Portables-Pro
User Manual

Portables-Pro
Quick and simple in-field gas test and calibration solution

Click here for navigation instructions

Click here for functions list

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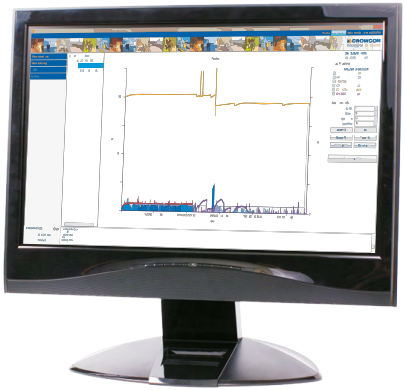

BE SAFE POSITIVE
+ve Safety™

M070008
Issue 3 Jan 2015

CROWCON
Detecting Gas Saving Lives

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NAVIGATION INSTRUCTIONS

The symbols in the left-hand margin of each page of the manual will enable you to carry out the following functions:

The buttons below do not function. They are for illustrative purposes only.

Contents Click on this button to display the Contents page.

Click on this button to display the previous page.

Click on this button to display the next page.

Click on this button to display the previous view (use it to return from a reference jump).

Click on this button to display next view (use it to return to a reference jump).

Click this button to print some or all of the document (specific pages can be chosen).

Exit Click this button to exit the user guide.

Press the Esc key to display normal Acrobat© Controls.

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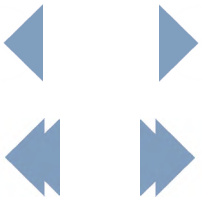


Prologue

General

Portables-Pro allows full configuration and control of your gas detector, and will provide the following functions:

- Configuration of Instruments
- Calibration of Instruments
- Information Management

The level of access will depend on the license issued to the user. There are 4 levels of access available:

- Standard user
- Calibration Technician
- Fleet Manager
- Service user

This manual contains a description of all the available functions. A user's license level will determine the functions that can be accessed.

The table on *page 71* indicates orange for the functions available for each license level.

1. Set-up

1.1 System requirements

The following are the minimum system requirements that will enable Portables-Pro to run efficiently:

- **Processor** Pentium 4 or equivalent
- **Processor speed** 2.2 GHz
- **Bus Speed** 400 mHz
- **Memory size** 1Gb
- **Hard Drive** 40 Gb
- **CD Rom** 48x (CD)
- **Monitor** 15 inch
- **Resolution** 1024 x 768 minimum
- **Operating system** Windows XP SP3 or later
- **USB port** 2
- **Mouse & Keyboard** Yes

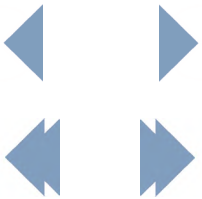
1.2 Software installation

Ensure all previous versions of the software have been uninstalled before proceeding with the software installation.

▶ Insert the CD supplied into your PC's CD drive.

▶ If your PC is set not to allow AutoPlay of CDs, select **Run Autorun.exe** from the dialogue box shown below.

Figure 1: AutoPlay dialogue box



▶ The Portables-Pro installation screen will be displayed as shown below:

Figure 2: Portables-Pro installation screen

▶ Click on Install Portables-Pro.

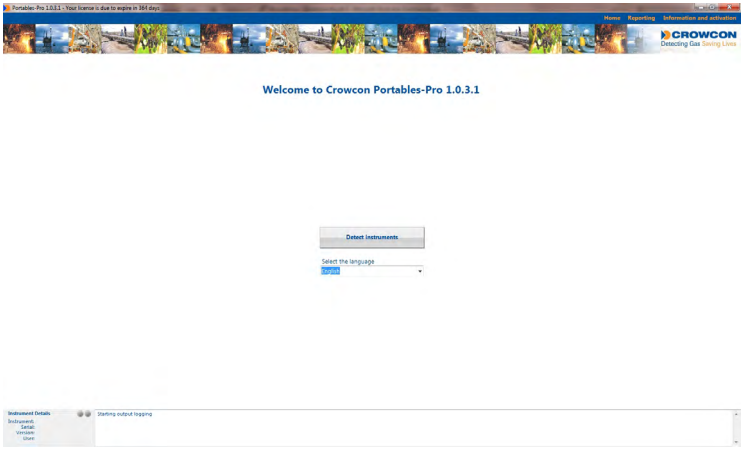
▶ Follow the on-screen instructions (including the validation of any operating system notifications) until the software is fully installed.

▶ If required, select the appropriate user guide from the installation screen and then close the screen.

2. Starting the software

Double click on the Portables-Pro icon on your PC's desktop. The Home screen will be displayed (see below).

Figure 3: Home screen



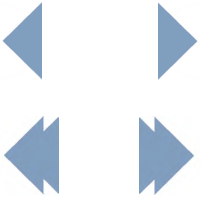
2.1 Home screen options

The following options are available from the Home screen without a detector being connected to the PC:

- Detect instruments (see *page 12*)
- Reporting (see *page 55*)
- Information and activation (see *page 62*)
- Language selection (see below)

2.1.1 Language selection

If necessary, select your preferred language from the **Select the language** drop down list at the base of the screen.

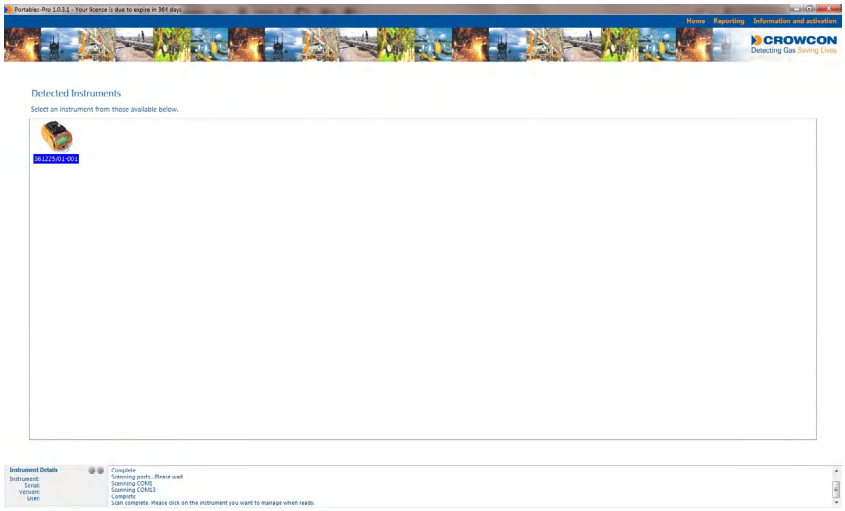


3. Detect instruments

To use Portables-Pro to configure or calibrate a detector, or view the data currently stored on it, proceed as follows:

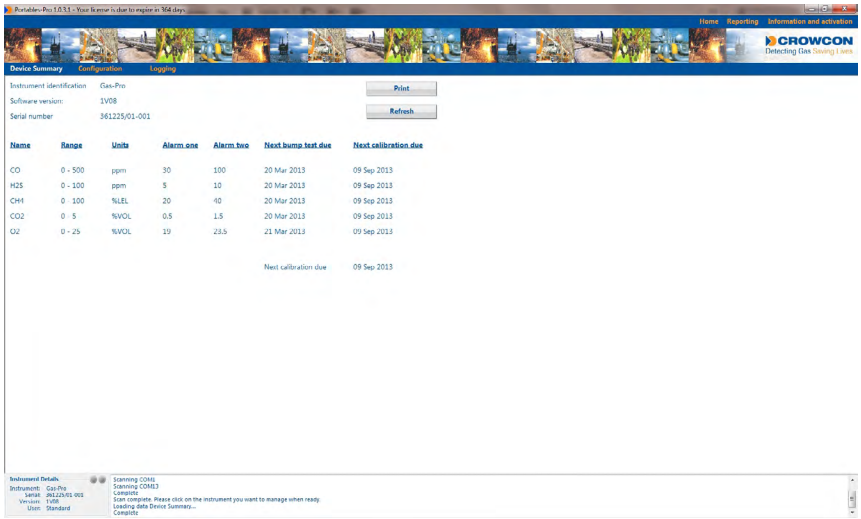
- With Portables-Pro started and on the Home page, connect the detector to the PC via a USB port
- Turn the detector on and wait for the start up processes to finish.
- Click the **Detect instruments** button on the Home page. When the scan is complete, an image of the detector (in this example a Gas-Pro) will be shown with the unit's serial number underneath (see below).

Figure 4: Scan complete screen



▶ Click on the image of the instrument you wish to manage. After the detector's data has been read, a Device summary will be displayed (see below for an example).

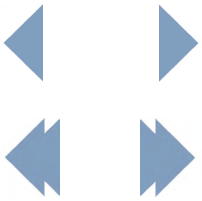
Figure 5: Device summary screen



Once on this screen, a series of options will appear below the banner. These options are:

- Device Summary (see *page 54*)
- Configuration (see *page 14*)
- Calibration (see *page 37*)
- Logging (see *page 50*)

For more information, see the relevant section in the manual for each of these options.

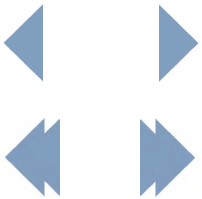


4. Configuration

The Configuration menu contains the following options:

- Instrument settings (see *page 15*)
- Sensors (see *page 20*)
- +ve Safety™ (see *page 27*)
- Instrument customisation (see *page 29*)
- User configuration (see *page 31*)
- Language options (see *page 32)*
- Set instrument time and date from PC (see *page 33*)
- Fleet Management (see *page 34*)
- Instrument Upgrade (see *page 35*)

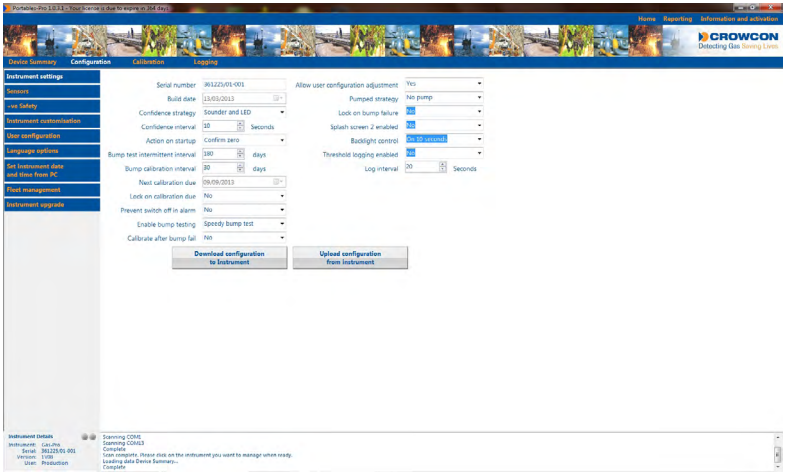
Select the required option from the menu.



4.1 Instrument settings

When **Instrument settings** is selected from the Configuration menu, the screen shown below will be displayed:

Figure 6: Instrument settings screen



The Instrument settings function enables the user to view and/or alter the following settings:

To ensure the screen is displaying the current settings of the detector being managed, click on the Upload configuration button. The screen above will then be displayed.

When all the required alterations have been made using this screen, click on the Download configuration button to write the changes to the detector being managed.

4.1.1 Serial number

This field contains the detector's serial number and must only be altered if a the detector's main PCB has been replaced.

4.1.2 Build date

This field indicates the build date of the detector's software. It should only be altered when there has been a software update.

4.1.3 Confidence strategy

The Confidence strategy is how the detector indicates to the user that it is functioning normally. The following settings are possible:

Off	No indications
Sounder only	The detector just beeps at preset intervals (see *4.1.4 Confidence interval* to set this interval).
LED only	The confidence LEDs flash at preset intervals (see *4.1.4 Confidence interval* to set this interval).
Sounder and LED	The detector beeps and the confidence LEDs flash at preset intervals (see *4.1.4 Confidence interval* to set this interval).

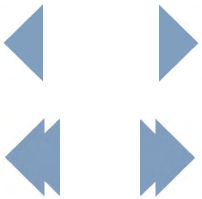
4.1.4 Confidence interval

This field sets the time interval in seconds for the Confidence strategy indications (minimum interval 5 seconds, maximum 60 seconds). Either edit the value in the field or click on the up and down arrows to increase or decrease the value as required.

4.1.5 Action on startup

This field allows the following ‘Clean air’ actions during startup to be set:

No action	No ‘Clean air’ zero at startup.
Confirm zero	This setting allows the ‘Clean air’ zero to be carried out at the user’s discretion.
Always zero	This setting means a ‘Clean air’ zero will always be carried out at startup.



