

TIGER[®]

Instrument User Manual V3.9



Register
your instrument
online to receive
your extended
warranty.

Register your instrument online for extended warranty

Thank you for purchasing your Ion Science product.

The standard warranty of your instrument can be extended to up to five years on Tiger and two years on other Ion Science product.

To receive your extended warranty, you must register your instrument online within one month of purchase. Terms and conditions apply.

Visit ionscience.com/instrument-registration



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:	Do not remove the sensor cover in the hazardous area. 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. Do not service the instrument live; Remove battery pack before servicing Substitution of components may impair intrinsic safety.
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 Industrial by Duracell ID1500 batteries.
BATTERY CONNECTION:	The PhoCheck Tiger's lithium ion and alkaline battery packs have been specially designed to allow connection to the PhoCheck Tiger Instrument while in potentially hazardous atmospheres. Ensure all electrical connections are clean and undamaged before connection. The PhoCheck Tiger instruments ingress protection rating is reduced to IP20 when its battery pack is removed so avoid changing batteries in dusty or wet environments.
BATTERY USE:	Use supplied battery packs only on the PhoCheck Tiger. Never replace primary alkaline battery cells while in a potentially explosive or hazardous location. Use only Industrial by Duracell ID1500 batteries.
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.
PROBE USE	When using the Probe part numbers A-861414, A-861413 the Safety rating of the Phocheck Tiger Instrument drops from II 1 G Ex ia IIC T4 Ga to II 1 G Ex ia IIB T4 Ga. The temperature performance of the unit is unaffected

Proper Use	If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
Type of safety protection	Intrinsically safe



Avertissement

MODE D'EMPLOI :	Veuillez lire entièrement et comprendre ce mode d'emploi avant d'utiliser l'instrument PhoCheck Tiger.
RISQUES LIES AUX PROPRIETES ANTISTATIQUES :	N'utilisez pas de détergents abrasifs ou chimiques pour nettoyer l'instrument PhoCheck Tiger, au risque de réduire les propriétés antistatiques des matériaux utilisés. Employez uniquement un chiffon humide.
EXPOSITION AUX MATERIAUX :	N'exposez pas le PhoCheck Tiger à des atmosphères connues pour avoir un effet indésirable sur la polyoléfine thermoplastique ou le PC/l'ABS antistatique.
ENTRETIEN :	Ne retirez pas le couvercle du capteur dans les zones dangereuses. N'ouvrez aucune partie du PhoCheck Tiger dans une zone dangereuse, sauf pour le remplacement de la batterie. L'entretien du PhoCheck Tiger doit se dérouler dans un environnement non dangereux et être confié uniquement à des centres de service agréés Ion Science. Ne procédez pas à l'entretien de l'instrument lorsqu'il est sous tension. Otez la batterie avant l'entretien. Le remplacement de composants risque de nuire à la sécurité intrinsèque.
CHARGE DE LA BATTERIE :	Chargez le PhoCheck Tiger et sa batterie lithium-ion uniquement dans un environnement non dangereux.
REMPLACEMENT DES PILES:	Ne remplacez jamais de piles alcalines dans un endroit dangereux ou potentiellement explosif. N'utilisez que des piles alcalines Industrial by Duracell ID1500.
CONNEXION DES PILES/DE LA BATTERIE :	Les batteries lithium-ion et les piles alcalines du PhoCheck Tiger ont été spécialement conçues pour permettre la connexion à l'instrument PhoCheck Tiger dans des atmosphères potentiellement dangereuses. Assurez-vous que les connexions électriques sont propres et intactes avant la connexion. L'indice de protection des instruments PhoCheck Tiger étant ramené à IP 20 lors du retrait de la batterie, évitez de remplacer les batteries dans des environnements poussiéreux ou humides.
UTILISATION DES PILES/DE LA BATTERIE :	N'utilisez que les batteries fournies avec le PhoCheck Tiger. Ne remplacez jamais des piles alcalines primaires dans un endroit dangereux ou potentiellement explosif. N'utilisez que des piles alcalines Industrial by Duracell ID1500.
ESSAI DE FONCTIONNEMENT :	Le PhoCheck Tiger doit subir un essai de fonctionnement avant de pénétrer dans une zone dangereuse chaque fois qu'une connexion a été effectuée au port USB. L'instrument doit terminer sa routine de démarrage et afficher des valeurs lisibles. Si l'écran LCD n'affiche pas de données correctes et intelligibles, n'utilisez pas l'instrument dans une zone dangereuse.
CONNEXION USB :	Le port USB peut uniquement être utilisé dans un environnement non dangereux.
UTILISATION DE LA SONDE:	Lors de l'utilisation des pièces de la sonde dont les numéros vont de A-861414, A-861413, la côte de sécurité de l'instrument Phocheck Tiger se réduit de II 1 G Ex ia IIC T4 Ga à II 1 G Ex ia IIB T4 Ga. La performance de la température de l'unité n'est pas affectée"

Utilisation appropriée	Si l'équipement est utilisé d'une manière non spécifiée par le fabricant, la protection fournie par l'équipement peut être altérée.
Type de protection de sûreté :	Sécurité intrinsèque



EU Declaration of conformity

Manufacturer:	Ion Science Ltd, The Hive, Butts Lane, Fowlmere, Cambridge, SG8 7SL, UK
Product:	PhoCheck TIGER
Product description:	Intrinsically safe photo-ionisation gas detector for detecting volatile organic compounds
Directive 2014/34/EU	Required Coding -  II 1 G Ex ia IIC T4 Ga
	$T_{amb.} = -15^{\circ}\text{C}$ to $+45^{\circ}\text{C}$ (with Lithium ion Battery pack)
	$T_{amb.} = -15^{\circ}\text{C}$ to $+40^{\circ}\text{C}$ (with Alkaline Battery pack)
Certificate Number-	ITS09ATEX26890X issue 2 IECEx ITS 10.0036X issue 4
Notified body:	Intertek, 0359, Chester, UK
Report number:	102394781CHE-001
Intertek	3193491 Conforms to UL Std. 913, 61010-1 & Certified to CAN/CSA Std. C22.2 No.61010-1
Standards	
BS EN 60079-0: 2012	Electrical apparatus for explosive gas atmospheres. General requirements
BS EN 60079-11: 2012	Explosive atmospheres. Equipment protection by intrinsic safety "i"
BS EN61326-1:2006	Electrical equipment for measurement, control and laboratory use - EMC requirements. Group 1, Class B equipment - (emissions section only)
BS EN61326-1:2006	Electrical equipment for measurement, control and laboratory use - EMC requirements. Industrial location immunity - (immunity section only)
BS 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	
BS EN ISO 9001: 2015	Quality Management System - Requirements
BS EN 80079-34: 2011	Application of Quality Systems for equipment manufacture



Ion Science Ltd has sole responsibility, 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: Graham Davies

Position: Quality Manager

Signature:

Date: 9th April 2018

Issued by Ion Science Ltd of the above address on the 09/04/2018



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Statements

Responsibility for Use

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

Inadequate performance of the gas detection equipment described in this manual may not necessarily be self-evident and consequently equipment must be regularly inspected and maintained. Ion Science Ltd recommends that personnel responsible for equipment use a regime of regular checks prior to use to ensure it performs within calibration limits, and that a record be maintained which logs calibration check data. The equipment should be used in accordance with this manual, and in compliance with local safety standards.

IMPORTANT

It is essential that the TIGER is always used with a supplied 0.5 micron PTFE Filter Disc 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 ionscience.com.

Quality Assurance

TIGER instruments are manufactured by Ion Science Limited within an ISO 9001:2015 compliant quality system, which ensures that the equipment supplied to our customers has been designed and assembled reproducibly, and from traceable components.

Disposal

Dispose of 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 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 TIGER calibration kit is available from your distributor or service centre or at ionscience.com. Ion Science Ltd recommends annual return of all instruments for yearly service and calibration.

Legal Notice

Whilst every attempt is made to ensure the accuracy of the information contained in this manual, Ion Science Ltd accepts no liability for errors or omissions, or any consequences deriving from the use of information contained herein. It is provided "as is" and without any representation, term, condition or warranty of any kind, either expressed or implied. To the extent permitted by law, Ion Science Ltd shall not be liable to any person or entity for any loss or damage which may arise from the use of this manual. We reserve the right at any time and without any notice to remove, amend or vary any of the content which appears herein.



Introduction to Tiger

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 and Safety (optional) 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.

The TIGER has an intuitive graphical interface allowing easy access to instrument settings. Two soft keys A and B 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 pack that not only boasts an impressive running time and short charge time, but also allows the battery pack to be replaced in potentially hazardous environments. Field replaceable alkaline battery packs (non-rechargeable) are also available for when power to recharge 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 Ltd. 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. The 'Statements' and 'Introduction to TIGER' sections contain important information, which should be read before you turn your TIGER on for the first time.

Inlet Probes

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

Turn On

Press the **Enter / On/Off** key once to turn TIGER on.



Turn Off

Press and hold the **Enter / On/Off** key for 3 seconds, indicated by a 3 second countdown, to turn TIGER off. (**Note:** If the TIGER fails to shut down, press the **Escape (Esc)** key once or twice to return to the main screen, then press and hold the **Enter / On/Off** key again.) Once the unit is switched off, please allow a few seconds before attempting to switch on again.



Batteries

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

Rechargeable Batteries

TIGER instruments leave the factory with the Rechargeable Battery Pack (A2) 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 'Batteries' section of this manual.

Alkaline Batteries

An alkaline AA battery pack (A3) is also supplied with the TIGER. For more information please see the 'Batteries' section of this manual.

Select the Gas

TIGER instruments leave Ion Science Ltd pre-set for gas type isobutylene. 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.

Switch the TIGER on by pressing the Enter / On/Off key once.

Press the **Information** icon  (see 'Using your TIGER') and check the correct gas alarms are selected.

