TIGER XT Select

Instrument User Manual V1.0



Register your instrument online for extended warranty

Thank you for purchasing your ION Science instrument.

The standard warranty of your instrument can be extended to five years.

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

Visit the ION Science Website.

WARNINGS:

USER MANUAL:	Read and understand this user manual completely before operating the Tiger XT instrument.
STATIC HAZARDS:	Do not use abrasive or chemical detergents to clean the Tiger XT instrument as this may reduce the antistatic properties of the materials used, clean it using a damp cloth only.
MATERIAL EXPOSURE	The Tiger XT 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 Tiger XT may be opened in a hazardous area except for replacement of the battery pack. The Tiger XT 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 Tiger XT 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. Only use batteries approved by ION Science Ltd as listed on the applicable Tiger XT ATEX/IECEx Certification.
BATTERY CONNECTION:	The Tiger XT Lithium ion and Alkaline battery packs have been specially designed to allow connection to the Tiger XT Instrument while in potentially hazardous atmospheres. Ensure all electrical connections are clean and undamaged before connection: The Tiger XT instruments ingress protection rating is reduced when its battery pack is removed so avoid changing batteries in dusty or wet environments. The enclosure is rated to IP20 so avoid continuous exposure to wet weather and harsh water spray conditions.
BATTERY USE:	Use supplied battery packs only on the Tiger XT. Never replace primary Alkaline battery cells while in a potentially explosive or hazardous location. Only use batteries approved by Ion Science LTD as listed on the applicable Tiger XT ATEX/IECEx Certification.
FUNCTIONAL TEST	The Tiger XT 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.
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.

MODE D'EMPLOI : Veuillez lire entièrement et comprendre ce mode d'emploi avant d'utiliser l'instrument Tiger XT.

RISQUES LIES AUX PROPRIETES ANTISTATIQUES :
N'utilisez pas de détergents abrasifs ou chimiques pour nettoyer l'instrument Tiger XT, au risque de réduire les propriétés antistatiques des matériaux utilisés. Employez uniquement un chiffon humide.

EXPOSITION AUX MATERIAUX : N'exposez pas le Tiger XT 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 Tiger XT dans une zone dangereuse, sauf pour le remplacement de la batterie. L'entretien du Tiger XT 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 Tiger XT 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 batteries approuvées par ION Science Ltd telles qu'énumérées sur le Tiger XT ATEX/IECEx applicable.

CONNEXION DES PILES/DE LA BATTERIE :
Les batteries lithium-ion et les piles alcalines du Tiger XT ont été spécialement conçues pour permettre la connexion à l'instrument Tiger XT dans des atmosphères potentiellement dangereuses. Assurez-vous que les connexions électriques sont propres et intactes avant la connexion.
L'indice de protection des instruments Tiger XT étant ramené lors du retrait de la batterie, évitez de remplacer les batteries dans des environnements poussiéreux ou humides.
Le boîtier est classé IP20, évitez donc une exposition continue au temps humide et aux conditions de pulvérisation d'eau difficiles.

UTILISATION DES PILES/DE LA BATTERIE :
N'utilisez que les batteries fournies avec le Tiger XT.
Ne remplacez jamais des piles alcalines primaires dans un endroit dangereux ou potentiellement explosif. N'utilisez que des batteries approuvées par ION Science Ltd telles qu'énumérées sur le Tiger XT ATEX/IECEx applicable.

ESSAI DE FONCTIONNEMENT : Le Tiger XT 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 APPROPRIEE : Si l'équipement est utilisé d'une manière non spécifiée par le fabricant, la protection fournie pat l'équipement peut être altérée.

TYPE DE PROTECTION DE SÛRETÉ : Sécurité intrinsèque

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1. Safety

Legal Notices Regarding the Safe Operation of Equipment

- While every attempt is made to ensure the accuracy of the information contained in this manual, ION Science accepts no liability for errors or omissions in the manual, 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 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 in this manual.

Symbols

	**WARNING!** **USED TO INDICATE DANGER WARNINGS WHERE THERE IS A RISK OF INJURY OR DEATH.**
	**Caution** **Used to indicate a caution where there is a risk of damage to equipment.**
	**Information** Important information or useful hints about usage.
	**Recycling** Recycle all packaging.
	**WEEE Regulations** Ensure that waste electrical equipment is disposed of correctly.

Warnings and Cautions and Information Notifications

The following apply to the product described in this manual.

	**BATTERY CHARGING: CHARGE THE TIGER XTS AND ITS LITHIUM BATTERY PACKS IN A NON-HAZARDOUS ENVIRONMENT ONLY.**



The instrument should be used in accordance with the safety standards and installation instructions given in this manual, and in compliance with local safety standards.



Responsibility for use: TIGER XTS instruments detect a large range of gases which are potentially dangerous from both a poisoning and/or an explosive perspective. TIGER XTS instruments have many adjustable and selectable features allowing the instrument 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 XTS can be used as a personal safety device. It is the user's responsibility to respond appropriately to an alarm situation.



The TIGER XTS must not be exposed to atmospheres known to have an adverse effect on Thermoplastic polyolefin or Anti-static PC/ABS.



The instrument must be serviced in a Non-Hazardous environment and by ION Science Ltd authorized service centers only. Substitution of components may impair intrinsic safety.



Do not service the instrument live; Remove the Battery Pack before servicing.



Ingress Protection: Continuous exposure to wet weather conditions should be limited to less than one day and harsh water spray conditions should be avoided.



When using the Probe part numbers A-861414, A-861413 the Safety rating of the TIGER XTS 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.

Disposal

- The equipment does not include any toxic materials, but if it has been contaminated by toxic materials, then exercise due care and follow the appropriate regulations when disposing.
- Always adhere to local regulations and procedures when disposing of the equipment.



RECYCLING

Recycle all Packing.



WEEE REGULATIONS

Ensure that all waste electrical equipment is disposed of correctly.



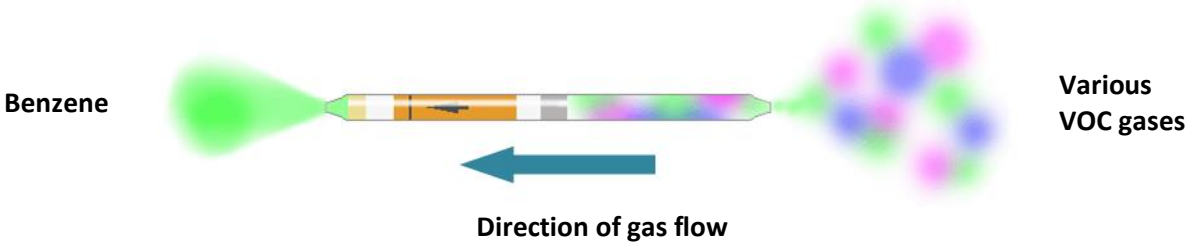
Ion Science Ltd offer a take back service. Please contact us for more information.

2. Product Overview

GASES THAT ARE CROSS SENSITIVE TO BENZENE WILL RESULT IN SIGNIFICANT ERRORS IN READING.

The TIGER XTS is a handheld gas detector for the rapid, accurate detection of benzene and Total Aromatic Compounds (TACs).

Utilizing the high output ION Science 10.0 eV detection system, a reading for TACs is seen immediately on start-up. Should aromatics be detected, an ION Science Benzene Pre-filter Tube can be easily attached to ensure fast detection and selective measurement of benzene. Benzene Pre-filter Tubes absorb many VOC gases, but benzene will pass through.



The number of gases a PID can detect directly relates to the maximum photon energy (eV) of the PID Lamp being used. As TIGER XTS uses a 10.0 eV light source, many gases associated with benzene are ignored due to their higher eV.

Throughout the measurement process, TIGER XTS continues to display real-time data, ensuring the final reading represents the full value of actual benzene present. Benzene concentrations are displayed down to parts-per-billion (ppb) levels, giving you accurate, reliable data you can count on.

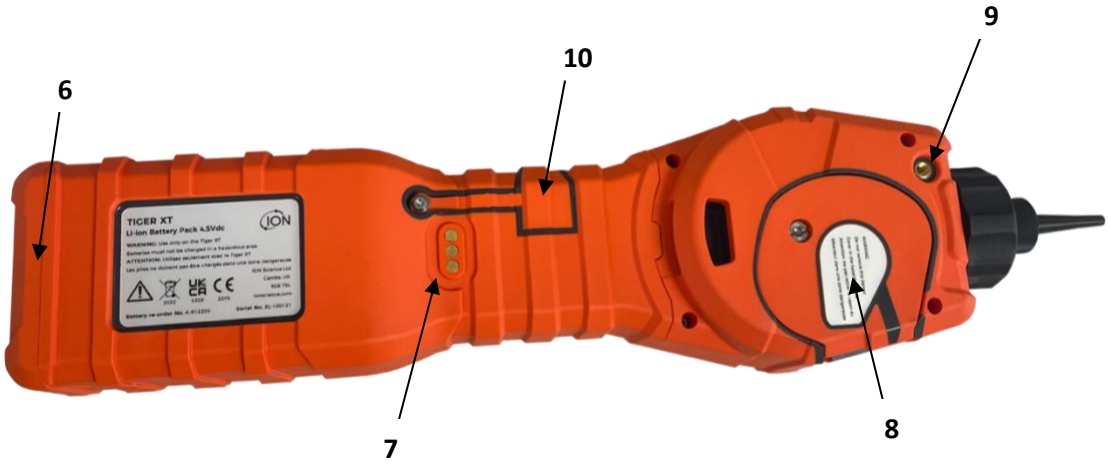
The TIGER XTS is capable of providing 15-minute short-term exposure limits (STELs) and 8-hour time-weighted averages (TWAs) for total aromatic compounds (TACs). In addition, the ION Science MiniPID 2 Sensor incorporates both humidity resistant technology and anti-contamination design for extended operation in difficult working environments.

The TIGER XTS benzene and total aromatic compound detector can also be used in standard operational mode without the use of a Benzene Pre-filter Tube to deliver active indications of volatile organic compounds (VOCs), including benzene, at concentrations as low as 1 ppb benzene equivalent.

The TIGER XTS has been designed and certified Intrinsically Safe.



1 Alarm LEDs / Torch
2 Probe Assembly
3 Display Screen
4 Keypad
5 Instrument Body



6 Battery Pack
7 Charging Contacts
8 Sensor Cover
9 Pump Outlet
10 USB Port (Type B)

Upgrades

The following optional features can be purchased either during initial sale, or via remote upgrade post-sale:

- PPB Sensitivity
- Health and Safety
- Single-log Data Logging option
- Multi-log Data Logging option
- Full Data Logging

Refer to the Features screen for details.

Tiger PC Software

The Tiger PC software enables you to fully configure the instrument, view and edit gas tables, and view logged data, including health and safety readings.

We recommend you install the software and set up your TIGER XTS as described in Tiger PC Software.

TIGER XTS Kit

ION Science provides a range of TIGER XTS kits and accessories. The content of a standard kit is:

- TIGER XTS instrument
- Rechargeable Battery (Li-ion) - one per kit*
- Battery Charge Cradle and Mains Adaptor*
- Rugged Carry Case
- Benzene Pre-filter Tubes
- TIGER XTS Quick Start Guide
- Benzene Pre-filter Tube Opener
- Carbon Filter Assembly
- PTFE Filter Discs
- Removal Tool for MiniPID Stack
- Sample Cleaning Compound
- Lanyard
- Calibration Adaptor
- Sensor Seal – coated
- USB Cable

* Only included with the rechargeable TIGER XTS (see Battery Packs).

For details of different kits and other accessories, contact ION Science or your local distributor.

Keypad Function Descriptions





The functionality of the **A** and **B** keys varies. Prompts on the display indicate their functionality at a given time.





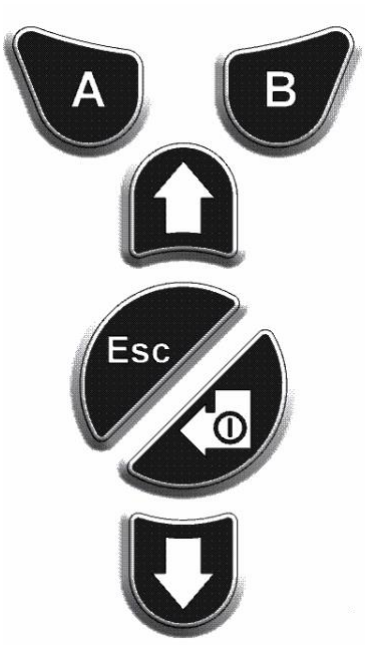
The **Up** and **Down** keys are used to adjust settings and navigate through the menu structure.



The **Esc** (Escape) key is used to cancel a change or exit a menu.



The **Enter / On / Off** key are used to accept changes, select functions, and to turn the TIGER XTS on and off.



In general, setup and application settings are selected and adjusted using the soft keys. Options are selected using the arrow keys and confirmed using the **Enter** key or a soft key.

A continuous press is used to scroll through options and numbers, e.g., to change the gas selection by scrolling through the available selections until the required gas selection is displayed.

3. Getting Started

Fitting the Inlet Probe

Ensure that the inlet probe supplied is fitted to your TIGER XTS.

Switching your TIGER XTS On

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

The lights will flash white, red, then amber, and a “beep” will sound. You should also be able to hear the pump start operating.

The display screen will initially display the ION Science logo. It will then show the ID of the instrument, as entered in the Instrument ID in TigerPC, and the firmware version installed.

The screen will then show that the instrument is checking that the Lamp is working (the  symbol is displayed).

Next, if the instrument is set to Zero when switched on, the screen will display the  symbol.

The main running screen is then displayed:



Your instrument is now ready to use.

Switching your TIGER XTS Off

Press and hold the **Enter / On / Off** key for 3 seconds to turn TIGER XTS Off. A 3 second countdown will be displayed on the screen. While this is happening, a continuous beep will sound, and the lights will flash red.

Once the instrument is switched off, wait for a few seconds before switching on again.

Checking the Battery Charge

Check that your TIGER XTS has sufficient charge for use. The battery icon (see Batteries) should show at least two full segments. If not, the instrument should be charged to at least this level before use.

TIGER XTS instruments leave the factory with their Rechargeable Battery Pack 30% charged. We recommend charging the instrument for seven hours before first use.

A non-rechargeable AA Battery Pack can also be used, but it is recommended that it only be used if no power is available to recharge the Rechargeable Battery Pack.

For further details of Battery Packs and recharging, refer to Batteries.

Select the Gas

Next, ensure that the instrument is set to detect the correct gas. This is displayed on the main running screen above the current measurement units.

If necessary, change the selected gas. This can be done using Tiger PC, or using the instrument.

TIGER XTS instruments leave ION Science Ltd pre-set to monitor gas type TAC. Instruments are factory calibrated against isobutylene and all response factors are equivalent to this.

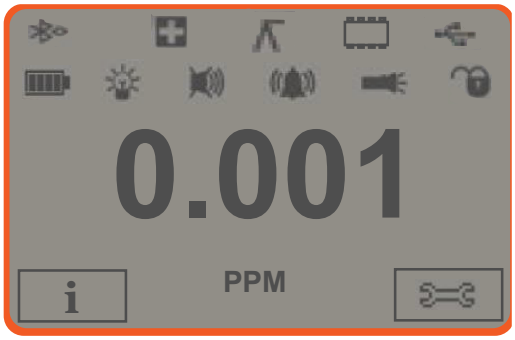
Set Alarm Levels

We recommend that alarm levels are set to user specifications as soon as possible before the TIGER XTS is first used. See Alarms for details.

4. Understanding the Display Screen

IF AN ALARM STATE IS TRIGGERED THE USER SHOULD LEAVE THE HAZARDOUS ENVIRONMENT AND ACT IN ACCORDANCE WITH NATIONAL SAFETY REGULATIONS.

Overview



The display screen is divided into four sections:

1. The top of the screen shows fixed LCD status icons indicating instrument status at a glance.
2. The central area displays readings in four large numbers during normal operation (i.e., when the main running screen is displayed). During setup and adjustment, a function bar is displayed here.
3. The bottom left and right areas of the screen display the two soft key indicators, i.e., which functions are currently tied to the **A** and **B** keys.
4. The area between the two soft key indicators displays the measurement units and the gas that the instrument is currently set to detect.

The TIGER XTS 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 is 19,999 ppm. When the maximum range is exceeded, the display will show ‘99999’.