4.1.6 Bump test intermittent interval

Channels may be assigned a bump test category (None, Daily, Intermittent). Channels with the 'Intermittent' category will need to be bump tested at the interval set in this option.

4.1.7 Bump calibration interval

If a bump test should fail on a channel, the detector may be set to perform a 'follow-on calibration' (see *page 23*). If this follow-on calibration is successful, the calibration due date on the channel will be incremented by the **Bump Calibration interval**.

4.1.8 Next calibration due

This field is read-only. It shows the date on which the instrument is next due a calibration. As different channels may be due calibration on different dates, this date is the earliest of all calibration due dates. After passing this date, the instrument will display calibration due warnings on its display.

4.1.9 Lock on calibration due

Use this field to prevent further use of the detector (i.e. lock it) when the calibration interval has been exceeded. Yes to Lock, No to allow the detector to still be used.

4.1.10 Prevent switch off in alarm

Set this field to Yes to prevent the detector being turned off when it is in the alarm state.

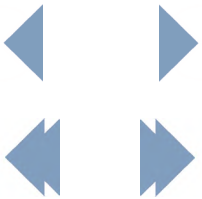
4.1.11 Enable bump testing

Channels may be configured individually for bump testing, however this option is a global 'on/off' switch for bump testing. If this option is set to either 'smart' or 'speedy', then all channels whose individual setting is set to 'yes' (see *page 20*) will be tested. If this option is set to 'None', then no channels will be bump tested regardless of their individual settings.

For more information on bump testing, and the difference between a 'Smart Bump' and a 'Speedy Bump', see the Gas Pro Manual, section "Gas testing and calibration".

None	This option will disable Bump testing on the detector
Speedy Bump test	This option will cause the detector to carry out a Speedy Bump when a Bump test is initiated.
Smart Bump test	This option will cause the detector to carry out a Smart Bump when a Bump test is initiated.

Note: Smart bump functionality is not available for the PID sensor. If Gas-Pro is configured for smart bump then only a speedy bump will be performed on the PID sensor.



4.1.12 Calibrate after bump fail

Set this field to **Yes** in order to force the detector to perform a calibration when a Bump test fails.

4.1.13 Allow user configuration

There are a limited number of options (active user, volume etc.) that may be modified directly on the detector by the user. This ability can be enabled or disabled using the **Allow user configuration** option.

4.1.14 Pumped strategy

This field enables the detector to set as a pumped or non-pumped unit.

This setting should only be modified if a pump has been added or removed from a detector.

4.1.15 Lock on bump failure

Use this field to prevent further use of the detector (i.e. lock it) when the detector has failed a Bump test. Yes to Lock, No to allow the detector to still be used.

4.1.16 Splash screen 2 enabled

Set this field to Yes to enable splash screen 2 to be displayed during the start up process.

To modify the splash screen 2 image and text, see *page 30*.

4.1.17 Backlight control

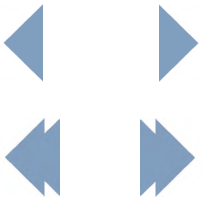
Use this field to change the detector's backlight to one of the following settings:

- Always off
- On for 10 seconds
- On for 30 seconds
- Always on

4.1.18 Threshold logging

Set this field to Yes if the detector is to ignore levels of gas in the log if they are beneath a set threshold limit.

Threshold limits can be set individually for each channel. For more information see **Sensors** on *page 20*.



4.1.19 Log interval

Use this field to set the time interval in seconds between log readings.

The detector will record in the log the highest gas reading each channel has reported during the interval.

4.1.20 Upload configuration from instrument

Click this button to upload the detector's configuration settings to the PC.

4.1.21 Download configuration to instrument

Click this button to download the PC's configuration settings to the detector.

4.2 Sensors

All changes to sensors are performed on this page.

Amongst other features this page provides the ability to:

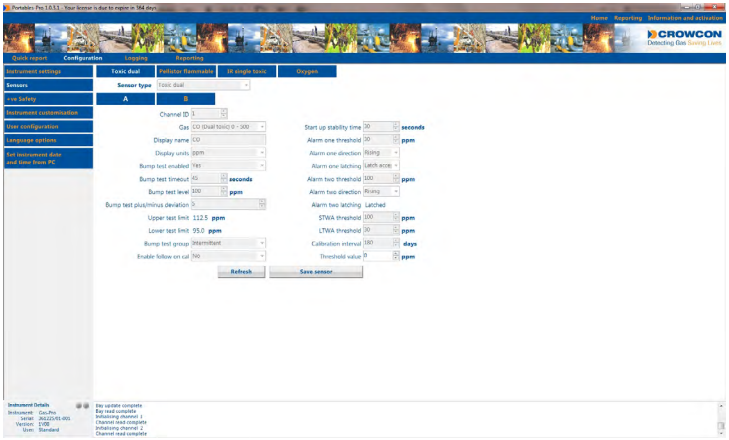
- Change alarm levels per sensor
- Change bump test parameters
- Change sensor display name and/or units
- Reconfigure detector to a new sensor type

When physically replacing a sensor type in a detector, the sensor settings will need to be updated with the new sensor type and alarm levels in order to reconfigure the detector to match the required sensor type.

When values are modified, the software will highlight them in yellow to express that they are yet to be written to the detector. When a **Save** is performed, the highlight will be removed.

When **Sensors** is selected from the Configuration menu, the screen below will be displayed:

Figure 7: Sensors screen

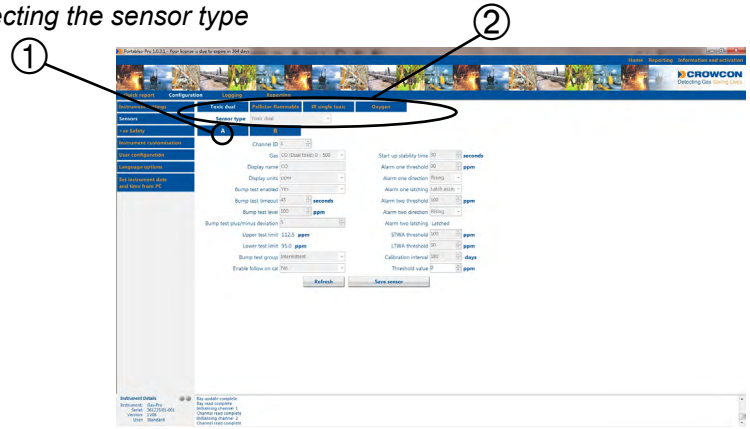


The Sensors function enables the current types and settings for the sensors installed in the detector's bays to be viewed and/or altered as follows:

4.2.1 Sensor type

This field displays the sensor type currently installed in the bay highlighted ①.

Figure 8: Selecting the sensor type



The settings available in the drop down list are dependant upon:

- The hardware board variant fitted in your detector.
- The sensor bay number.

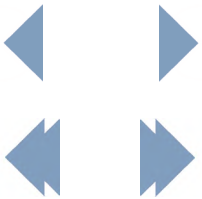
There are different hardware boards which allow different sensors in certain bays, and certain bays only accept certain sensor types. Refer to the Gas-Pro Service Manual section ‘sensor replacement’ for further details on hardware variants and applicable sensor types.

If a sensor is to be changed for a different type, for example changing a Toxic Dual to a Toxic, the drop down box ② will have to be altered. Dependant upon the hardware variant and the bay number the possible settings are:

- No sensor
- Toxic single
- Toxic dual
- Oxygen
- Pellistor flammable
- IR single toxic
- IR
- Photoionization Detector (PID)

The Toxic Dual sensor type allows two channels to be configured. These will appear as two extra buttons below the sensor type box – channel ‘A’ and channel ‘B’.

These channels cannot be configured with a single ‘save’ action, and instead must be saved one after the other.



4.2.2 Channel ID

This field contains a value representing the position the channel appears on the instrument display and should remain fixed. If the channel ID is zero then it will not appear on the screen, and will need to be set to the relevant value.

If a sensor has been added to a sensor bay that previously had no sensor fitted, it will be necessary to assign a new channel ID. Enter a channel ID between 1 and 5 that is not being used by another sensor type within the detector.

4.2.3 Gas

This field shows the current gas being monitored. If the sensor type has been changed, select the respective gas type from the drop down list.

When this selection is changed, default values will be loaded for all fields apart from alarm levels which will need to be specified.

4.2.4 Display name

If necessary, key in an appropriate identifier for the gas type being monitored.

This is the text string which will appear on the screen of the detector to identify the channel.

4.2.5 Display units

Use this field to select the display units for the gas being monitored. The options are:

- PPM
- %VOL
- %LEL

4.2.6 Bump test enabled

Set this field to Yes if the detector is to be enabled to carry out Bump tests.

The ‘Enable bump testing’ setting on the configuration page functions in conjunction with this value. See *page 17*.

4.2.7 Bump test timeout

Use this field to set the time after which a Bump test will be stopped automatically if the test has not passed within this period.

4.2.8 Bump test level

Use this field to set the level of gas to be applied for the bump test for either speedy bump or smart bump.

The units for this field are set in *Display units* on *page 22*.

4.2.9 Bump test plus/minus deviation

Use this field to set the percentage error allowed from the applied gas level during a smart bump test.

4.2.10 Upper test limit

This is a read only value based on the **Bump test level** and **Bump test plus/minus deviation** settings.

4.2.11 Lower test limit

This is a read only value based on the **Bump test level** and **Bump test plus/minus deviation** settings.

4.2.12 Bump test group

Use this field to set the regularity of Bump tests. The options are:

- None
- Daily
- Intermittent

Setting this option to 'None' will mean the detector never initiates a bump test on the channel.

Setting to 'Daily' will mean the channel will require a daily bump test (put simply, it will have a bump interval of 1 day). The 'Intermittent' setting will require the channel to be bump tested at the interval defined in the settings page (**Bump test intermittent interval**, see *page 17*).

Note: The PID sensor can only be allocated to the 'intermittent' group; 'daily' group is not available for the PID sensor. The PID sensor must also be the only sensor in the intermittent group to ensure the bump test functionality operates correctly.

4.2.13 Enable follow on cal

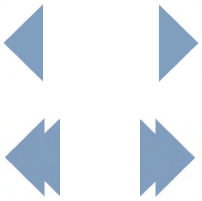
Set this field to **Yes** to start a calibration when a sensor fails a Bump test.

This option works in conjunction with the **Calibrate after bump fail** setting on the Instrument settings page. Both settings will need to be set to **Yes** for a channel to perform this function.

4.2.14 Correction Factor

The PID sensor can be configured to detect Volatile Organic Compounds (VOC) other than Isobutylene by changing the correction factor.

See *Section 4.2.31* on *page 26* for full details on configuring the PID sensor.



4.2.15 Zero with background gas & Background gas level

Only available for CO_2.

This function allows the channel to be zeroed while in the presence of gas, at a level specified in the **Background gas level** field

Use this field to set the amount of ambient gas monitored in the sample.

When performing a zero, it will be assumed that the gas level the detector is zeroing to is the value in this setting.

If zero with background gas is set to **No**, the Background gas level will be assumed to be '0', in relevant units.

The units for this field are set in *Display units* **on** *page 22***.**

4.2.16 Initialise Gain and Bias

When changing gas or sensor types, this checkbox ***MUST*** be checked. It causes the software to transfer gas characterisation data to the detector during a **Save**.

This checkbox should automatically check itself when a different gas type is selected.

4.2.17 Start up stability time

This field indicates the time in seconds for a sensor to stabilise before monitoring starts.

4.2.18 Alarm one threshold

Use this field to set the threshold of gas monitored before an Alarm 1 is triggered.

The units for this field are set in *Display units* **on** *page 22***.**

4.2.19 Alarm one direction

Use this field to set the direction in which monitored gas quantity should be changing in order to trigger the detector into the Alarm 1 state (e.g. Toxic gas = rising).

4.2.20 Alarm one latching

Set this field to Unlatched if the Alarm 1 state will automatically be removed if the monitored gas level returns to normal, or Latched to remain in the Alarm 1 state once triggered.

4.2.21 Alarm two threshold

Use this field to set the threshold of gas monitored before an Alarm 2 is triggered.

The units for this field are set in *Display units* **on** *page 22*.

4.2.22 Alarm two direction

Use this field to set the direction in which monitored gas quantity should be changing in order to trigger the detector into the Alarm 2 state (e.g. Oxygen = falling, Toxic gas = rising).

4.2.23 Alarm two latching

This field is permanently set to the latched state which means once triggered, it will remain in the alarm state.