Change the gas (if necessary) as instructed under Gas Selection in the 'Using your TIGER' section.

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 the 'Using your TIGER' section of the manual 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 in the 'TIGER PC Software' section of this manual.



Understanding the keypad

General Description

The keypad comprises two soft keys: **A** and **B**, **Up** and **Down** arrow keys, an **Escape (Esc)** key, and an **Enter / On/Off** button. 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** and **B** rely on graphical prompts on the display to indicate their functionality.



Up and **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 shown below displays readings in large numbers. The Tiger instrument auto-ranges therefore the number of decimal places reduce as the VOC reading increases. The minimum achievable sensitivity is 0.001 ppm, the maximum range is 19,999 ppm (Isobutylene equivalent). When the maximum range is exceeded and the sensor over-ranges, the display will show '99999'. 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.

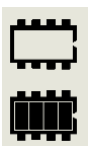
Status icon



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



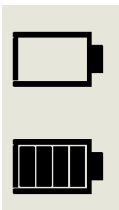
Peak Hold: When peak hold is switched on, the icon appears.



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 available capacity. When discharging, the border of the final segment will flash for one minute before the instrument shuts down. When charging, the segments will successively fill until all four segments are highlighted, indicating full charge.



Understanding the display screen



Backlight: 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.

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.



Flashlight / Torch: Pressing both soft keys together switches the flashlight / torch on and off. When the flashlight / torch is illuminated the light beams appear.



Lock: The Lock icon will appear when the configuration of the TIGER has been locked in TIGER PC. Soft keys in Button **A** column are enabled and Buttons in column **B** disabled, see page 13.

Main Screen Area

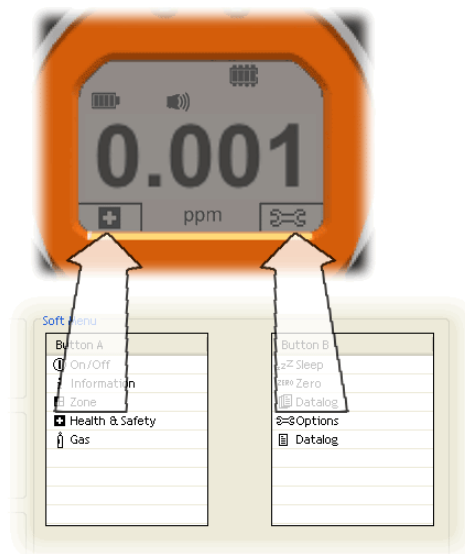
During normal operation, this area displays the readings in four large numbers, with the units of measurement below. During setup and adjustment, a function bar overlays the main screen.



Understanding display screen

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 and Safety
(optional)

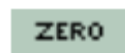


Multiple Data Log
(optional)

Button B



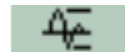
Sleep



Zeroing



Peak Hold



Average



Data Log (optional)



Stealth



Using your Tiger

Instrument functionality is broken into two parts; Application and Setup. Application settings are initially selected via the soft keys **A** and **B**. Setup functions like Backlight, Sound, Calibration and Alarm setting are adjusted within **Options**. 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 **Enter / On/Off** 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 the 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 **Enter/ On/Off** key. A three second count down takes place before the instrument shuts down. During this count down the instrument activates the upper alarm, visual red LED's flash and audible alarm sounds. This is done to alert the user to avoid accidental switch off.

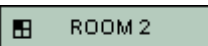
Sleep

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 the screen. Press the **Esc** key to awaken the instrument. (The instrument can also enter 'Sleep mode' during data logging when the duration between logs exceeds two minutes. This is a power saving function which only occurs when a tick box is set in TIGER PC.)

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 the **Up** and **Down** keys to select alternative zones.

Single Data Log (optional)

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 Log (optional)

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 setup. 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

Health and Safety (optional)

Press the **Health and 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. If a gas has no STEL and TWA level allocated in the gas table the following symbol will appear: .

IMPORTANT: TIGER STEL.

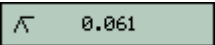
While the TIGER calculates the 15 minute STEL the instrument displays the ongoing STEL as it is calculated. This ongoing calculation is for indication purposes only to allow the user to gauge how the calculation is progressing. Only the final reading at the end of the calculation is logged by the instrument and should be referenced by the user.

Gas Selection

Press the **Gas Selection** 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 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. Pressing the **RESET** soft key resets the peak value. 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 **RESET** soft key again resets the calculation even if there is an average already running. Press **Esc** to return to the main screen.

Stealth

When selected all audible and visual alarms are disabled except for the alarm indicator on the screen. This function may help avoid triggering panic in public places.

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). Select the preferred option with the **Up** and **Down** keys and confirm with **Enter**.



Using your Tiger



Sound

The sound options are presented as set up in TIGER PC. Use the **Down** key 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** keys 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.



Factory Calibration Not for operator use.

Users can set their instruments to operate using the factory calibrated values, however, the actual calibration function cannot be carried out by the user. The instrument must be returned to Ion Science Ltd or an authorised service centre.



Custom Calibration

Users can carry out a custom calibration with the 10.0eV, 10.6eV or 11.7eV mini PID. Custom PID calibration should be carried out as part of regular instrument maintenance. Please refer to the 'Maintenance' section of the manual.



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.



Units

Select the available units by using the **Up** and **Down** keys and then press **Enter**.



Lamp

Select the lamp type by pressing the **Up** and **Down** keys and then press **Enter**



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 **Esc** to return to the main screen:



Using your Tiger

First Screen	Gas selected	
	Response Factor	RF
	Upper alarm	
	Lower alarm	
	Run time	Run Time: 0:00
Second screen	Lamp selected	
	Date of Factory calibration	
	Date of Custom calibration	
	Date of Select tube calibration (optional)	
Third Screen	SPAN 1	SPAN 1 (gas concentration set in TIGER PC)
	SPAN 2	SPAN 2 (gas concentration set in TIGER PC)
	PID detector in units	PID
	PID sensor A/D reading	A/D
Fourth Screen	Short Term Exposure Levels (optional)	STEL
	Time Weighted Average (Optional)	TVWA
	Internal Reference Number	IRN:
	Firmware version	Firmware:
	Bootloader version	Bootloader:
	Battery type and voltage	
Fifth Screen	Memory available	
	Gas Table Date	
	Date and time	
Sixth Screen	Features. An icon will appear for each feature available	Features ppb



Tiger PC software

PC Requirements

TIGER PC Software must be used in conjunction with a PC or laptop using Windows Vista, Windows 7, Windows 8 or Windows 10.

Installation of TIGER PC Software

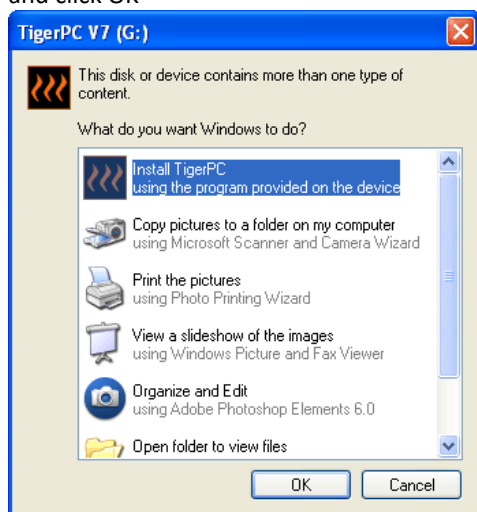
Download the TigerPC software from the Ion Science website:

<http://ionscience.com/customer-support/media-centre/instrument-software/>

Alternatively, the TigerPC software can be purchased on a memory stick, part number: A-861268

When the memory stick is plugged into a USB socket the following 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



Follow the prompts until the installation is complete. Should you have difficulty please contact your local distributor: <http://ion-science-2016.gridglobal.co.uk/where-to-buy/>

Alternatively contact Ion Science directly:

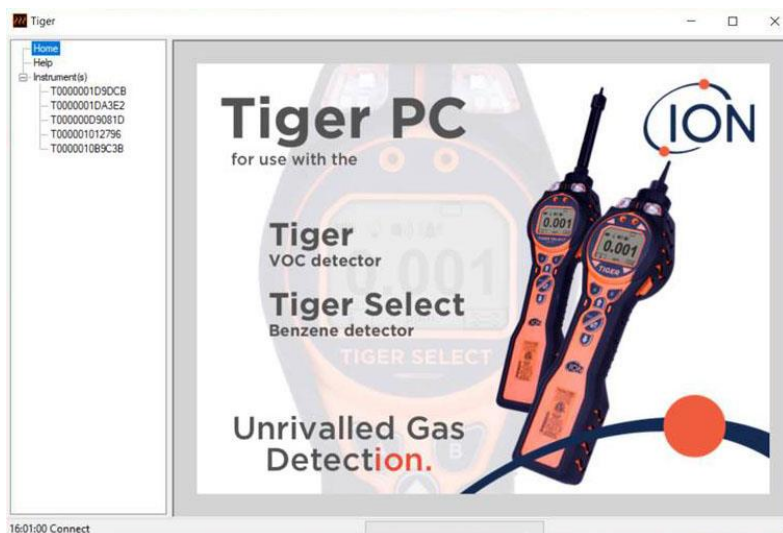
<http://ion-science-2016.gridglobal.co.uk/contact/>