Status Icons

	**Health and Safety**: This will flash in an alarm condition and (if the instrument has the Health and Safety upgrade) when health and safety readings are being collected.
	**Peak Hold**: This is displayed when peak hold is on.
	**Memory Status**: Only displayed if the instrument has the Data Logging upgrade. 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. The icon fills as data log memory is filled. It will flash when multi-logging is activated.
	**USB**: This is displayed when the instrument is connected to a PC.
	**Battery Status**: A standard battery charge indicator. When the battery is nearly discharged, the final segment flashes for one minute before the instrument shuts down.
	**Backlight**: This is displayed when the backlight is on.
	**Sound**: The top icon is displayed if all three alarm sounders are off, and the volume is set to 0%. Otherwise, zero to three sound projection lines are displayed to indicate the volume level (there are four sound levels; no line is displayed for the quietest).
	**Alarm Bell:** When a 'Low alarm' is triggered, the bell symbol and one curved line on either side of the bell symbol will flash. When a 'High alarm' is triggered the bell symbol and two curved lines on either side of the bell symbol will flash.
	**Flashlight/Torch**: This is displayed when the flashlight/torch is turned on by pressing the **A** and **B** keys simultaneously.
	**Lock**: This is displayed when the configuration of the TIGER XTS has been locked in TigerPC. Soft key **B** will be disabled.

5. Using the TIGER XTS

Start-up Modes

TIGER XTS can start up in either **Basic** start-up mode or **Advanced** start-up mode. When the TIGER XTS is first switched on, the instrument will start up in Basic Start-up Mode by default. It may subsequently be set up in Tiger PC to switch on in Advanced Start-up Mode instead, or to "ask" the user what mode they require.

Basic Start-up Mode

For efficiency and ease of use, Basic Start-up Mode has been designed to only offer the core functions for the detection of benzene and other TACs. When using TIGER XTS for this specific purpose, extraneous functionality is not available. Therefore, in Basic Start-up Mode, only the **Standard Running** and **Tube** and **Calibration** operational modes are available (see below).

Advanced Start-up Mode

Advanced Start-up Mode offers the full functionality of the TIGER XTS.

In Advanced Start-up Mode, **Standard Running**, **TAC**, and **Tube** operational modes are available (see below).

Operational Modes

The TIGER XTS has three operational modes: Standard Running Mode, TAC Mode, and Tube Mode.

- In **Standard Running Mode**, the display shows a live reading of gas concentration. This mode will operate using 0.1 ppm sensitivity, unless the ppb sensitivity upgrade has been installed.

  In Advanced Start-up Mode, you can select from multiple gases. The chosen gas name is displayed on the screen.

- **TAC Mode** is used to identify the presence of TACs, including benzene. If TACs are detected, Tube Mode is then activated to determine the specific benzene content. This two-stage approach avoids using pre-filter tubes unnecessarily. As benzene is a TAC, if there are no TACs present there is no benzene, and therefore no need to engage Tube Mode.

  TACs are also detected in Basic Start-up Mode but TAC Mode cannot be selected from Basic Start-up Mode.

- **Tube Mode** is used to determine the specific benzene content.

Using Basic Mode

The Basic Mode display offers two functions: Tube Mode, and Calibration. Each is selected using one of the soft keys.

Key A: Tube Mode

 Tube Mode is designed to accurately measure the level of benzene gas present using the Benzene Pre-filter Tube. The initial benzene test has a test time which varies with temperature. This test time is required to condition the tube, which then offers a proportional output relating to the benzene being sampled.

See Tube Mode for details of the procedure.

Important: A tube calibration must be carried out before Tube mode can be used. The following icon will appear until a calibration is carried out: .

The Tube Mode results will be automatically logged. They can later be reviewed in the Health & Safety screen in Tiger PC (if available).

Important: When entering Tube Mode, the pump will stop until the test cycle begins. This is not a fault condition. The initial gas sample from the tube is used to set the Zero, therefore it is essential that a clean tube is used.

Key B: Calibration



When selected, the user is presented with two options:

PID Calibration

-  **Factory**: You can set your instrument to operate using the factory calibrated values. These are set by ION Science Ltd or authorized service centers.
-  **Custom**: You can carry out a Custom Calibration with the 10.0 eV MiniPID. Custom PID calibration should be carried out as part of regular instrument maintenance.
- 

Zero: This option is used to set the instrument either to the selected calibration Zero (Absolute Mode), or to Zero against the ambient (Relative Mode):

   **Absolute Mode** uses fixed calibration Zero (either Factory or Custom Calibration).

   **Relative Mode** sets the Zero level to the ambient.

Refer to Calibration for details of calibration procedures.

Using Advanced Mode

Key A: Tube Mode

 Once TACs have been detected, Tube Mode is designed to identify the level of benzene gas present. Refer to Using Basic Mode for details.

Key B

In Advanced Mode, the **B** key can be configured to select multiple functions which can be accessed by using the **Up** and **Down** keys while in the main running screen to scroll through them. The list can be configured using TigerPC. The default list is as follows.

Calibration 

By default, key **B** will be set to the Calibration function, as in Basic Mode. See Key **B**: Calibration above for general details of the Calibration options, and the Calibration section for full details on calibration procedures.

Options 

The **Options** soft key accesses several instrument settings. These can also be configured using:

- **Time and Date** 
  To adjust the time and date via the instrument, use the **Up** and **Down** keys to select the date or time and press **Enter**. Then use the **Up** and **Down** keys to adjust the values, as required. Confirm settings with **Enter**.
- **Backlight** 
  Refer to the Tiger PC Configuration Screen topic for details of these options. Select the preferred option with the **Up** and **Down** keys and confirm with **Enter**. Note that if the limited time option is selected, the time is set using Tiger PC.
- **Sound** 
  Refer to the Tiger PC Configuration Screen topic for details of these options. Select the preferred option with the **Up** and **Down** keys and confirm with **Enter**.

  For percentage volume, press **Enter** again to confirm selection. The frame will flash. Use the **Up** and **Down** keys to change the percentage volume and press **Enter** to confirm the chosen value.
- **Alarms** 

  Upper and lower alarms levels for the selected gas are taken from gas tables. They can be changed using Tiger PC, or via this option.

  Upper  and lower  alarm options are displayed. Select an 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.

The lower alarm setting should never be greater than the upper alarm. Therefore, if the lower alarm is set to higher than the upper alarm, the upper alarm is automatically incremented to the lower alarm level plus 1.

- **Units** 

  Refer to the Tiger PC Configuration Screen topic for details of these options. Select from the available units by using the **Up** and **Down** keys and then pressing **Enter**.

Zeroing 

Pressing the **Zero** soft key presents two Zero options . Use the **Up** or **Down** keys to select them. The upper symbol represents an absolute Zero. The lower symbol represents a relative Zero, which follows the drift of the MiniPID 2 Sensor.

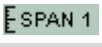
The screen displays a tick '✓' to confirm your selection. If the relative Zero has been selected, TIGER XTS will then Zero itself.

Peak Hold 

Press the **Peak Hold** soft key to display the peak reading: . This reading will stay on screen, updating as the current peak reading changes. Press the **Reset** soft key to reset the peak value. Press **Esc** to cancel**.**

Information 

Pressing the **Information** soft key provides access to a list of screens which display the current settings of the TIGER XTS. Use the **Up** and **Down** keys to scroll through the list and press **Enter** to view a screen. Press **Esc** to return to the main running screen.

First screen	Gas selected	
	Response Factor	
	Upper alarm	
	Lower alarm	
Second screen	Lamp selected	
	Date of Factory Calibration	
	Date of Custom Calibration	
Third screen	SPAN 1	
	SPAN 2	
	PID live response	

	MiniPID 2 Sensor A/D reading	A/D
Fourth screen	Short Term Exposure Levels	STEL
	Time Weighted Average	TWA
	Internal Reference Number	IRN:
	Firmware version	Firmware:
	Bootloader version	Bootloader:
	Battery type and voltage	
Fifth screen	Memory available	
	Gas Table Date	
	Run Time	Run Time: 0:00
	Date and time	
Sixth screen	Features* - an icon will appear for each feature available	Features ppb

* Refer to the Features screen for details of these optional upgrades.

Gas Selection

Select the TAC Mode function to select TAC gas. For all other gases, use this function (or use TigerPC).

Press the **Gas Selection** soft key to display an alphabetical letter which can be changed using the **Up** and **Down** keys: I. Press the **Enter** key to list the gases beginning with that letter. Using the **Up** and **Down** keys scroll through the gases starting with that letter. Press **Enter** to select the required gas. If a tick '✓' appears, press **Enter** again, and TIGER XTS will use the relevant data for the selected gas from the gas table for alarms, response factor, etc.

If the selected gas has no response factor, or is incompatible with the units selected, a warning symbol will appear. The message can be cleared by pressing the **Enter** key. The gas will still be selected.

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 resets the calculation even if there is an average already running. Press **Esc** to cancel.

TAC

TAC Mode automatically offers higher sensitivity and selects a response factor. Higher sensitivity down to 0.01 benzene (RF 0.5) is automatically selected, no other gases are selectable when used in this mode.

The TIGER XTS can be left in this mode even through a power cycle or battery replacement.

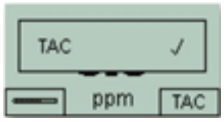
TAC Mode can be entered and exited by selecting the **TAC** icon and then pressing **Enter**.

Important: The TAC gas used within TAC Mode has a STEL set to 1 ppm. This level has been chosen based on the low STEL levels often associated with aromatic chemicals, including benzene. However, the TIGER XTS TAC STEL is not supported by nationally recognized bodies which publish official levels.

1. TAC Mode is entered and exited by scrolling to the TAC icon and pressing **Enter** key. A tick '✓' will appear to confirm the selection.



2. Press the **Esc** key to clear the confirmation.



3. The TAC response factor will be temporarily displayed before TAC Mode is entered.



4. To ensure best results, TAC Mode automatically selects a specific instrument setup. The TAC response factor and higher sensitivity functions become available.

5. To exit TAC Mode, press the TAC soft key and then **Enter**.



6. A tick '✓' will appear to confirm the selection. Press the **Esc** key.



7. The gas response factor will be temporarily displayed before TAC Mode is exited.



Health & Safety

Only available if the relevant upgrade has been installed.

Press the **Health & Safety** soft key to display the Health & Safety symbol with a question mark: 

. Press **Enter** to confirm and start the calculations. The Health & Safety icon will flash.

The STEL and TWA values are then shown. To stop calculations, press **Enter**. A question mark is then displayed. Press **Enter** again to confirm that calculations are to be stopped. A tick '✓' then appears beside the question mark, and then main running screen is displayed.

While the instrument calculates the instrument displays the ongoing STEL as it is calculated. The live reading is for indication only. Only the final reading at the end of the process is logged and should be used as reference.

If a gas has no STEL and TWA levels in the gas table this symbol will appear: .

Zones 

Press the **Zone** soft key to display the name of the currently selected Zone: 

. The TIGER XTS default is '001'. Zones are set up in Tiger PC. Use the **Up** and **Down** keys to select other zones.

Data Logging: Single-log (push-to-log) 

Only available if the relevant upgrade has been installed.

Press the **Single Data Log** soft key to take a single data log reading. The Single Data Log symbol appears briefly with a tick:  before returning to the main screen. Press the **Single Data Log** soft key again to take another reading. The memory status icon flashes when a Single log is taken.

Data Logging: Multi-logging 

Only available if the relevant upgrade has been installed.

Pressing the **Multi Data Log** soft key results in the multi-logging symbol appearing with a question mark: . Press the **Enter** key to start the Data Logging process based on Tiger PC setup. A tick '✓' briefly appears beside the question mark to confirm that Data Logging has started. The memory status icon flashes once per second while continuous Data Logging is in progress.

To stop Data Logging, press the soft key again. A crossed-out data log symbol is then displayed next to a question mark. Press the **Enter** key to confirm the action. A tick '✓' then appears beside the question mark, confirming that Data Logging has stopped.

Sleep Mode 

Press and hold the **Zzz** soft key to send the TIGER XTS to “sleep”. A three second count down takes place before it enters Sleep Mode. All functionality is switched off. “Zzz” is displayed on screen. Press **Esc** to cancel.

If set to do so in Tiger PC, the instrument can also enter Sleep Mode during data logging when the duration between logs exceeds two minutes, and automatically when connected to a PC.

Stealth Mode

By default, this option is not available via either soft key. Assign it to a soft key menu using Tiger PC.

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.

Tube Mode

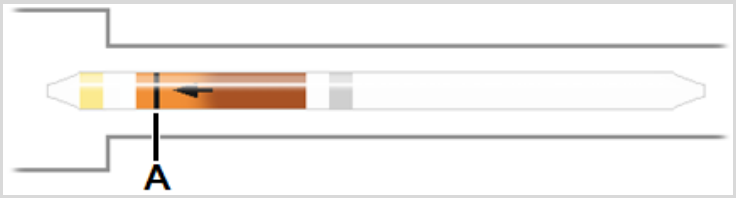
IF THE LEVEL OF BENZENE THROUGH THE PRE-FILTER TUBE EXCEEDS 200 PPM THE ACCURACY OF THE READING SHOULD BE APPROACHED WITH CAUTION. READINGS ABOVE 200 PPM ARE STILL DISPLAYED, HOWEVER, THE DISPLAY WILL FLASH ">200" IN THE BOTTOM LEFT CORNER OF THE SCREEN.

Important: Benzene Pre-filter Tubes should be used for a single reading and one STEL test only. ION Science recommends that a new tube is used with each tube measurement for best accuracy and performance.

The TIGER XTS should not be stored with tubes connected.

Additional Notes: When using the TIGER XTS to measure higher concentrations of benzene, the concentrations of other hydrocarbons may also be high, and the Benzene Pre-filter Tube capacity should be considered:

- As the pre-filter capacity reaches its limit, the tube will change color from bright orange to a green/brown.
- If the color changes beyond the ¾ marking, the benzene concentration may not be accurate.
- If the color changes past the ¾ marking (see **A** below), if the benzene reading is below the test limit (e.g., 200 ppm), the result is still within the environmental compliance.



The working temperature range of the Benzene Pre-filter Tube is between 2°C to 40°C (36°F to 104°F).

Important: A tube calibration must be carried out before Tube mode can be used.

The following icon will appear until a calibration is carried out: .

Preparing the Benzene Pre-filter Tube

Use the Tube Opener supplied with the instrument:

Remove both ends of the Benzene Pre-filter Tube using the Tube Opener. This is done by inserting the tube into the Tube Opener and twisting the tube. A slight angle may be required to cut the glass.

Using the Tube Opener tool will enable you to easily break the ends off the Benzene Pre-filter Tubes without leaving jagged edges or bits of broken glass.



Basic Tube Mode

The Basic Tube Mode consists of a single-point benzene reading only. The benzene test has a test time which varies with temperature. This test time is required to condition the tube which then offers a proportional output relating to the benzene being sampled.

Basic Tube Mode Procedure

1. To enter Tube Mode, select TUBE  using the soft key **A**. The pump will stop running and the calibration-selected tube type will briefly appear. The temperature screen is then displayed.
2. Use the **Up** and **Down** keys to adjust the temperature to reflect the ambient temperature. The default temperature units are °C. This can be changed to °F in Tiger PC. Select 'NEXT'.
3. The display will prompt for the new tube to be inserted. The tube will need to be prepared prior to fitting into the instrument. See the Preparing the Pre-filter Tube.

If the Benzene Pre-filter Tube breaks up to the shoulder it must not be used as this will damage the Probe Seals within Tube Holder when inserted.

4. Unscrew the cap of the Tube Holder and insert the tube into the Tube Holder Cap, ensuring the black arrow on the tube is pointing towards the instrument. Screw the Tube Holder Cap and the tube on to the instrument. Select 'NEXT'.



5. Press 'START' to commence the test cycle. A countdown will indicate the remaining test time, and a live tube reading will be displayed.

   Note that this live reading is for indication only. It is only the final reading at the end of the test cycle that should be used as reference. The final reading will automatically be data logged.
6. Once the countdown has completed, the instrument will display the final reading. Select 'OK'.
7. Once the measurement has finished, the display will prompt you to remove the used tube. Remove the tube and refit the probe.

   Select 'OK' to return to the main running screen. The selected gas will be displayed briefly.

Advanced Tube Mode

The Advanced Tube Mode has two parts: an initial single point reading as described in Basic Tube Mode, followed by an optional 15-minute STEL calculation. Both tests use the same Benzene Pre-filter Tube.

STEL Calculation

The second stage of Tube Mode is optional.

The STEL for benzene will be automatically selected from the Gas Table. If a benzene STEL is not specified it can be added to the Gas Table in Tiger PC.

Advanced Tube Mode Procedure

1. Follow the procedure described in Basic Tube Mode to take the initial single point reading. The display will then prompt you with the option to run the STEL measurement. Select 'YES' to run this measurement.
2. A countdown timer will indicate the remaining test time, and a live STEL reading will be displayed.

   Note that this live reading is for indication only. It is only the final reading at the end of the test cycle that should be used as reference. The final STEL reading will automatically be data logged.
3. After 15 minutes, the instrument will display the STEL final reading. Select 'OK'.
4. Once the measurement(s) have finished, the display will prompt you to remove the used tube. Remove the tube and refit the probe.

   Select 'OK' to return to the main running screen. The selected gas will be displayed briefly.

6. Using the Tiger PC Software and Downloading Data

The Tiger PC software enables you to fully configure the instrument, view and edit gas tables, and view logged data, including health and safety readings.

PC Requirements

Tiger PC Software must be used in conjunction with a PC or laptop using Windows 10.