4.2.24 STWA threshold

Use this field to set the threshold value for the STWA (Short Time Weighted Average) alarm for toxic sensors.

The units for this field are set in *Display units* **on** *page 22*.

4.2.25 LTWA threshold

Use this field to set the threshold value for the LTWA (Long Time Weighted Average) alarm for toxic sensors.

The units for this field are set in *Display units* **on** *page 22*.

4.2.26 Background gas level

Use this field to set the amount of ambient gas monitored in the sample.

The units for this field are set in *Display units* **on** *page 22*.

4.2.27 Threshold value

If the channel's gas reading exceeds this threshold value, data logging will start on all channels. When the reading drops below this threshold value, logging will stop.

Use this feature if you wish to minimise the amount of data that gets stored on the instrument.

4.2.28 Calibration interval

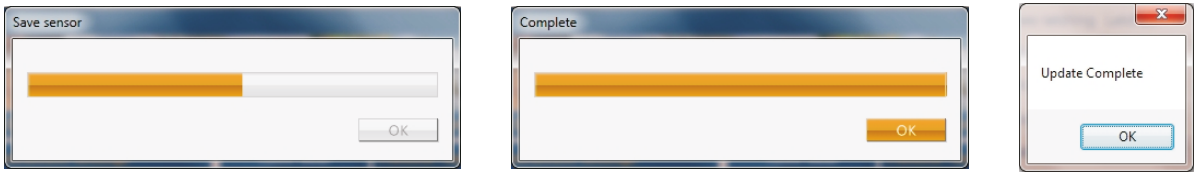
The calibration interval field is the number of days the calibration date will be incremented after a successful gas calibration of the sensor (see *page 41*).

The calibration date of the instrument will be set to today's date PLUS the number of days specified in this field.

4.2.29 Save sensor

- When the required alterations have been made, click the **Save sensor** button to upload the changes to the detector. The **Save sensor** status box will be displayed.
- When complete, click **OK**. The **Update complete** box will then be displayed. Click **OK** (see below).

Figure 9: Save sensor procedure



4.2.30 Refresh

Click the **Refresh** button to download the current sensor settings to this screen.

4.2.31 PID Correction Factor Configuration

PID sensors are configured and calibrated to Isobutylene when manufactured.

The PID sensor can be configured to detect Volatile Organic Compounds (VOC) other than Isobutylene by changing the correction factor in the PID sensor type options.

For a list of VOC correction factors, refer to *Appendix D: PID Correction Factors* on *page 74*.

- Enter the correction factor for the required VOC in the Correction Factor field
- The maximum allowable correction factor is 10.0
- The minimum allowable correction factor is 0.1
- The name of the VOC should then be entered in the Display name field.
- Alarm one threshold, alarm two threshold, STWA threshold & LTWA threshold fields should then be updated as appropriate for the specific VOC.

The PID sensor must ALWAYS be calibrated with Isobutylene even if it is configured to a different VOC type.

If the sensor is not calibrated with Isobutylene the sensor will be incorrectly calibrated and may cause the sensor to display incorrect gas readings.

4.3 +ve Safety™

+ve Safety™ is a feature of the detector which allows quick and easy assessment of a detector to decide whether it has entered an error or warning state, and if all systems are healthy.

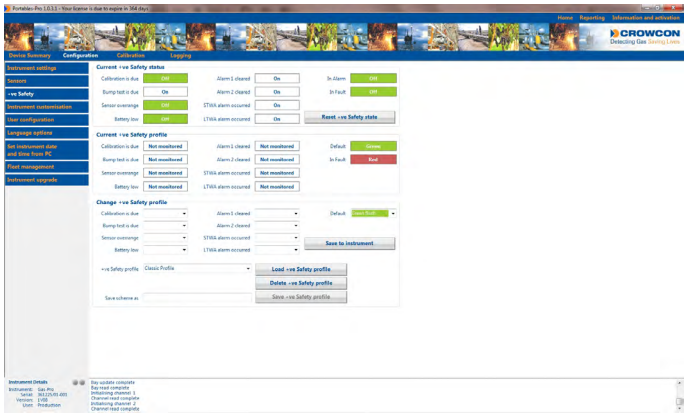
The LED on the front of the detector can illuminate green, yellow or red, and may flash dependant on settings. This behaviour is defined in the following section.

Where an option has been changed to 'Not monitored', the detector will effectively ignore the associated state and will not change +ve safety if the state is entered.

The +ve Safety™ function enables the user to view, edit, create or delete a +ve Safety™ profile as follows:

▶ Select **+ve Safety** from the Configuration menu. The screen below will be displayed:

Figure 10: +ve Safety™ screen

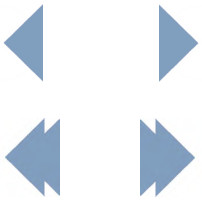


▶ The +ve Safety™ screen is divided into the following 3 areas:

Current +ve Safety™ status This screen area displays the current status of each +ve Safety™ alert within the attached detector. These status levels can be reset to **Off** by clicking on the **Reset +ve Safety™** button.

Current +ve Safety™ profile This screen area displays +ve Safety™ profile for the detector currently being monitored by Portables-Pro. None of the settings can be altered in this screen area.

Change +ve Safety™ profile This screen area enables a +ve Safety™ profile to be viewed, edited, created or deleted as follows:



- Previously saved profiles may be loaded by selecting the profile name from the **+ve Safety profile** drop down list, and the clicking the **Load +ve Safety profile** button.
- If you wish to create a new profile, select the profile with the nearest settings to your requirements from the **+ve Safety™ profile** drop down list, make the necessary changes, key the new profile's name into the **Save scheme** as box and click the **Save +ve Safety profile** button.
- If you wish to delete a previously created profile, simply select it from the **+ve Safety profile** drop down list, and click the **Delete +ve Safety profile** button.

You cannot delete the Crowcon supplied default profiles.

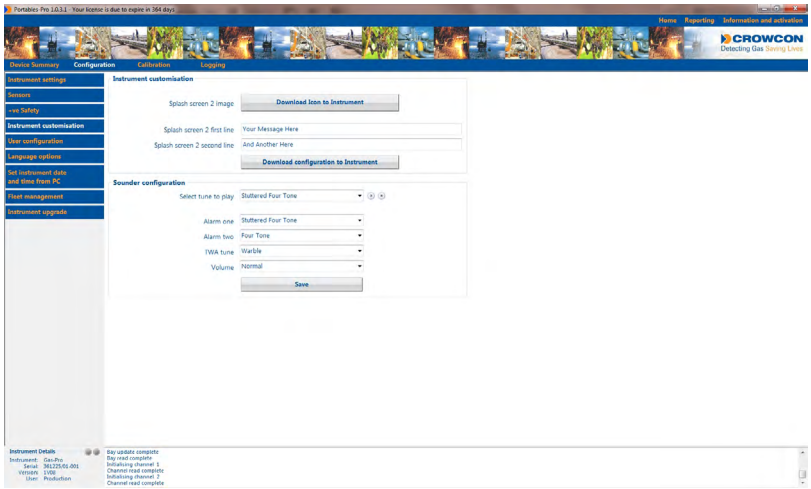
The 'default' option is the state the LED should be in when no other states have been triggered.

- With the exception of the **Default** field, the drop down lists for the configurable fields that control the illumination of the +ve Safety LED can be set as follows:
  - Not monitored (no action undertaken on this event)
  - Green (when condition met)
  - Red (when condition met)
  - Amber (when condition met)
  - Off (when condition met)
- The **Default** field can be set to one of the following which controls the illumination condition when the +ve Safety LED would be illuminated green:
  - Green flash
  - Off
  - Green
- When all the alterations have been made, click the **Save to instrument** button, this will download the chosen +ve Safety Profile to the detector.

4.4 Instrument customisation

When **Instrument customisation** is selected from the Configuration menu, the screen below will be displayed.

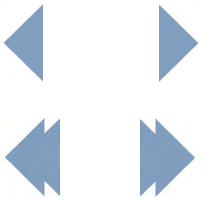
Figure 11: Instrument customisation screen



This function enables the following to be altered:

- Splash screen 2 (see *page 30*)
- Sounder configuration (see *page 30*)

When all the required alterations have been made to the splash screens and sounder, click the Save button.



4.4.1 Splash screens

During the start up process, a detector can display 1 or 2 splash screens (according to its configuration) but only splash screen 2 can be altered. To set up splash screen 2, proceed as follows:

- Click the **Download icon to instrument** button and browse to the location of the required Crowcon splash image file (.csi).

  Select this image and click **OK**. The image will then be loaded to the instrument.

- Alter the text for the splash screen's first and second line as required.

If the text entered is greater than 12 characters, the message will scroll across the screen when the detector is displaying it at start up.

- When all the required alterations to the splash screen 2 have been made, click the **Download configuration to instrument** button.

The 'enable splash 2' setting on the instrument settings page (see *page 18*) will need to be set to 'yes' in order for these options to be seen on the instrument.

4.4.2 Sounder configuration

This function enables the alarm sound and volume to be altered as follows:

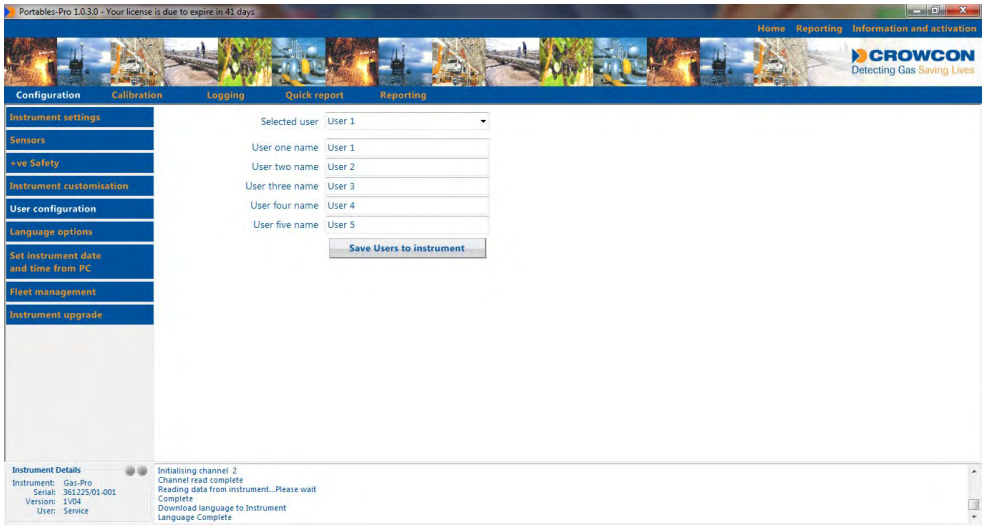
- Use the **Select tune to play** drop down list and the **Play** and **Stop** buttons to help select the required alarm sounds.
- Select the alarm sound required from the **Alarm one**, **TWA tune** and **Alarm two** drop down lists.
- Set the required sounder volume from the **Volume** drop down list (Normal = 95dB, High = 98dB).
- When all the required changes have been made, click on the **Save** button to apply changes.

4.5 User configuration

This function enables up to 5 user names to be entered and any one of these to be selected as the active user which will be shown on the instrument screen as follows:

▶ Select **User configuration** from the Configuration menu. The following screen will be displayed:

Figure 12: User configuration screen



▶ If required, edit the user names in the **User name** fields.

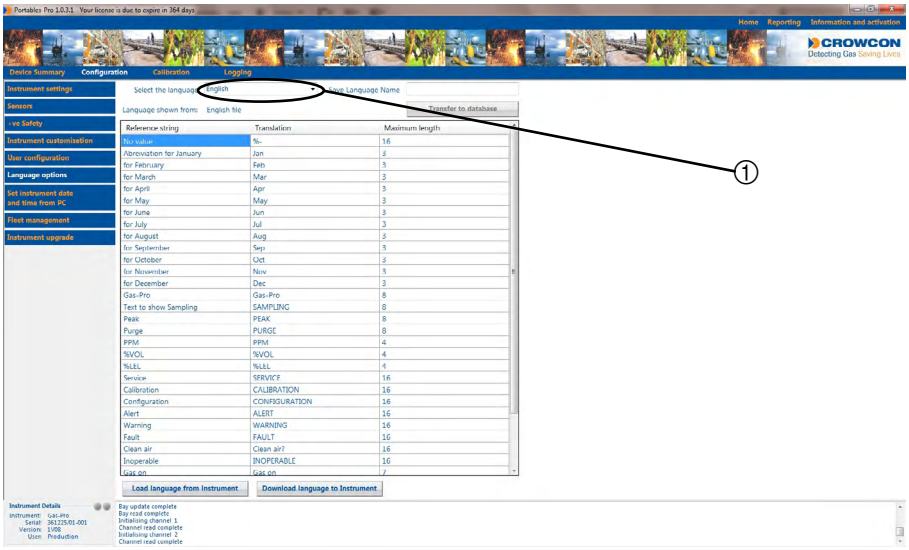
▶ Select the required nominated user from the **Selected user** drop down list and click the **Save Users to instrument** button. All the User names will be loaded to the detector with the detector's nominated user being set to the name shown in the **Selected user** field.