Tiger PC software

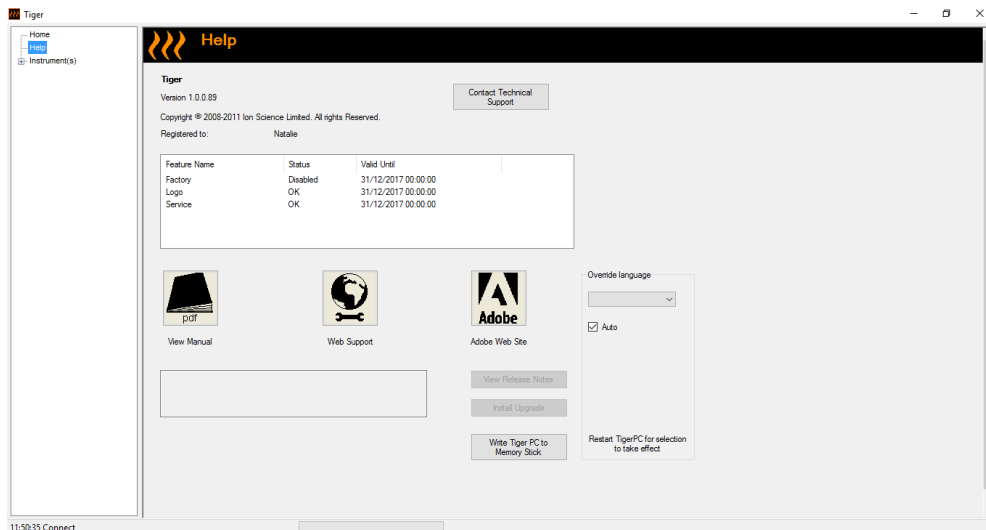
Connecting TIGER to a PC

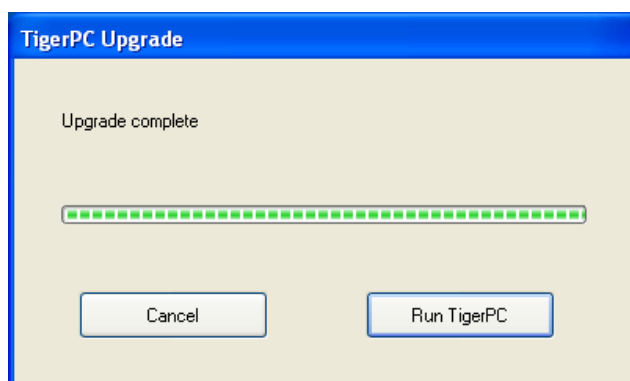
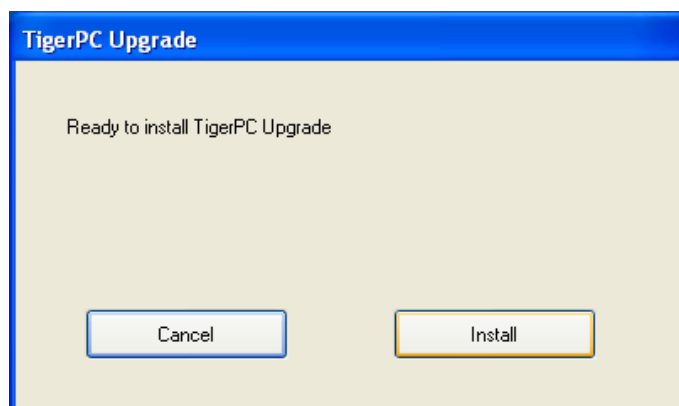
1. Double click the TIGER icon on your desktop and open TIGER PC.
The Home page should appear:



The Help Screen

This screen will show you if a new version of PC software is available. You can then install the upgrade if required. We encourage users that Tiger PC should always be kept up to date to ensure the latest functionality.

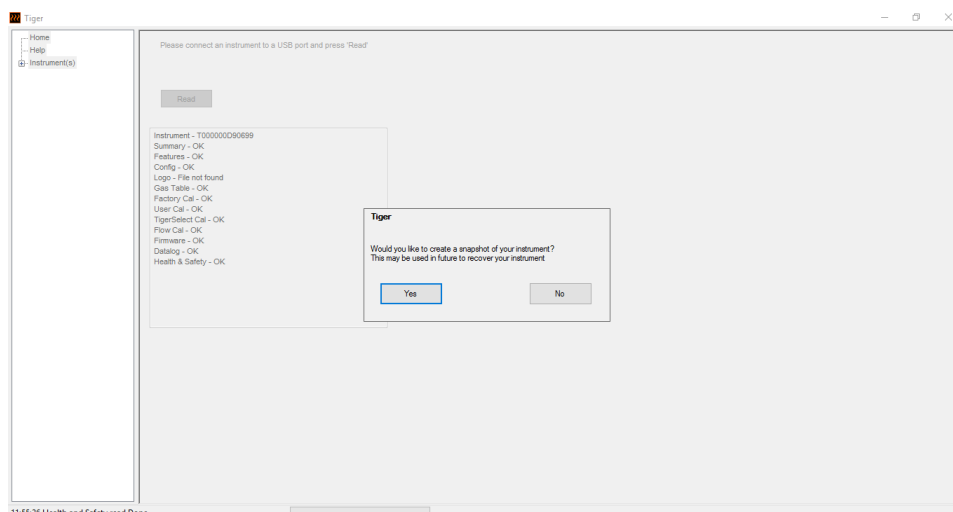




2. Click on 'Instrument(s)'. If your TIGER has previously been connected to your PC your instruments IRN (Internal Reference Number) will appear.

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:

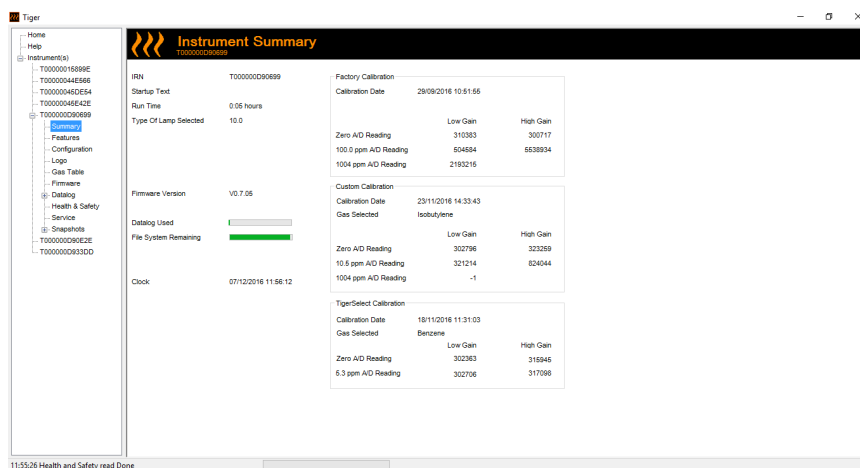
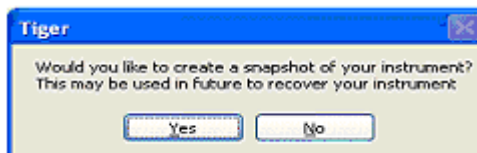
3. Switch TIGER on and when fully booted up connect to a USB socket on your PC using the USB cable supplied. If the 'Found New Hardware' screen appears, follow the prompts to install your instrument on your PC.
4. Click on 'Read'. Your instrument number will appear under 'instrument(s)' (if it was not there already) and the Instrument Summary page will appear.





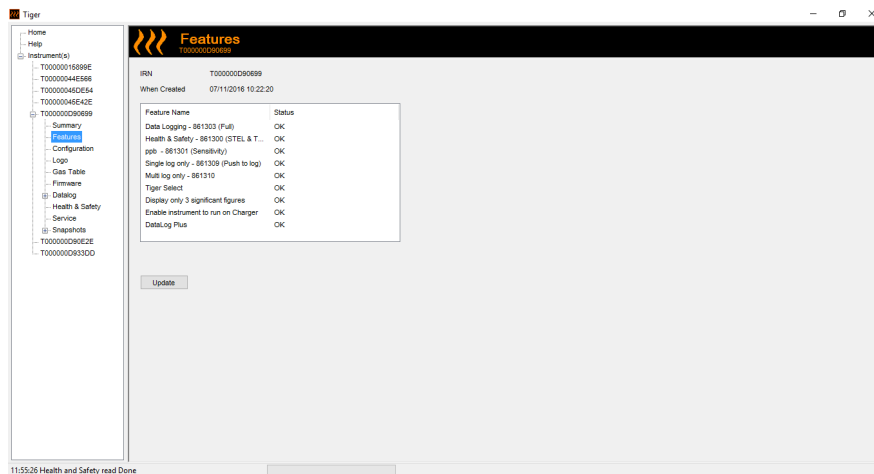
Tiger PC software

5. 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 'TIGER PC Software').



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





Tiger PC software

The Configuration Screen

Use this screen to configure your TIGER.

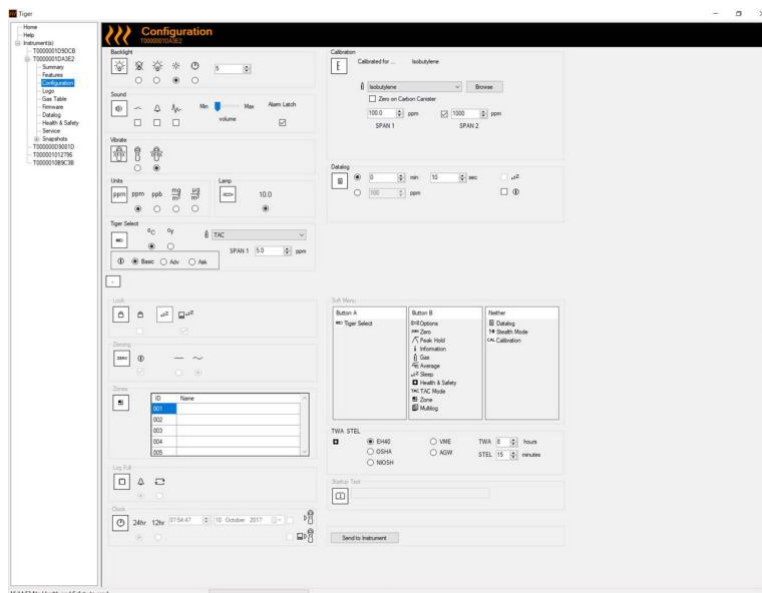
Backlight

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.

User set alarm conditions are triggered and also reset based on the alarm thresholds set by the user. When 'Alarm latch' is selected alarms continue to sound even if the gas level falls below the threshold until the 'Esc' button is pressed.