Installation of Tiger PC Software

Download the Tiger PC software from the ION Science website.

Run setup.exe to install the software.

Alternatively, the Tiger PC software can be purchased on a memory stick.

Follow the prompts until the installation is complete. Should you have difficulty, please contact your local distributor, or contact ION Science directly.

Connecting a TIGER XTS to a PC



The TIGER XTS 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.

Connect your TIGER XTS to the PC. The (type B) USB port of the TIGER XTS is located at the back of the instrument, above the charging connectors.

While the TIGER XTS is connected, unless it is in TAC Mode, the instrument will go into Sleep Mode if set to do so in Tiger PC. The instrument will “awaken” when it is disconnected.

Opening Tiger PC

Before opening Tiger PC, connect your TIGER XTS to the PC.

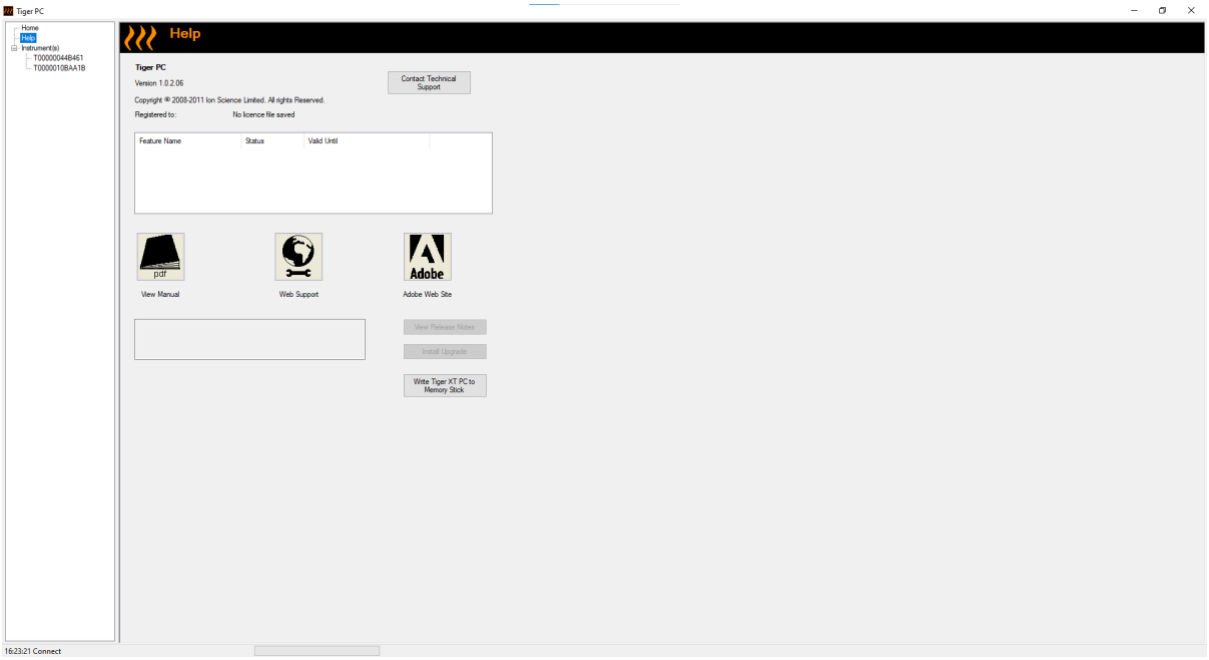
Double-click the Tiger icon on your desktop or in the Start menu to open Tiger PC (or run Tiger.exe in the installation folder). The Home page will be displayed:



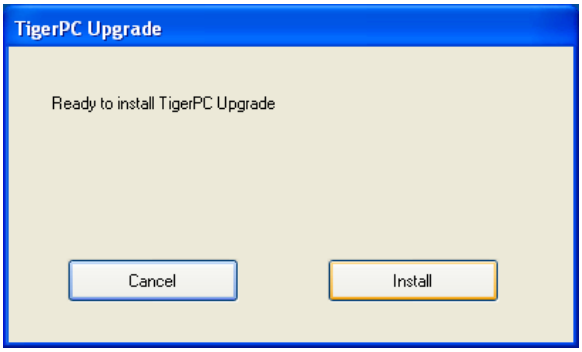
The menu on the left-hand side is used to select further screens.

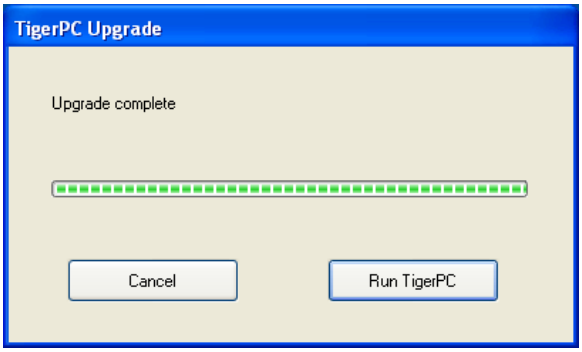
Help Screen

This screen will inform you if a new version of PC software is available. You can then install the upgrade if required. We recommend that Tiger PC is kept up to date to ensure that the latest functionality is available to you.



To install an upgrade, press **Install Upgrade**. The following are then displayed:



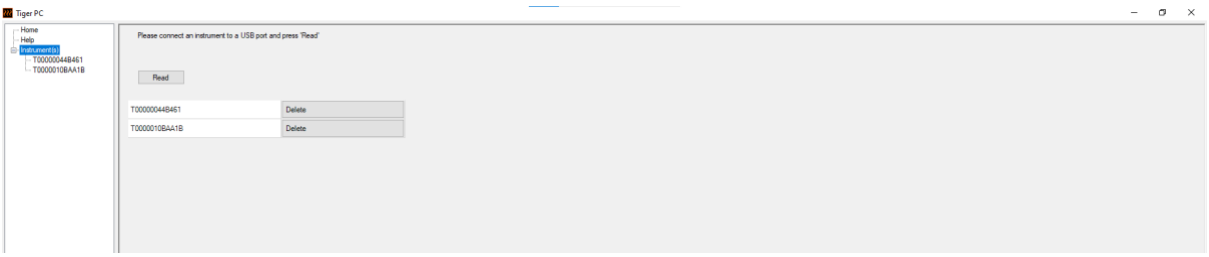


The Instruments List

The **Instrument(s)** list in the menu lists the Internal Reference Numbers (IRNs) of the TIGER XTS instruments that Tiger PC has previously interfaced with and logged. Your instrument will be added to this list once Tiger PC has “read” it, as described next.

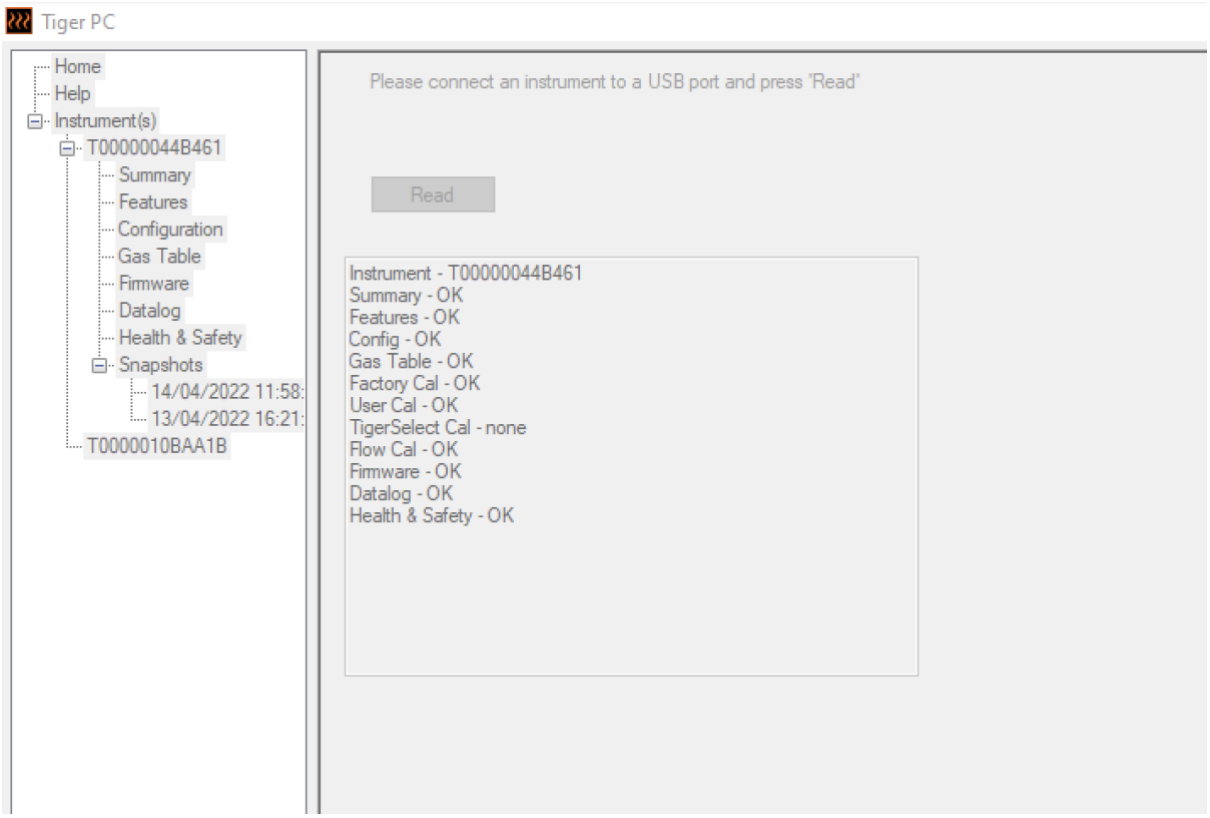
Downloading Data Logged Readings and Instrument Settings

Click **Instrument(s)**. The page that is then displayed lists the instruments that Tiger PC has previously logged.



To download data from the connected instrument (and to add it to the instrument list if it hasn't been logged with Tiger PC before) click **Read**.

The current setup of the instrument and logged data is then downloaded:

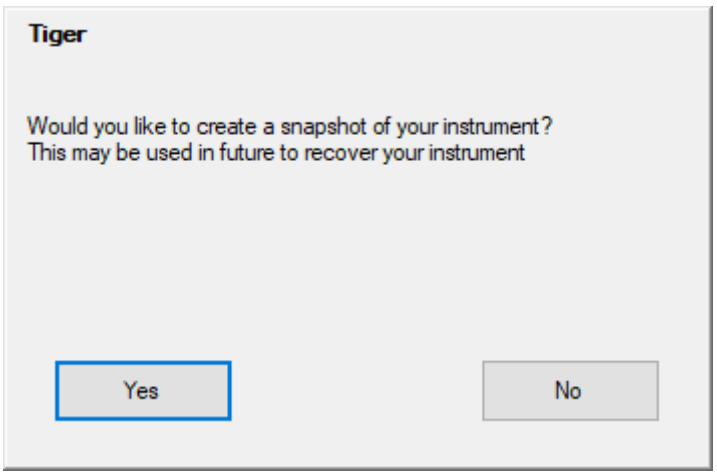


To "un-log" an instrument, click **Delete**. All details of the instrument are then removed from the software. If that instrument is connected again, it will be treated as a new (previously unlogged) instrument by Tiger PC.

If not already listed, the instrument IRN will be added to the list of instruments.

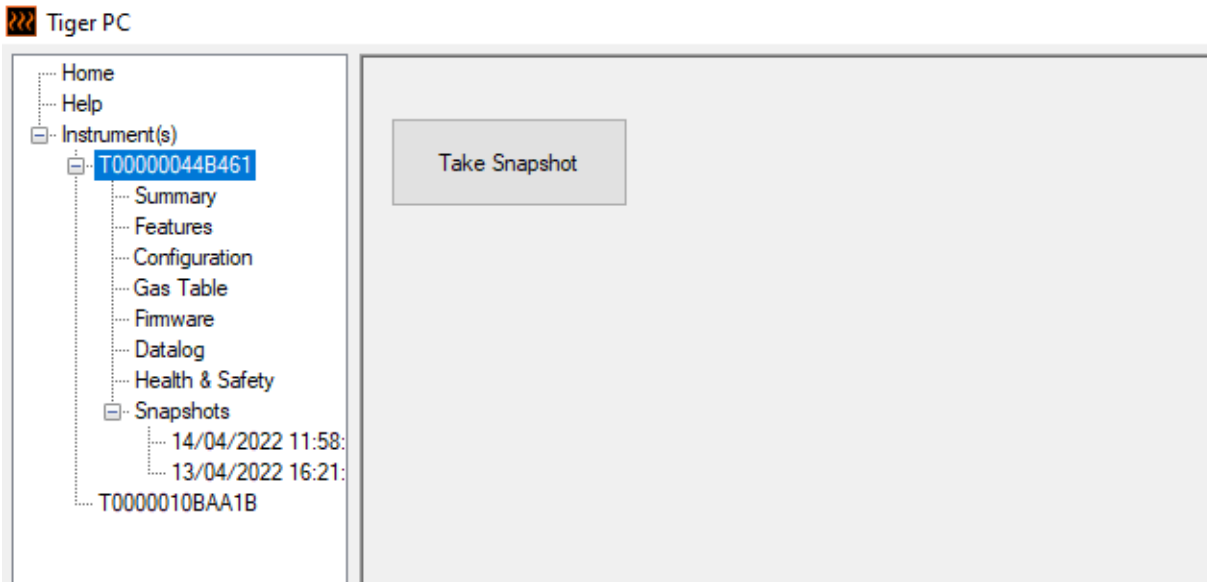
Taking Snapshots

The first time you "read" an instrument a snapshot is taken automatically (see Snapshots Screen). On subsequent occasions this pop-up displayed:



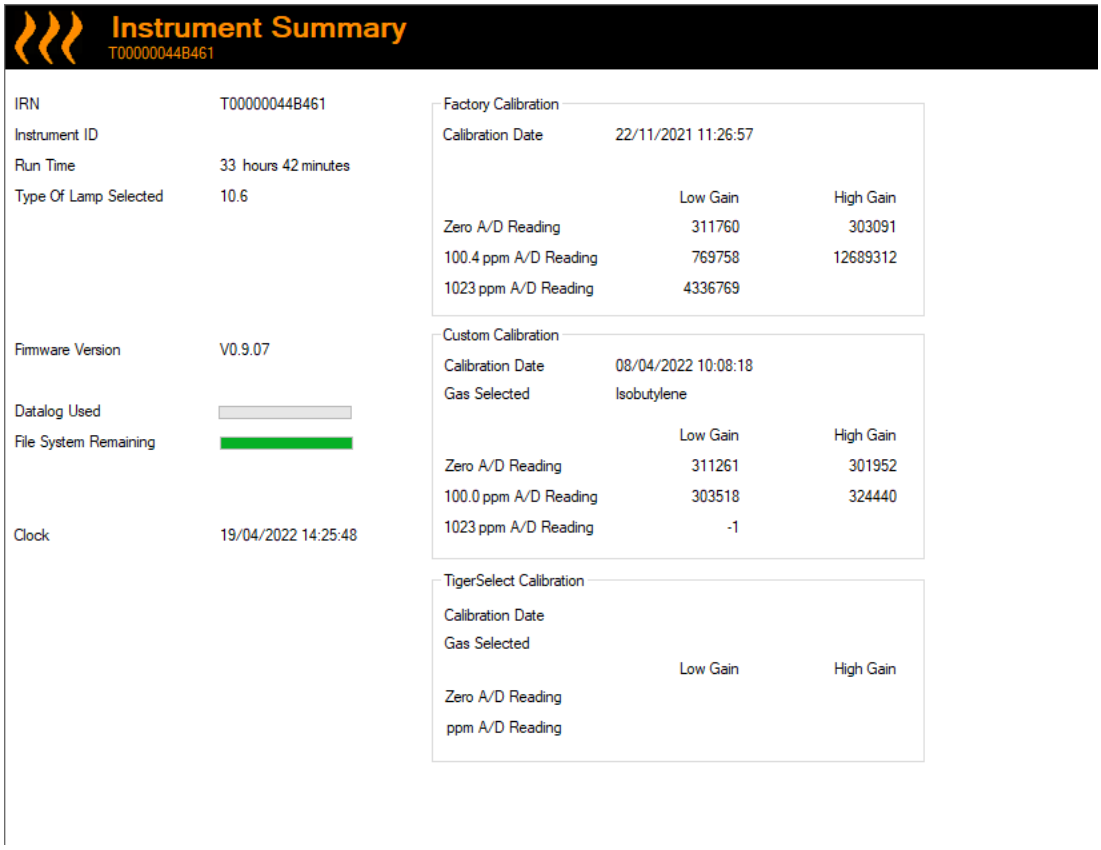
Click **Yes** or **No** as required.

To take a snapshot of a connected instrument at any time, click on the IRN of the instrument in the **Instrument(s)** list, then click **Take Snapshot** on the screen that is then displayed.



