PhoCheck TIGER

Instrument User Manual V2.0

Register your instrument online to receive your Extended 5 year Warranty. See page 42 for details.

Part Number: 861265

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Advanced Gas Sensing Technologies

WARNINGS

USER MANUAL:	Read and understand this user manual completely before operating the PhoCheck Tiger instrument.
STATIC HAZARDS:	Do not use abrasive or chemical detergents to clean the PhoCheck Tiger instrument as this may reduce the antistatic properties of the materials used, clean it using a damp cloth only.
MATERIAL EXPOSURE	The PhoCheck Tiger must not be exposed to atmospheres known to have an adverse effect on Thermoplastic polyolefin or Anti-static PC/ABS
SERVICING:	No part of the PhoCheck Tiger may be opened in a hazardous area except for replacement of the battery pack. The PhoCheck Tiger must be serviced in a Non Hazardous environment and by Ion Science authorised service centres only.
BATTERY CHARGING:	Charge PhoCheck Tiger and its Lithium ion battery packs in a Non Hazardous environment only.
BATTERY REPLACEMENT:	Never replace primary Alkaline battery cells while in a potentially explosive or hazardous location. Use only Duracell Procell Alkaline batteries MN1500.
BATTERY CONNECTION:	The PhoCheck Tigers Lithium ion and Alkaline battery packs have been specially designed to allow connection to the PhoCheck Tiger Instrument while in potentially hazardous atmospheres. The PhoCheck Tiger instruments ingress protection rating is reduced to IP 20 when its battery pack is removed so avoid changing batteries in dusty or wet environments.
FUNCTIONAL TEST	The PhoCheck Tiger must be functionally checked prior to entering a hazardous area after every occasion when a connection has been made to the USB port. The instrument must complete its start up routine and display legible readings. If the LCD display fails to show an intelligible and uncorrupted display the instrument must not enter a hazardous area.”
USB CONNECTION	The USB port can only be used in a Non Hazardous environment.

Declaration of conformity

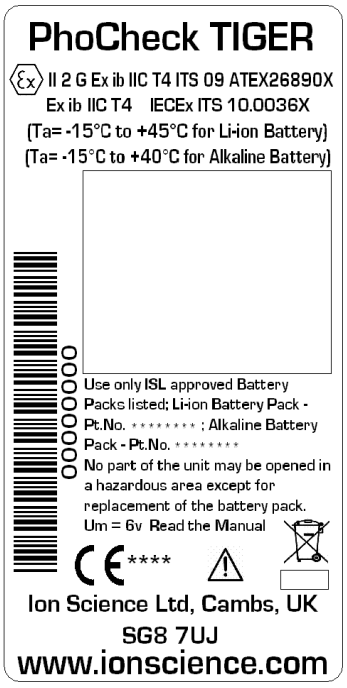
Manufacturer: Ion Science Ltd, The Way, Fowlmere, Cambridge, UK. SG8 7UJ

Product: PhoCheck TIGER

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

Directive 94/9/EC **Required Coding-** Ⓔx II 2 G Ex ib IIC T4
Cert Number- IECEx ITS 10.0036X

$T_{amb.}$ = -15ºC to +45 ºC (with Lithium ion Battery pack)
$T_{amb.}$ = -15 ºC to +40 ºC (with Alkaline Battery pack)



Notified body Intertek – Report number: 08036757A1
Standards

EN 60079-0: 2006 Electrical apparatus for explosive gas atmospheres. General requirements

EN 60079-11: 2007 Explosive atmospheres . Equipment protection by intrinsic safety "i"

EN61326-1:2006 Electrical equipment for measurement, control and laboratory use - EMC requirements. Group 1, Class B equipment - (emissions section only)

EN61326-1:2006 Electrical equipment for measurement, control and laboratory use - EMC requirements. Industrial location immunity - (immunity section only)

EN50270:2006 Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen. Immunity Type 2 - industrial environments.

CFR 47:2008 Class A
Code of Federal Regulations: 15 Subpart B- Radio Frequency Devices - Unintentional Radiators.

Other Standards

EN ISO 9001: 2008 Quality Management System - Requirements

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 January 2010

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Statements

Responsibility for Use
PhoCheck Tiger instruments detect a large range of gases which are potentially dangerous from both a poisoning and/or an explosive perspective. PhoCheck Tiger 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 Tiger can be used as a personal safety device. It is the user's responsibility to respond appropriately to an alarm situation.

!CAUTION!
It is essential that the PhoCheck TIGER is always used with a supplied PTFE 0.5 micron filter fitted to the front of the instrument. Without a filter, particles of debris and dust can be drawn into the detector inhibiting the function of the instrument. These filters are consumable and should be changed after every 100 hours of use. The frequency of replacement should be increased for dusty or moisture laden environments. Filters are available from your distributor or at www.ionscience.com .

Quality Assurance
PhoCheck TIGER 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 TIGER, 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 TIGER 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 national standards. A PhoCheck TIGER calibration kit is available from your distributor or service centre or at www.ionscience.com . Ion Science recommends annual return of all instruments for yearly service and calibration.

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Introduction to PhoCheck TIGER

PhoCheck TIGER is a portable gas detector that uses Photo-ionization technology to detect a large range of Volatile Organic Compounds (VOC's) which can be dangerous from both a poisoning and explosive perspective.

The TIGER uses a Photo-Ionization Detector (PID) to measure gas concentrations. The patented fence electrode technology minimises the effects of moisture and contamination, avoiding the need for compensation.

Survey is the default mode of operation. This mode is often used in applications such as Head Space Sampling and Leak Detection 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.

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.

The TIGER can be upgraded from the users own desk top. Additional features can be added without the need to return the instrument to a service centre.

Like it's predecessor, PhoCheck+, the TIGER also has an intuitive graphical interface allowing easy access to instrument settings. Two soft keys can be configured to suit the user's application, so many functions can be selected without entering the main menu structure. This improves efficiency of use, particularly with repeatable tasks.

TIGER PC (the TIGER's PC Software) maintains the intuitive look and feel by adopting the same graphical symbols. TIGER PC also helps manage logged data files and multiple instrument settings in a clear and concise way.

The TIGER uses a Lithium-ion battery that not only boasts an impressive running time and short charge time, but also allows battery packs to be replaced in potentially hazardous environments. Field replaceable alkaline battery packs are also available for when power to charge is unavailable.

The TIGER has true USB capability so the instrument can be connected directly to a PC via a standard USB cable. It also offers fast data download.

A loud audio output, vibration and bright LED's indicate alarm conditions. Orange and Red LED's indicate High and Low conditions respectively. This colour scheme is used within TIGER PC to offer clear indication of alarm levels within logged data.

Getting started

Thank you for choosing TIGER from Ion Science Limited. We hope that your TIGER will give you many years of active and trouble-free service.

The Manual
Ion Science Ltd recommend that you familiarise yourself with this manual before using your TIGER. Pages 7 & 8 contain important information, which should be read before you turn your TIGER on for the first time.

Probes
Ensure that the probe supplied is fitted to your TIGER. Details on how to fit and change probes is detailed in the Maintenance section on page 33. If the supplied probe is unsuitable for your application, details of alternative probes can be found on page 34.

Turn On.
Press the ON/OFF / ENTER key once to turn TIGER on.

Turn Off
Press and hold the ON/OFF / ENTER key for three seconds to turn TIGER off. (NOTE If the TIGER fails to shut down, press the ESCAPE key once or twice to return to the main screen, then press and hold the ON/OFF / ENTER key again.)

Batteries
Check that your TIGER has sufficient charge for use. The battery icon (see Understanding the display screen, page 11) should show at least two full segments.

Rechargeable Batteries
TIGER instruments leave the factory with the rechargeable battery fully charged. However prolonged periods of storage may result in the battery pack discharging. We recommend charging the instrument for seven hours before use. See the battery section of this manual, page 29.

Alkaline Batteries
An alkaline battery pack is also supplied with the PhoCheck TIGER. For more information please see the battery section of this manual, page 29.

Select the gas
TIGER 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 internal gas table all readings will be given using that gas's response factor.

- Turn the TIGER on by pressing the On/Off / Enter key once.
- Press the information icon i (see page 16) and check the correct gas, alarm levels and flow rate are selected.
- Change the gas (if necessary) as instructed under Gas Selection on page 15.

Set alarm levels
We recommend that alarm levels are set to user specifications as soon as possible before the TIGER is used for the first time. Please see page 16 for details of how to set alarm levels.

TIGER PC
The full functionality of your TIGER can only be realised through the TIGER PC software.
Ion Science Ltd recommend that you load the software supplied with your instrument and set up your TIGER according to the instructions on page 17 of this manual.

Understanding the Keypad

General description

The keypad comprises two soft keys: A and B, 'up' and 'down' arrow keys, an escape key, and an 'on/off' button, which also serves also as an enter key. In general, setup and application settings are selected and adjusted via the soft keys, options are selected by the arrow keys and confirmed by the enter key. A single press is used as a switching operation. A continuous press is used to adjust numbers or change gas selections by automatically rolling.

Keypad function descriptions

Soft keys A & B rely on graphical prompts on the display to indicate their functionality.
NOTE: Pressing both soft keys together switches the torch on and off.

Up & Down keys are used to adjust settings and navigate through the menu structure.

Enter / On/Off key is used to accept adjustments and select functions; also to turn the TIGER on and off.

Escape (**Esc**) key is used to abort an adjustment or exit from a menu.

Understanding the display screen

Screen display

The display is divided into four sections.
Fixed LCD Status icons fill the top of the screen offering instrument status at a glance. The Icons display only when a function is selected. The main central viewing screen will display readings in large numbers only, 4 digits and decimal place will display 0.001 ppm to 19,999 ppm. Two soft key areas have been set aside as soft key indicators. The area between the soft key indicators displays the measurement units.

Left is the default display with no functions active.

Right is the display with all functions active.

Status icons

Health & Safety: The icon consists of a single part and will flash in an alarm condition and when health and safety readings are being collected.

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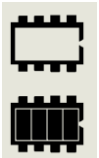
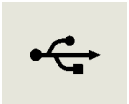
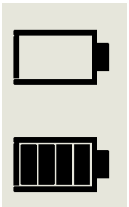
Peak Hold: When peak hold is switched on, the icon appears.



Memory status: This icon only appears if the instrument has the data logging functionality. Four sections within the border fill as the data log memory is filled. Empty border = 100% memory available through to full, where all segments are present.



USB: The icon will appear when connected to a host device.



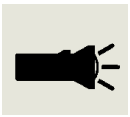
Battery status: This icon consists of a border and four segments. The segments fill or empty to indicate 0-25, 26-50, 51-75 & 76-100% full. When discharging, the border will flash for 1 minute before the instrument shuts down. When charging, the segments will successively fill until 100% charge is reached.

Understanding the display screen (continued)

Back light: Light beam lines appear when the backlight is on.