4.6 Language options

This function allows the detector's screen display language to be changed or edited as follows:

▶ Click the **Language options** from the Configuration menu. The following screen will be displayed.

Figure 13: Language options screen

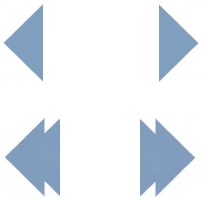


▶ To download a different language file to the detector, **Select the language** file from the drop down list ① and it will be displayed in the language table. Click the **Download to instrument** button to then save the language to the detector.

▶ To view the language currently loaded on the detector, click the **Load language from instrument** button.

▶ If you wish to enter a custom language into the detector, click on the text to be edited in the **Translation** column. Make the required change, click on another cell to ensure the change is made and then click on the **Download language to instrument** button. Your custom language will be loaded to the instrument.

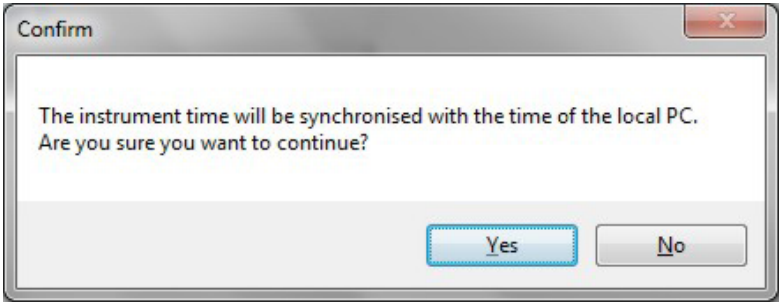
▶ If you wish to store your custom language setup for use in another instrument, enter the name you wish to save this language as in the text box and click **Save to database**.



4.7 Set instrument date & time from PC

▶ Select **Set instrument date & time from PC** from the Configuration menu. The confirmation dialog box below will be displayed.

Figure 14: Time and date confirmation dialog box.



▶ To set the detector's internal clock to the time of the PC the instrument is connected to, click **Yes** To abort, click **No**.

4.8 Fleet management

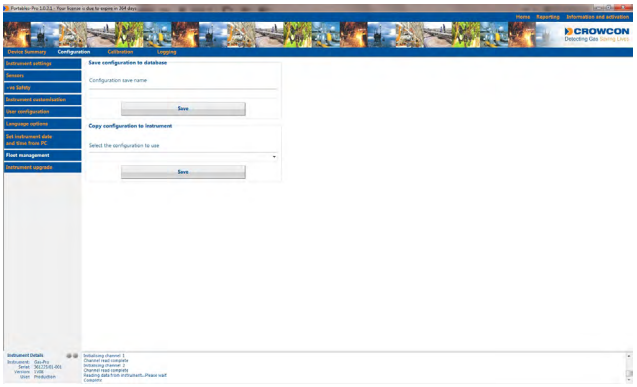
The Fleet management function enables a fleet manager to save the current detector configuration to the database and subsequently download it to other instruments that are required to perform in the same way.

Fleet management allows the configuration items of a detector to be saved to the database. A generic detector that has the same hardware and sensor configuration can then effectively be easily configured to have the same configuration settings as the initial detector. This is achieved by downloading the saved configuration from the database to the 'generic' detector.

This function is intended to be used between instruments which have identical hardware setups. It cannot be used to change the gas on a channel, or the type of sensor in a bay, in an instrument that has a different hardware variant/sensor fit.

▶ Select **Fleet management** from the Configuration menu. The following screen will be displayed:

Figure 15: Fleet Management screen



4.8.1 Copy configuration to instrument

When selected, this function enables a previously saved configuration (see below) to be downloaded to an instrument. Select a configuration from the drop down list and click **Save**.

Not all values are downloaded to instruments. The Fleet Management download table in Appendix B on *page 68* shows the values that are excluded from the download.

4.8.2 Save configuration to database

When selected, this function enables a fleet manager to save the current configuration of the attached instrument to the database so that it can be subsequently copied to one or more instruments (see above). Key in the required configuration file name and click **Save**.

4.9 Instrument upgrade

Instrument upgrade allows the user to extract all instrument configuration items from the detector and save this to the database. This may be used for example when an instrument's main PCB needs to be replaced, this will allow all configuration data to easily be removed and then uploaded to the instrument when a new PCB is installed.

This significantly simplifies the process of reconfiguring a detector when the main PCB is replaced.

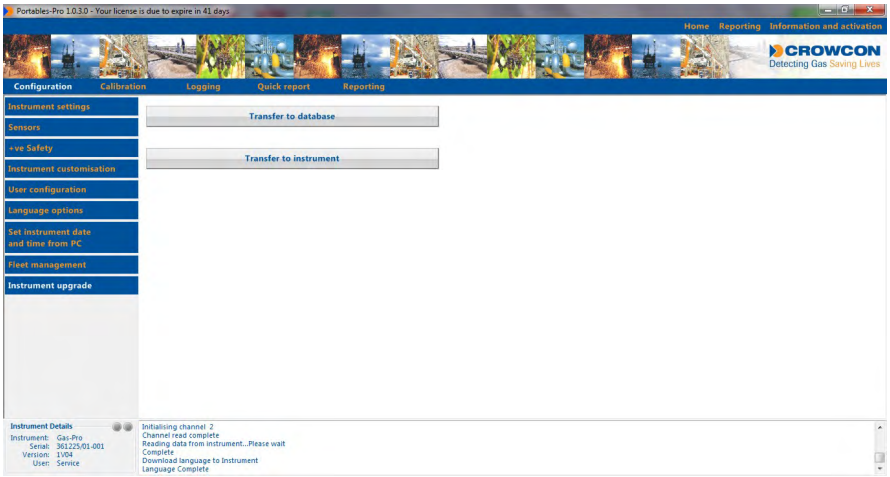
This function is intended to be used to transfer the complete setup from a broken or faulty PCB onto a new PCB with the same sensor fit as the previous board.

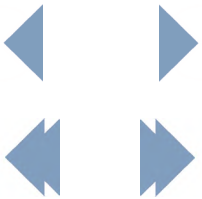
When a main board is replaced, there are further actions required for the battery configuration dependant on the battery used. Refer to the Gas-Pro Service Manual section 'Replacing the Main PCB for further details.

If the existing battery is used with the new board, no further battery configuration is required as the battery information is extracted via the instrument upgrade process. However if a new battery is fitted, once the instrument upgrade process is complete and the new board is reconfigured, the new battery must be initialised, see *5.3 Battery calibration*.

▶ Select **Upgrade instrument** from the Configuration menu. The following screen will be displayed:

Figure 16: Instrument upgrade screen

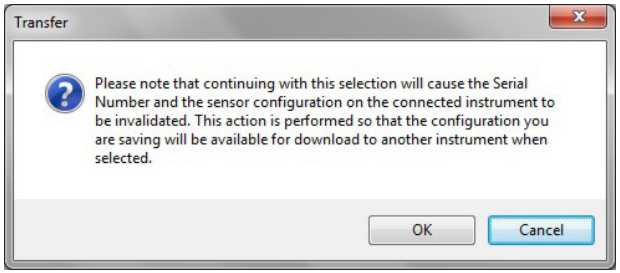




4.9.1 Transfer to database

▶ When the function is selected, the following warning will be displayed:

Figure 17: Transfer to database warning screen



▶ Click **OK** to proceed or **Cancel** to abort the transfer.

▶ On clicking **OK**, the software will proceed to extract all information from the detector. When complete, the configuration will be stored in the software database via the serial number reference. The detector will then have its serial number changed to 'INVALID' to signify that the board should no longer be used.

4.9.2 Transfer to instrument

Use this function to reinstall the configuration of the instrument when its main PCB has been repaired or replaced.

▶ Click **Transfer to instrument**, then select the relevant serial number from the drop down list. Once the correct serial number has been selected, click **Write to Instrument**.

▶ The software will then proceed to write all configuration data from the database back into the instrument. When complete, the instrument will require a calibration on all channels.

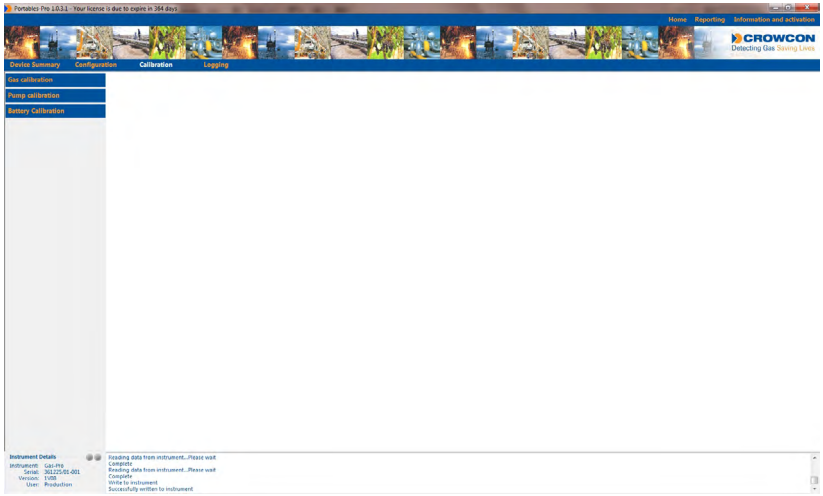
5. Calibration

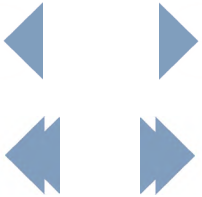
The Calibration menu contains the following options:

- Gas calibration (see *page 38*)
- Pump calibration (see *page 48*)
- Battery calibration (see *page 49*)

When the Calibration menu is selected, the following screen will be displayed:

Figure 18: Calibration menu



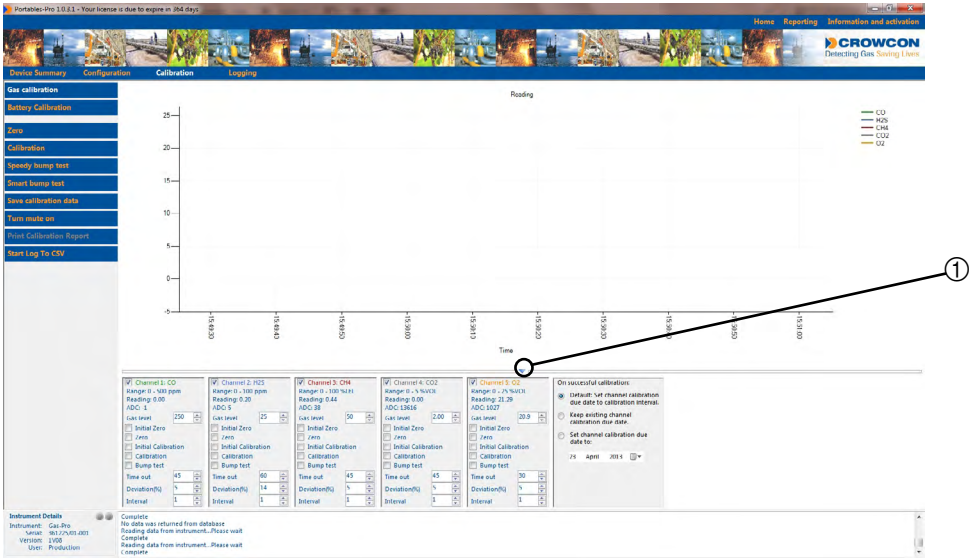


5.1 Gas calibration

This page can be used for various reasons, including when an instrument/sensor requires a calibration or bump test, when a new sensor has been fitted, when an instrument upgrade has been performed (see *page 35*), or simply if you wish to graphically view the current gas readings from the detector.

Select **Gas calibration** from the Calibration menu, the following screen will be displayed:

Figure 19: Gas calibration screen



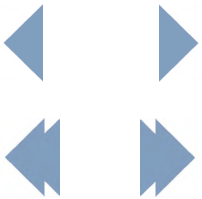
The screen includes a live gas reading graph, showing data from the last two minutes from all channels.