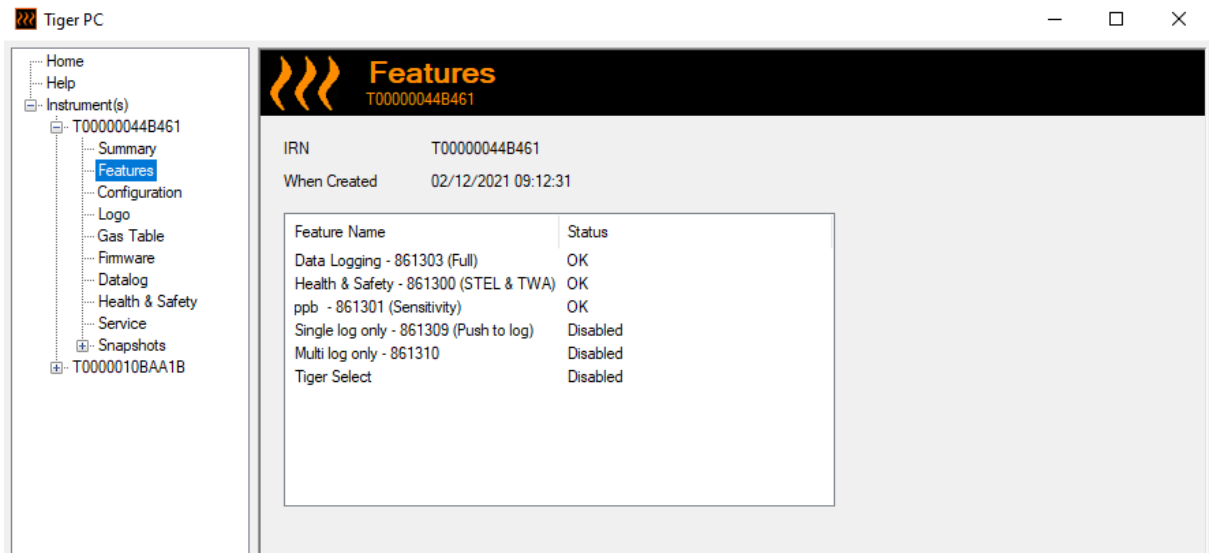
Instrument Summary Screen

Once an instrument has been read, expand its entry in the menu and click on **Summary** to display the Instrument Summary screen. This screen shows the current status and properties of your TIGER XTS.



Features Screen

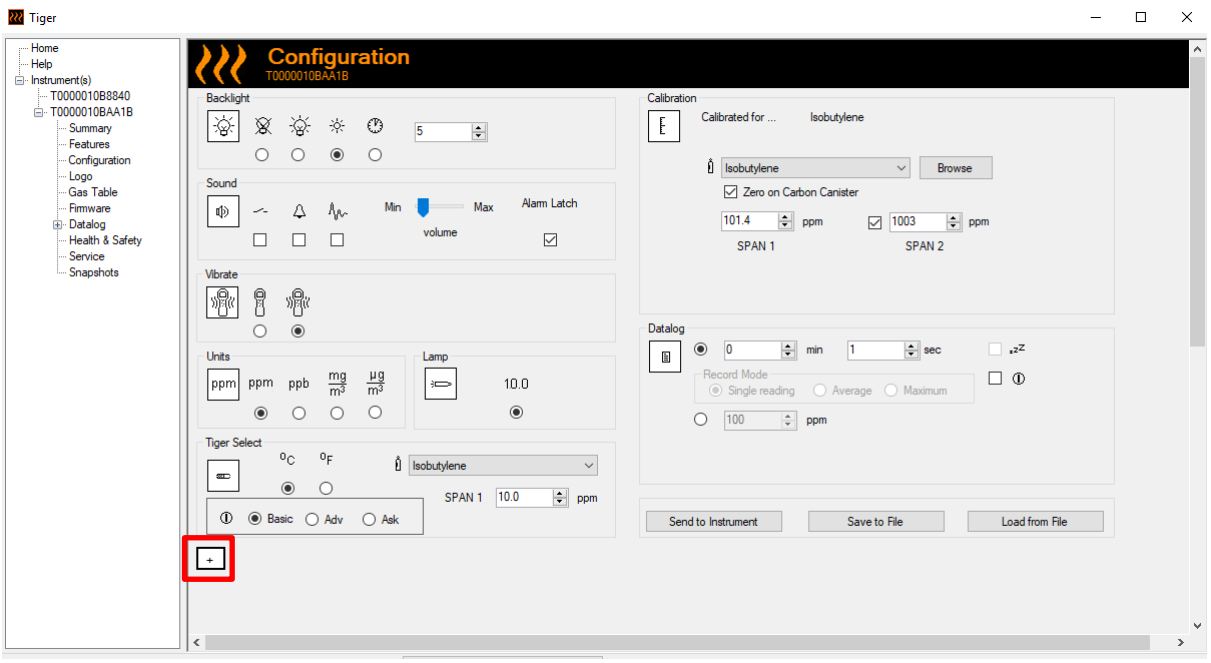
This screen indicates which of the available feature upgrades have been added to your TIGER XTS.



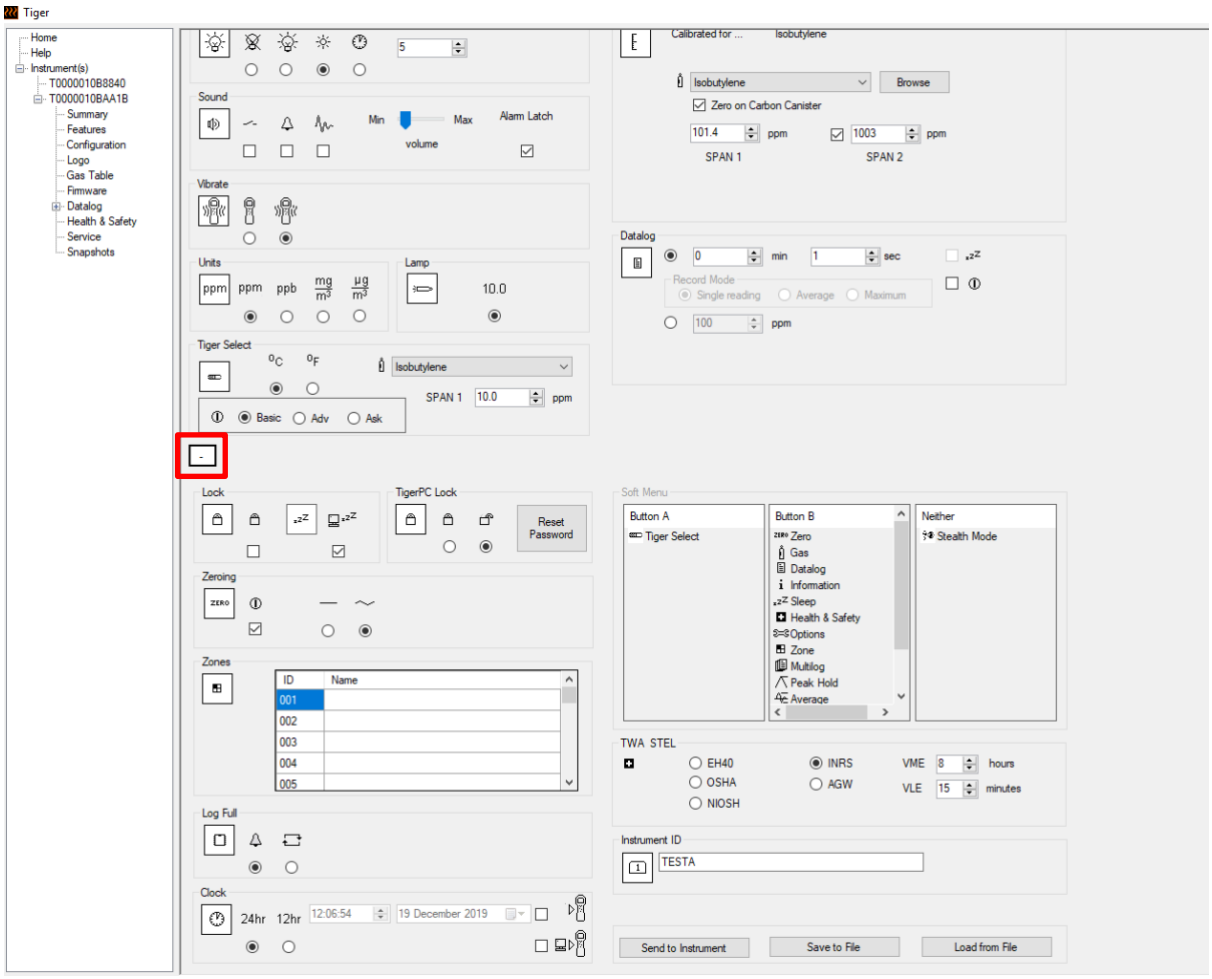
To purchase additional features, contact ION Science Ltd or your distributor. Once the transaction is completed and confirmed, click **Update** to install the features on your TIGER XTS.

Configuration Screen

Use this screen to configure your TIGER XTS.

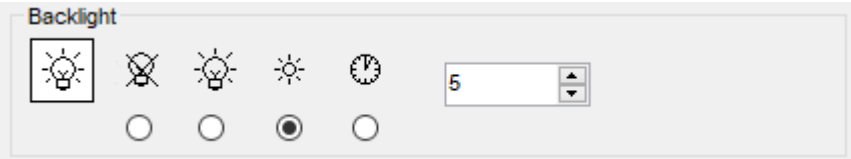


+ / - Click these buttons (highlighted above and below) to display or hide additional settings:



Note that the images in this topic display the default Tiger PC settings.

Backlight

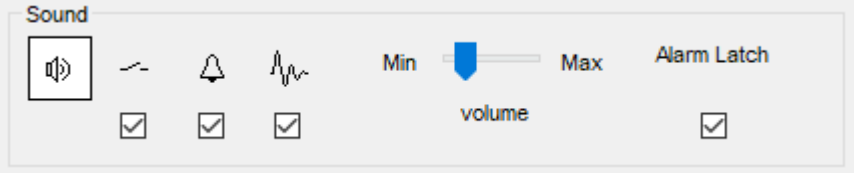


Choose from:

-  Permanently off
-  Permanently on
-  On in low ambient light
-  On for limited time

Enter time for the limited time option in the field provided (1 - 99 seconds).

Sound

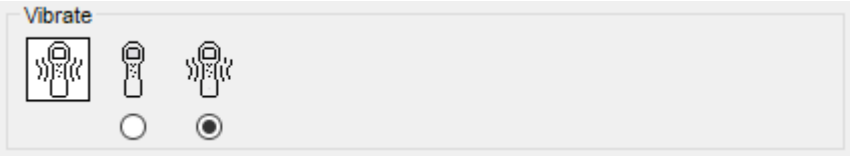


The following options are available:

- Keys press sounds
- Audible alarms
- "Crescendo", i.e., the volume of low-level alarms increases as the upper alarm level is approached
- **Alarm latch**: alarms continue to sound even if the gas level falls below the threshold until the **Esc** key is pressed

Volume is adjusted using the slider.

Vibrate



Use to set your TIGER XTS to vibrate under alarm conditions.

Units



Choose from parts per million (ppm) or milligrams per meter cubed (mg/m^3).

If you have the high sensitivity upgrade, then parts per billion (ppb) and micrograms per meter cubed ($\mu g/m^3$) are also available.

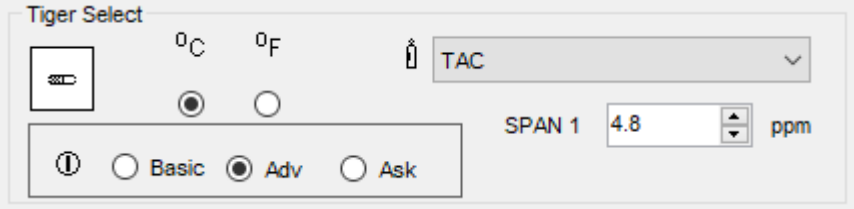
When the ppb Model is selected, the instrument over ranges at 9999 ppb (1ppm).

Lamp



The TIGER XTS is configured for use with the 10.0eV Lamp only.

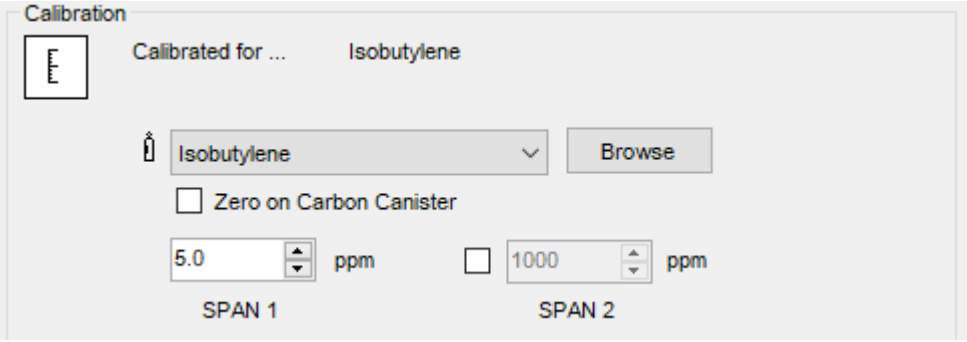
TIGER XTS



Used to configure the settings exclusive to TIGER XTS:

- Temperature units
- Gas selection
- SPAN 1 range
- The mode of operation the TIGER XTS starts in:
  - **Basic**: Always start in Basic Start-up Mode
  - **Adv**: Always start in Advanced Start-up Mode
  - **Ask**: Instrument “asks” the user during start-up

Calibration



Select the calibration gas using the drop-down list.

If no gases are shown in the drop-down list, click **Browse** and go to the location where the Tiger PC software files are saved:
<Installation folder>/IonScience/Tiger/software/instruments/<instrument number>/gas table

Find the appropriate gas table and open it.

If required, tick **Zero on Carbon Canister** to ensure a near Zero reading after calibration. The fixed Zero option — should also be selected.

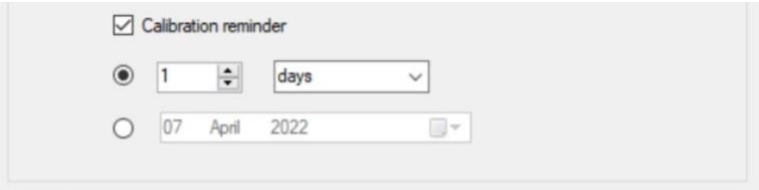
Tiger PC offers two-point (Zero + SPAN 1) and three-point (Zero + SPAN 1 + SPAN 2) calibration options:

- For two-point calibration, enter the SPAN 1 concentration and ensure that the SPAN 2 checkbox is unticked.
- For three-point calibration, tick the checkbox and enter the SPAN 1 and SPAN 2 concentrations.

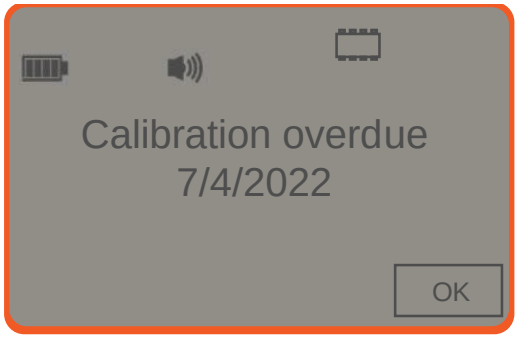
Select **Send to instrument** to save these settings to your TIGER XTS.

The calibration procedure is detailed in Calibration.

Calibration Reminder



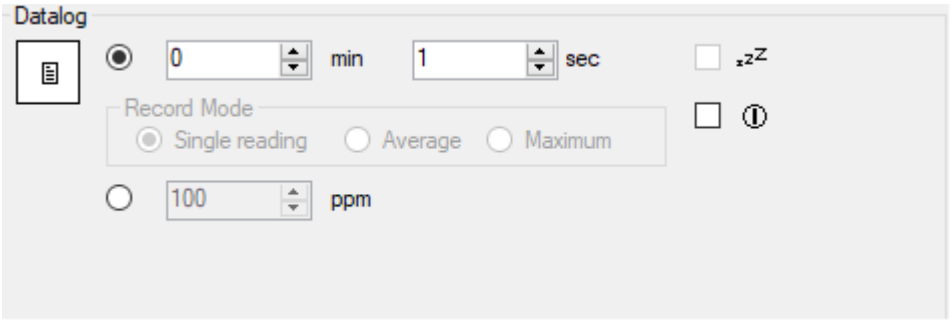
The calibration reminder allows you to set a reminder for when calibration is needed. To turn on the calibration reminder, ensure the box is ticked next to 'calibration reminder'. You then have two options below that. You can either set how many days, weeks or months you want the reminder to appear after the day you are on, or you can set a more precise date by selecting the bottom option. The calibration reminder looks like the below.



On the day (and after) the calibration due date, 'Summary !' will appear in bold in the left-hand side on Tiger PC. 'Overdue' will also appear in red within the instrument summary (see below). Once the instrument has been calibrated, 'Overdue' text will disappear.