Sound: The main body of the icon is present at all times.
The disable lines appear if all 3 alarm sounders are disabled and the volume is at 0%. Three sound projection lines indicate the volume level.
However there are four sound levels and the quietest level has no line.

Alarm bell: The icon consists of 2 parts, the Bell and the sound bars. When the instrument reaches a 'Low alarm' the Bell and one sound bar will flash; when a 'High alarm' is reached the Bell and both sound bars flash.



Flash light / Torch: When the flashlight is illuminated the light beams appear.

Lock: The Lock icon will appear when the configuration of the TIGER has been locked in Tiger PC.

Main Screen Area

During normal operation this area displays the readings in four large numbers, with the units of measurement below.

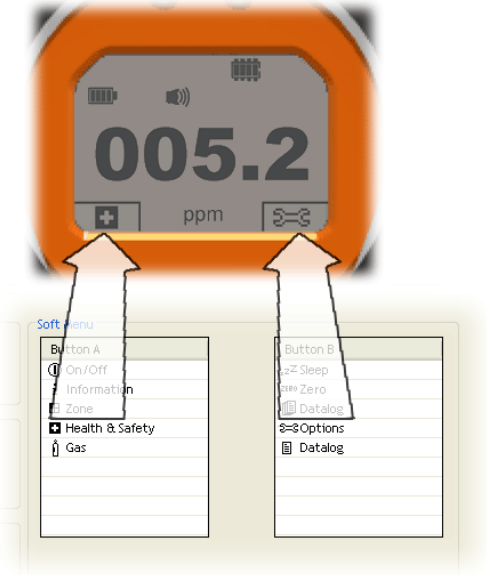
During setup and adjustment, a function bar overlays the main screen.

Understanding the display screen (continued)

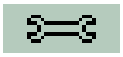
Soft key areas

The following icons will appear in the soft key areas as soft key options. They are selected using the UP and DOWN keys. Those labelled 'optional' will only appear if your TIGER has that functionality.

These icons can be reorganised using the TIGER PC software.



Button A 

	Information
	Zone(s)
	Gas selection
	Options
	Health & safety (optional)
	Multiple data logging (optional)

Button B 

	Sleep
	Zeroing
	Peak hold
	Average
	Data log (optional)

Using your TIGER

Instrument functionality is broken into two parts; Application and Setup. Application settings are initially selected via the soft keys. Setup functions like backlight, sound, calibration and alarm setting are adjusted within the Adjust soft key setting. Many of the screens have a 2 second time out which returns to the main screen if no other keys are pressed.

ON To switch the TIGER on press the On/Off and Enter key once. Start up screen 1 appears showing the TIGER logo. Start up screen 2 contains variable text sent from the TIGER PC configuration screen. The lower half of the screen contains the instrument IRN (Internal Reference Number) and firmware version. The third screen shows TIGER checking that the lamp has 'struck'. When 'OK' appears, the working screen will follow. If the lamp fails to strike, turn TIGER off, wait for 30 seconds and try again. If the problem persists, change the lamp or contact Ion Science Ltd or your distributor.

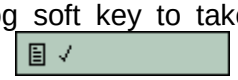
OFF To switch the TIGER off press and hold the On/Off / Enter key. A three-second count down takes place before the instrument shuts down. During this count down the instrument activates the upper alarm. viz. RED LED's flash and audible alarm sounds. This is done to alert the user to avoid accidental switch off.

zZz **SLEEP** Press and hold the Zzz soft key to send the TIGER to sleep. A three-second count down takes place before entering sleep mode. This function is not available when the instrument is locked. All peripherals switch off. Only 'Zzz' remains on screen. Press ESC key to awaken the instrument. (The instrument can also enter 'Sleep mode' during data logging when the duration between logs exceeds 2 minutes. This is a power saving function which only occurs when a tick box is set in TIGER PC.)

ZERO **ZEROING** Pressing the Zero soft key presents two zero options  selected with the UP or DOWN keys. The upper symbol represents an absolute zero. The lower symbol represents a relative zero which follows the drift of the PID detector. Having made your selection, press Esc. If the relative zero has been selected TIGER will zero itself before returning to the main screen.

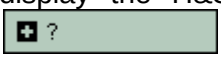
ZONES Press the Zone soft key to display the currently selected Zone: 

The TIGER's default is 'Zone 1' Zones are set up in TIGER PC only and the name given to the zone(s) will appear on the screen.. Use Up and Down keys to select alternative zones.

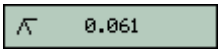
DATA-LOGGING Press the Single Data log soft key to take a single data log reading. The single data log symbol appears with a tick:  Press Esc to return to the main screen. Press the Single Data log soft key again to take another reading.. The fixed LCD memory icon flashes off when a single log is taken.

MULTIPLE DATA-LOGGING Pressing the Multiple Data log soft key results in the multiple log symbol appearing with a question mark:  Press the ENTER key to start the data logging process based on TIGER PC set-up. A tick appears beside the question mark, confirming that data logging has started. The fixed LCD memory icon flashes at 1 Hz while continuous data logging is in progress. Press Esc to return to the main screen. To stop data logging, press the soft key again. A crossed out data log symbol is presented with a question mark. Press the ENTER key to confirm the action. A tick appears beside the question mark, confirming that data logging has stopped and the LCD memory icon ceases to flash. Press Esc to return to the main screen.

Using your TIGER (continued)

HEALTH & SAFETY readings Press the Health & Safety (H&S) soft key to display the H&S symbol with a question mark to ask if the user wishes to proceed:  Press ENTER to start the calculation. The STEL (Short Term Exposure Level) and TWA (Time Weighted Average) values are shown. The fixed LCD H&S icon will continually flash while calculating. Pressing the ENTER key while the values are displayed presents the user with a screen asking if the calculation should stop. Press ENTER again to stop the calculation. Press Esc to return to the main screen.

GAS SELECTION Press the Gas soft key to display an alphabetical letter which can be changed using the Up and Down keys:  Press the ENTER key to present the gases beginning with that letter. Using the Up and Down keys scroll through the gases starting with that letter to find the subject gas. Press enter to select the chosen gas. If a tick appears, press Enter again and TIGER will use the relevant data for the chosen gas for the chosen gas from the gas table for alarms and response factor etc. Should the selected gas have no numeric response factor then a warning screen  will appear. The message can be cleared by pressing the ENTER key and the gas will still be selected. An alternative lamp type may then be selected to match the chosen gas. Should an incompatible gas/lamp combination be selected the instrument will show the warning screen again.

PEAK HOLD Press the Peak Hold soft key to present the screen 

When 'Peak hold' is selected the sub display will appear and this will continue to display the peak reading until peak hold is no longer required. To deselect the peak hold function press Esc.

AVERAGE Press the Average soft key to display a rolling average over 10 seconds. A tick appears when time is up. Pressing the 'Average soft key' again resets the calculation even if there is an average already running. Press ESCAPE to return to the main screen.

OPTIONS Press the Options soft key to give access to various adjustable features, selected with the UP and DOWN keys. Press ENTER to confirm selection.

BACKLIGHT Four options are presented: 'Permanently Off', 'Permanently On', 'On in low ambient light' and 'Timed'. (Set the time in TIGER PC - see page 21). Select the preferred option with the UP and DOWN keys and confirm with ENTER.

SOUND The sound options are presented as set up in Tiger PC. Use the DOWN arrow to select either keypad beep, alarm sound, crescendo or percentage volume. Press ENTER to turn selection on or off. For percentage volume, press ENTER again to confirm selection. The frame will flash. Use UP and DOWN arrows to change the percentage volume and press ENTER to confirm the chosen value. Press Esc twice to return to the main screen.

CALIBRATION Only two options are presented: Factory calibration and Custom calibration. Select the preferred option with the UP and DOWN keys and confirm with ENTER. Whichever calibration standard is selected, the TIGER will operate against that calibration. Readings taken against unsatisfactory calibrations may be unreliable.

Using your TIGER (continued)

Factory Calibration Not for operator use.
Return to Ion Science Ltd or your distributor for calibration. (see also page 33)

Custom Calibration see under Maintenance on page 33.

ALARMS Upper and Lower alarm settings are displayed. Select the subject alarm using the UP and DOWN keys and press ENTER. The arrow(s) on the chosen alarm will flash. Adjust the level using the UP and DOWN keys and press ENTER. Repeat, if necessary for the other alarm. Press Esc twice to return to the main screen.

NOTE: The Lower alarm setting must never be greater than the Higher alarm.

INFORMATION Pressing the Information soft key allows access to a number of other information screens. Use the DOWN key to scroll through the screens. Press ESCAPE to return to the main screen:

First Screen	Gas selected	
	Upper alarm	
	Lower alarm	
	Pump flow	
Second screen	Lamp selected	
	Date of Factory calibration	
	Date of Custom calibration	
	Date and time	
Third Screen	SPAN 1	SPAN 1 (gas concentration set in TIGER PC)
	SPAN 2	SPAN 2 (gas concentration set in TIGER PC)
	PID detector	
	A/D reading	A/D
Fourth Screen	Temperature	Temp (optional upgrade module)
	Barometric pressure	(optional upgrade module)
	Relative humidity	(optional upgrade module)
	Battery type and status	
Fifth Screen	STEL	
	TWA	
	IRN number (Internal Reference Number)	
	Firmware version	
	Bootloader version	

TIGER PC Software

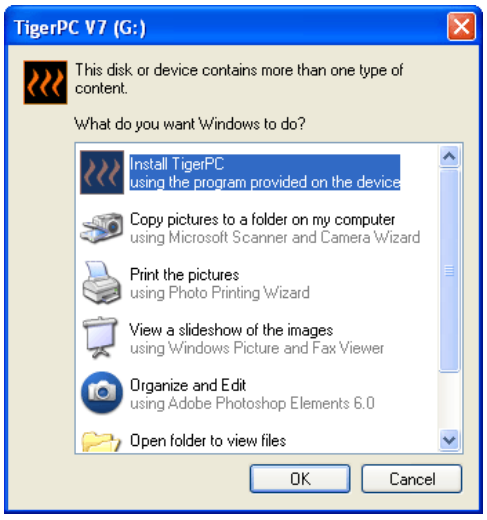
PC Requirements

TIGER PC Software must be used in conjunction with a PC or laptop using Windows XP, Windows Vista or Windows 7. The software is supplied on a USB memory stick.

Installation of TIGER PC Software

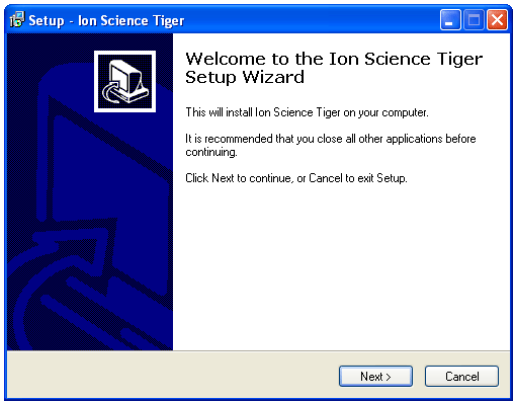
When the memory stick is plugged into a USB socket the flowing screen (Below left) should appear. If it doesn't, view the content of the memory stick and double click the file named:
' ion_cd_Tiger.exe '.