Time of readings is marked on the x-axis of the graph, and gas reading level is on the y-axis. The y-axis shall auto-resize itself so that all readings are visible.

The y-axis is in 'channel units', as different channels may be measured in different units. i.e. a reading of '20' on an Oxygen channel will correspond to 20% volume, a reading of '20' on a CO channel will correspond to 20ppm.

If you wish to hide the controls at the bottom of the screen click the blue arrow ① between the controls and the graph, and vice versa to reveal them.

CROWCON



Individual channels may be shown or hidden from the graph by clicking the checkbox to the left of the coloured channel names.

Gas readings and raw ADC values can also be read numerically in each channel's control box at the bottom of the screen.

There are a number of buttons that will have appeared at the left of the screen; these are:

- Zero (see *page 39* and *page 40*)
- Calibration (see *page 40* and *page 41*)
- Speedy Bump Test (see *page 45*)
- Smart Bump Test (see *page 46*)
- Save Calibration Data (see *page 46*)
- Turn Mute On (see *page 46*)
- Print Calibration Report (see *page 47*)
- Start Log To CSV (see *page 47*)

The function of each of these buttons is described in the following sections.

5.1.1 Initial zero

This function is used when a new sensor has been added to the detector, when the sensor has had the **Initialise gain and bias** function performed (see *page 24*), or when the **Instrument upgrade** function has been performed (see *page 35*).

It is effectively the first zero operation that must be performed on a newly set up sensor. Following a successful **Initial zero**, all subsequent zeros should be standard zero operations.

An initial zero should only be performed once on a sensor at time of initial fitment or replacement.

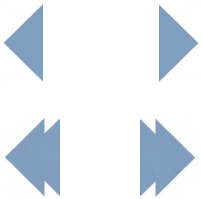
▶ To proceed, follow the steps below:

▶ Ensure the detector is in clean air, and that ADC readings are stable. Click the **Initial zero** box or boxes in the required channel(s).

▶ Click the **Zero** button in the calibration options to the left of the screen. As each channel is zeroed, it will be reported at the base of the screen.

Your detector may beep momentarily for each channel that is zeroed.

▶ Un-check the **Initial zero** boxes when the zero function is complete.



5.1.2 Zero

This function enables users to zero any one or more of the channels.

A standard zero should be used rather than an initial zero when an initial zero has already been performed on the sensor since its first set up.

In most cases of operation, a standard zero should be used as follows:

- Ensure the detector is in clean air.
- Click the **Zero** box or boxes in the required channel(s).
- Click the **Zero** button in the calibration options to the left of the screen. As each channel is zeroed, it will be reported at the base of the screen.

Your detector may beep momentarily for each channel that is zeroed.

- Un-check the **Zero** boxes when the zero function is complete.

5.1.3 Initial calibration

This function is used when a new sensor has been added to the detector, when the sensor has had the **Initialise gain and bias** function performed (see *page 24*), or when the **Instrument upgrade** function has been performed (see *page 35*).

Performing an initial calibration rather than a standard calibration will store extra data to the device to gauge the accuracy of subsequent calibrations.

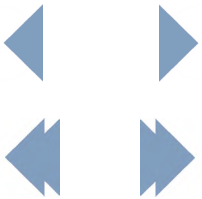
An initial calibration should only be performed once on a sensor at time of initial fitment or replacement.

To carry out a calibration on one or more channels, proceed as follows:

- Make a note of the level of the gases to calibrate on your calibration gas cylinder.
- Enter these values in the ‘gas level’ text box for each channel to be calibrated.

Be aware of the cross sensitivity of sensors.

- Attach a flow plate firmly to the device.
- Attach a gas pipe from the required calibration gas cylinder to the flow plate inlet.
- Attach a gas pipe from the outlet/exhaust of the flow plate into a sensible extraction point, e.g. out of a window.
- Click the **Initial Calibration** box or boxes for the required channel(s).



Your detector may show a warning during the calibration process. These may safely be dismissed.

- Open the valve on the gas cylinder and wait for ADC readings on the required channel(s) to stabilise.
- Click the **Calibration** button in the calibration options to the left of the screen. The result of the calibration for each channel selected will be displayed at the base of the screen.
- Close the valve on the gas cylinder and detach the pipes and flow plate.
- When you have performed calibrations on all channels you wish to calibrate, click the **Save calibration data** button. This will transfer all calibration results to the database, ready for producing a calibration report.

When performing calibrations sequentially with single gas cylinders, it is unwise to click the Save calibration data button between calibrations as the results will be stored across several reports rather than all in the same report.

If Save calibration data is not clicked then it will not be possible to create a calibration report at a later date.

5.1.4 Calibration

This function enables a user to carry out a calibration on one or more channels.

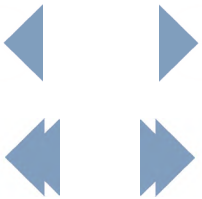
A standard calibration should be used rather than an initial calibration when an initial calibration has already been performed on the sensor since its first set up.

In most cases of operation, a standard calibration should be used as follows:

- Make a note of the level of the gases to calibrate on your calibration gas cylinder.
- Enter these values in the ‘gas level’ text box for each channel to be calibrated.

Be aware of the cross sensitivity of sensors.

- Attach a flow plate firmly to the device.
- Attach a gas pipe from the required calibration gas cylinder to the flow plate inlet.
- Attach a gas pipe from the outlet/exhaust of the flow plate into a sensible extraction point, e.g. out of a window.
- Click the **Calibrate** box or boxes for the required channel(s).



Your detector may show a warning during the calibration process. These may safely be dismissed.

- Open the valve on the gas cylinder and wait for ADC readings on the required channel(s) to stabilise.
- Click the **Calibrate** button in the calibration options to the left of the screen. The result of the calibration for each channel selected will be displayed at the base of the screen.
- Close the valve on the gas cylinder and detach the pipes and flow plate.
- When you have performed calibrations on all channels you wish to calibrate, click the **Save calibration data** button. This will transfer all calibration results to the database, ready for producing a calibration report.

When performing calibrations sequentially with single gas cylinders, it is unwise to click the Save calibration data button between calibrations, as the results will be stored across several reports rather than all in the same report.

If Save calibration data is not clicked then it will not be possible to create a calibration report at a later date.

5.1.5 Calibration Due Date

Three options are presented to production and service users on how the calibration due date will be updated upon successful calibration of a channel, these are:

- **Default:** the calibration date will be set to today's date PLUS the number of days specified for that channel's calibration interval. This value is specified, per channel, as the **Calibration interval** value on the sensors page (see *page 25*).
- **Keep existing channel cal due date:** The calibration will be performed, and the cal due date will be maintained at its current value for each channel. Note that different channels may have different due dates. Each channel with therefore have the existing due date persisted.
- **Set channel cal due date to [date]:** The user may select any date they wish from the date/time selector to set the cal due date to. Check the radio button to the left of 'set channel calibration due date to', then click the arrow to the right of the date box. A calendar will be shown, which may be navigated around to select the calibration due date you wish the channels to be assigned upon successful calibration.

5.1.6 Cross Calibration of Flammable Pellistor

Calibration of the flammable pellistor is normally undertaken with target gas, calibrating the sensor with the same gas the sensor is configured to detect.

It is possible to calibrate with Methane gas and the implementation of cross calibration factors, Gas-Pro's manufactured to detect Propane, Butane and Pentane.

For example Portables-Pro can be used to calibrate a Gas-Pro with a propane configured sensor utilising methane gas and cross calibration factors.

This is achieved by entering the 'equivalent' propane concentration into the Gas Level text box on the Gas Calibration page, then applying the methane gas and following the normal calibration procedure.

For example if the cylinder of gas to be used contains 27.3% LEL methane.

For an ATEX calibrated Gas-Pro and with reference to the table below a value of

27.3 x 1.825 (methane gas level applied x cross calibration factor) = 49.8 % LEL

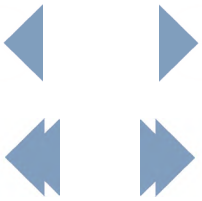
would be entered into the Gas Level text box as this is the equivalent level of propane for the applied 27.3% LEL methane.

The normal calibration process should then be followed.

Cross calibration factors for ATEX calibrated and UL calibrated Gas-Pro's are different. The appropriate calibration factor should be used or Gas-Pro will be incorrectly calibrated and may cause the sensor to display incorrect gas readings.

ATEX/IECEx

	LEL (% VOL)	Cross Calibration Factors Relative to Methane
Methane	4.4	1.00
Propane	1.7	1.825
Butane	1.4	1.825
Pentane	1.1	2.22



UL

	LEL (% VOL)	Cross Calibration Factors Relative to Methane
Methane	5.0	1.00
Propane	2.1	1.68
Butane	1.8	1.68
Pentane	1.4	1.99

This method of calibration may cause the pellistor to enter pellistor saver mode, if too high a value of methane is applied as the calibration gas.

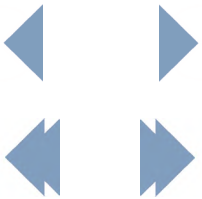
The tables below show the recommended maximum levels of methane that should be applied to avoid the sensor entering pellistor saver mode. In practice higher levels may be possible without triggering pellistor saver mode.

ATEX/IECEx
Recommended Maximum Level of Methane for Cross Calibration

Propane	44% LEL
Butane	44% LEL
Pentane	36% LEL

UL
Recommended Maximum Level of Methane for Cross Calibration

Propane	48% LEL
Butane	48% LEL
Pentane	40% LEL



5.1.7 Speedy bump test

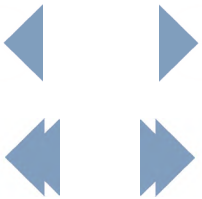
This function enables a user to carry out a Speedy bump test on a selected channel.

For more information on Bump Tests, and for a more in depth description of a 'Speedy' bump test, refer to the Gas-Pro manual.

- Make a note of the level of the gases to bump test on your gas cylinder. Enter these values in the 'gas level' text box for each channel to be tested.

Be aware of cross sensitivity of sensors.

- The Timeout value will be how long the detector will wait before declaring a speedy bump test to have failed, if alarm level one has not yet been triggered.
- The bump due date in the detector will be set to today's date PLUS the value in the 'Interval' field, should the bump test be successful.
- Attach a flow plate firmly to the device.
- Attach a gas pipe from the required bump gas cylinder to the flow plate inlet.
- Attach a gas pipe from the outlet/exhaust of the flow plate into a sensible extraction point, e.g. out of a window.
- Click the **Bump test** box for the required channels.
- Open the valve on the gas cylinder and immediately select **Speedy bump test**. The result of the test will be displayed at the base of the screen.
- Close the valve on the gas cylinder and detach the pipes and flow plate.



5.1.8 Smart bump test

This function enables a user to carry out a Smart bump test on a selected channel.

For more information on Bump Tests, and for a more in depth description of a 'Smart' bump test, refer to the Gas-Pro manual.

- Make a note of the level of the gases to bump test on your gas cylinder. Enter these values in the 'gas level' text box for each channel to be tested.

Be aware of the cross sensitivity of sensors.

- The Timeout value will be how long the detector will wait before taking the reading for the smart bump test.
- The deviation value is the tolerance level from the gas level applied to determine if the bump test should passed or failed.
- The bump due date in the detector will be set to today's date PLUS the value in the 'Interval' field, should the bump test be successful.
- Attach a flow plate firmly to the device.
- Attach a gas pipe from the required bump gas cylinder to the flow plate inlet.
- Attach a gas pipe from the outlet/exhaust of the flow plate into a sensible extraction point, e.g. out of a window.
- Click the **Bump test** box for the required channels.
- Open the valve on the gas cylinder and immediately select **Smart bump test**. The result of the test will be displayed at the base of the screen.
- Close the valve on the gas cylinder and detach the pipes and flow plate.

Smart bump test will be disabled if the Bump test option is ticked for a PID sensor. Only Speedy bump test is available for the PID sensor.

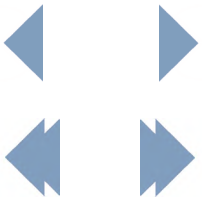
5.1.9 Save calibration data

Select this function to save the calibration data to the database.

5.1.10 Turn mute on

Use this function to turn the detector's audio alarm off whilst carrying out bump tests and calibrations.

The detector will automatically turn the mute function off again after 5 minutes.



5.1.11 Calibration of PID Sensor

PID sensors are configured and calibrated to Isobutylene when manufactured.