Datalog



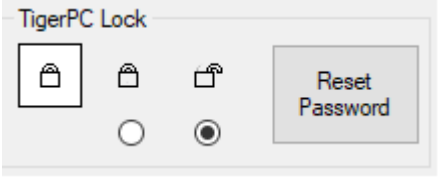
Select one of the following:

- **min** and **sec**: set the interval between readings. Users can select to record each live data points (single), or the average or maximum value between the desired sampling frequency. Must be at least 1 second.
- **ppm**: the instrument starts data logging at 1 second intervals for as long as the ppm gas level is exceeded.

Other options:

- zzZ Available only if the interval is over 2 minutes. When selected, the instrument will sleep between logs to preserve battery life.
- ⏻ The instrument starts data logging when it is switched on.

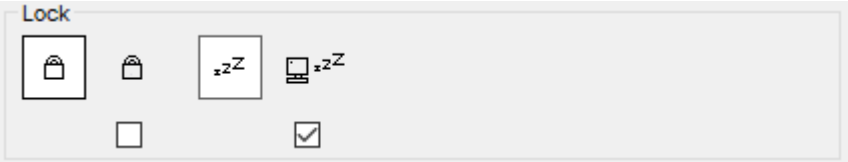
Tiger PC Lock



Tiger PC can be locked by a master-user to prevent unauthorized adjustment of configuration or settings.

- To lock Tiger PC, select the Lock option and enter your password. The default password for Tiger PC is 0000. The password can be changed using the Reset Password button.
- If you forget your password, please contact Ion Science so that a master password can be issued to you. Master passwords are generated daily and are only valid on the day of generation.

Lock



The following options are available:

- Enables a supervisor to disable user access to the functions accessed via the instrument's soft key **B**.
- When connected to a PC, unless it is in TAC Mode, the instrument will go into Sleep Mode. The instrument will "awaken" when disconnected from the PC.

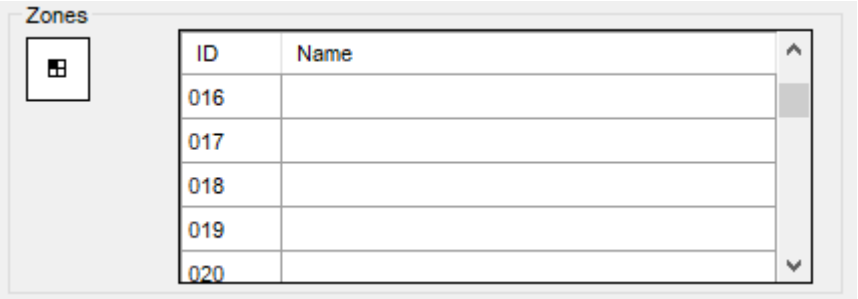
Zeroing



The following options are available:

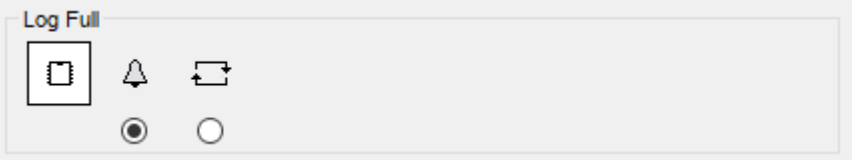
- When selected, the TIGER XTS will automatically set its Zero reading based on ambient air when it is switched on. When deselected the instrument will use its calibration Zero.
- When selected, TIGER XTS uses the fixed calibration Zero. If used in conjunction with the 'Zero at switch on' option, the instrument will Zero at switch on and then remain at that level.
- When selected, the Zero level will move negative if cleaner ambient air is detected. This ensures 0.0 ppm is displayed in clean air and ensures sub ppb levels are always detected.

Zones



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

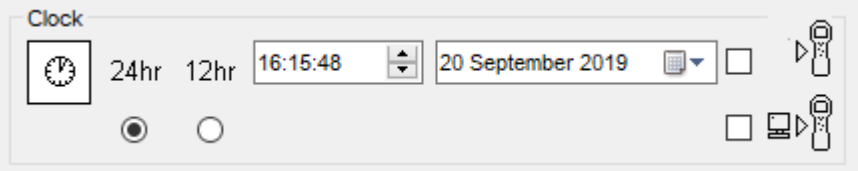
Log Full



Select one of the following:

- The instrument will alarm when the memory log is full. Logging will stop.
- Logging will continue. New data will overwrite the oldest data in the log.

Clock



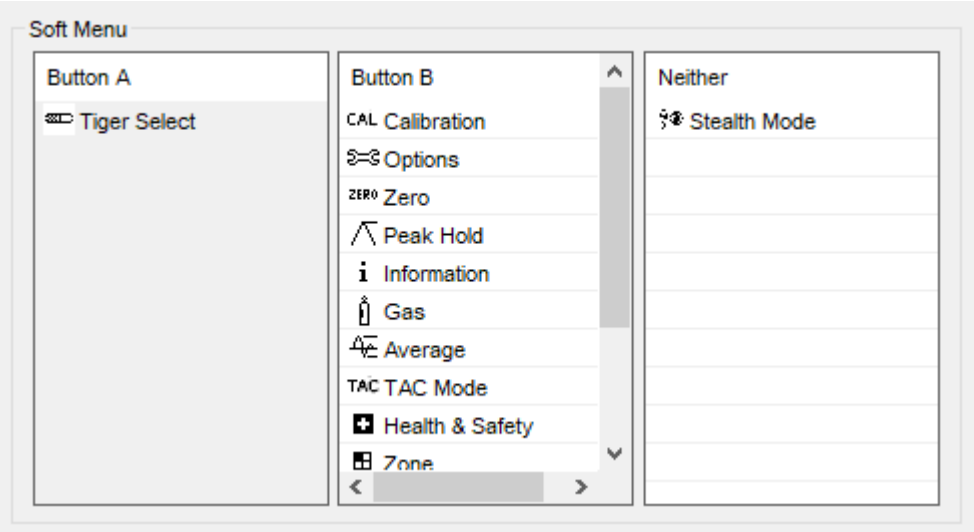
Select 24- or 12-hour format.

If required, select one of the following:

- To set the time on your TIGER XTS. Set the time and date in the fields provided.
- To synchronize the instruments time with that of the PC.

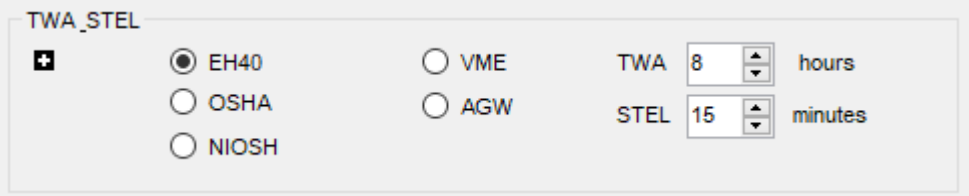
If neither option is selected, the instrument will use its internal clock.

Soft Menu



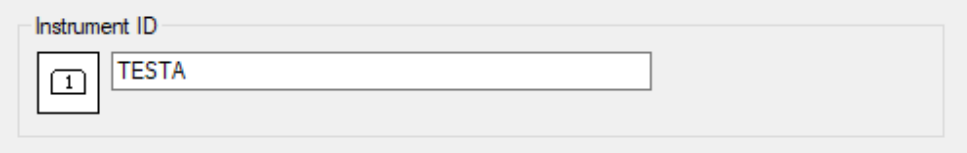
The various functions listed here may be allocated to the **A** and **B** keys (or neither) in any order by dragging and dropping them to the required positions in the lists. The order in which they are listed under a button controls the order in which they are listed in the soft-key menus.

TWA STEL



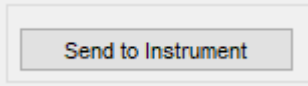
Select the regulatory code to which you are working and specify TWA and STEL periods.

Instrument ID



Enter the text to be displayed on the start-up screen of your TIGER XTS.

Send to Instrument

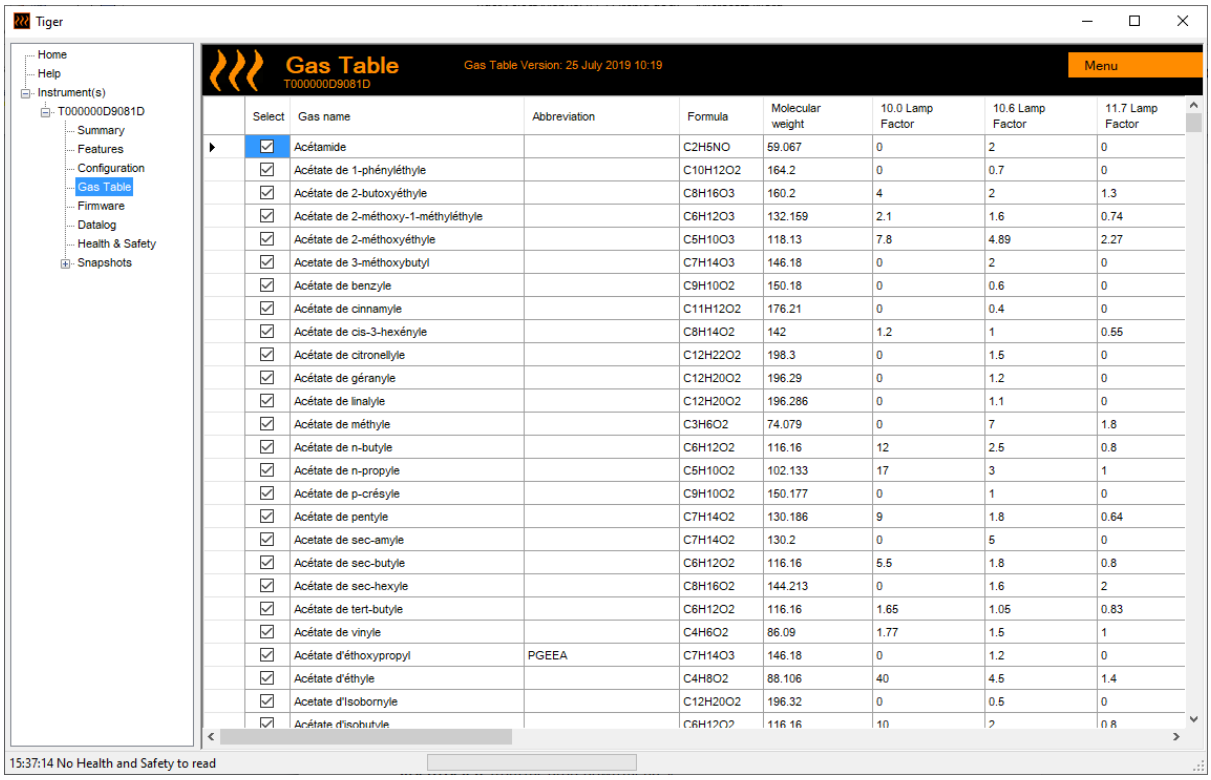


When you have configured your instrument or completed your changes, send them to your TIGER XTS by clicking **Send to Instrument**.

If your PC still fails to write to the TIGER XTS, seek advice from your distributor or from ION Science Ltd.

Gas Table Screen

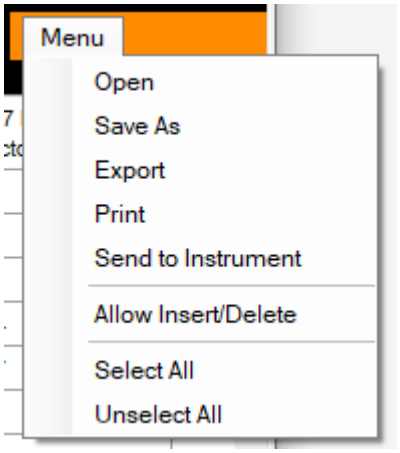
Select **Gas Table** from the menu to display the Gas Table screen.



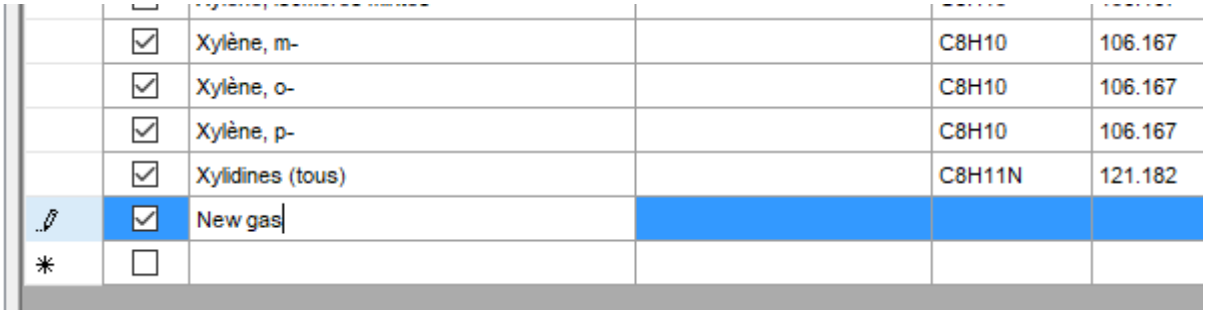
Select	Gas name	Abbreviation	Formula	Molecular weight	10.0 Lamp Factor	10.6 Lamp Factor	11.7 Lamp Factor
☑	Acétamide		C2H5NO	59.067	0	2	0
☑	Acétate de 1-phényléthyle		C10H12O2	164.2	0	0.7	0
☑	Acétate de 2-butoxyéthyle		C8H16O3	160.2	4	2	1.3
☑	Acétate de 2-méthoxy-1-méthyléthyle		C6H12O3	132.159	2.1	1.6	0.74
☑	Acétate de 2-méthoxyéthyle		C5H10O3	118.13	7.8	4.89	2.27
☑	Acetate de 3-méthoxybutyl		C7H14O3	146.18	0	2	0
☑	Acétate de benzyle		C9H10O2	150.18	0	0.6	0
☑	Acétate de cinnamyle		C11H12O2	176.21	0	0.4	0
☑	Acétate de cis-3-hexényle		C8H14O2	142	1.2	1	0.55
☑	Acétate de citronellyle		C12H22O2	198.3	0	1.5	0
☑	Acétate de géranyle		C12H20O2	196.29	0	1.2	0
☑	Acétate de linalyle		C12H20O2	196.286	0	1.1	0
☑	Acétate de méthyle		C3H6O2	74.079	0	7	1.8
☑	Acétate de n-butyle		C6H12O2	116.16	12	2.5	0.8
☑	Acétate de n-propyle		C5H10O2	102.133	17	3	1
☑	Acétate de p-crésyle		C9H10O2	150.177	0	1	0
☑	Acétate de pentyle		C7H14O2	130.186	9	1.8	0.64
☑	Acetate de sec-amyle		C7H14O2	130.2	0	5	0
☑	Acétate de sec-butyle		C6H12O2	116.16	5.5	1.8	0.8
☑	Acétate de sec-hexyle		C8H16O2	144.213	0	1.6	2
☑	Acétate de tert-butyle		C6H12O2	116.16	1.65	1.05	0.83
☑	Acétate de vinyle		C4H6O2	86.09	1.77	1.5	1
☑	Acétate d'éthoxypropyl	PGEEA	C7H14O3	146.18	0	1.2	0
☑	Acétate d'éthyle		C4H8O2	88.106	40	4.5	1.4
☑	Acetate d'Isobornyle		C12H20O2	196.32	0	0.5	0
☑	Acétate d'isobutyle		C6H12O2	116.16	10	2	0.8

You can modify this table and download it to your instrument.

To add new gases to the table (or delete them), click the **Menu** button and select **Allow Insert/Delete** from the drop-down menu:



An additional row is added at the bottom of the Gas Table into which details of the new gas can be entered.



Upper and lower alarm levels can be adjusted in the Gas Table. Type the required alarm level in the appropriate column for the gas in question.

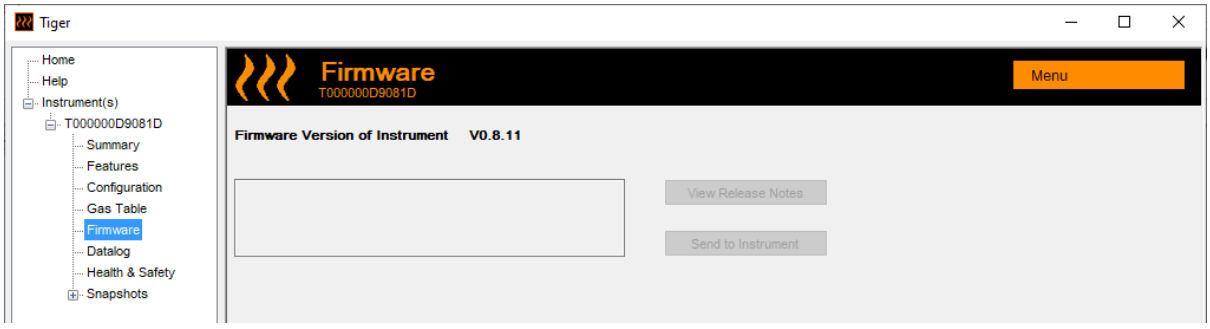
Always save modified gas tables under a different file name. Do not overwrite the original.