On the TigerPC screen (below),
select 'Install TigerPC' and click OK.

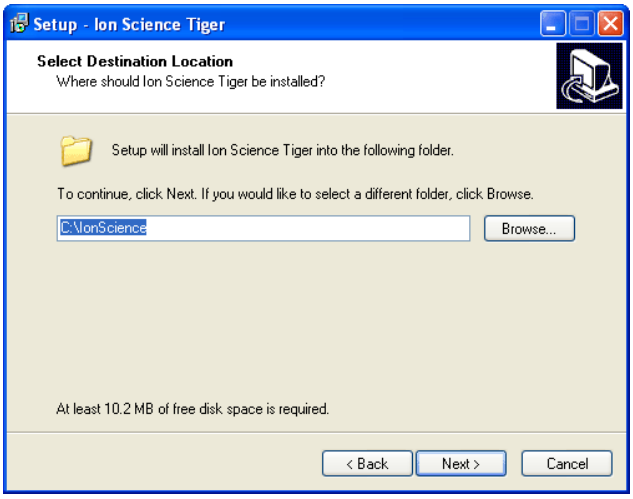


On the Ion Science screen (below), select 'Install Tiger Software'

On the Welcome screen (below), click 'Next' to proceed.

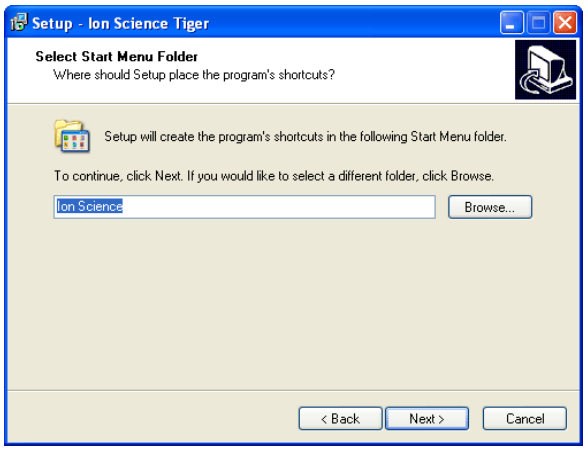


On the select destination location screen (below), click 'Next' to create an 'Ion Science' folder on your C drive.

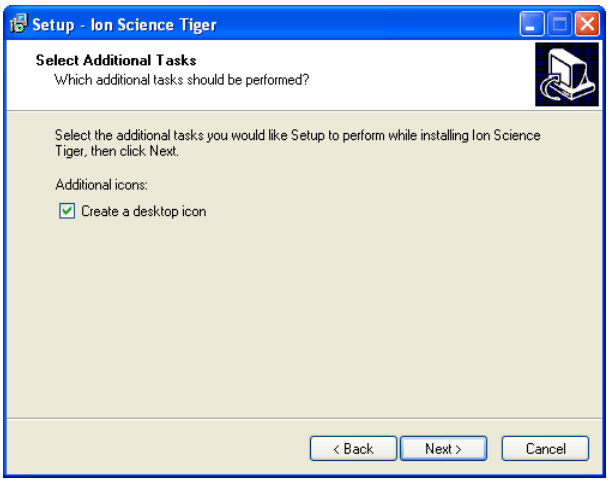


TIGER PC Software (continued)

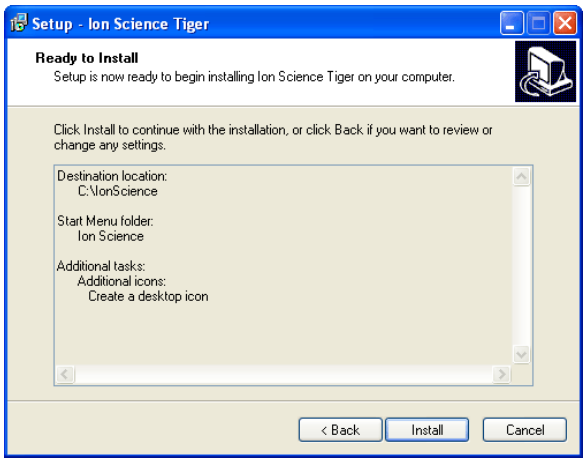
On the set up screen (below) click ‘Next’ to create an ‘Ion Science’ start up folder.



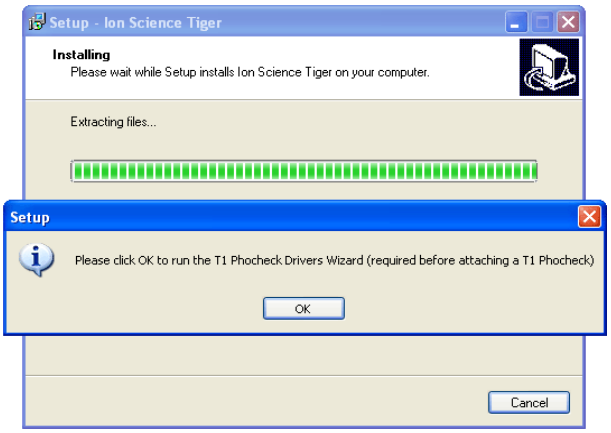
On the additional tasks screen (below) tick the box and click ‘Next’ to create a desktop icon.



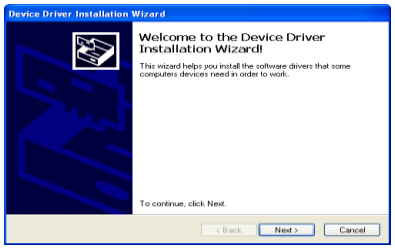
On the ready to install screen (below), click ‘Install’.



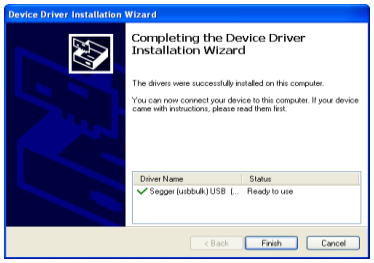
On the install screen (below) Click ‘OK’.



Click ‘Next’ on the Device Driver screen,



‘Finish’ on the installation wizard



and ‘Finish’ on the Setup wizard.

Finally Exit the Ion Science screen.

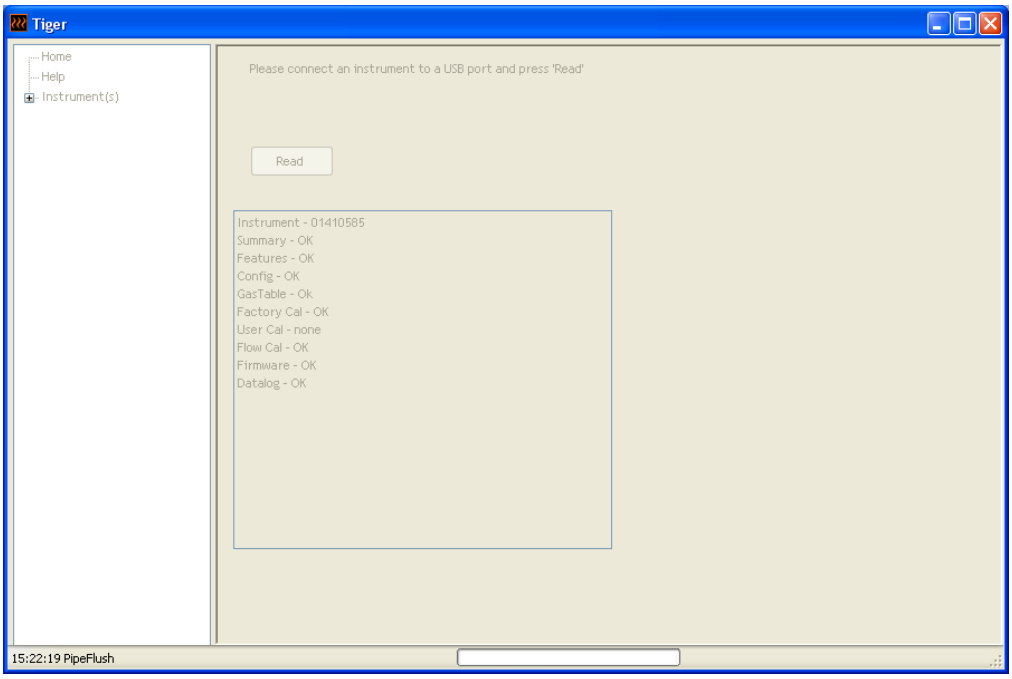
The Tiger icon should appear on your desktop.

TIGER PC Software (continued)

Connecting TIGER to a PC

1. Double click the TIGER icon on your desktop and open TIGER PC.
   The Home page should appear.

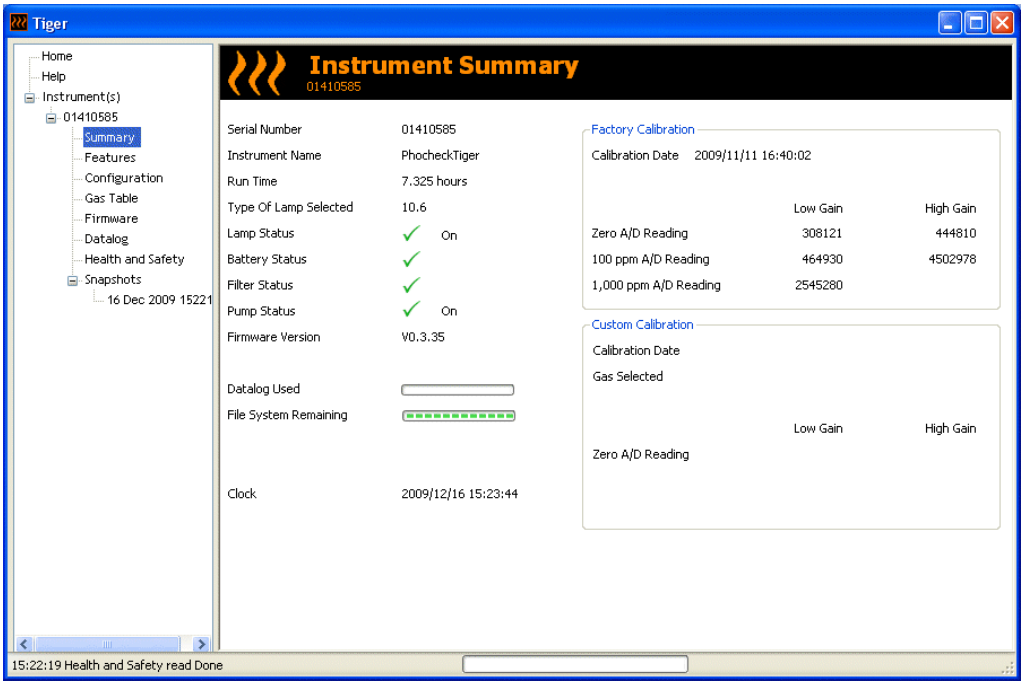
2. Click on 'Instrument(s)'. If your TIGER has previously been connected to your PC your instruments IRN (Internal Reference Number) will appear.
   Note: If, while using this software your TIGER should inadvertently be turned off or disconnected from your computer, click on 'Instrument(s) again and proceed as below.