Units

The units of measurement may be chosen as parts per million (ppm) or milligrams per cubic meter cubed (mg/m^3). If you have the high sensitivity option / upgrade then Parts Per Billion (ppb) and Micrograms per meter cubed ($\mu\text{g}/\text{m}^3$) are also available.

IMPORTANT: when ppb mode is selected the instrument over ranges at 9999 ppb (1ppm)

Lock

The Lock function allows a supervisor to restrict access to critical functions. See icons on page 14
Soft keys in Button A column are enabled and Buttons in column B disabled.

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.

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

Tiger Select

Please refer to the TIGER Select User Manual.

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.

There are various options for zeroing a TIGER or TIGER Select. The symbols below are found on the configuration screen of TIGER PC.

Zero at switch on

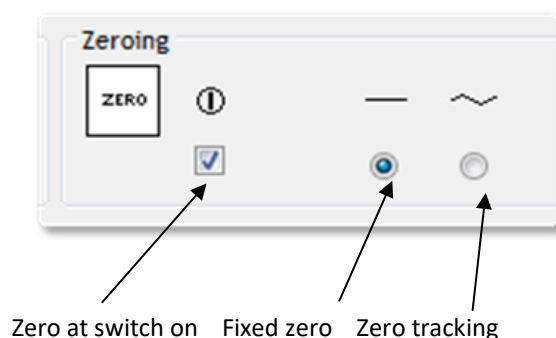
When selected, the TIGER will automatically set its zero reading based on ambient air. When deselected the instrument will use its calibration zero.

Fixed zero

When selected, TIGER uses the fixed calibration Zero. If used in conjunction with the 'Zero at switch on' feature the instrument will zero at switch on and then remain at that level.

Zero tracking

When selected, the Zero level will move negative if a cleaner ambient air is detected. This ensures 0.0 ppm is displayed in clean air and ensures sub ppb levels are always detected.



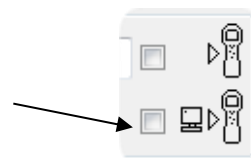
Zero at switch on Fixed zero Zero tracking

Clock

Select 24 or 12 hour format using the radial buttons. Set the time and date and tick the box on the right to set the time on your TIGER.

Alternatively, the instrument can be set synchronise its time with the host computer.

Synchronise with 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.

IMPORTANT

If you have purchased the instrument with the MiniPID 2 Lamp (Argon)11.7eV (LA4SM700), there are a number of things related to applications that you must take into consideration before using the lamp.

1. It is important for the lamps to be stored in their desiccated vials in cool conditions (15-25°C).
2. The lamps should not be used in:
 - Chemically severe environments, i.e. those containing significant concentrations of acids and strong solvents such as dichloromethane.
 - Conditions of condensing humidity; always pass dry cool air through the instrument before storage. For long storage periods, remove the lamp and return it to the desiccated vial.
 - Physically severe environments: large temperature changes may initiate lamp failure.



Tiger PC software

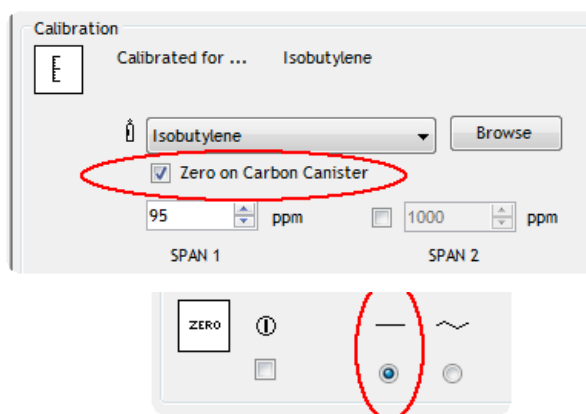
11.7 eV lamps may not strike/illuminate first time and result in a 'lamp fail' alarm on the TIGER instrument, particularly if the lamps are unused for an extended period. If the TIGER instrument raises a lamp fail alarm please switch the instrument off and then switch on again. Several start cycles may be required.

11.7 eV lamps have a relatively short life partly due to the type of lamp window material. Prolonged exposure to airborne moisture slowly degrades the lamp window. Therefore the lamps should be removed from the TIGER and stored in their desiccated vial when not in use.

11.7 eV lamps have quite different characteristics to the standard 10.6 eV lamps.

In applications where the detected gas levels are expected to be below 100 ppm then only a two point calibration (i.e. Zero and 100 ppm) is necessary however in applications that require measurement above 100 ppm a three point calibration (i.e. Zero, 100 ppm and 1,000 ppm) should be carried out.

When setting up the custom calibration on TIGER PC's configuration screen select the 'Zero on Carbon Canister' option, this will ensure a near zero reading after calibration. The fixed zero option should also be selected on the configuration screen, do not select 'Zero at switch on'.



Soft Menu

Functions on the Tiger instrument can be configured to either the A or B button's by dragging and dropping the functions into either the A or B areas on the configuration screen. Alternatively, they can be moved to the 'Neither' area if not required. Features in the 'Neither' area do not appear on the instrument.

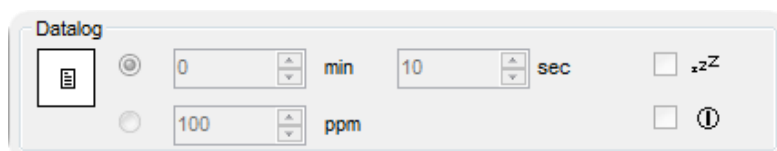
Data log

Interval: Use this area to set the interval between readings, the minimum time permitted is one second.

Sleep: When the interval between data log is >2 minutes the sleep (zZ) function becomes available. When selected, the instrument will sleep between logs therefore preserves battery life.

ppm: By selecting 'ppm' the instrument starts data logging at a 1 second interval for as long as the ppm gas level is exceeded.

On/off: The instrument starts data logging when the instrument is switched on.



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

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./gas table

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.

Select "send to instrument" to save these settings this information to your TIGER. The calibration procedure is detailed under the 'Maintenance' section of this manual.

Startup Text

Enter the text you wish to appear on the startup 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 Ltd.



Tiger PC software

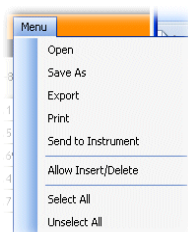
The Gas Table Screen (including setting alarm levels)

Connect your TIGER to your PC as described previously. 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.

Select	Gas name	Abbreviation	Formula	Molecular weight	10.0 Lamp Factor	10.6 Lamp Factor	11.7 Lamp Factor	high alarm ppm	low alarm ppm	EH40 STEL ppm
☒	Acetaldehyde		C2H4O	44.053	0	5.5	2.2	0	0	60
☒	Acetamide		C2H5NO	59.067	0	2	0	0	0	0
☒	Acetic acid		C2H4O2	60.05	0	28	4	0	0	16
☒	Acetic anhydride		C4H6O3	102.089	0	4	2	0	0	2
☒	Acetoin		C4H8O2	88.11	0	1	0	0	0	0
☒	Acetone		C3H6O	58.08	1.2	1.17	1.7	0	0	1500
☒	Acetone cyanohydrin		C4H7NO	85.1	0	0	1	0	0	0
☒	Acetophenone		C8H8O	120.15	0	0.6	0	0	0	0
☒	Acetyl bromide		C2H3BrO	122.96	0	8	1.5	0	0	0
☒	Acetylene		C2H2	26.037	0	0	2	0	0	0
☒	Acetyl glycol, N-		C4H7NO3	117.1	0	2	0	0	0	0
☒	Acrolein		C3H4O	56.064	0	3.2	1.2	0	0	0.3
☒	Acrylic Acid		C3H4O2	72.063	0	21	3	0	0	20
☒	Acrylonitrile		C3H3N	53.063	0	0	1.6	0	0	0
☒	Alkanes, n-, C6+		C6H12=2	0	0	1.2	0	0	0	0
☒	Allyl acetate		C7H12O2	142.152	0	1.5	0	0	0	0
☒	Allyl alcohol		C3H6O	58.08	4	2.3	1.1	0	0	4
☒	Allyl bromide		C3H5Br	120.99	0	3	0	0	0	0
☒	Allyl chloride		C3H5Cl	76.525	0	4.5	0.7	0	0	0
☒	Allyl glycidyl ether		C6H10O2	114.2	0	0.8	0	0	0	0
☒	Allyl propyl disulfide		C6H12S2	148.3	0	0.4	0	0	0	0
☒	Ammonia		NH3	17.03	0	8.5	5.7	0	0	36
☒	Amyl acetate		C7H14O2	130.186	9	1.8	0.64	0	0	0
☒	Amyl alcohol		C6H12O	88.149	10	2.6	0.75	0	0	0
☒	Amyl alcohol, tert-		C6H12O	88.15	2.8	1.5	1.01	0	0	0
☒	Anethole		C10H12O	148.2	0	0.4	0	0	0	0

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.

Note: To ensure the required gases display on the instrument, the tick box next to the gas names must be selected.

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



Tiger PC software

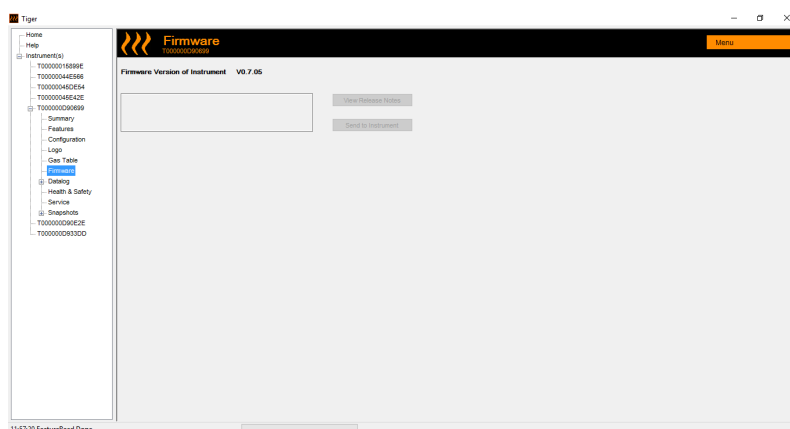
The Firmware Screen

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

At this point you can also check the 'View Release Notes' information which is a description of the changes in the new version as shown here.