For a gas to be available to the instrument, the checkbox next its name must be ticked.

To send the Gas Table to the instrument, select **Send to Instrument** from the drop-down menu shown above.

Firmware Screen

This screen displays the current firmware version installed on your TIGER XTS and provides facilities to install new versions on the instrument.



If new firmware is available, this will be noted on the screen in the box under the current firmware version: “New firmware is available”.

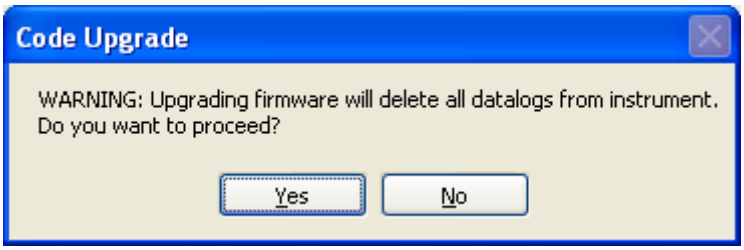
Click **View Release Notes** for a description of the changes in the new version.

To install a firmware update, connect TIGER XTS to your computer 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. 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 process, take a snapshot of the instrument before upgrading. This can be reloaded after the update is complete.

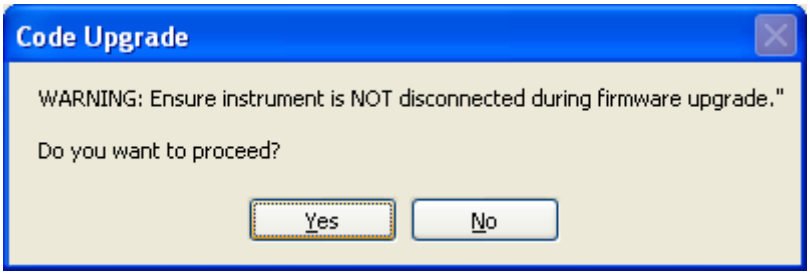
Select **Send to Instrument** to install them on your instrument.

The following message is displayed:



To continue, click **Yes**.

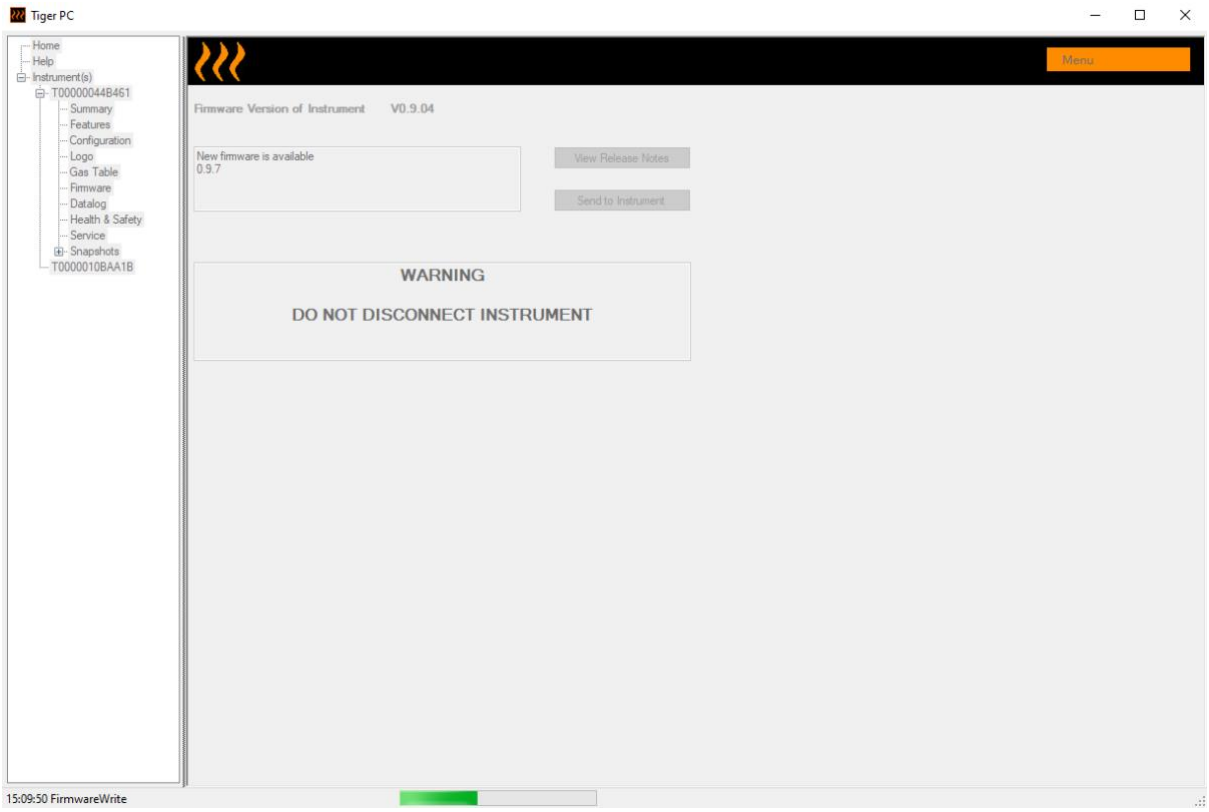
The following message is displayed:



Check that the instrument is connected and click **Yes**.

Important: Do not operate your TIGER XTS during the update process.

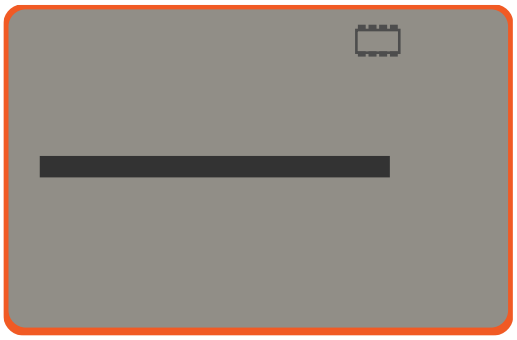
The firmware will now be sent to the TIGER XTS. A bar at the bottom of the screen will indicate the progress of the update.



The new version will be shown on the screen.

Important: Do not disconnect the TIGER XTS at this point. Follow the instructions below before disconnecting.

After the upgrade been sent to the TIGER XTS, the instrument will install it. The TIGER XTS will flash the two torch LEDs. The screen on the TIGER XTS will remain blank for about 30 seconds. A progress bar will then be displayed as the installation takes place:

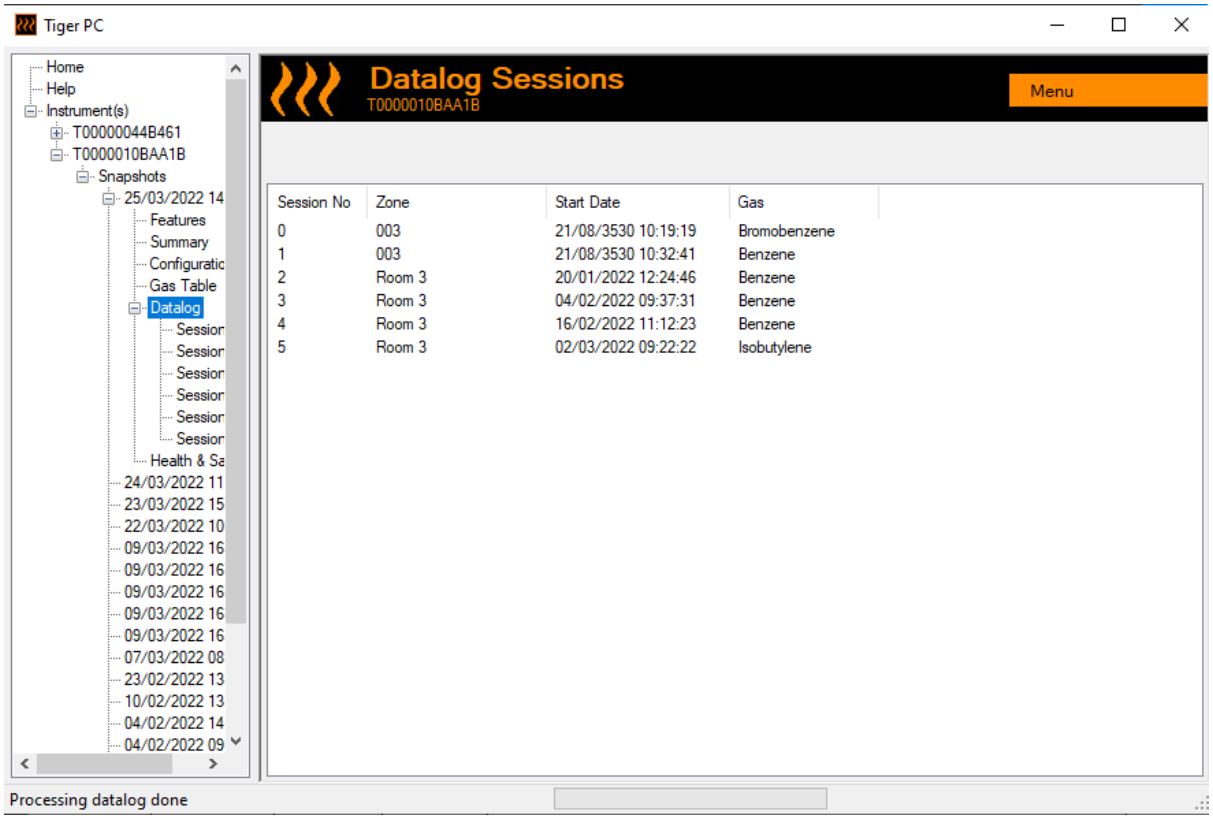


A 'verifying file system' message will then be displayed.

The firmware is now installed on the instrument. It will then restart automatically.

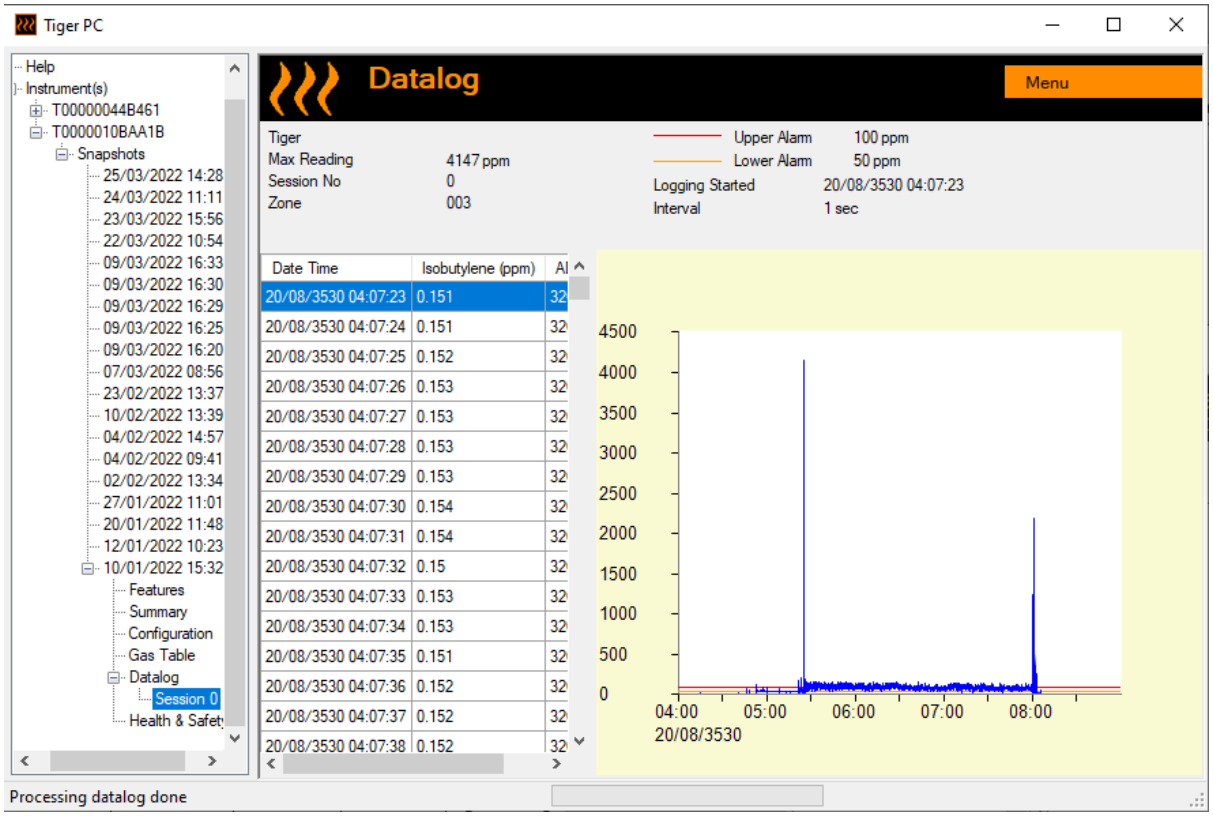
Datalog Screen

This screen is used to view data logged readings downloaded from your TIGER XTS, if a relevant upgrade has been installed. New readings are downloaded from the TIGER XTS when the instrument is read.



The **Datalog** sub-menu displays a list of the Datalog sessions.

Click on a session. Details of the data collected during that session are presented in numerical and graphical form on the Datalog screen.

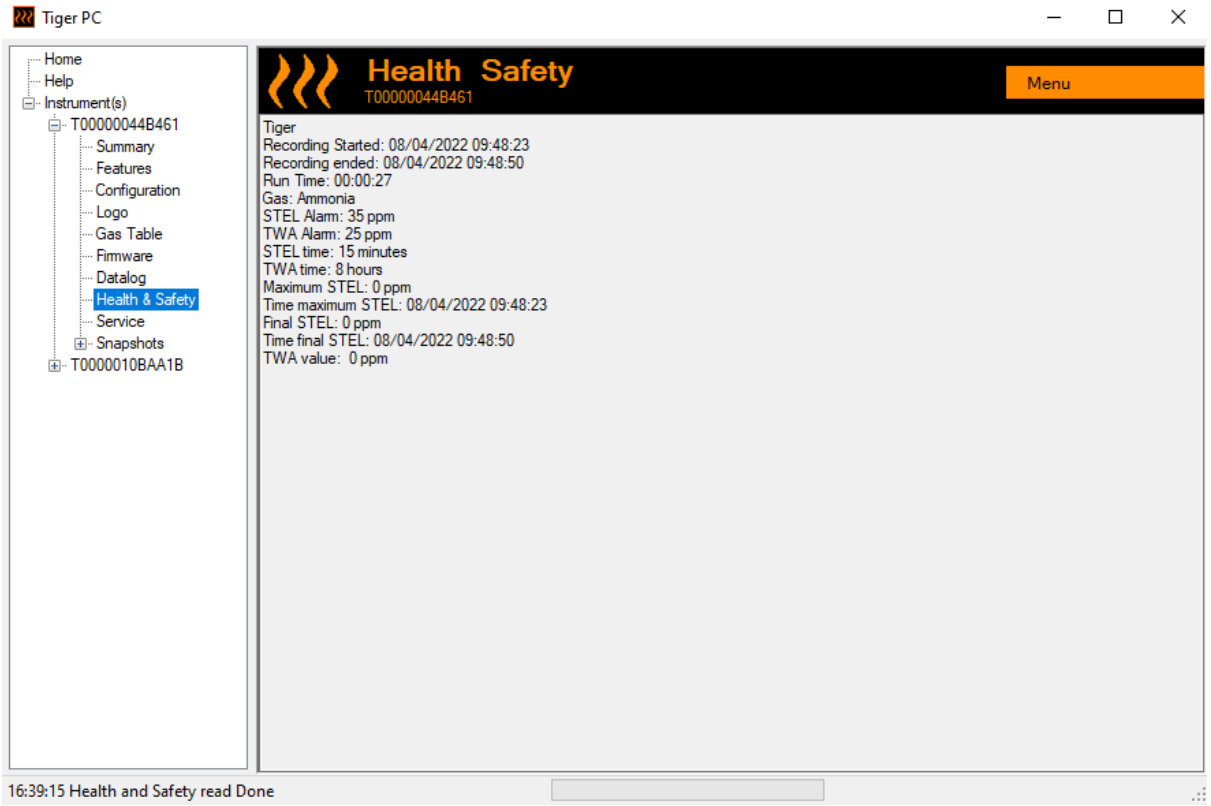


Use the menu accessed from the **Menu** button in the top right-hand corner of the window to zoom, print, or export the data.

Important: The **Delete** option on the menu deletes all logged data from your TIGER XTS. Ensure all valuable data is exported to your PC before selecting it.