TIGER PC Software (continued)

3. Switch TIGER on and when fully booted up connect to a USB socket on your PC using the USB cable supplied. If the 'Found New Hardware' screen appears, follow the prompts to install your instrument on your PC.

4. Click on 'Read'. Your instrument number will appear under 'instrument(s)' (if it was not there already) and the Instrument Summary page will appear. This page gives the current status of your TIGER. If the 'snapshot' screen appears click 'Yes'. You can delete the snapshot later if you wish (see page 27).



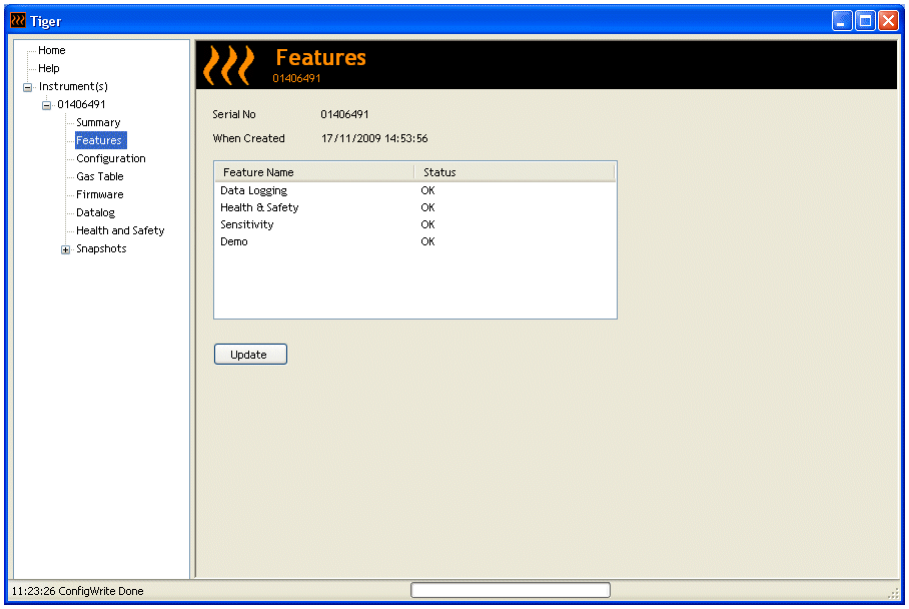
The Features Screen

The 'Features' screen indicates which of the available updates has been added to your TIGER.

Should you wish to purchase additional features, contact Ion Science Ltd or your Distributor.

Some updates may be available on the website www.ionscience.com .

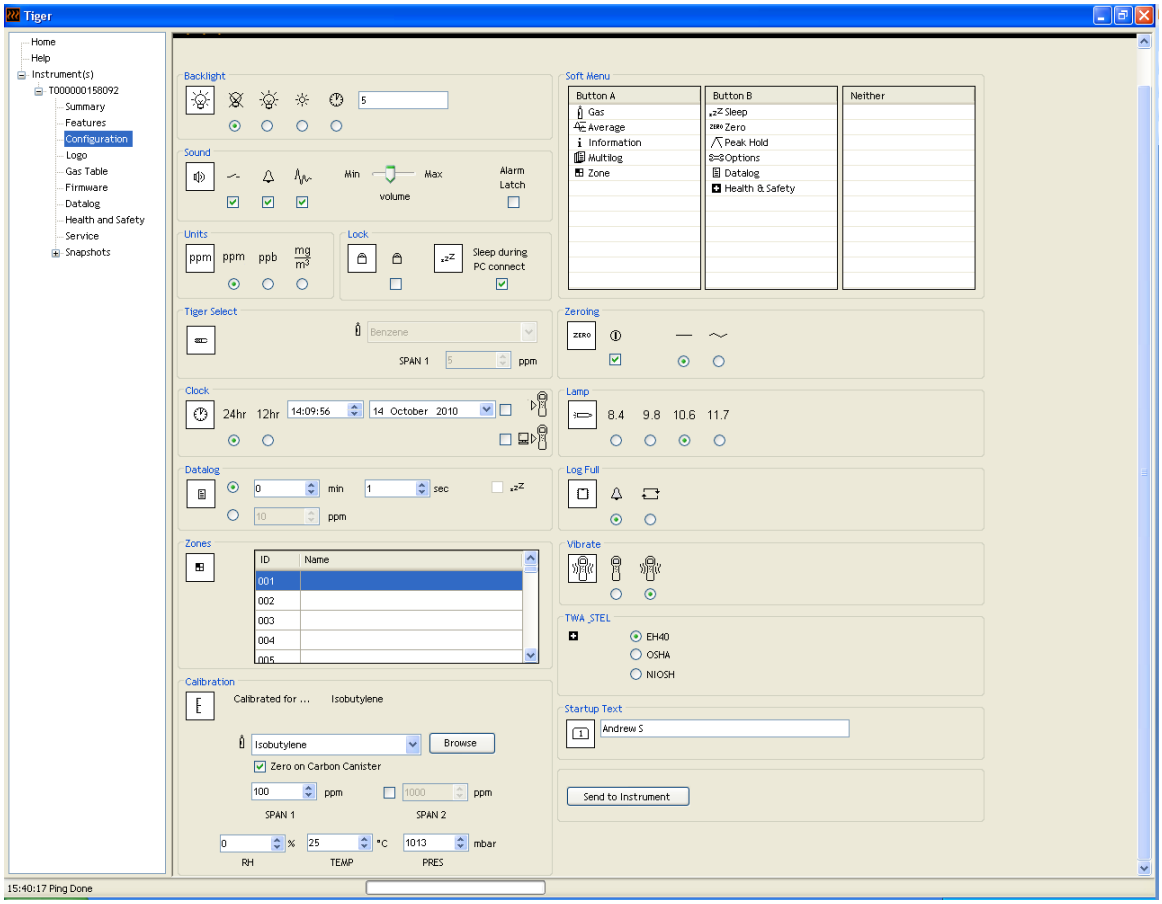
Once the transaction is complete and confirmed, click on Update to add the relevant features to your TIGER.



TIGER PC Software (continued)

The Configuration Screen

Use this screen to configure your TIGER.



Backlight
Choose from 'Permanently Off', 'Permanently On', 'On in low ambient Light', or 'On For Limited Time'. The Backlight Timeout can be set from 1 to 99 seconds.

Sound
The three icons represent: key press; alarm; and crescendo. Crescendo increases the sound as the upper alarm is approached. Sound on each of these may be enabled or disabled by ticking or un-ticking the box. Sound volume is adjusted with the slider.

Units
The units of measurement may be chosen as parts per million (ppm), parts per billion (ppb) or milligrammes per cubic metre (mg/m^3).

Soft Menu
The various functions may be allocated to the soft buttons in any order of preference by dragging and dropping the icons.

TIGER PC Software (continued)

Lock
The TIGER may be locked in any configuration to avoid unauthorised changes by the operator. A tick in the box locks the instrument.
Sleep during PC connect will send the instrument into sleep mode while it is connected to the PC software. The instrument will awaken as soon as it is disconnected from the PC software.

Zeroing
This function allows either an assumed constant zero or for the zero to be tracked compensating for the shift in the zero of the PID lamp during operation. The function may be enabled or disabled by ticking or un-ticking the box. Constant or tracked zero is selected by use of the radio buttons associated with the icons.

Clock
Select 24 or 12 hour format using the radio buttons. Set the time and date and tick the box on the right to set the time on your TIGER. Alternatively, tick the lower box to synchronise your TIGER with the time on your computer.

Lamp
Enables the selection of different lamp types you may have purchased to use with your instrument. Ensure that the lamp selected is the same as that fitted in your TIGER. If not, select the correct lamp from the options provided.

Datalog
Use this area to set the interval between readings. The minimum time permitted is one second. If you wish your TIGER to switch to sleep mode during data-logging, tick or un-tick the sleep box to enable or disable the function. The sleep mode will only operate for datalog intervals of 2 minutes or greater.

Log full
If you select the bell symbol your TIGER will alarm when the memory log is full. Alternatively, if you wish new data to overwrite the oldest stored data in the memory and continue to store new data during data-logging, select the recycle symbol.

Zones
Use this table to define and name up to 128 separate zones. The name field is limited to eight characters including spaces.

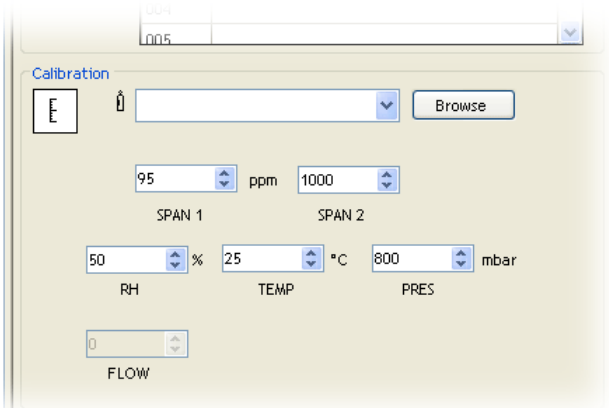
Vibrate
To set your TIGER to vibrate under alarm conditions select the ‘vibrate’ symbol.

TWA STEL
Select the appropriate regulatory code to which you are working.

TIGER PC Software (continued)

Calibration

Use this area to define your Custom Calibration parameters.
First connect TIGER to your PC as detailed above under 'Connecting your TIGER to a PC'.



If no gas is shown in the drop down box, browse your system to find the gas table for your instrument. Go to the location where the TIGER PC software files are saved. Follow the path:
IonScience/Tiger/software/instruments/ serial no./gastable
Select the appropriate instrument number and open the gas table.
Select the calibration gas using the drop-down box.

TIGER PC offers a two-point calibration (zero + span 1) or three-point (zero + span 1 + span 2) calibration. Enter the SPAN 1 concentration. For two-point calibration ensure that the box is un-ticked. For three-point calibration tick the box and enter the SPAN 2 concentration. Send this information to your TIGER. The calibration procedure is detailed under Maintenance on page 33 of this manual.

Startup Text

Enter the text you wish to appear on the start-up screen of your TIGER.