The PID sensor can be configured to detect Volatile Organic Compounds (VOC) other than Isobutylene by changing the correction factor in the PID sensor type options.

The PID sensor must ALWAYS be calibrated with Isobutylene even if it is configured to a different VOC type.

Portables-Pro will display the PID gas reading in the Gas calibration screen as Isobutylene as this must be the gas used for calibration

Gas-Pro will show on its display gas readings as configured by the correction factor, therefore readings shown on Gas-Pro display and Portables-Pro may differ if the instrument is not configured with a correction factor for Isobutylene

Gas-Pro must be powered and switched on for 15 minutes prior to performing a calibration on the PID sensor.

5.1.12 Print calibration report

This function is only available when the Save calibration function has been used.

▶ To print out the calibration report to your default printer, click the **Print calibration report** button.

5.1.13 Start log to CSV

The function will output the data displayed in the graph to a csv file in the user's data folder.

5.1.14 Gas Testing Recommendations

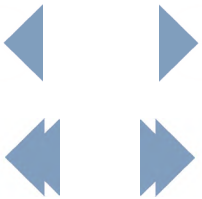
When using reactive gases all pipe work and regulators should be purged with the respective reactive gas.

Crowcon recommend using a typical flow rate of the test of 0.5 litres per minute.

When using chlorine and chlorine dioxide as the test gas the typical flow rate should be increased to 1 litre per minute.

Chlorine dioxide gas testing and calibration must only be carried out using a chlorine dioxide generator. Crowcon recommend Advanced Calibration Designs, inc. Gas Generator, model: CAL2000 (P/N: 750-0603-AT), using the Chlorine Dioxide Cell (P/N: 510-2060-00). Refer to generator instructions for use.

Ozone gas testing or calibration must only be carried out using an ozone generator. Crowcon recommend Analytical Technology, inc. Ozone Generator, Model: A23-14. Refer to generator instructions for use.



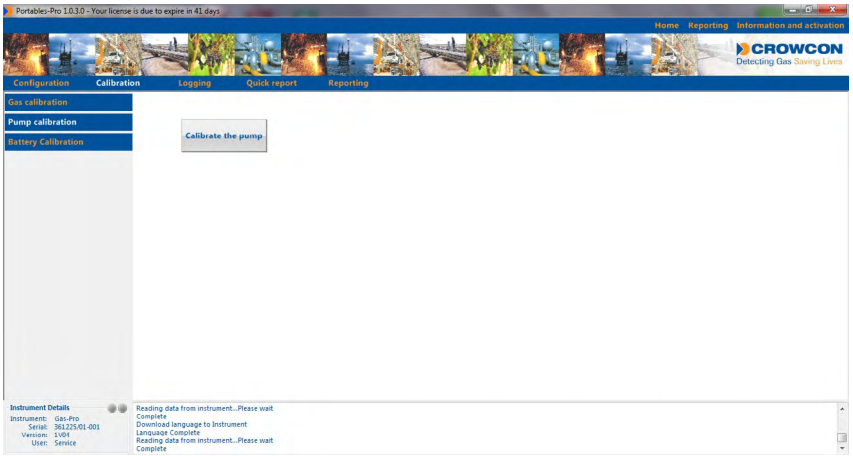
5.2 Pump calibration

A pump calibration is always required when the pump has been replaced, or if the pump stalls prematurely.

This option is only visible when the unit is configured as 'pumped' (see *page 18*).

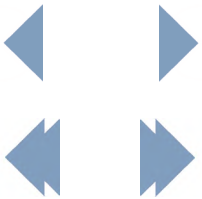
▶ Select **Pump calibration** from the Calibration menu, the following screen will be displayed:

Figure 20: Pump calibration screen



▶ Click on the **Calibrate the pump** button.

▶ When the calibration is finished, the result will be displayed at the base of the screen.



5.3 Battery calibration

The term 'Battery Age Scalar' refers to a variable that the instrument stores to gauge the age of the battery.

▶ Select **Battery calibration** from the Calibration menu, the following screen will be displayed:

Figure 21: Battery calibration screen

5.3.1 Initialise a new battery

If a completely new battery is placed into an instrument, this function will reset the battery age scalar stored in the instrument.

Performing the initialise function on a *used* battery will cause irreparable damage to a device.

5.3.2 Extract battery age scalar

This should be used if a battery is to be removed from a device and placed into another device, or removed from an old board and written to a new board.

Once extracted, the serial number and the date & time of data extraction will be displayed below the Extract battery age scalar button.

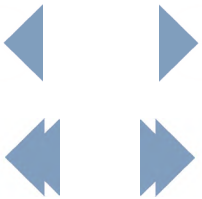
5.3.3 Write battery age scalar

This function should ***only*** be used to write the age scale data back to a PCB with the same battery to which the age scalar information relates.

Writing an age scalar function from a different battery will cause irreparable damage to a device.

▶ Select the serial number from the drop down list, from which the battery originated. The date of extraction will be displayed below the drop down list.

▶ Check this information corresponds to the battery in the detector you are now configuring, click the "Write battery age scalar" button. The value will then be written to the device.



6. Logging

This feature allows extraction of stored event and gas reading data from a detector.

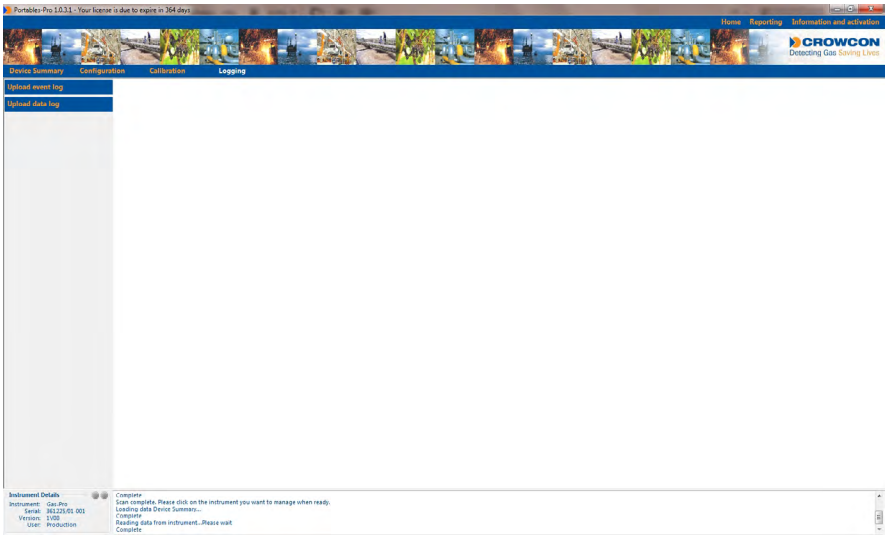
Data will then be stored on your PC, where it can be viewed at any time in the future without the detector being connected.

The Logging menu contains the following options:

- Upload event log (see *page 51*)
- Upload gas log (see *page 52*)

When the Logging menu is selected, the following screen will be displayed:

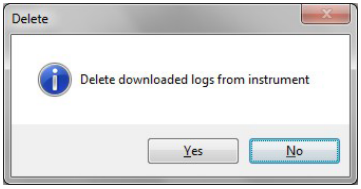
Figure 22: Logging menu screen



6.1 Upload event log

▶ Select **Upload event log** from the Logging menu. Once the data transfer is complete, the Delete confirmation dialog box will be displayed:

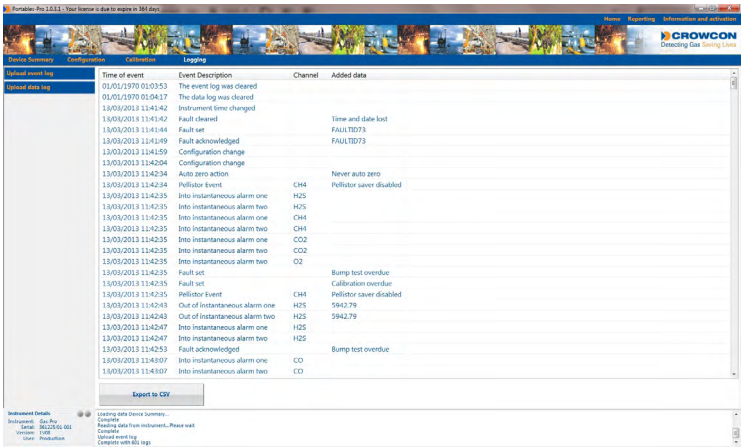
Figure 23: Delete log confirmation screen



If the setting for deleting logs is not enabled (see *page 64*), you will not see the above dialog, and all logs will remain intact on the detector.

▶ Select **Yes** to delete the logs on the device (this will reduce loading time in the future) or **No** to retain them. The Upload event log screen will be displayed:

Figure 24: Upload event log screen



Use the scroll bars to the right and below the data fields to view the required events.

To create a 'comma separated value' (CSV) file of the event data, click the Export to CSV button, name the file, navigate to the required destination and save it to disk.

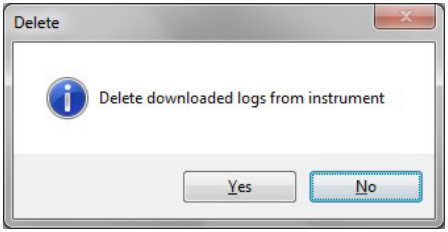
Event data may include items such as outcome of calibrations, when the detector entered an alarm state, and various other events.

6.2 Upload data log

▶ Select **Upload data log** from the Logging menu. Once the data transfer is complete, the Delete confirmation dialog box will be displayed:

The data log will include gas readings from each channel, at an interval set on the Instrument settings page (see *page 19*).

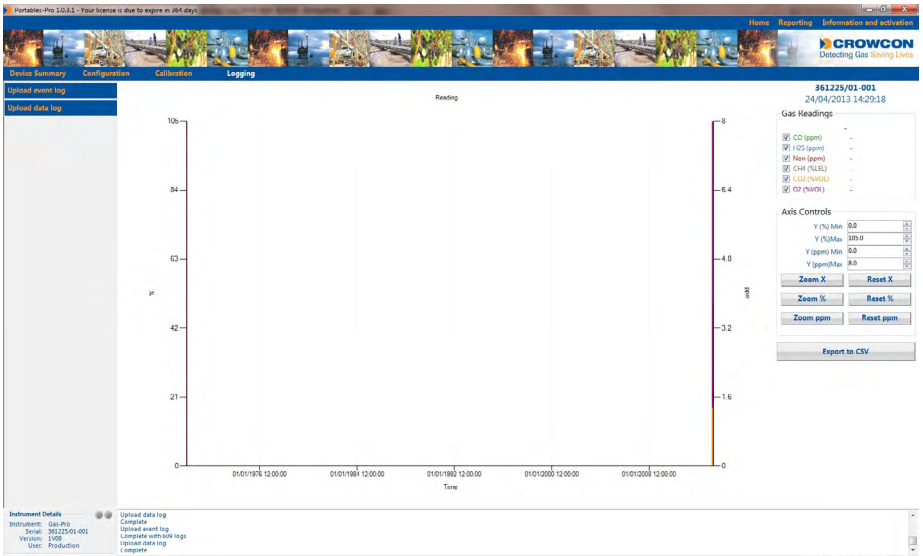
Figure 25: Delete log confirmation screen

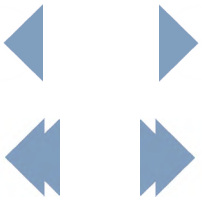


If the setting for deleting logs is not enabled (see *page 64*), you will not see the above dialog, and all logs will remain intact on the detector.

▶ Select **Yes** to delete the logs on the device (this will reduce loading time in the future) or **No** to retain them. The Upload data log screen will be displayed:

Figure 26: Upload data log screen





The graph shows all gas data which has just been downloaded from the detector. The x-axis shows date and time, the left y-axis shows % (bundling together both LEL and VOL), and the right y-axis shows ppm.

To the top-right of the graph is the information area. This is headed with the serial number of the detector, and the date/time that the data was retrieved from the device.

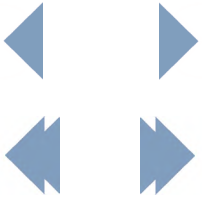
The gas readings box allows you to show or hide individual data series by clicking the checkboxes. By moving the mouse pointer over the graph area, the gas readings for each data series will be shown in the gas readings box, along with the date/time.

You may zoom in on the data by dragging a box with the box around the area you wish to zoom in on. Note that this will only zoom the x-axis; the y-axes must be zoomed using the axis controls area. Entering a value in any of the text boxes will adjust the graph immediately with your new values. Alternatively you may use the buttons in the axis controls area to zoom.