Health & Safety Screen

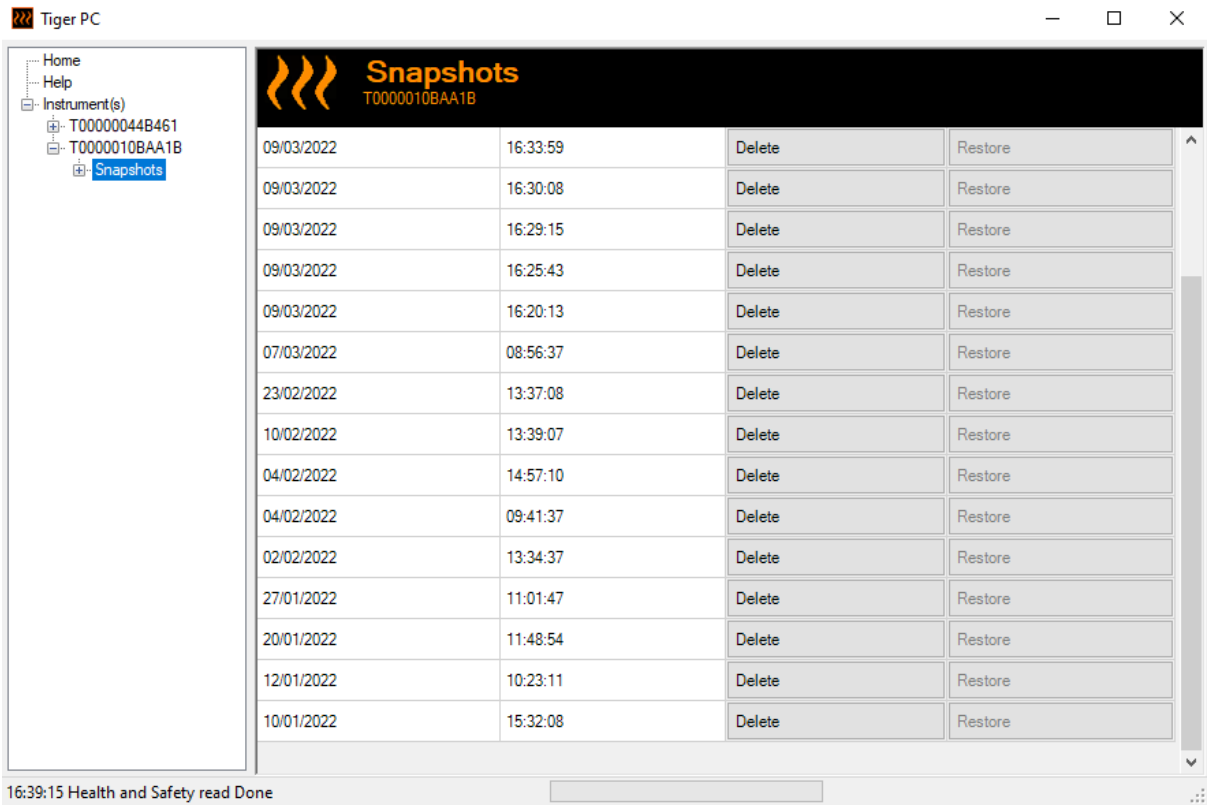
This screen displays the latest Health and Safety readings held on your TIGER XTS, if the relevant feature upgrade has been installed. New readings are downloaded from the TIGER XTS when the instrument is read.



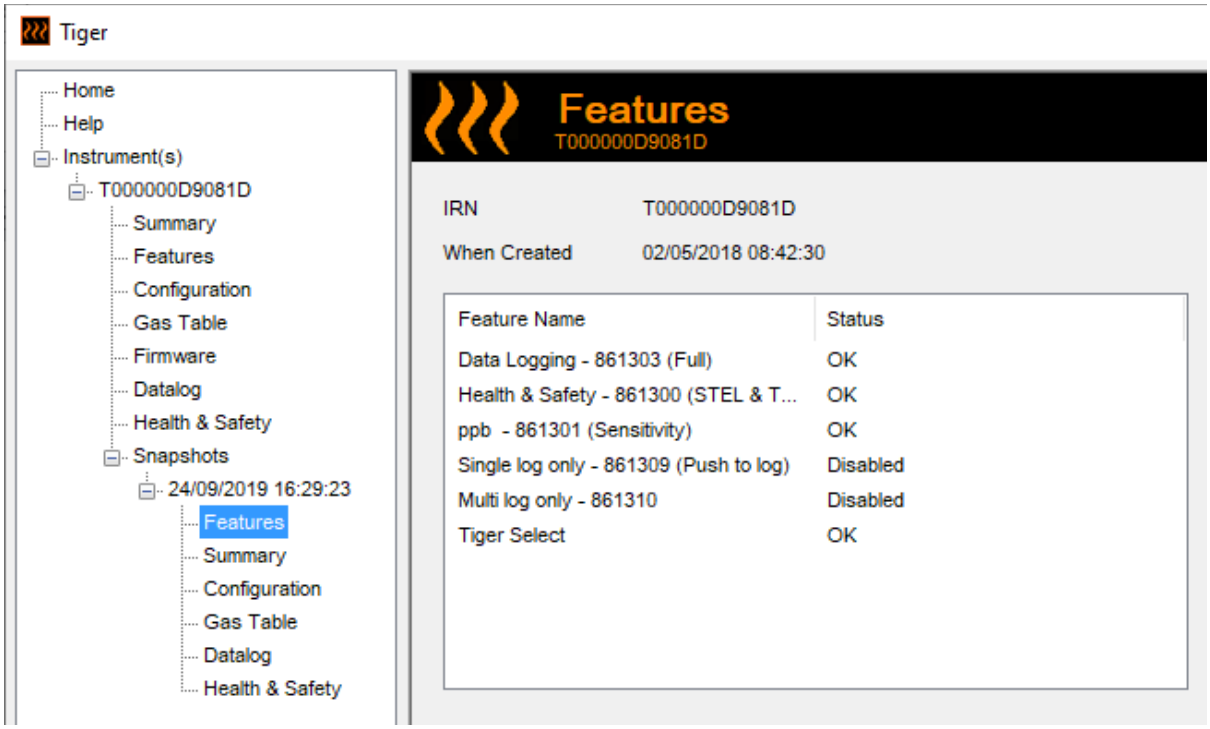
Click **Menu** then **Export** to save this data to a file on your computer. The next Health and Safety readings will overwrite the data on your TIGER XTS.

Snapshots Screen

A snapshot records the calibration settings of your TIGER XTS at a point in time. If required, your TIGER XTS can be reset to a snapshot's settings. The Snapshots screen lists those stored on the PC.



Details of a snapshot can be viewed by expanding the menu entry for that snapshot and accessing the Features, Summary, Configuration etc. screens for the snapshot:



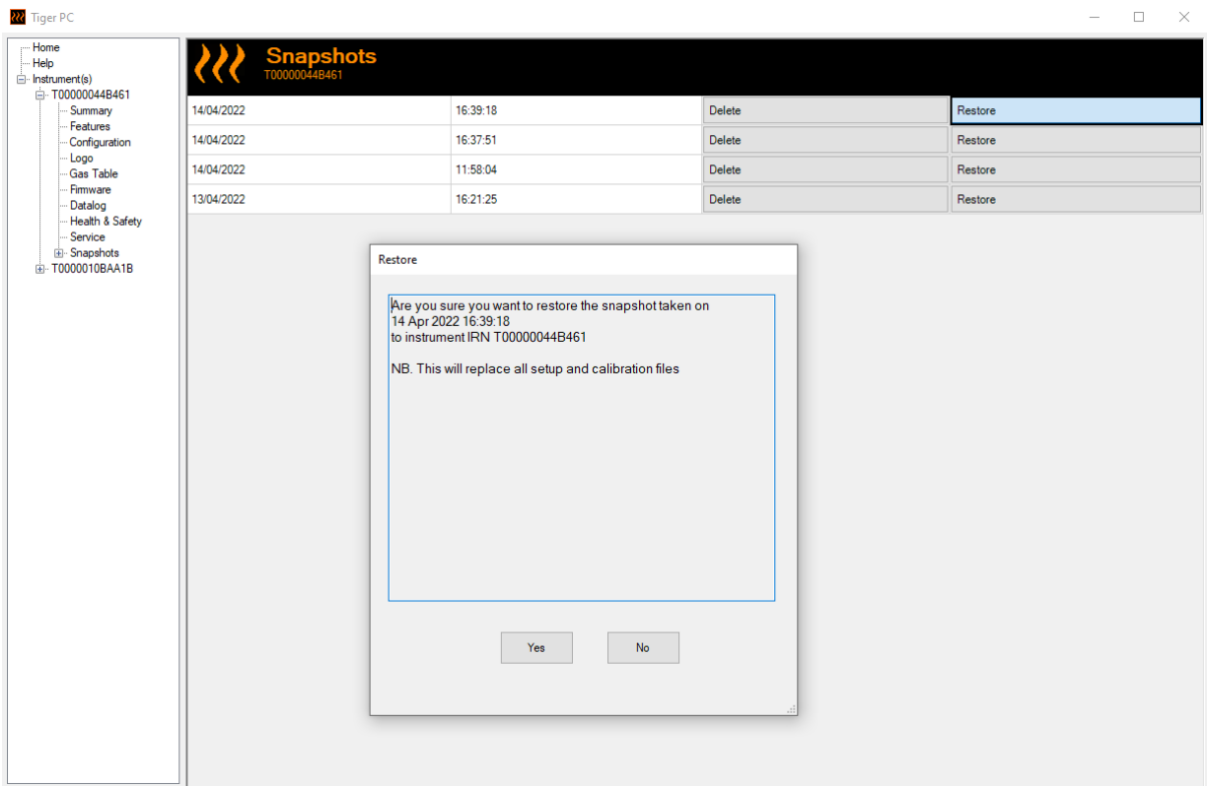
The data on these screens cannot be edited.

To restore the stored settings to your TIGER XTS, first ensure that your instrument is fully booted and connected to your PC as described 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.

Important: Be aware that this process will replace all setup and calibration files.

Click **Restore** against the relevant snapshot.

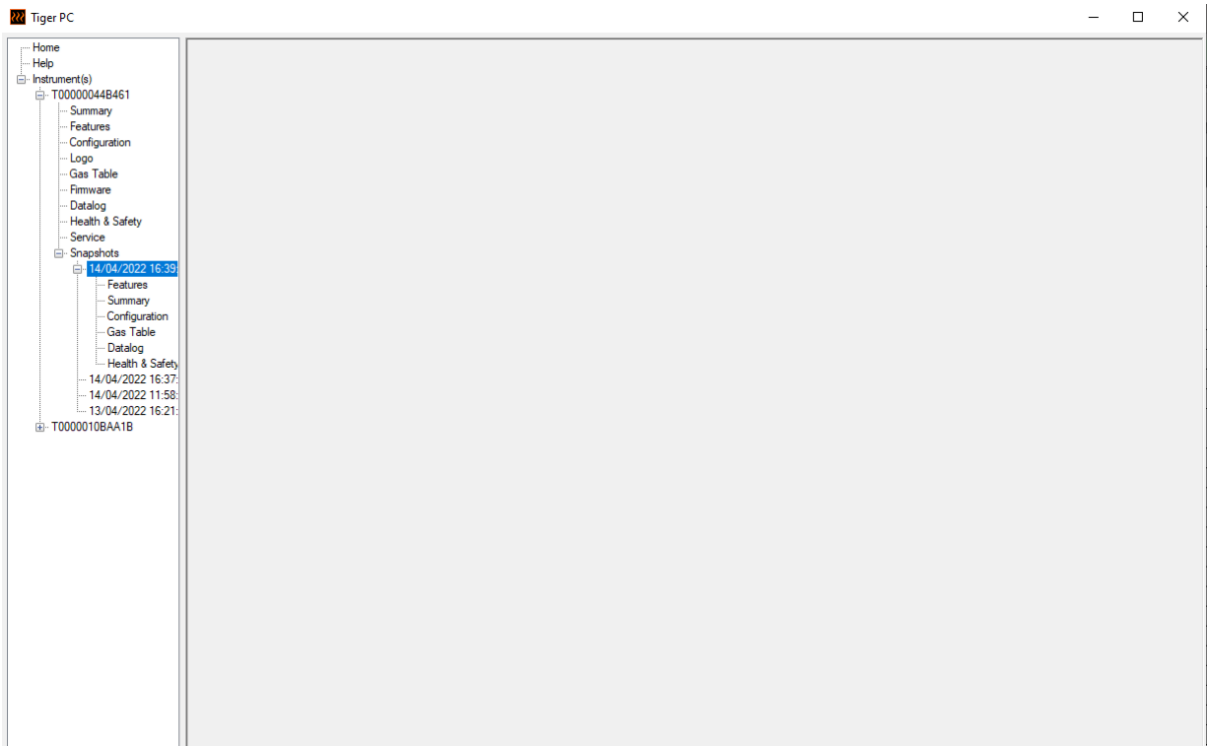
On the restore pop-up that is then displayed:



Click **Yes** to load the snapshot. When the loading is complete, click **Close** and restart your TIGER XTS. Your TIGER XTS will now be restored to the settings and calibration data stored at the time of that snapshot.

The snapshot menu also allows stored data to be reviewed when an instrument is not attached.

Expand the menu until the relevant snapshot is displayed. Double-click on the snapshot. All the data stored in that snapshot can now be viewed.



Click **Delete** to remove a selected snapshot.

7. Calibration

ION Science recommends that personnel responsible for equipment use institute a regime of regular checks to ensure it performs within calibration limits, and that a record be maintained which logs calibration check data.

PID Calibration

TIGER XTS offers the following PID calibration options:

- **PID Factory Calibration** is set by ION Science Ltd during instrument manufacture or on re-calibration by an ION Science authorized service center, for example during an annual service. 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. Please contact ION Science Ltd or your local distributor for further information.

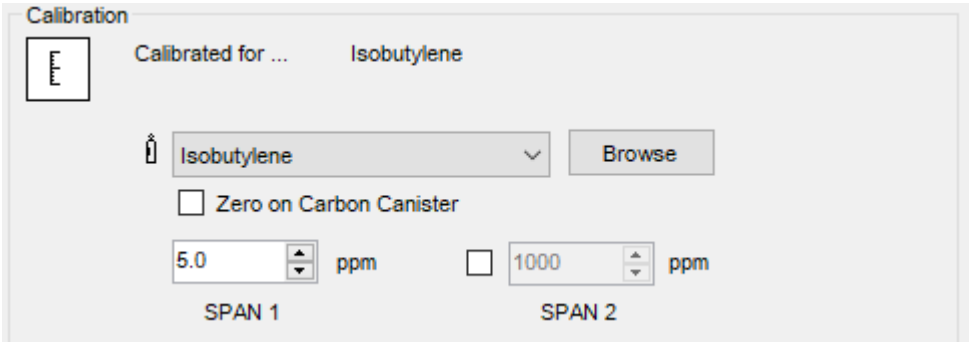
  ION Science Ltd recommends annual servicing and calibrations for users who require traceable calibration records. During this service, the Lamp and MiniPID 2 Sensor are brought back to factory specifications and new Factory Calibration data is loaded.

- **PID Custom Calibration** is performed by the instrument user and should be carried out as part of regular instrument maintenance. Before doing so, first set up the calibration parameters in Tiger PC.

  TIGER XTS scales its linear output across a Zero level (clean air reference) and the SPAN 1 user-defined gas concentration. However, due to the linear output of the ION Science MiniPID 2 Sensor, a two-point calibration is often adequate. For more exacting requirements, TIGER XTS therefore offers a three-point calibration which uses an additional SPAN 2 higher gas concentration.

PID Custom Calibration

Before proceeding, ensure the calibration parameters are set in Tiger PC:



TIGER XTS allows you to custom calibrate using any gas from the Gas Table at any concentration from 10ppm. You will need a cylinder of the gas at the chosen concentrations.

Have the cylinder(s) of gas, regulator(s), and the Carbon Filter Assembly 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 XTS. If flow regulators are to be used

then a 0.3L/min is recommended, a flow adaptor should be used to avoid over-pressurizing the instrument (sold separately). Please ensure you are familiar with the entire calibration procedure before attempting to calibrate your TIGER XTS.

The calibration of your TIGER XTS 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.

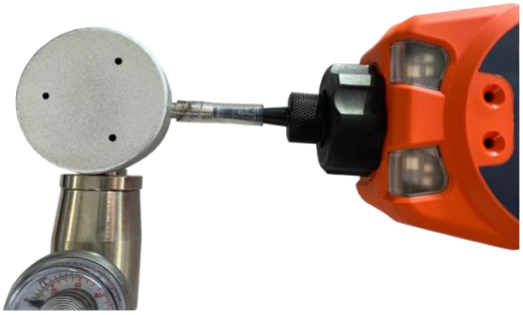
PID Custom Calibration Procedure

1. From the main running screen, select the 'CAL' icon on key **B**. CAL
2. Highlight the PID option and press 'OK'.
3. Select the 'Custom Calibration' icon.
4. **Zero calibration** ZERO: Attach the Carbon Filter Assembly (if using) and select 'OK' to commence Zero calibration sequence. The display will countdown 30 seconds. Once complete, select 'OK' to proceed. Disconnect the Carbon Filter Assembly and replace the cap ends.