Send to Instrument

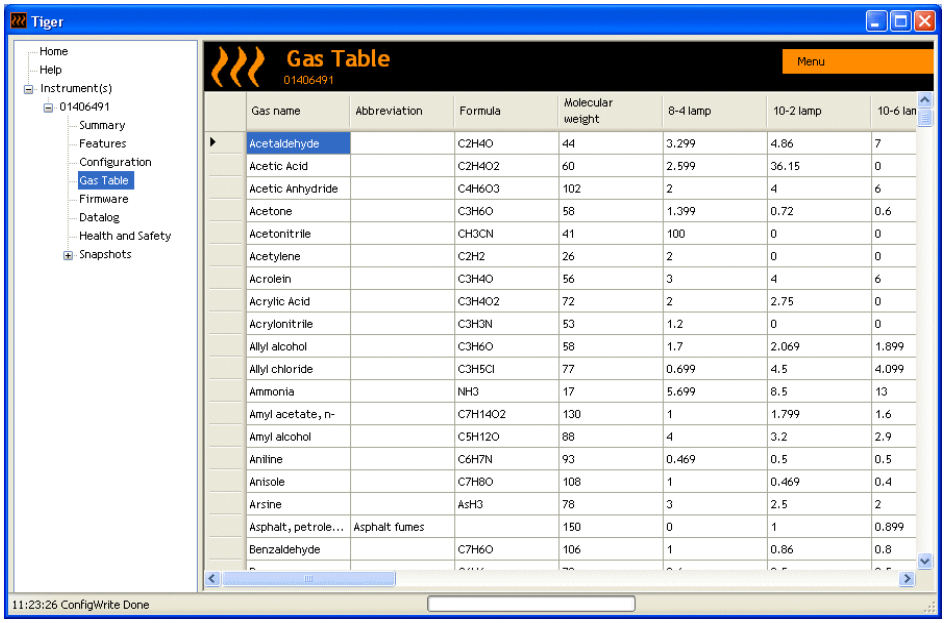
When you have configured your instrument or completed your changes, send them to your TIGER by clicking the 'Send to Instrument' box. If the message 'There was a problem sending to the instrument' appears, click OK and return to the Home screen. Repeat the procedure under 'Connecting your TIGER to a PC' above. If the 'Summary' screen for your TIGER appears, visit the configuration screen again. If not, repeat the entire procedure. If your PC still fails to read or write to your TIGER seek advice from your distributor or from Ion Science.

TIGER PC Software (continued)

The Gas Table Screen (including setting alarm levels)

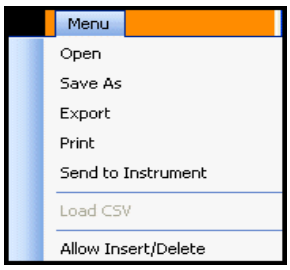
Connect your TIGER to your PC as described above on page 19ff. Any fresh data-logged readings will be down loaded as the software 'reads' your TIGER.

Select Gas Table from the menu to display the Gas Table



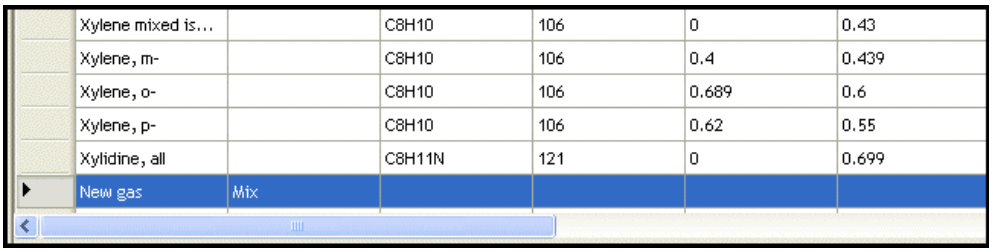
Gas name	Abbreviation	Formula	Molecular weight	8-4 lamp	10-2 lamp	10-6 lan
Acetaldehyde		C2H4O	44	3.299	4.86	7
Acetic Acid		C2H4O2	60	2.599	36.15	0
Acetic Anhydride		C4H6O3	102	2	4	6
Acetone		C3H6O	58	1.399	0.72	0.6
Acetonitrile		CH3CN	41	100	0	0
Acetylene		C2H2	26	2	0	0
Acrolein		C3H4O	56	3	4	6
Acrylic Acid		C3H4O2	72	2	2.75	0
Acrylonitrile		C3H3N	53	1.2	0	0
Allyl alcohol		C3H6O	58	1.7	2.069	1.899
Allyl chloride		C3H5Cl	77	0.699	4.5	4.099
Ammonia		NH3	17	5.699	8.5	13
Amyl acetate, n-		C7H14O2	130	1	1.799	1.6
Amyl alcohol		C5H12O	88	4	3.2	2.9
Aniline		C6H7N	93	0.469	0.5	0.5
Anisole		C7H8O	108	1	0.469	0.4
Arsine		AsH3	78	3	2.5	2
Asphalt, petrole...	Asphalt fumes		150	0	1	0.899
Benzaldehyde		C7H6O	106	1	0.86	0.8

You are now able to modify this table and then download it to your instrument.



If you wish to add new gases to the table, select the 'Menu' tab, and from the drop down menu select 'Allow Insert/Delete'.

This will add an additional line at the bottom of the Gas table which allows the user to add new gas types as below.



Xylene mixed is...		C8H10	106	0	0.43
Xylene, m-		C8H10	106	0.4	0.439
Xylene, o-		C8H10	106	0.689	0.6
Xylene, p-		C8H10	106	0.62	0.55
Xylidine, all		C8H11N	121	0	0.699
New gas	Mix				

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

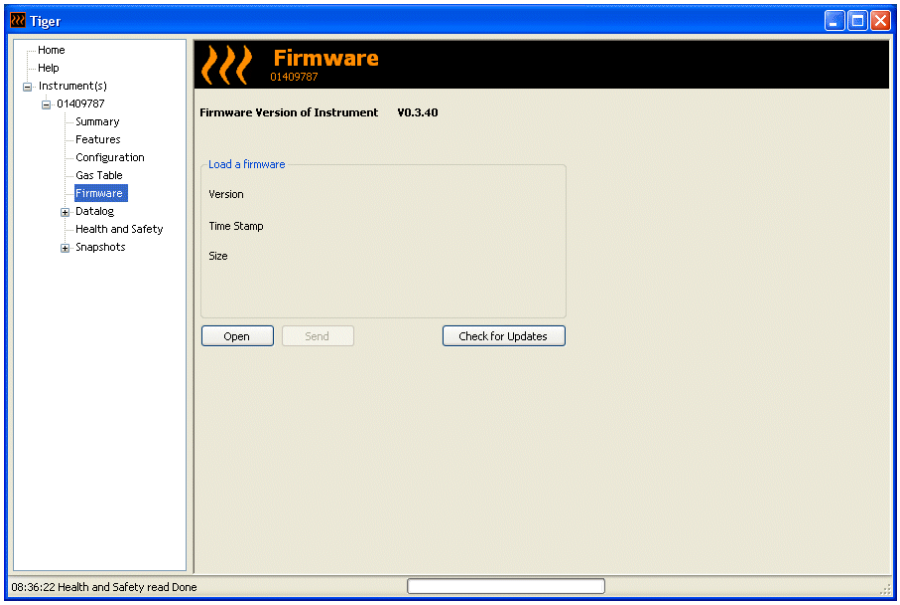
To send the gas table to the instrument, select 'Send to Instrument' from the dropdown menu shown above.

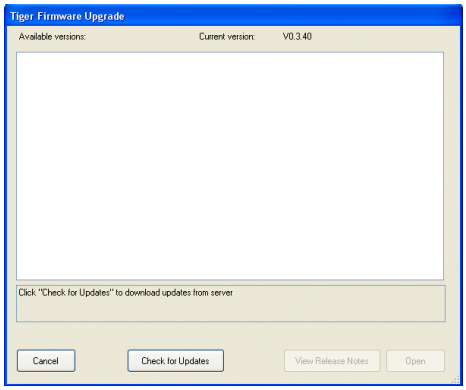
TIGER PC Software (continued)

The Firmware Screen

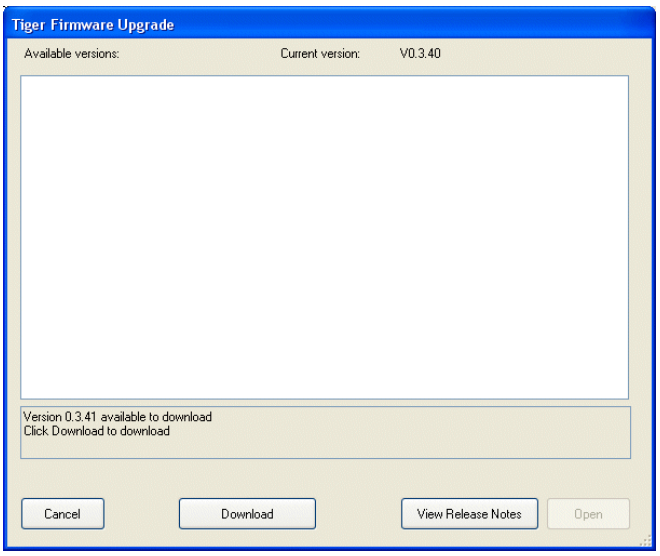
This screen displays the current firmware version installed on your TIGER. It also provides a facility to download updated versions to your TIGER.

To download a firmware update, connect TIGER to your computer as detailed above on page 19ff. Ensure that your instrument is in normal Survey mode, is not in an alarm condition and that no datalogging or Health & Safety readings are being collected. Check that the battery is sufficiently charged (at least two bars). Click on 'Check for Updates'.





When the upgrade screen appears, click on 'Check for updates'.



The next screen shows the available upgrades for your instrument
If a higher version than your current version is available click 'Download'.
Do not attempt to operate your TIGER during the update process.

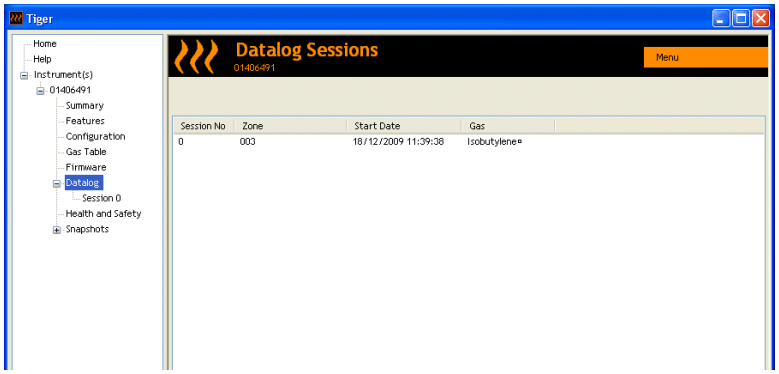
The firmware on your TIGER will be updated and the new version will be shown on the Firmware screen.