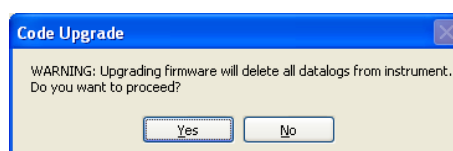
To download a firmware update, connect TIGER to your computer as detailed previously. Ensure that your instrument is in normal operation, is not in an alarm condition and that no datalogging or Health and Safety readings are being collected. Check that the battery pack is sufficiently charged (at least two bars).

IMPORTANT: The 'Firmware' upgrade process will delete all data from the instrument. To avoid loss of any data during the upgrade process, take a snapshot of the instrument before proceeding. The snapshot can be re-installed after the update process is complete.

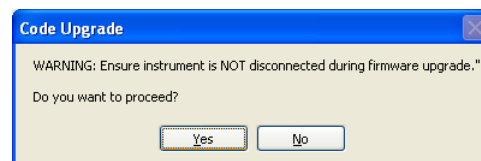


When you are ready to send the new Firmware to the instrument. Select 'Send to Instrument'.

You will now see a message that will warn you that all the data will be lost on your instrument. If you are happy to continue confirm with 'Yes'.



A 'WARNING' message will appear. If you are happy to continue confirm with 'Yes'.

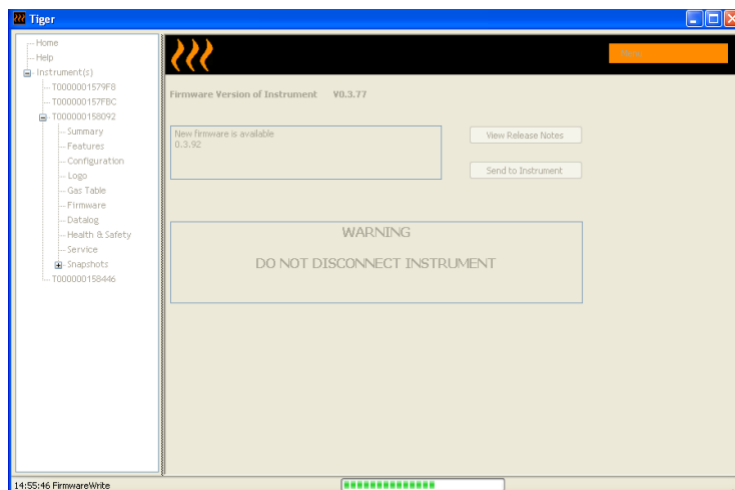




Tiger PC software

IMPORTANT: 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.



A bar at the bottom of the screen will indicate the progress of the update.

IMPORTANT: Do not disconnect the TIGER at this point. Please follow the next part before disconnecting the TIGER.

After the PC Software has completed sending the upgrade to the TIGER the instrument will then have to finish the upgrade process. The TIGER will flash the two torch LED's and the screen on the Tiger will remain blank for approximately 30 Seconds. A bar will then appear and travel across the screen. A message will be displayed as follows, 'verifying file system'. The Firmware is now installed on to the instrument and will start up automatically.



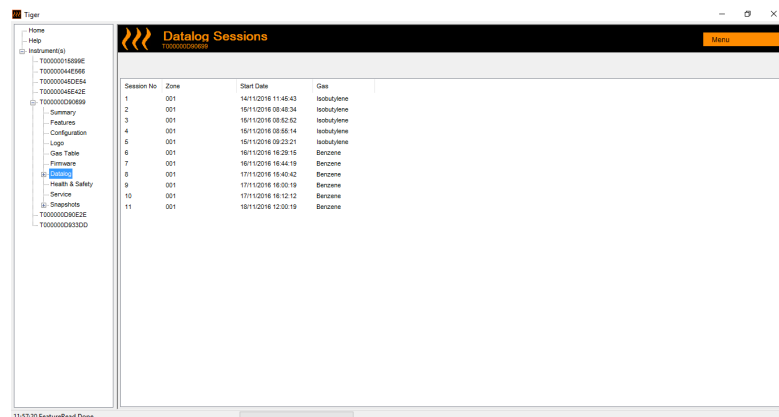


Tiger PC software

Downloading Data Logged Readings

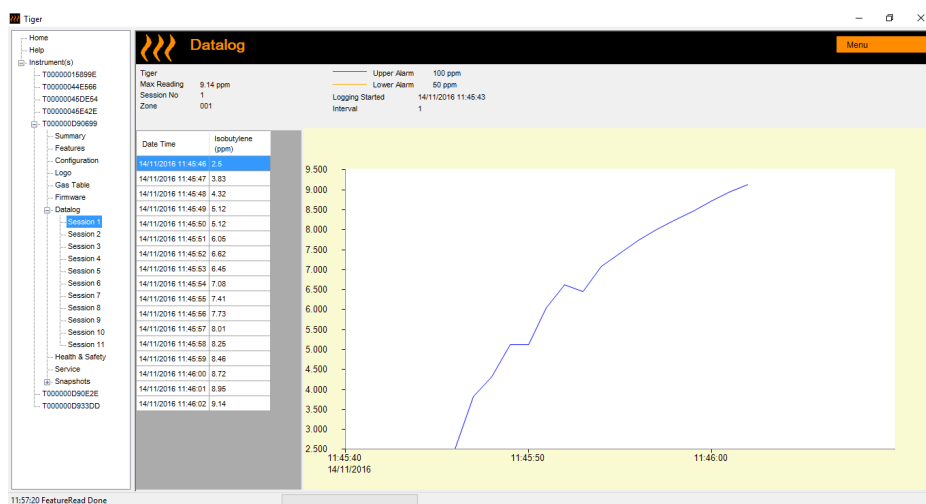
Connect your TIGER to your PC as described previously. Any fresh data-logged readings will be downloaded as the software 'reads' your TIGER.

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.

CAUTION:

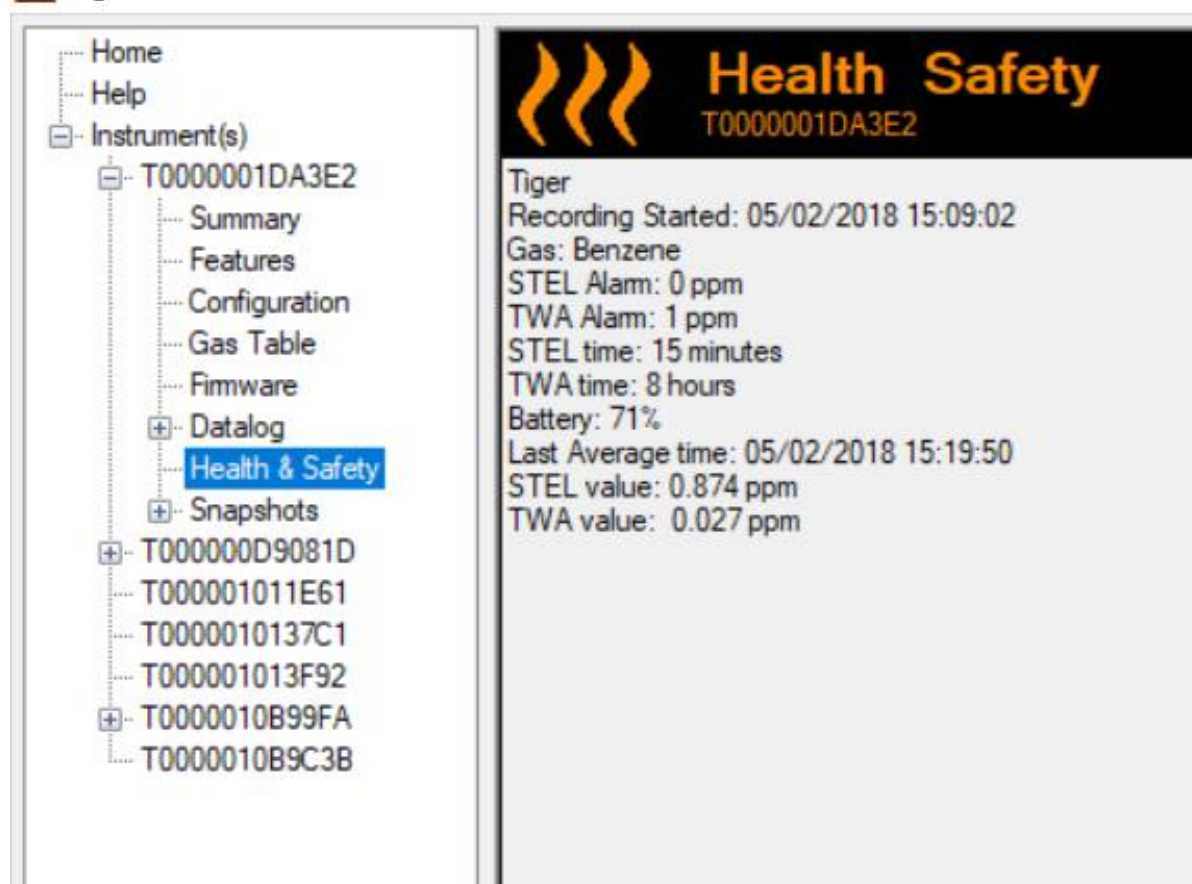
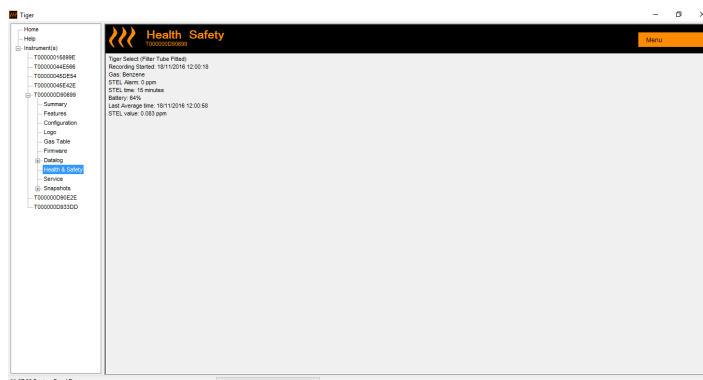
The delete function deletes all logged data from your TIGER. Ensure all valuable data is exported to your PC before selecting 'Delete'.