The useful life of the Carbon Filter Assembly will be shortened if it is open to atmosphere for prolonged periods.

5. **SPAN 1 calibration** SPAN 1 : Press **Enter**. The gas and concentration for SPAN 1 (previously set up in Tiger PC) are displayed along with a 30 second countdown. Attach the SPAN 1 gas using the supplied Calibration Adaptor and press **Enter** to start the SPAN 1 countdown.



6. At the end of the countdown a tick '✓' will appear, indicating that the SPAN 1 has been accepted. Press **Enter**. For a two-point calibration, the calibration procedure is complete.

7. **SPAN 2 calibration** SPAN 2 : For a three-point calibration, the gas and concentration for SPAN 2 are displayed (previously set up in Tiger PC) along with a 30 second countdown. Attach the SPAN 2 gas and press Enter to start the SPAN 2 countdown.

   To skip SPAN 2, press **Esc** and then 'skip' to complete a SPAN 1 only calibration and return to the main running screen.

8. At the end of the count down a tick '✓' will appear, indicating that the SPAN 2 has been accepted. Press **Enter** again to complete the calibration procedure.

8. Maintenance



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.



Do not use abrasive or chemical detergents to clean the instrument as this may reduce the antistatic properties of the materials used, clean it using a damp cloth only.

Batteries

Battery Packs

Two types of battery packs are available for use with the TIGER XTS instrument, a lithium-ion Rechargeable Battery Pack and non-rechargeable AA Battery Pack (to be fitted with 3 AA Alkaline batteries).

The rechargeable pack is recommended for normal operation. The AA Battery Pack should only be used when power for the rechargeable pack is unavailable. The Rechargeable Battery Pack is normally fitted as standard to the instrument when shipped.

Recharging Batteries



BATTERY CHARGING: CHARGE THE TIGER XTS AND ITS LITHIUM-ION BATTERY PACKS IN A NON-HAZARDOUS ENVIRONMENT ONLY.



Battery Connection: Ensure all electrical connections are clean and undamaged before connection. The TIGER XTS instrument's ingress protection rating is reduced to IP20 when its Battery Pack is removed so avoid changing batteries in dusty or wet environments.



Lithium-Ion Batteries can be damaged if left in a discharged state. Please recharge if battery indicator is showing empty. Please note also that if the instrument is left for one year unused, it needs to be charged fully before it can continue to be kept in storage. Please repeat annually.

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

To charge your TIGER XTS, connect the Charge Cradle to the mains. Place the TIGER XTS in the Charge Cradle so that the contacts on the TIGER XTS are aligned with those in the cradle.

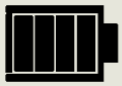


LED Color	Meaning
RED	Power connected, not charging.
AMBER	Instrument charging.
GREEN	Instrument fully charged.

The battery icon on the TIGER XTS will display the level of charge:



Battery empty
When the battery is nearly empty, the icon will flash for one minute before the instrument shuts down.



Battery fully charged

Only use the Charge Cradle supplied with your TIGER XTS.

ION Science Ltd recommends keeping your TIGER XTS on charge at all times when not in use, as batteries can lose power over time.

The lithium-ion battery pack can be charged separately from the Tiger XTS instrument. To charge your lithium-ion battery pack, connect the Charge Cradle to the mains. A red light on the charger indicates that it is ready. Place the TIGER XTS in the Charge Cradle so that the contacts on the lithium-ion battery pack are aligned with those in the cradle. To hold the lithium-ion battery in place, use the battery lid catch pn/912255 and connect to the top of the charge cradle.

Turn the battery lid catch and secure lithium-ion battery to charge cradle.



Taking off the Rechargeable Battery Packs

Battery Use: Use supplied battery packs only on the TIGER XTS.

1. Ensure TIGER XTS is switched Off.
2. Press the release button at the rear of the instrument and lift the Rechargeable Battery Pack away from the Instrument Body.
3. Take your new rechargeable battery pack and push it back into the instrument body.
4. Charge the TIGER XTS for 7 hours before use.



Replacement of Non-rechargeable Batteries

BATTERY REPLACEMENT: NEVER REPLACE PRIMARY ALKALINE BATTERY CELLS WHILE IN A POTENTIALLY EXPLOSIVE OR HAZARDOUS LOCATION. USE ONLY INDUSTRIAL BY DURACELL ID1500 BATTERIES.

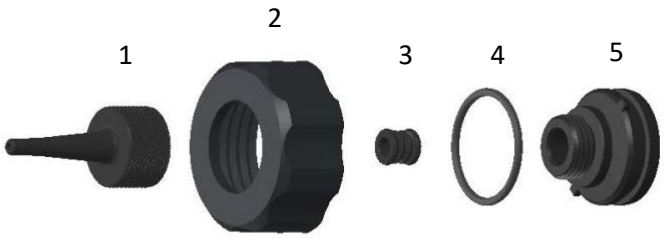
Fitting batteries or connecting the Battery Pack with the wrong polarity may result in damage to the instrument.

WEEE REGULATIONS

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

Inlet Probe Assembly

All parts of the probe assembly can be replaced if they become damaged or contaminated with use.



1 Probe – Tiger (880207)

2 Filter Housing Cap (912221)

3 Probe Seal (880202)

4 O-ring (5/OV-02)

5 Filter Clamp (912220)

PTFE Filter Disc

It is essential that the TIGER XTS is always used with a supplied 0.5 micron PTFE Filter Disc fitted to the front of the instrument. Without the filter, particles of debris and dust can be drawn into the MiniPID 2 Sensor 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. PTFE Filter Discs are available from your distributor or at http://ionscience.com.

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

To change the PTFE Filter Disc (see the Inlet Probe Assembly):

1. Unscrew the Filter Housing Cap and lift off the Filter Clamp and O-ring.
2. Lift the PTFE Filter Disc from the Instrument Body. Carefully place a new PTFE Filter Disc into the Instrument Body.

   Under no circumstances should a PTFE Filter Disc be used once it has been removed.
3. Replace the Filter Clamp, ensuring that the O-ring is correctly seated.
4. Replace the Filter Housing Cap. Do not over-tighten.

Probe Seal

The Probe Seal (see the Inlet Probe Assembly) should be inspected and replaced when required.

Cleaning your Instrument

To clean your Tiger XTS instrument, use a damp cloth or wipe.

Water Ingress

If the instrument has been immersed or splashed with water, take the PID 2 Sensor out to dry (see below) and replace the PTFE Filter Disc as described previously.

Lamp Cleaning and Electrode Stack Replacement



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

When to Clean or Replace the Lamp

The TIGER XTS MiniPID uses an ultraviolet light source ionizing VOC gases as they pass across the Lamp window. This process may result in a fine layer of contamination on the detector window that must be removed on a regular basis.

- In normal use the Lamp should be cleaned after every 100 hours (based on 30 ppm for 100 hours). If the Tiger XTS is used in heavily gas contaminated environments, the Lamp should be cleaned more often.
- 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.
- Damaged Lamps must be replaced immediately. Do not use a Tiger XTS with a damaged Lamp.

When to Replace the Electrode Stack

When using your Tiger XTS in conditions of high ambient humidity, it may show unexpected and increasing readings. This is due to dust or other small particles within the detector becoming hydrated which causes these particles to conduct a signal between the electrodes.

The problem can be resolved by replacing the electrode stack.

Removing and refitting the sensor cover

To remove the sensor, cover from the instrument body, unscrew the bottom left screw using a 3mm A/F allen key. The screw will stay retained in the sensor cover when fully loosened.

Use 3mm A/F allen key to loosen the screw



Once the screw is loose, gently pull the right side of the sensor cover from the instrument body until you feel that the sensor cover has unengaged from the inlet/outlet ports. Once it is unengaged, gently pull the entire sensor cover from the instrument body.



Gently pull the right side of the sensor cover from the instrument body



Inlet/outlet ports

To refit the sensor cover to the instrument body, line up the sensor cover with the back of the instrument ensuring it is align with the inlet/outlet ports. Gently push the right side of the sensor cover and the instrument body together until you hear and feel it is engaged.



Once you hear it has engaged, push the rest of the sensor cover to the instrument body and screw the bottom left hand screw into place using the 3mm A/F allen key.



Removing the MiniPID 2 Sensor

Protect the MiniPID 2 Sensor from exposure to silicone vapors as this may foul the windows of the Lamps and reduce response to some gases. This can usually be remedied by polishing the Lamp window with alumina powder.

Do not remove the MiniPID 2 Sensor Cover in the hazardous area.

Before Lamp cleaning or replacement, the the MiniPID 2 Sensor must be removed.

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

On the Sensor Cover loosen the bottom left screw using a suitable allen key.
Carefully lift the MiniPID 2 Sensor from the Instrument Body.





Using the Mini PID Electrode Stack Removal Tool provided, locate its 'prongs' in the slots in the side of the Mini PID 2 Sensor body:

Using the forefinger to restrain the white Electrode Stack (the internal parts of the MiniPID 2 Sensor are spring-loaded), squeeze the Removal Tool to release the Electrode Stack.

At this point the MiniPID Electrode Stack can be replaced.

Lamp Removal and Examination



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

Following removal of the Electrode Stack as described previously, the Lamp may now be removed.

Carefully remove the Lamp:

- If the Lamp is held in the Electrode Stack, carefully pull it out of the O-ring around the well in the underside of the Electrode Stack.
- If the Lamp is sitting in the sensor body - the Lamp can be gripped and lifted out or the sensor body can be inverted and the Lamp tipped out.

Inspection of the Lamp may reveal a layer of contamination on the detection window. This appears as a 'blue hue.' To check for this, hold the Lamp in front of a light source and look across the window surface at an angle.

If necessary, clean the Lamp.

Lamp Cleaning

Clean the window using the PID Lamp Cleaning Kit supplied.



THE LAMP CLEANING COMPOUND CONTAINS ALUMINIUM OXIDE AS A VERY FINE POWER. THIS MAY CAUSE IRRITATION OF RESPIRATORY TRACT AND EYES. (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.

Handling:

- Do not breathe vapor/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:

- Always replace the lid after using the cleaning compound.
- Keep container closed to prevent water adsorption and contamination.

Note: Alumina polishing of MiniPID 2 lamps is appropriate for all MiniPID 2 lamps except the MiniPID 2 11.7 eV lamp. Instead, please use anhydrous ethanol or methanol (please refer to the MiniPID 2 manual for guidance or contact sensors@ionscience.com for further support).

The cleaning procedure is as follows:

1. Open the vial of Aluminum Oxide polishing compound. With a clean cotton bud collect a small amount of compound.
2. Use this cotton bud to polish the Lamp detection window. Use a circular action applying light pressure to clean the detection window. Never touch the detection 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 a short blast of air from the can of clean, dry, oil free air.
5. Refit the Lamp into the Electrode Stack as described previously.

Replacing a Lamp

Never refit a damaged Lamp.

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

Following removal of the Electrode Stack as described previously, the Lamp may be replaced.

Carefully remove the Lamp:

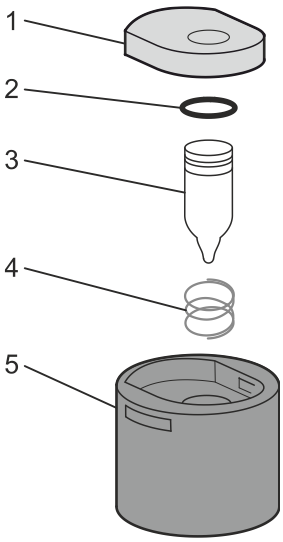
- If the Lamp is held in the Electrode Stack, carefully pull it out of the O-ring around the well in the underside of the Electrode Stack.
- If the Lamp is sitting in the sensor body - the Lamp can be gripped and lifted out or the sensor body can be inverted and the Lamp tipped out.

Discard the removed (old) Lamp.

At this point the MiniPID Electrode Stack can be replaced.

Replacing the MiniPID Electrode Stack

At this point the MiniPID Electrode Stack can be replaced.



1 Electrode Stack
2 O-ring
3 Lamp
4 Spring
5 Sensor Body

Discard the removed (old) Electrode Stack, carefully removing the Lamp if still attached.

Visually check the condition of the Lamp detection window (the upper flat surface of the Lamp). If this needs cleaning proceed as detailed later.

Place the Electrode Stack onto a clean, flat surface, flat surface downwards. Carefully twist the detection window end of the Lamp into the O-ring around the well in the underside of the Electrode Stack. The Lamp window should now sit flush within the Electrode Stack.

This procedure ensures that the Lamp is firmly held in the Electrode Stack with the detection window level with the electrodes for consistent and reliable VOC readings. Lamp placement by any other means is likely to give unreliable readings because the O-ring in the Electrode Stack becomes trapped between the window face and the Electrode Stack.

Carefully align the MiniPID 2 Sensor body over the Electrode Stack plus Lamp. Push the sensor body down to secure the assembly - two clicks should be heard.

Carefully align/push the new MiniPID 2 Sensor into the Instrument Body.

Then ensuring, the PTFE Filter Disc and O-ring are correctly positioned, screw the Sensor Cover back onto the Instrument Body. Do not over-tighten.

The instrument MUST now be re-calibrated.

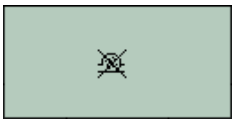
9. Troubleshooting

Diagnostics

Basic faults or diagnostics are presented as symbols. Most faults can be corrected by pressing **Enter** or **Esc** to clear the fault message. All fault conditions cause the TIGER XTS to alarm.

Pump failure

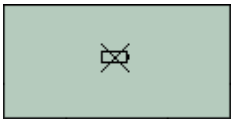
Pump blocked or pump failure



The flow of gas through the instrument has fallen below 50cc/minute. Check the Probe and PTFE Filter Disc for signs of blockage. Water or dirt in the Probe, a bent Probe, dirty PTFE Filter Disc 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

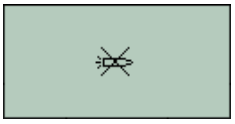
Battery low or battery failure



The TIGER XTS 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 XTS off and on. If this fault persists, then the electrode stack or lamp should be replaced. (See the PID Sensor/Lamp Replacement and Cleaning section).

Memory full

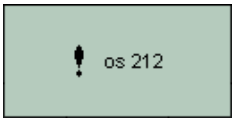
Memory cannot receive more data



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, but the TIGER XTS will no longer continue to log data. Select 'recycle' in Tiger PC and the TIGER XTS will overwrite the oldest data and no alarm will be raised or delete datalogs from instrument via Tiger PC.

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 authorized service center.

Technical Specifications

Minimum Resolution (ppm)	Standard running mode: 0.1 ppm TAC mode: 0.01 ppm Tube mode: 0.01 ppm (res. 0.001 ppm)
Minimum Resolution (ppb)	Standard running mode: 0.001 ppm TAC mode: 0.001 ppm Tube mode: 0.01 ppm (res. 0.001 ppm)
Maximum Reading	Standard running mode: up to 20,000 ppm or 20,000 mg/m^3 (gas dependent) Tube mode: 200 ppm or 639 mg/m^3 benzene
Response Time	130 seconds at 20 °C (variable) Progressive indication of benzene breakthrough is displayed in real time
Intrinsically Safe Approvals	• Ex II 1G Ex ia IIC T4 Ga • Tamb = -25 °C ≤Ta ≤+45 °C (with Lithium-ion Battery Pack) • Tamb = -25 °C ≤Ta ≤+40 °C (with Alkaline Battery Pack) • IECEx ITS 22.0025X ITS-I22ATEX35111X • ITS22UKEX0635X • 3193491 conforms to UL Std. 913, 61010-1 & Certified to CAN/CSA Std. C22.2 No. 61010-1
Accuracy	+/- 10 % display reading +/- one digital benzene
Linearity	+/- 5 % display reading +/- one digital
Battery Life	Li-ion: Typically up to 24 hours Typical charge time of 8 hours Alkaline 3 x AA: Typically, 8.5 hours life
Lamps	10.0 eV Krypton PID lamp
Data Logging	>120,000 data log points including date and time stamp
Alarms	Flashing LEDs's amber (low alarm) red (high alarm) Sounder 95 dBA at 300 mm (12") Vibration on alarm Pre-programmed TWA and STEL
Flow Rate	≥ 220 ml/min
Humidity	0-99% RH (non-condensing)

Protection	Designed to IP65 EMC tested to EN61326-1:2013 & EN50270:2015 & CFR 47:2008 Class A
Weight & Dimensions	**Instrument Weight:** 870g **Instrument Dimensions:** 370 mm (H) x 91 mm (W) x 60 mm (D)
Communication	Direct USB 1.1
Calibration	2 and 3 point calibration (via calibration kit accessory)

Warranty

Standard Warranty can be extended to up to 5 years on the TIGER XTS when registering your instrument via our website: ION Science Website.

To receive your Extended Warranty, you need to register within one month of purchase (Terms and Conditions apply). 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

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