TIGER PC Software (continued)

Downloading data logged readings

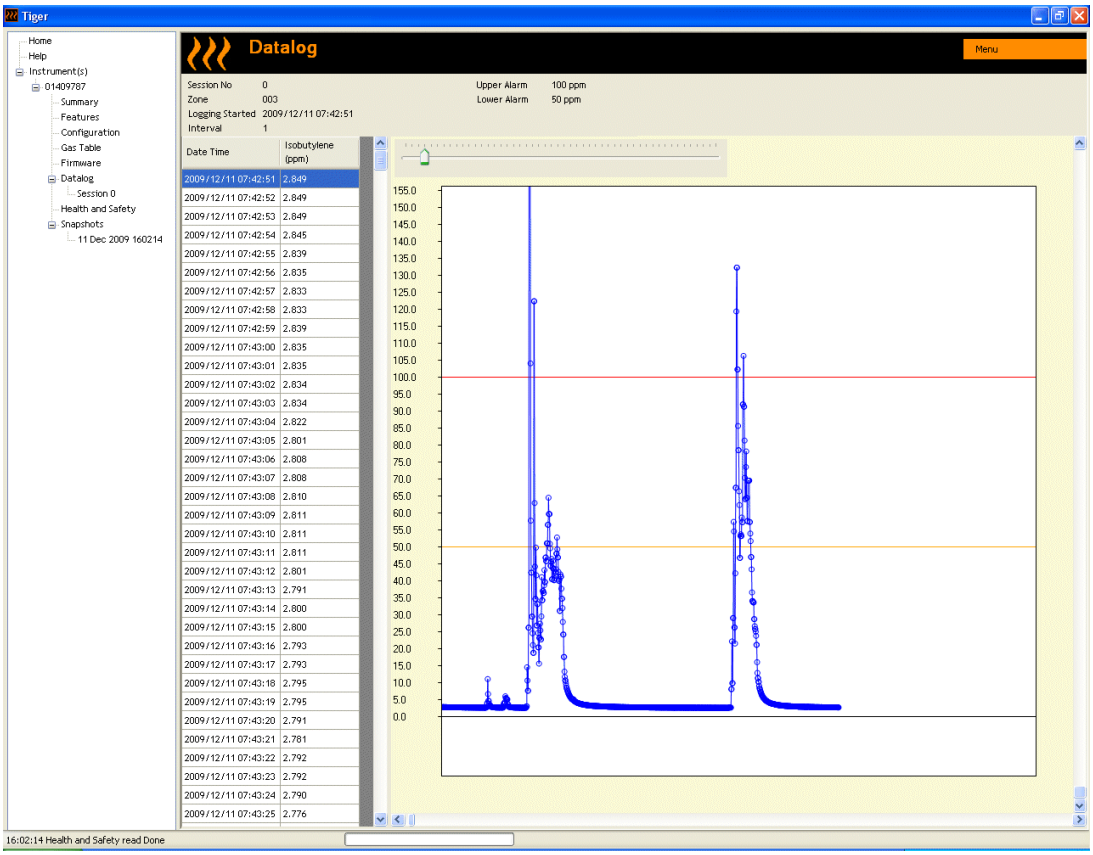
Connect your TIGER to your PC as described above on page 19ff. Any fresh data-logged readings will be downloaded as the software 'reads' your TIGER.

Go to the datalog screen and a list of the datalog sessions is presented.



Expand the datalog folder and select the session of interest.

Details of the data collected during that session are presented in numerical and graphical form.



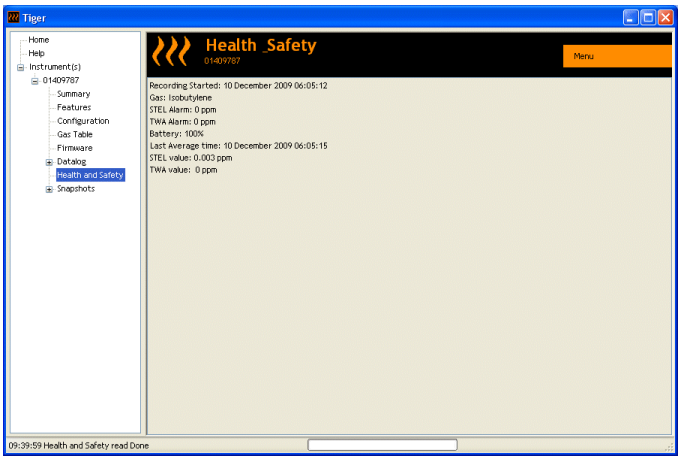
Use the menu function at the top right hand corner of the window to print, export or delete the data.

WARNING: The delete function deletes all logged data from your TIGER. Ensure all valuable data is exported to your PC before selecting 'Delete'.

TIGER PC Software (continued)

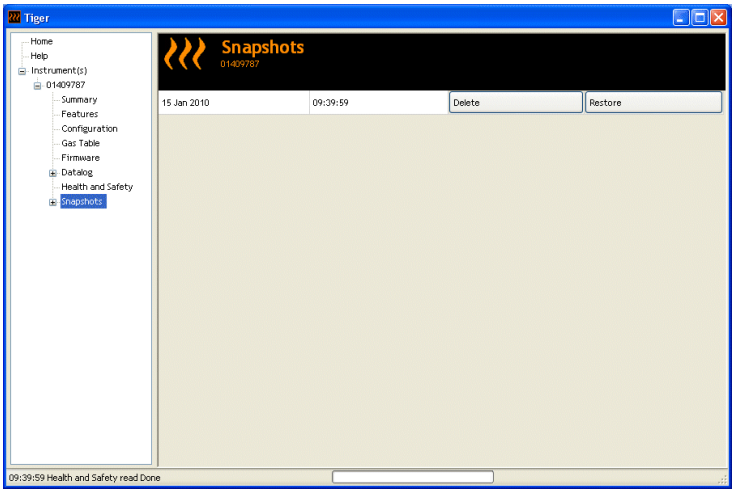
The Health & Safety Screen

This screen displays the latest Health & Safety readings held on your TIGER. Click 'Menu' then 'Export' to save this data to a file on your computer. The next readings will overwrite the data on your TIGER.



Snapshots

A snapshot records the settings and calibration data on your Tiger at any particular point in time. The Snapshots screen displays a list of all those stored on your PC.



Click 'Delete' to remove a selected snapshot.

To restore the stored settings to your TIGER, first ensure that your instrument is fully booted and connected to your PC as detailed on page 19. Ensure that your instrument is in normal Survey mode, is not in an alarm condition and that no datalogging or Health & Safety readings are being collected. Click 'Restore' against the relevant snapshot. ***Be aware that this process will replace all setup and calibration files.*** On the restore screen click 'Yes'. When complete, click 'Close' and restart your TIGER. Your TIGER will now be restored to the settings and calibration data stored at the time of that snapshot.

The snapshot menu also allows review of stored data when an instrument is not attached. Expand the menu until the latest or relevant snapshot is displayed. Double-click on the snapshot and all the data stored in that snapshot can be accessed

TIGER PC Software (continued)

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Governing Law

The laws of the United Kingdom govern this Agreement.

Batteries

Note: Ion Science recommends keeping your PhoCheck TIGER on charge at all times when not in use, as batteries can loose power over time.

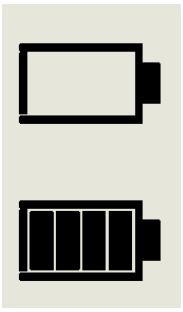
WARNINGS

BATTERY CHARGING:	Charge PhoCheck Tiger and its Lithium ion battery packs in a Non Hazardous environment only.
BATTERY REPLACEMENT:	Never replace primary Alkaline battery cells while in a potentially explosive or hazardous location. Use only Duracell Procell Alkaline batteries MN1500.
BATTERY CONNECTION:	The PhoCheck Tigers Lithium ion and Alkaline battery packs have been specially designed to allow connection to the PhoCheck Tiger Instrument while in potentially hazardous atmospheres. The PhoCheck Tiger instruments ingress protection rating is reduced to IP 20 when its battery pack is removed so avoid changing batteries in dusty or wet environments.

Recharging batteries

Ensure the PhoCheck Tiger is charged for at least 7 hours before using it for the first time. To ensure optimum charging the TIGER should be switched off during charging. If left on, the TIGER will take longer to charge, but should not suffer any damage. The TIGER should be charged in a non hazardous environment only.

To charge your TIGER, first connect the charging cradle to the mains, and switch on. A red light will indicate that the charger is ready. Place the TIGER in the charging cradle such that the contacts on the TIGER are aligned with those in the cradle. (There is no need to remove the black rubber Boot from the TIGER during charging.) During charging, the charger will display an orange light. A green light indicates that charging is complete.



Discharged

The battery icon on the TIGER will display the level of charge.

Fully Charged

NOTE: Only use the charger supplied with your TIGER to charge your instrument.

Batteries (continued)

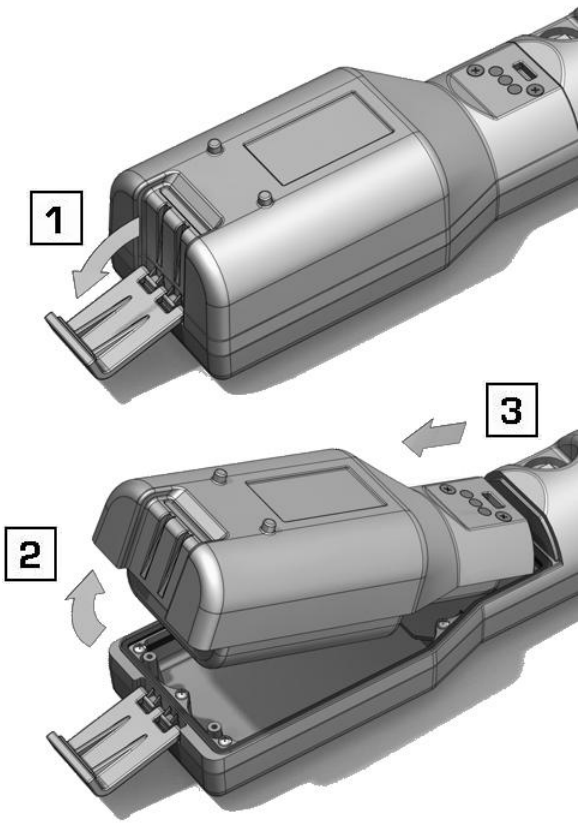
Replacement of rechargeable battery pack

To replace the battery pack, proceed as follows:

a. Ensure TIGER is switched Off;

b. Remove the black rubber Boot from your TIGER (this is most easily achieved by starting at the front end of the instrument (step 4 below));

c. Release the clip at the rear end of the instrument and lift the battery pack away from the body of the instrument, coincidently sliding it slightly backwards;



d. Reverse the procedure to install the replacement pack, ensuring that the Boot is a snug fit around the front of the instrument and the lights are not obscured;

e. Charge TIGER for seven hours before use.

