

Sensor

1. Detector cell 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 and use low pressure, oil free compressed air to blow out the contamination.
If the error persists return the instrument to the manufacturer.