To reset an axis, use the reset x / % / ppm buttons. This will effectively undo all zoom operations so all data can be viewed.

To create a 'comma separated value' (CSV) file of the event data, click the Export to CSV button, name the file, navigate to the required destination and save it to disk.

For a full explanation of the data log screen, see **Appendix A** on *page 66*.

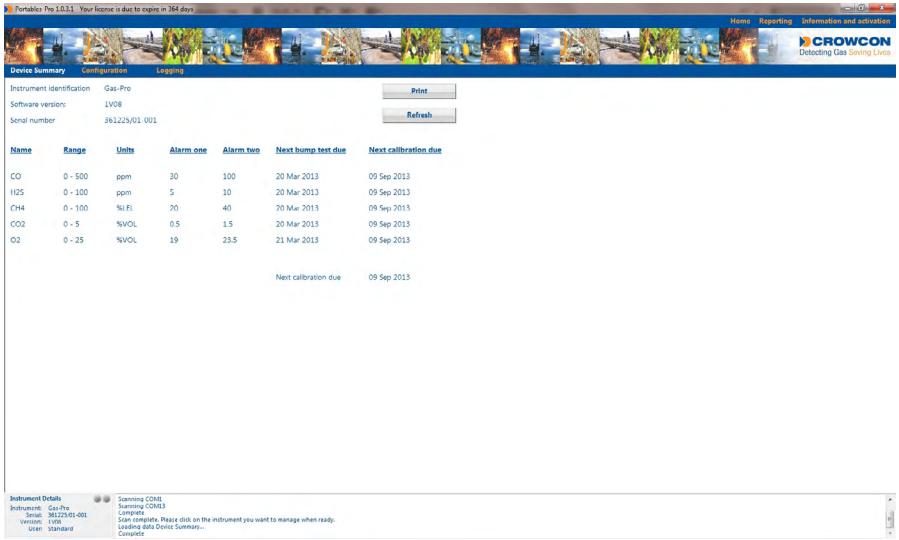


7. Device Summary

Selecting the Device Summary function will display the device summary screen as shown below:

This page is intended to give a quick overview of the setup of the detector, including its serial and software version, and which channels are present along with their alarm levels and calibration due dates.

Figure 27: Device summary screen



8. Reporting

The reporting function is used to view data which has previously been downloaded (or produced, in the case of calibration) from both the active detector and all other detectors that have been used with the software.

The user can view historical event data and gas logs, and also historical calibration reports.

The following options are available from the Reporting menu:

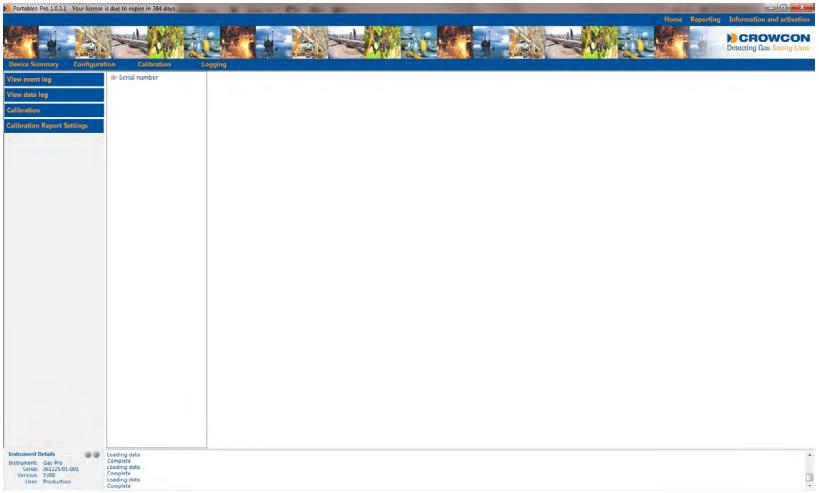
- View event log (see below)
- View data log (see *page 57*
- Calibration (see *page 59*)
- Calibration report settings (see *page 61*

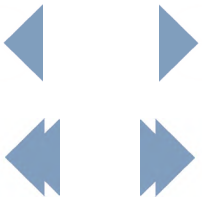
8.1 View event log

This function enables the event logs that have been previously downloaded from detectors to be viewed.

▶ Select **Reporting > View event log**. A blank event log screen will be displayed.

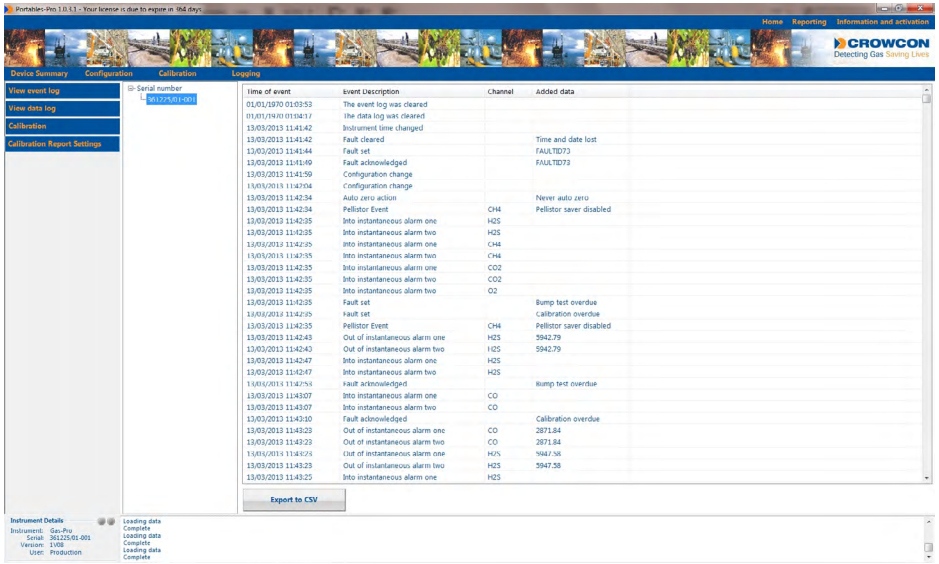
Figure 28: Blank event log screen





▶ Expand the serial number list by clicking on the '+' then select the serial number for the required detector. The fields to the right will be populated with the historic data (see below).

Figure 29: Populated event log screen



▶ All events which have been retrieved from the selected detector will be shown in the list view. These will include events such as when the detector entered alarm states, when calibrations occurred and other information.

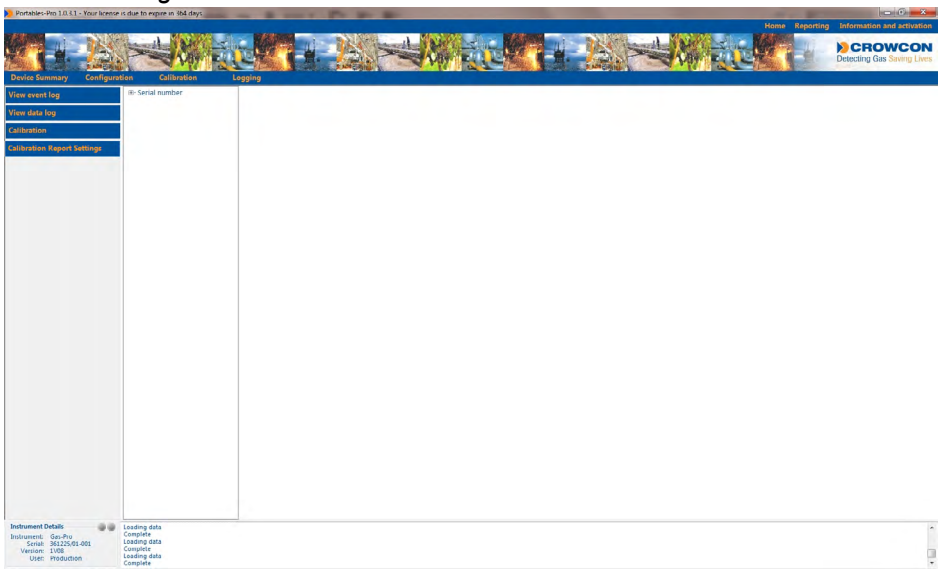
To create a 'comma separated value' (CSV) file click the Export to CSV button, name the file, navigate to the required destination and save it to disk.

8.2 View data log

This function enables the data logs that have been previously downloaded from detectors to be viewed.

▶ Select **Reporting > View data log**. A blank event log screen will be displayed.

Figure 30: Blank data log screen



▶ Expand the serial number list by clicking on the '+', select the serial number for the required detector and then select the required date. The graph to the right will now display the gas levels recorded for the selected date (see *Figure 31*).

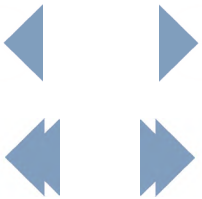
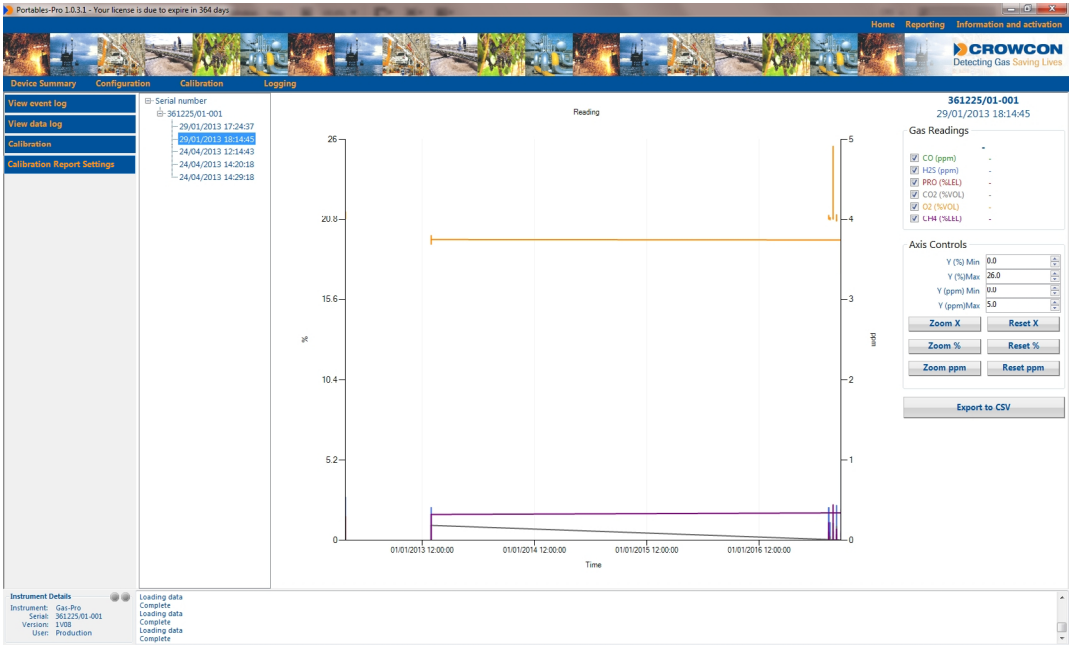


Figure 31: Populated data log screen



This graph is identical in function to the graph seen on the logging page when downloading gas logs (see *page 53*).

To create a 'comma separated value' (CSV) file click the Export to CSV button, name the file, navigate to the required destination and save it to disk.

For a full explanation of the data log screen, see **Appendix A** on *page 66*.

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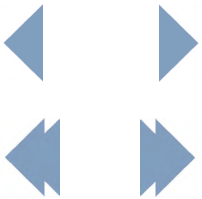


8.3 Calibration

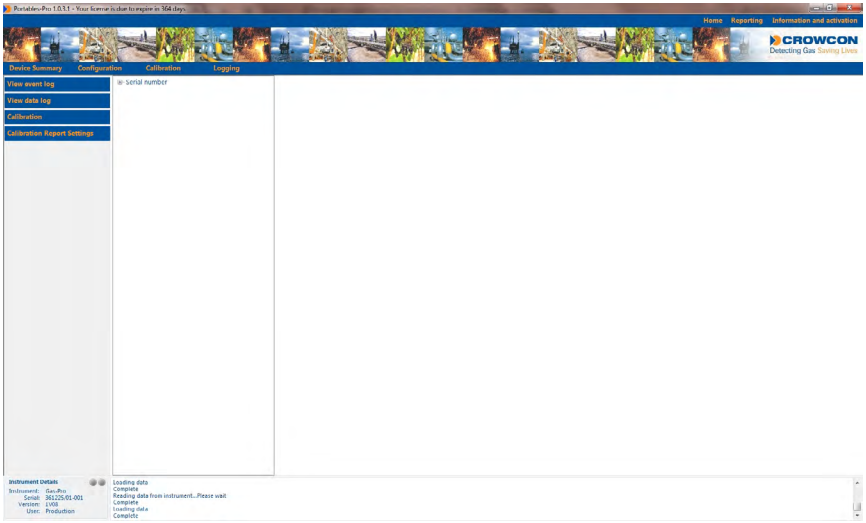
This page allows you to view calibration reports which have been saved during the calibration process.