Batteries (continued)

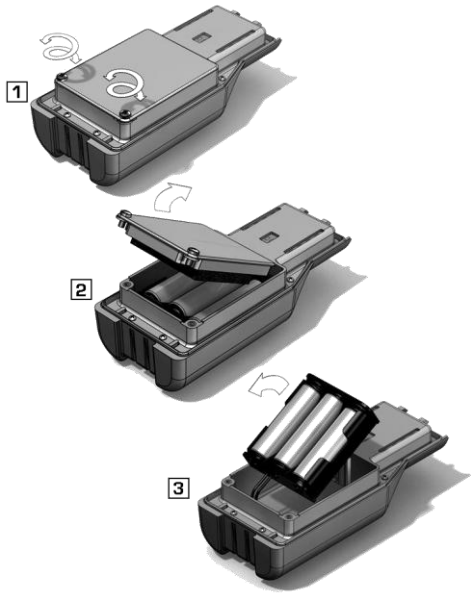
Replacement of Non-rechargeable batteries

WARNING

BATTERY REPLACEMENT: Never replace primary Alkaline battery cells while in a potentially explosive or hazardous location. Use only Duracell Procell Alkaline batteries MN1500.

a. Ensure TIGER is switched Off.

b. Remove the pack as in (b) and (c) above;



c. Remove the screws retaining the battery cover and lift it off. This reveals a set of 3 x AA cells contained in a removable battery holder;

d. Remove the battery holder;

e. Replace the exhausted batteries;

f. Check all batteries have the correct polarity before replacing the holder;

g. Replace the pack as described above.

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

WARNING: Non-rechargeable batteries **MUST NOT** be replaced in the field. Batteries should be loaded into the battery clip in a safe environment only. Only the assembled battery pack may be changed in the field.

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

Diagnostics

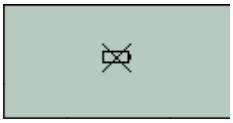
Basic faults or diagnostics are presented as symbols. Should a fault occur most can be corrected by pressing ENTER or ESC to clear the fault message. All fault conditions cause the TIGER to alarm.

Pump failure

Pump blocked or pump failure

The flow of gas through the instrument has fallen below 100 cc/minute. Check the probe and filter for signs of blockage. Water or dirt in the probe, a bent probe, dirty filter on the inlet or blockage of the exhaust (finger over hole on the back?) can all cause low flow. If the blockage can be removed, press Escape to clear the alarm. If the fault persists send the instrument to your distributor for service.

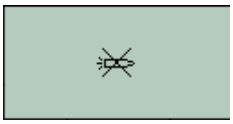
Battery dead



Battery low or battery failure

The Tiger will shut down when the battery level falls below 2%. Recharge the battery as instructed on page 29 of this manual ensuring that all connections are sound and the indicator lights on the charger are in order. If the battery fails to charge, fit another battery pack if available. If using alkaline batteries, replace them. If the fault persists send the instrument and charger to your distributor for service.

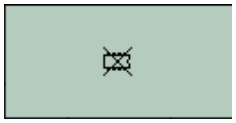
Lamp out



Lamp failure

The PID lamp has failed to strike (illuminate); this may occur at switch on or during use. Switch the TIGER off and replace the lamp. See Maintenance page 35.

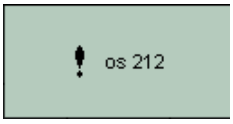
Memory full



Memory cannot receive more data

The data log memory is full. This will only happen if the Log Full box is set to ‘alarm’ on the TIGER PC configuration screen. Press the Escape key to continue, but the TIGER will no longer continue to log data. Select ‘recycle’ in TIGER PC and the TIGER will overwrite the oldest data and no alarm will be raised.

System error



Total system failure

The instrument’s firmware is corrupted. In the unlikely event of this message appearing, contact Ion Science or your nearest authorised service centre.

Maintenance

Calibration

Ion Science recommends an annual service and calibration for users who require a traceable calibration. During this service the lamp and detector are brought back to factory specifications and new Factory Calibration data is stored.

Due to the linear output of the Ion Science PID detector, a two-point calibration is often adequate. TIGER scales its linear output across a ZERO level (clean air reference) and the SPAN 1 user defined gas concentration. For more exacting requirements, TIGER offers a three-point calibration with a higher SPAN 2 gas concentration.

TIGER offers the options of Factory calibration or Custom calibration. 'Factory calibration' is set by Ion Science during instrument manufacture or on re-calibration. 'Custom calibration' can be set by the instrument user.

For ***Factory Calibration*** contact Ion Science Ltd. or your distributor.
'Factory' calibration offers a safe set of three-point calibration data. This should be used if the custom calibration fails and will keep the unit working until a good custom calibration is completed.

For ***Custom Calibration***, first set up the parameters in TIGER PC - see page 23.
TIGER allows you to custom calibrate using any gas from the Gas Table at any concentration from 10ppm. You will need a cylinder of the selected gas at each of the chosen concentrations. Each cylinder should be regulated for a flow rate above 250ml/min.

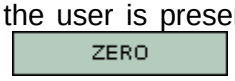
Have the cylinder(s) of gas, regulator(s) and the zero carbon filter (included in the Calibration Kit for your TIGER) on hand before starting the procedure. Alternatively a known clean air supply may be used as the 'zero' gas. Please ensure you are familiar with the entire calibration procedure before attempting to calibrate your TIGER.

Note: The calibration of your TIGER must be carried out in a clean air environment. Ensure all parts of the calibration kit are available and ready for use.
Never calibrate the zero with the span gas connected

Press the Options soft key  on your TIGER to access the adjustable features.

Then use the UP or DOWN key to select calibration.  Press ENTER to confirm selection.

Select Custom Calibration  and press Enter to confirm.

On confirming the selection, the user is presented with a 15 second count down. 

Remove both caps from the carbon filter and attach the Carbon filter adaptor (A-861229 in accessories box) to the filter and then fit onto the probe of your TIGER. Press ENTER to start the 'zero' countdown. At the end of the count down a tick '✓' will appear, indicating that the Zero has been accepted. 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.

Maintenance (continued)

Press ENTER again and the gas and concentration for Span 1 (previously set up in TIGER PC) are displayed along with a 15 second count-down. SPAN 1 Attach the 'Span 1' gas using the calibration adaptor supplied in the accessory box (see page 40) and press ENTER to start the Span 1 countdown. At the end of the count down a tick '✓' will appear, indicating that the Span 1 has been accepted. For two-point calibration, press ENTER and the calibration is complete.

For three-point calibration, press ENTER to display the gas and concentration for Span 2 (previously set up in TIGER PC) along with a 15 second count-down. SPAN 2 Attach the 'Span 2' gas and press ENTER to start the Span 2 countdown. At the end of the count down a tick '✓' will appear, indicating that the Span 2 has been accepted.
Press ENTER again and the calibration is complete.

Probes

Should the probe become cantaminated or damaged, replacement probes may be obtained from your distributor or from Ion Science Ltd. Please note that a small 'O ring' at the base of the probe ensures the probe is sealed, this can bee seen in the transparent filter housing when the probe is removed.

The probe can be removed for cleaning or replacement by unscrewing it from the transparent filter housing.

Refit the probe using fingers only, avoid using tools as this may damage the filter housing. To ensure the assembly is sealed, place a finger over the probe to block the flow while the instrument is running. A flow alarm should occur if sealed correctly.

Filter

The filter should be changed after every 100 hours of use. This frequency should be increased for dusty or moisture laden environments or whenever the filter appears 'dirty' when viewed through the transparent upper surface of the Filter Clamp. Filter changing should be conducted in a suitably clean environment, with clean hands and equipment to avoid contamination of the new filter.

To change the filter, unscrew the Filter Housing Cap (item 1 of the 'Front End Filter Assembly' on page 37), lift off the Filter Clamp and O-ring and lift the filter from the TIGER Body'. Carefully place a new filter into the TIGER Body. ***(Under no circumstances should a filter be used once it has been removed.)*** Replace the Filter Clamp, ensuring the locating lugs are correctly positioned in the cut-outs in the Tiger Body and that the O-ring is correctly seated. Replace the Filter Housing Cap. Do not over-tighten.

Maintenance (continued)

PID Sensor/Lamp replacement and cleaning

When using your TIGER 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. The problem can be resolved by the user in the field using the procedure below and a can of computer duster air.

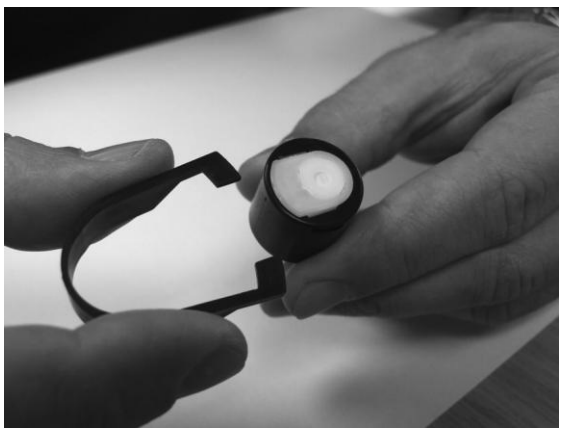
In normal use the lamp should be cleaned after every 100 hours of use (based on 30 ppm for 100 hours). Reduce this if TIGER is used in heavily gas contaminated environments. Please note that some esters, amines and halogenated compounds may accelerate window fouling; in these cases cleaning may be required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

CAUTION!
The TIGER is a sensitive detector. Internal components must be handled with clean hands and clean tools. The TIGER lamp is fragile. Handle with great care. Never touch the window and do not drop!!

To remove the Mini PID sensor for cleaning or lamp replacement, first ensure that the TIGER is turned off and that you are in a clean environment such that the sensor parts will not be contaminated by dust, oil or grease. Remove the sensor cover (A5 on page 37). The centre screw may be turned with a small coin or a suitable flat bladed screwdriver.

Ensure that the sensor seal (9), on the inside of the sensor cover is not disturbed.

Carefully lift the Mini PID Sensor (A6) from the TIGER body, ensuring that the two Inlet/Outlet Seals (10) remain in place in the TIGER body.



Using the special tool provided, locate its ‘prongs’ in the slots in the side of the Sensor body. Using the forefinger to restrain the sensor, (the internal parts are spring-loaded and careless disassembly will leave you hunting for the spring!) squeeze the tool to release the lamp housing.

The lamp may now be removed.

To replace the lamp or install a new one, reverse the procedure, ensuring the seals are all in place. When replacing the sensor cover ensure that the markers are aligned correctly and that the cover is a snug fit.

The instrument MUST be re-calibrated after fitting a replacement or cleaned lamp.

WARNING! NEVER REFIT A DAMAGED LAMP!

Maintenance (continued)

Lamp Cleaning

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

First ensure that the TIGER is turned off and that you are in a clean environment such that the sensor parts will not be contaminated by dust, oil or grease.

Remove the lamp as detailed above.

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

USE of PID lamp cleaning kit A-31063

The container 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:
Always replace the lid after using the cleaning compound.