Tiger PC software

The Health & Safety Screen

This screen displays the latest Health and 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.





The Snapshots Screen

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 previously. Ensure that your instrument is in normal operation, is not in an alarm condition and that no data logging or Health and Safety readings are being collected. Click 'Restore' against the relevant snapshot

Snapshots				
07/12/2016	11:55:50	Delete	Restore	
23/11/2016	10:46:00	Delete	Restore	
19/10/2016	10:57:20	Delete	Restore	
19/10/2016	09:45:41	Delete	Restore	
17/10/2016	14:23:55	Delete	Restore	
17/10/2016	14:27:39	Delete	Restore	
17/10/2016	14:30:53	Delete	Restore	
28/09/2016	17:58:45	Delete	Restore	
28/09/2016	17:58:58	Delete	Restore	
02/09/2016	15:03:13	Delete	Restore	

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

Software Disclaimers

Termination of Software Licence

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Disclaimer of Warranty

The SOFTWARE and accompanying materials (including the user's manual) are provided "as is" without warranty of any kind including the implied warranties of merchantability and fitness for a particular purpose, even if Ion Science Ltd have been advised of that purpose. Furthermore Ion Science Ltd does not warrant, guarantee, or make any representation regarding the use, or the results of the use, of the SOFTWARE or written materials in terms of correctness, accuracy, reliability, current revision, or otherwise. Ion Science Ltd specifically does not warrant the SOFTWARE after you assume operation. If the SOFTWARE or written materials are defective you, not Ion Science Ltd or its dealers, distributors, agents, or employees, assume the entire risk and costs of all necessary servicing, repair, or correction, except as stated below.

Defective Memory Stick (if purchased)

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

Replacement of Defective Memory Stick (if purchased)

Ion Science Ltd entire liability and the original Licensee's exclusive remedy under this agreement are at the discretion of Ion Science Ltd, to either (a) return of payment as evidenced by a copy of the Receipt, or (b) replacement of the memory stick that does not meet Ion Science Ltd limited warranty and which is returned to Ion Science Ltd with a copy of the Receipt. If failure of the memory stick has resulted from accident, abuse, or misapplication, Ion Science Ltd will have no responsibility to either replace the item or refund payment. Any replacement memory stick will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer. This warranty gives you limited, specific legal rights. You may have other rights in some places.

No Right to Reply

No oral or written information or advice given by Ion Science Ltd, its dealers, distributors, agents or employees will create a warranty or in any way increase the scope of the obligations of Ion Science Ltd under this agreement, and you may not rely on any such information or advice.

Limitation of Liability

Ion Science Ltd will not be liable for any direct, indirect, consequential or incidental damages (including damages for loss of business profits, business information, or possibility of such damages). The above limitation will apply where allowed under local laws.

Governing Law

The laws of the United Kingdom govern this Agreement.



Batteries

Warnings

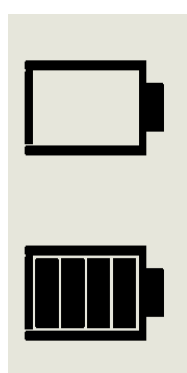
BATTERY CHARGING:	Charge PhoCheck TIGER and its Lithium ion battery packs in a Non Hazardous environment only.
BATTERY REPLACEMENT:	Never replace primary Alkaline battery cells while in a potentially explosive or hazardous location. Use only Industrial by Duracell ID1500 batteries.
BATTERY CONNECTION:	The PhoCheck's TIGER Lithium ion and Alkaline battery packs have been specially designed to allow connection to the 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.

Two battery packs are available for use with the TIGER instrument. A lithium ion Rechargeable Battery Pack **(A2)** and non-rechargeable AA Battery Pack **(A3)**, (that may be fitted with 3 AA Alkaline batteries). The rechargeable pack is recommended for normal operation with the Non-rechargeable pack available when power is not available and the use of the instrument is needed. The rechargeable pack is normally fitted as standard to the instrument when shipped.

Recharging Batteries

Ensure the 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 Charger Cradle **(A4)** to the mains, and switch on. A red light will indicate that the charger is ready. Place the TIGER in the Charger Cradle such that the contacts on the TIGER are aligned with those in the cradle. (There is no need to remove the Instrument Boot **(8)** 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:**
1. Only use the Charger Cradle supplied with your TIGER to charge your instrument.
 2. Ion Science Ltd recommends keeping your TIGER on charge at all times when not in use, as batteries can lose power over time.

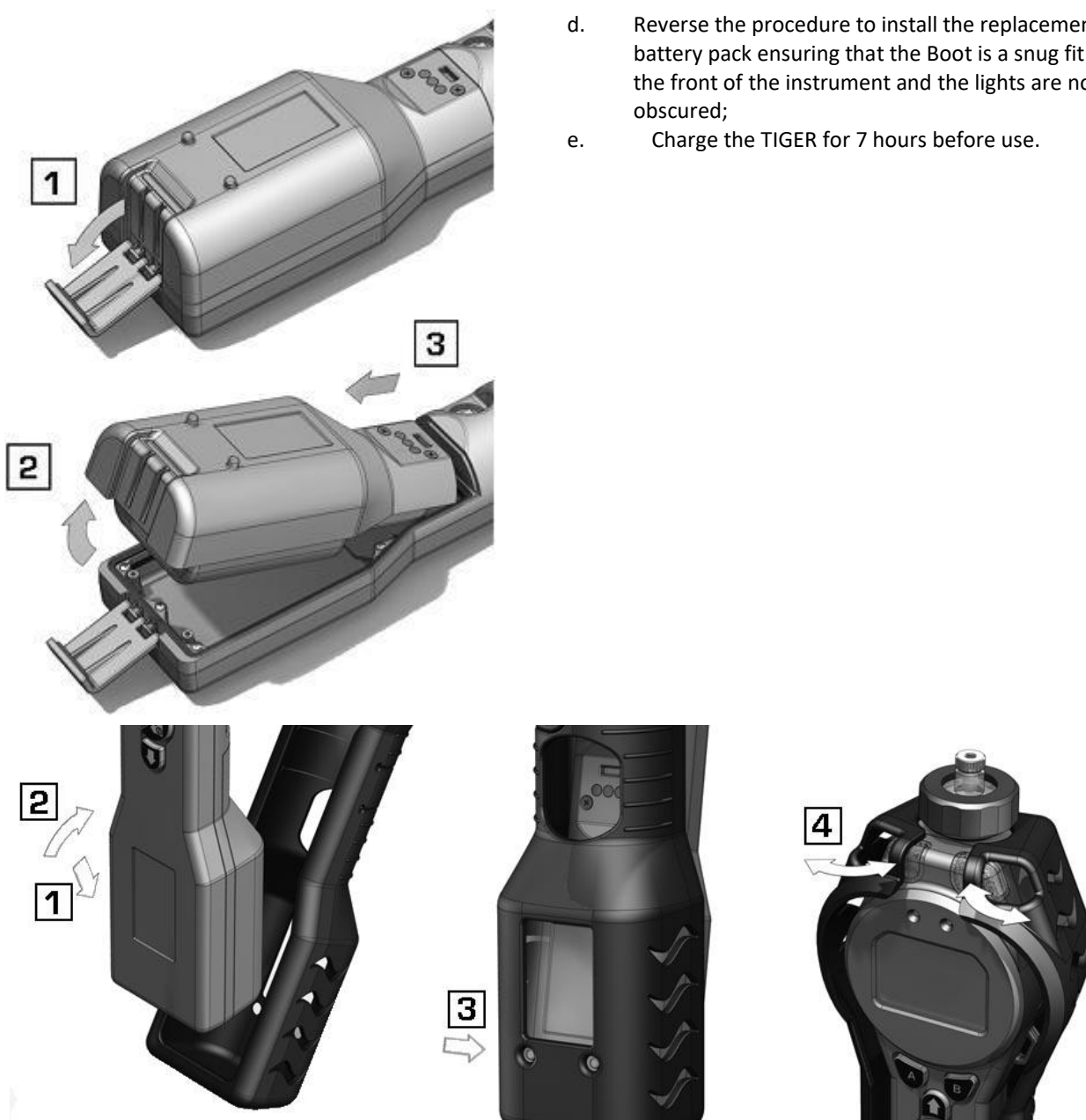


Batteries

Replacement / Exchange of Battery Packs

To replace the Rechargeable Battery Pack (**A2**), proceed as follows:

- a. Ensure TIGER is switched Off;
- b. Remove the Instrument Boot (**8**) 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 Rechargeable Battery Pack (**A2**) away from the Instrument Body (**A1**), coincidentally sliding it slightly backwards;
- d. Reverse the procedure to install the replacement battery pack ensuring that the Boot is a snug fit around the front of the instrument and the lights are not obscured;
- e. Charge the TIGER for 7 hours before use.



Item numbers in (bold) refer to the illustrations and parts list on page 41.