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/m^3.*

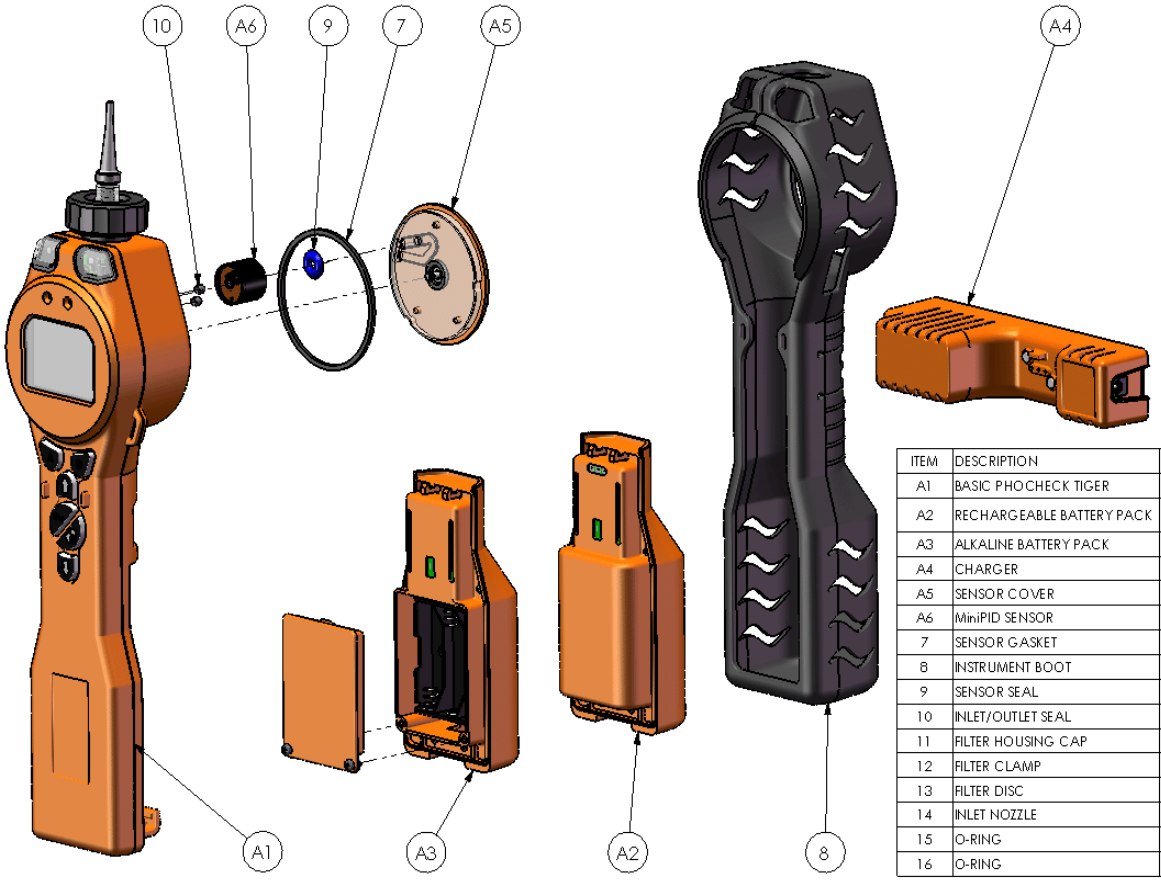
Storage:
- *Keep container closed to prevent water adsorption and contamination.*

To clean the lamp:

1. Open the vial of Aluminium Oxide polishing compound. With a clean cotton bud collect a small amount of compound;
2. 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;
3. Continue polishing until an audible "squeaking" is made by the cotton bud with compound moving over the window surface (usually within fifteen seconds);
4. Remove the residual powder with short blast of air from the can of air duster;
5. The instrument MUST now be re-calibrated.

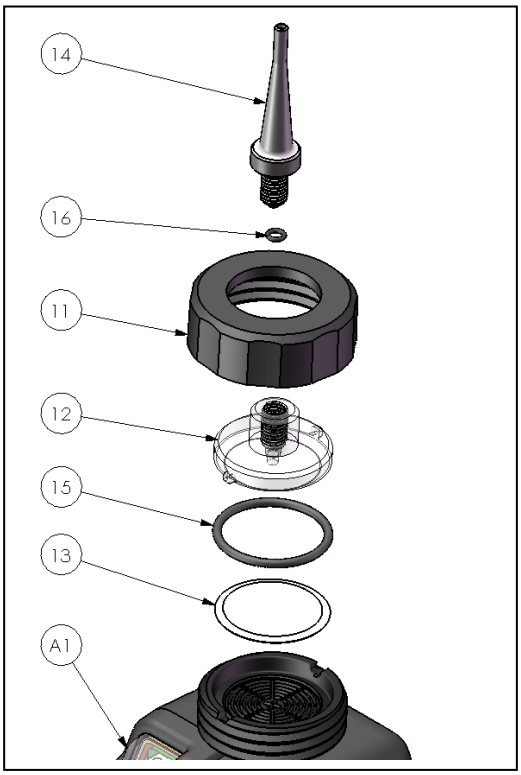
TIGER Parts

TIGER Main Assembly



ITEM	DESCRIPTION	PART No.	QTY
A1	BASIC PHOCHECK TIGER	A-861274	1
A2	RECHARGEABLE BATTERY PACK	A-861240	1
A3	ALKALINE BATTERY PACK	A-861241	1
A4	CHARGER	A-861220	1
A5	SENSOR COVER	A-861259	1
A6	MiniPID SENSOR	A-846219	1
7	SENSOR GASKET	861203-9	1
8	INSTRUMENT BOOT	861205	1
9	SENSOR SEAL	861214	1
10	INLET/OUTLET SEAL	861215	2
11	FILTER HOUSING CAP	861218	1
12	FILTER CLAMP	861219	1
13	FILTER DISC	861221	1
14	INLET NOZZLE	861443	1
15	O-RING	S/OV-09	1
16	O-RING	S/OV-04	1

Front End Filter Assembly



Accessories

Ion Science has developed an exclusive range of high quality accessories to compliment the PhoCheck TIGER. Please see a selection of these below:

Part Number	Accessory Description
1/jawu-01	2.1mm DC jack - cigar lighter plug Car Charger Lead
846216	Removal tool Min PID stack
861205	Protective, Removable rubber boot
861230	USB Cable - Angled B Connector
861413	5m Extension Hose
861414	10m Extension Hose
861415	Diluter
A-31063	PID lamp cleaning kit
A-830206	Decontamination Bag (10 Off)
A-861269	Explorer Case - Phocheck Tiger
A-861272	Accessory Kit - Rechargeable Battery
A-861273	Accessory Kit - Alkaline Battery
A-861400	Drager Tube Holder Assembly
A-861406	Flexible Probe Assembly
A-861416	Charging/Calibration Dock
A-861418	Calibration Kit
LA4TM600	MiniPID Lamp Krypton 10.6eV ppm
LA4TB600	MiniPID Lamp Krypton 10.6eV ppb
LA4SM700	MiniPID Lamp (Argon) 11.7eV

Contact Ion Science or your local Distributor for more information.

Accessories Content

	A-861267	Phocheck Tiger Accessory Box
	846216	Removal Tool Min PID Stack
	A-31057	Carbon Filter Assembly (Sm Blue)
	861221	PTFE Filter Disc

	861235	Lanyard
	A-31063	PID Lamp Cleaning Kit
	A-861229	Carbon Filter Adaptor
	861476	Calibration Adaptor

	861214	Sensor seal

Instrument Warranty and Service

Warranty

Standard Warranty can be extended to up to 5 years on the PhoCheck TIGER when registering your instrument via our website: www.ionscience.com/instrument-registration To receive your Extended Warranty, you need to register within one month of purchase (Terms and Conditions apply).

To register your PhoCheck TIGER instrument, simply fill in the online form. You will need to enter your instrument serial (IRN) number to hand. To find this, switch on your instrument. Using your soft keys, go into the 'info' menu and scroll down until you find the IRN number.

You will then receive a confirmation email that your Extended Warranty Period has been activated and processed.

Full details, along with a copy of our Warranty Statement can be found by visiting: www.ionscience.com/instrument-registration

Service

Ion Science Ltd also offers a number of service options for your PhoCheck TIGER that allows you to choose the instrument cover to best suits your requirements.

At Ion Science we recommend that all of our gas detection instruments be returned for service and factory calibration once every 12 months.

Contact Ion Science or your local distributor for service options in your area.

Find your local distributor by visiting: www.ionscience.com

Technical Specifications

Response time	T90 < 2 second	
Detectable Range	1 ppb – 10,000 ppm & ppb to 20,000ppm for Specific Gases	
Resolution	+/- 1 ppb	
Accuracy	+/- 5% displayed reading +/- one digit	
Linearity	+/- 5% displayed reading +/- one digit	
Battery	Lithium ion Alkaline (Duracell Procell MN1500)	30 hours 12 hours
Data log	Including date / time	120,000
Alarm visual	Flashing Red & Amber LED	
Alarm audible	95 dBA @ 30 cm	
Flow Rate	≥ 220 ml/min in Ambient conditions	
Temperature	Operating Storage Certified to	-20 to 60 °C (- 4 to 140 °F) -25 to 60 °C (-13 to 140 °F) -15 to 45 °C (- 5 to 140 °F)
Dimensions	Instrument	340 x 90 x 60 mm
Weight	Instrument	0.720 kg (1.6 lb)
Materials	Instrument Rubber Boot	Anti-static PC/ABS (Polycarbonate/ Acrylonitrile Butadiene Styrene) Anti-static TPE (Thermoplastic Polyolefin Elastomeric)

Manual History

Manual version	Amendment	Issue Date	Instrument Firmware	PC Software
1.0	First issue	15/01/2010	V 0.3.40	V 1.0.0.18
1.4	Updated filter replacement instructions on page 34.	9/4/2010	V 0.3.49	V 1.0.0.26
1.5	Addition of ATEX information and new probe graphics	11/05/2010	V0.0.57	V 1.0.0.30
1.6	Addition of IECEx number on page 4	17/06/2010	V0.0.63	V 1.0.0.31
1.7	Instrument Warranty Information added to page 41 Accessory images added to page 39-40 Images added on pages 33 and 34	21/07/10	V0.0.63	V 1.0.0.31
1.8	Pg 38 – Part Numbers LA4SB600 & LA4SM600 have been deleted and replaced with LA4TM600, LA4TB600 & LA4SM700	30/09/10	V0.0.63	V 1.0.0.31
1.9	Page 21 – New screen shot of PC software. New tick box added for 'Sleep during PC connect' mode. Page 33 – carbon filter adaptor added in instructions. Page 33 – Note added, 'Never calibrate the zero with the span gas connected'		V0.0.74	V 1.0.0.31
2.0	Page 41 – Accessory added, Sensor seal .		V0.0.74	V 1.0.0.33