Batteries

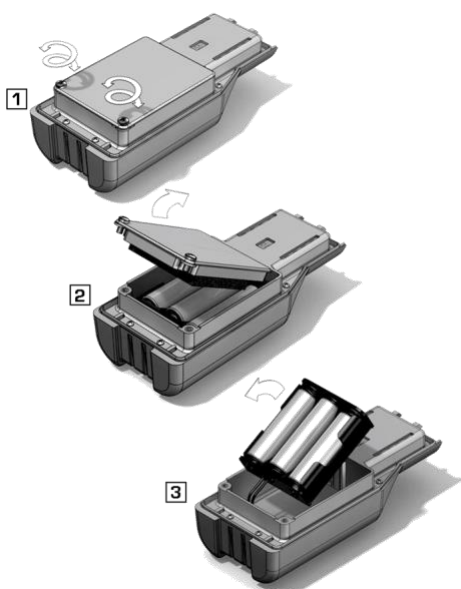
Replacement of Non-rechargeable Batteries in Battery Pack

WARNING

BATTERY REPLACEMENT:

Never replace primary Alkaline battery cells while in a potentially explosive or hazardous location. Use only Industrial by Duracell ID1500 batteries.

- a. Ensure TIGER is switched Off.
- b. Remove the AA Battery Pack (**A3**) as in (b) and (c) on page 34;



- 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; Use Industrial by Duracell Alkaline batteries ID1500
- f. Check all batteries have the correct polarity before replacing the battery holder;
- g. Assemble the battery holder into the AA Battery Pack (**A3**), refit the battery cover and fix in place using the securing screws. Replace the Instrument Boot (**8**) ensuring that it is a snug fit around the front of the Instrument Body (**A1**) and the lights are not obscured.

CAUTION:

Fitting batteries or connecting the battery pack with the wrong polarity may result in damage to the instrument!

CAUTION:

Non-rechargeable batteries must not be replaced in the field. Batteries should be loaded into the battery holder in a safe environment only. Only the assembled AA Battery Pack (**A3**) may be changed in the field.

CAUTION:

Do not make any connections to the USB port of this instrument whilst in a hazardous area.

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

Note: Dispose of used batteries in accordance with all local and national safety and environmental requirements.



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.

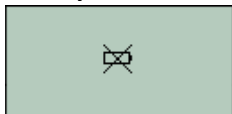
Pump failure



Pump blocked or pump failure

The flow of gas through the instrument has fallen below 50cc/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 can all cause low flow. If the blockage can be removed, press **Esc** 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 in the 'Batteries' section 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. Try switching the Tiger off and on. If this fault persists then the electrode stack or lamp should be replaced. (See the 'Maintenance' section)

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 **Esc** key to continue. Please note 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 Ltd or your nearest authorised service centre.



Calibration

Ion Science Ltd 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 Ltd during instrument manufacture or on re-calibration by an Ion Science authorised service centre. Factory Calibration offers a safe set of three-point calibration data. This should be used if the current custom calibration fails and will keep the unit working until a good custom calibration is completed. Please contact Ion Science Ltd or your local distributor for further information

Custom Calibration can be set by the instrument user and should be carried out as part of regular instrument maintenance. To do so first set up the calibration parameters in TIGER PC. Please refer to the 'TIGER PC Software' section of the manual for guidance.

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.

Have the cylinder(s) of gas, regulator(s) and the zero carbon filter (A-31057) for your TIGER) ready before starting the procedure. Alternatively a known clean air supply may be used as the 'zero' gas. Demand flow regulators are recommended for the calibration of the Tiger. If flow regulators are to be used then a 0.3L/min is recommended, a flow adaptor should be used to avoid over-pressurising the instrument (sold separately). 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.

Procedure:

1. Press the Options soft key  on your TIGER to access the adjustable features.
2. Then use the Up or Down key to select calibration.  Press Enter to confirm selection.

Select custom calibration icon .

3. Zero: Attach the carbon filter (if using) and select 'OK' to commence zero Sequence. The display will countdown 30 seconds. Once complete, select 'OK' and proceed. Disconnect the carbon filter and replace the cap ends.
Note: The useful life of the Carbon Filter Assembly will be shortened if the Carbon Filter Assembly is open to atmosphere for prolonged periods.
4. Span 1: Adjust the concentration to the gas concentration being applied using the Up and Down arrow keys, if required. Present the gas to the instrument probe and





select 'OK' to proceed. The display will countdown 30 seconds.

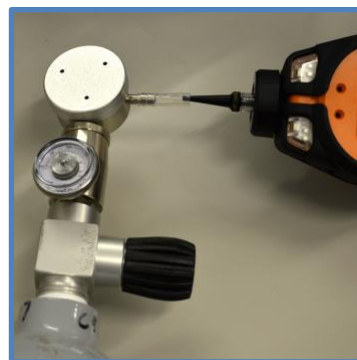
5. A tick will appear to confirm the span 1 calibration has been completed. Select 'OK' to proceed.
6. Span 2: If the unit has been configured for a two span calibration, the span 2 concentration will appear. Adjust the concentration to the gas concentration being applied using the Up and Down arrow keys, if required. Present the gas to the instrument probe and select 'OK' to proceed. The display will countdown 30 seconds.
7. A tick will appear to confirm the span 2 calibration has been completed. Select 'OK' to accept the calibration and return to the main screen / main calibration screen.

Maintenance

Press **Enter** again and the gas and concentration for Span 1 (previously set up in TIGER PC) are displayed along with a 30 second countdown. **SPAN 1** Attach the 'Span 1' gas using the Calibration Adaptor (861476) supplied in the Accessory Box (A-861267) (see 'Accessories') 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 30 second countdown. **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.



Inlet Probe assembly

All component parts of the probe assembly can be replaced if they become damaged or contaminated with use. Ion Science recommend using this design of probe as it offers improved performance. A probe upgrade kit is available (Part number: A-880214) that is compatible with all Tiger instruments.

PTFE Filter Disc (861221)

The Filter Disc 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 Disc changing should be conducted in a suitably clean environment, with clean hands and equipment to avoid contamination of the new Filter Disc.

To change the Filter Disc, unscrew the Filter Housing Cap, lift off the Filter Clamp and O-Ring and lift the Filter Disc from the Instrument Body. Carefully place a new Filter Disc into the Instrument Body. **(Under no circumstances should a Filter Disc be used once it has been removed.)** Replace the Filter Clamp, ensuring that the O-Ring is correctly seated. Replace the Filter Housing Cap. Do not over-tighten.



Maintenance

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 MiniPID 2 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 (see image on right). The centre screw may be turned with a small coin or a suitable flat bladed screwdriver.

Ensure that the Sensor Seal, on the inside of the Sensor Cover is not disturbed.

Carefully lift the MiniPID 2 Sensor from the Instrument Body, ensuring that the two Inlet/Outlet Seals remain in place in the Instrument Body.

Using the Mini PID electrode stack removal tool (846216) provided, locate its 'prongs' in the slots in the side of the MiniPID 2 Sensor body. Using the forefinger to restrain the sensor, (the internal parts are spring-loaded and careless disassembly may result in loss of the spring or lamp, squeeze the tool to release the lamp housing.

The lamp may now be removed.



To replace the lamp or install a new one, firstly, place the electrode stack onto a clean, flat surface. Carefully, twist the lamp into the electrode stack o'ring so that the lamp window now sits flush within the electrode stack. The mini PID may then be aligned over the electrode stack and lamp, and pushed down to secure the assembly; two clicks should be heard. When replacing the Sensor Cover ensure that the markers are aligned correctly and that the cover is a snug fit. Sealing of the Sensor Cover against the PID is important, the cover must be tightened to 70 cN.m +/- 10%.

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

CAUTION!

Never refit a damaged lamp!



Maintenance

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 on page 39.

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 PID Lamp Cleaning Kit (A-31063) 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/m3.

Storage:

- Keep container closed to prevent water adsorption and contamination.

To clean the lamp:

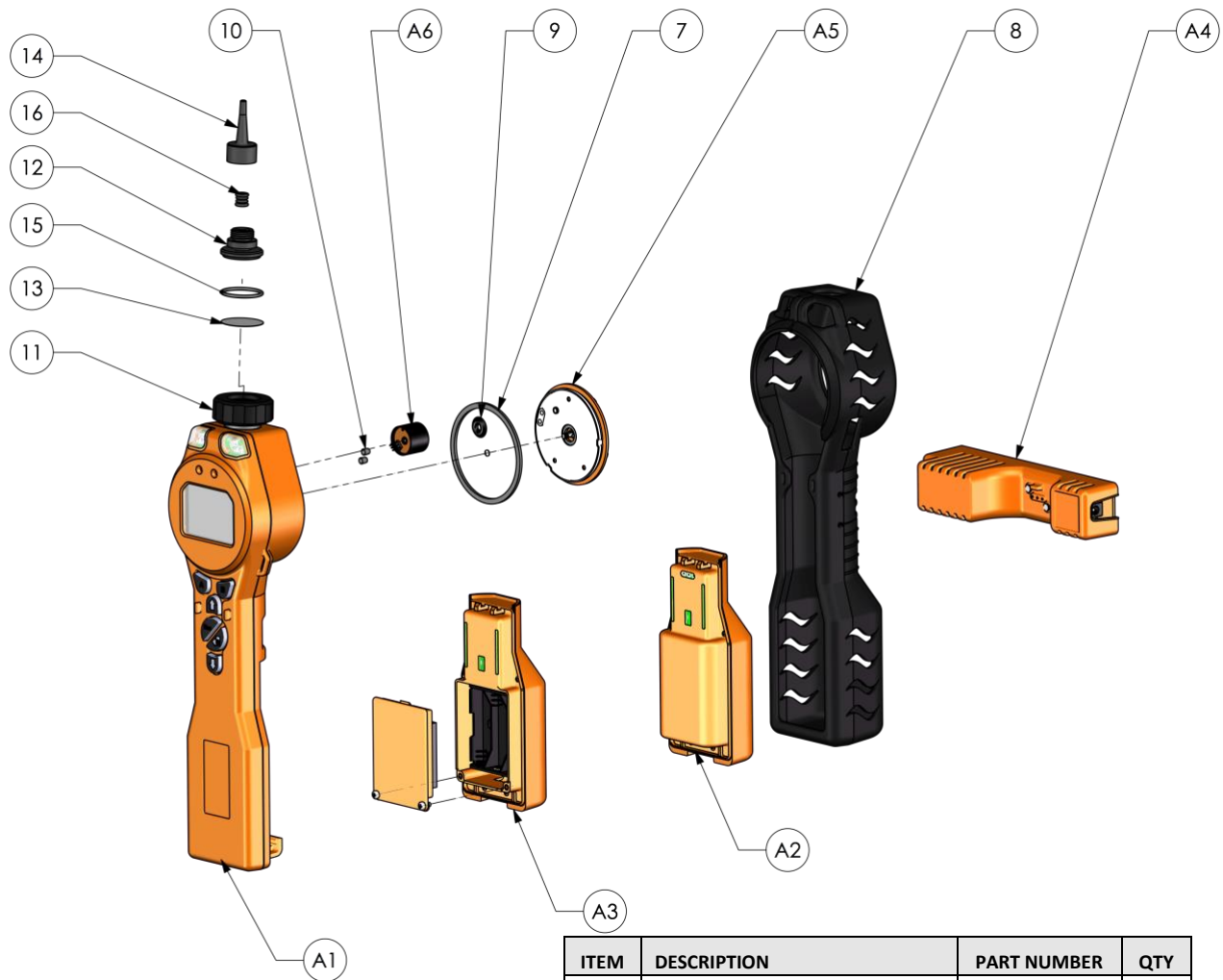
1. Open the vial of Aluminium Oxide polishing compound. With a clean cotton bud collect a small amount of compound;
2. Use this cotton bud to polish the PID lamp window. Use a circular action applying light pressure to clean the lamp window. Never touch the lamp window with fingers;
3. Continue polishing 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 NUMBER	QTY
A1	Instrument body	n/a	1
A2	Rechargeable battery pack	A-861240	1
A3	AA battery pack	A-861241	1
A4	Charge cradle	A-861220	1
A5	Sensor cover	A-861259	1
A6	MiniPID 2 sensor	MP6SX6BXU2	1
7	Sensor gasket	861203-9	1
8	Instrument boot	861205	1
9	Sensor seal	A-861214	1
10	Inlet / outlet seal	861215	2
11	Filter housing cap	861218	1
12	Filter clamp	861579	1
13	Filter disc	861221	1
14	Probe - Tiger	880207	1
15	O-ring	5/OV-2	1
16	Probe seal	880202	1



Accessories

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

Part Number	Accessory Description
1/jawu-01	Car Charger Lead – Allows the Charger Cradle (A4) to be powered from a standard vehicle cigar lighter (12 volt only)
A-861214	Sensor Seal (9) – Seal between the MiniPID 2 Sensor (A6) and the Sensor Cover (A5)
846216	Mini PID electrode stack removal tool – Used to remove the electrode stack from the MiniPID 2 Sensor (A6)
861205	Protective, Removable Rubber Boot (8) – Supplied with every TIGER, this is a replacement
861219	Filter Clamp (12) – Transparent clamp used with the 5m and 10m extensions probes
861230	USB Cable – Supplied with every TIGER, this is a replacement
861266	Leather instrument holster – TIGER can be carried on a belt around the waist allowing hands free operation
861412	Leather instrument harness – TIGER can be carried against upper body allowing hands free operation
880207	Inlet probe – new stronger design. Standard from January 2016
880202	Probe seal (used with 880207 above) Standard from January 2016
861579	Filter clamp
A-880210	Probe upgrade kit – Contains 880207, 880202 and 861579 (above)
861476	Calibration Adaptor – Must be used when calibrating using flow regulators
A-31057	Carbon Filter – Used during calibration to set a zero
A-31063	PID Lamp Cleaning Kit- Contains Alumina powder and 40 cotton buds
A-861413	5m Extension Hose – Replaces the standard probe, pipe material: PTFE
A-861414	10m Extension Hose – Replaces the standard probe, pipe material: PTFE
A-861406	Flexible Probe – 300mm, replaces the standard probe, internal pipe material: PTFE
A-861240	Lithium ion battery pack, intrinsically safe – Replacement / spare
A-861241	Alkaline battery pack, intrinsically safe. 3 x AA batteries included – Replacement / spare
A-861267	Accessory box as supplied with the TIGER – Includes carbon filter, lamp cleaning kit, PID electrode stack removal tool, lanyard, calibration adaptor and PID sensor seal
A-861472	PTFE filter discs (pack of 10)
A-861511	Anti-vibration charger cradle – Allows wall mounting of vehicle charging, includes charge cradle
LA4TM600	Lamp 10.6eV



LA4SM700	Lamp 11.7eV
MP6SX6BXU2	MiniPID2 with 10.6eV lamp and electrode stack (white)
MP6SX7BXU2	MiniPID2 with 11.7eV lamp and electrode stack (white)
A-846267	Electrode stack (white)
846600	Replacement spring for MiniPID 2

For more information please visit ionscience.com/Tiger and select Accessories.

Instrument warranty and service

Warranty

Standard Warranty can be extended to up to 5 years on the TIGER when registering your instrument via our website: 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 TIGER instrument, simply fill in the online form. You will need to enter your instrument serial number. The serial number is located on the front label of the instrument, towards the bottom end of the unit. Beneath the bar code, there will be a number beginning with T- followed by 6 digits. (E.g.T-123456).

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: ionscience.com/instrument-registration



Service

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

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

Find your local distributor by visiting: ionscience.com

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Technical specification

Response time:	T90 < 2 second		
Detectable Range:	1 ppb up to 20,000 ppm*		
Resolution:	+/- 0.001ppm (1 ppb)*		
Accuracy:	+/- 5% displayed reading +/- one digit (at calibration point)		
Linearity:	+/- 5% displayed reading +/- one digit		
Battery:	Lithium ion:		24 hours
	Alkaline (Duracell Procell MN1500):		8.5 hours
Data log:	Including date / time:		120,000
Alarm visual:	Flashing Red and Amber LED		
Alarm audible:	95 dBA at 300 mm		
Flow Rate:	≥ 220 ml/min in ambient conditions		
Temperature:	Operating:	-20 to 60 °C (-4 to 140 °F)	
	Storage:	-25 to 60 °C (-13 to 140 °F)	
	Certified to:	-15 to 45 °C (-5 to 140 °F)	
Dimensions:	Instrument:	370.0mm / 14.56" (H)	
		91.4mm / 3.59" (W)	
		61mm / 2.40" (D)	
Weight:	Instrument:	0.75 kg (1.6 lb)	
Materials:	Instrument:	Anti-static PC/ABS (Polycarbonate/ Acrylonitrile Butadiene Styrene)	
		Rubber Boot:	Anti-static TPE (Thermoplastic Polyolefin Elastomeric)

* gas and model dependant



User manual log

Manual version	Amendment	Issue Date	Instrument Firmware	PC Software
	For previous user manual versions please contact Ion Science Ltd.			
3.0	Page 15 – Removed temperature icon	19/04/2013	V0.4.20	V 1.0.0.70
3.1	SW & FW upgrade SPAN 2 adjusts to 5,000 ppm.	23/07/2013	V0.4.22	V 1.0.0.73
3.2	Accessory clarification 861443/5/OV-04 and A861474. Page 41	13/02/2014	V0.4.22	V 1.0.0.73
3.3	Instrument warranty text amended to direct customers to the serial number on the front label of the instrument – not the IRN number Page 42	12/08/2014	V0.4.28	V 1.0.0.73
	Tiger PC software updated	23/12/2014	V0.4.28	V 1.0.0.75
	Declaration of conformity updated and warnings in French added	19/06/2015	V0.4.33	V1.0.0.76
3.4	New inlet probe pages 38,41 and 42.	27/01/2016	V0.4.33	V1.0.0.77
3.5	Added torque setting page 39	15/04/2016	V0.4.33	V1.0.0.77
3.6	MiniPID changed to MiniPID 2 throughout.	28/04/2016	V0.4.33	V1.0.0.77
	Declaration of Conformity page 5.			
	US postal address page 44.			
	Responsibility for use page 8.			
3.7	Front cover image updated– Page 1 Display description - page 12 Alarm latch description - page 24 Run time - page 18 TigerPC access – page 19 Remove installation screens – pages 19 & 20 Lock function - page 24 Clock sync - page 25 Soft menu - page 26 Data log sleep - page 26 License agreement – page 32 Cal kit + images - page 38 Cal image - page 39 Exploded diagram - page 42 Detection ranges + dimensions - page 45 Update table – page 46 User manual part number – page 47 Part descriptions updated – page 37, 39, 42, 43 Specification updated – page 44	30/11/2016	V0.7.05	V1.0.0.89
3.8	Windows 8 and Windows 10 – Page 18 Add MiniPID spring to accessories – page 42 Modified detection range – page 44	27/06/2016	V0.7.05	V1.0.0.89



3.8R	Logo only	01/08/2017	V0.7.05	V1.0.0.89
3.9	General manual update All formal references to Tiger in Warnings/official text changed to PhoCheck Tiger Updated replacement battery information Updated Declaration of Conformity Text changes on p10 Turn Off, Rechargeable batteries, Select the gas, p13 Flashlight/Torch, p16 Peak Hold, p17 Calibration Section, p22 Features Section, p24 Clock, p25 Tiger PC Software, p27 Calibration, p28 Firmware, p32 Snapshots screen, p38 Diagnostics Section, p39 Calibration Section, p40 Maintenance Section – PTFE Filter Disc, p42 part number amendments, p44 Accessories, p46 Service Tiger PC Software Section – text changes and old image removed – page 19 Tiger PC Software – new image – page 20 Tiger PC Software – images updated to match Select User Manual – page 23	23/08/2018	V0.8.11	V1.0.1.11

Part number: 861265