See *page 37* for more information on performing calibrations and creating these reports.

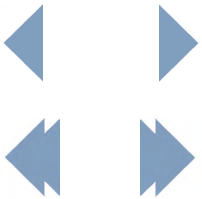
The reports contain information on the outcome of calibrations on each channel, and basic information on the configuration of the detector.

▶ Select **Reporting > Calibration**. The screen below will be displayed.

Figure 32: Blank calibration report screen



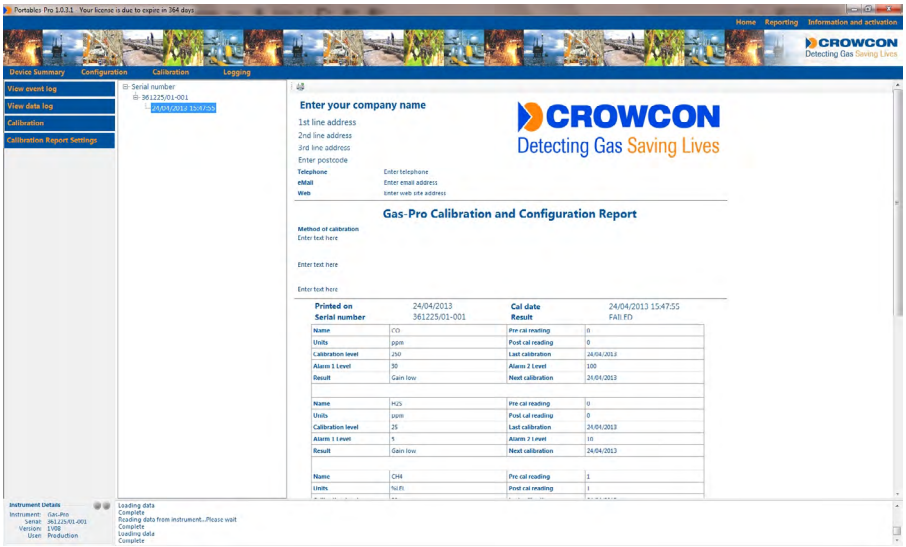
CROWCON



- Expand the calibration reports list by clicking on the '+'. The serial number list will be displayed.
- Expand the required serial number by clicking on the '+' next to it. A date list will be displayed.
- Click on the required date. The calibration report for the selected date will be displayed (see below). Use the scroll bar to read the complete report.
- You may also print the report by clicking the **Print** button at the top of the report.

Some information on the calibration report must be entered on the Calibration report settings page (see *page 61*).

Figure 33: Populated calibration report screen

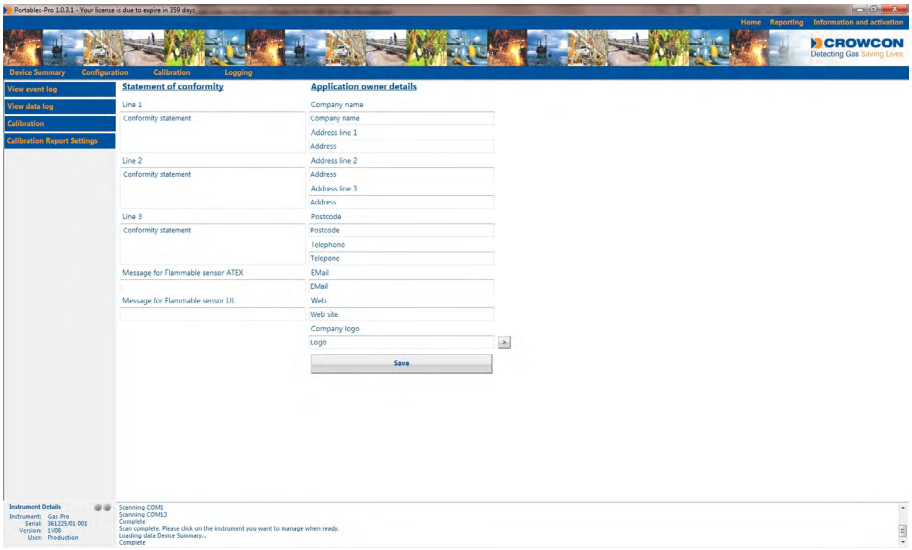


8.4 Calibration report settings

This function enables the statement of conformity and application owner details of calibration reports to be entered/edited.

▶ Select **Reporting > Calibration report settings**. The screen below will be displayed.

Figure 34: Calibration settings screen



▶ Updating these settings will change the text which is shown on all generated calibration reports. Be sure to keep these details up to date with your company contact details and logo.

▶ Make the additions or alterations as required and then click the **Save** button.

9. Information and activation

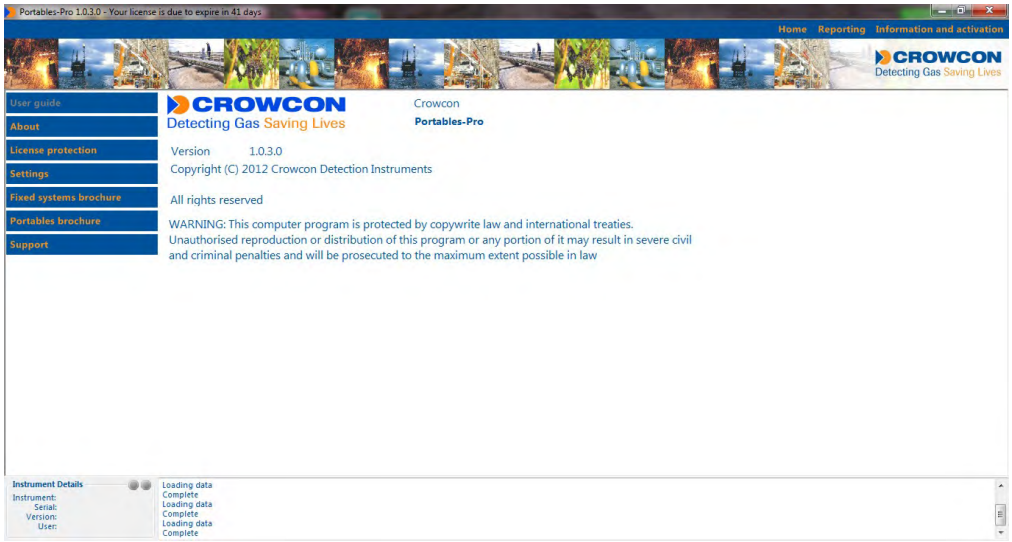
The following options are available from the Information and activation menu:

- About (see below)
- License protection (see *page 63*)
- Settings (see *page 64*)
- Fixed systems brochure (see *page 65*)
- Portables brochure (see *page 65*)
- Support (see *page 65*)

9.1 About

When this option is selected, a screen showing the current software version and copyright information will be displayed (see below).

Figure 35: About screen

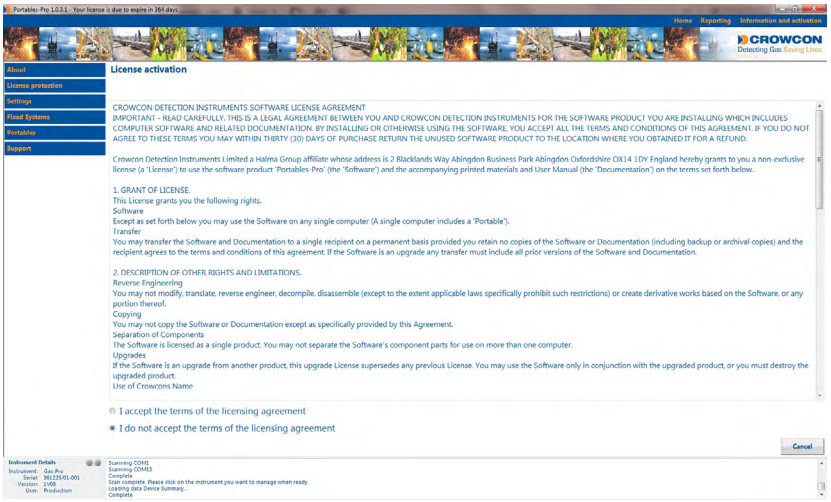


9.2 License protection

The license protection function enables the software to be activated or the license type changed as follows:

▶ Select License protection from the Applications settings menu. The screen shown below will be displayed.

Figure 36: License protection screen



▶ Either click on the **I accept the terms of the license agreement** radio button and then click the **Next** button, or just click the **Cancel** button to abort the procedure.

▶ If you accepted the terms of the license agreement, follow the on screen instructions in order to receive your activation code. When you have received your code, click the **Next** button, enter your activation code in the field at the centre of the screen and then click the **Finish** button.

▶ The software is now ready for use.

The activation code you receive will reflect the user level of your license: Standard, Calibration Technician, Service or Fleet Manager.

9.3 Settings

9.3.1 Database location

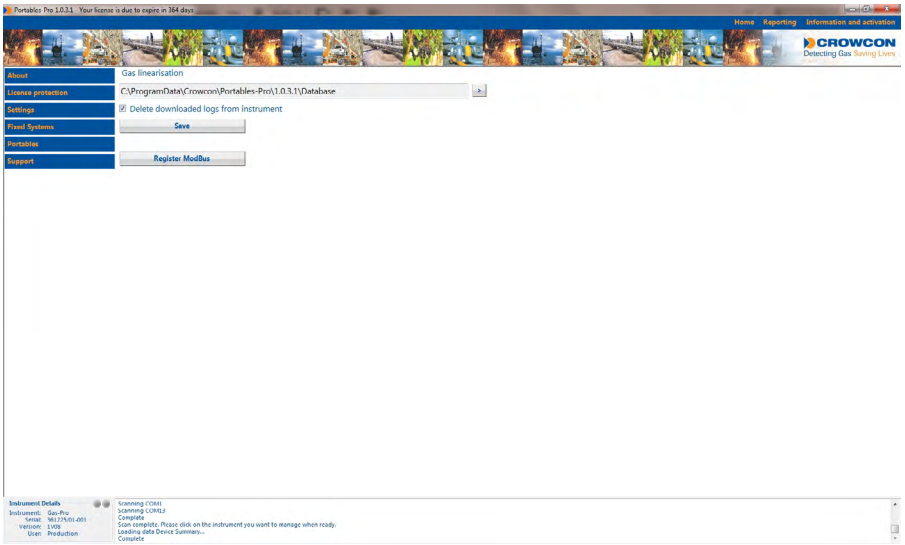
If you wish to use a shared database between several PCs, on a network drive for example, then you may modify the location of the database here.

If a Portables-Pro database is present in the directory you choose, it shall be used to store logs, calibration certificates etc. If there is no database in the target directory, Portables Pro shall create a new one.

This function enables the database settings to be changed as follows:

▶ Select Settings from the menu. The screen shown below will be displayed.

Figure 37: Database settings screen



▶ Use the **>** button to browse to the destination on disk where the database will be stored.

▶ The **Delete downloaded logs from instrument** checkbox enables the software to delete logs from instruments. If it is checked, you will be prompted whether you would like to delete logs from an instrument after the transfer is completed. If it is unchecked, all logs will be left on the instrument.

By not deleting logs, a large accumulation of data will build up on the device, meaning download times will be greatly increased.

9.3.2 Register Modbus

Some pieces of **Crowcon** software may install older versions of some files associated with communicating with **Crowcon** devices. These older versions are not compatible with some of the functions within **Portables-Pro**, but the new version is backward compatible with old software.

Should a user be experiencing issues with communications when installing other **Crowcon** software after **Portables Pro**, they may be advised by tech support to user the **Register Modbus** function to ensure that their computer is using the most up-to-date files associated with communication.

9.4 Fixed systems

When this option is selected, the fixed system product names that have information available will be displayed. Select a product and the relevant datasheet will be displayed.

9.5 Portables

When this option is selected, the portable product names that have information available will be displayed. Select a product and the relevant datasheet will be displayed.

9.6 Support

When this option is selected, the following screen will be displayed:

Figure 38: Support screen

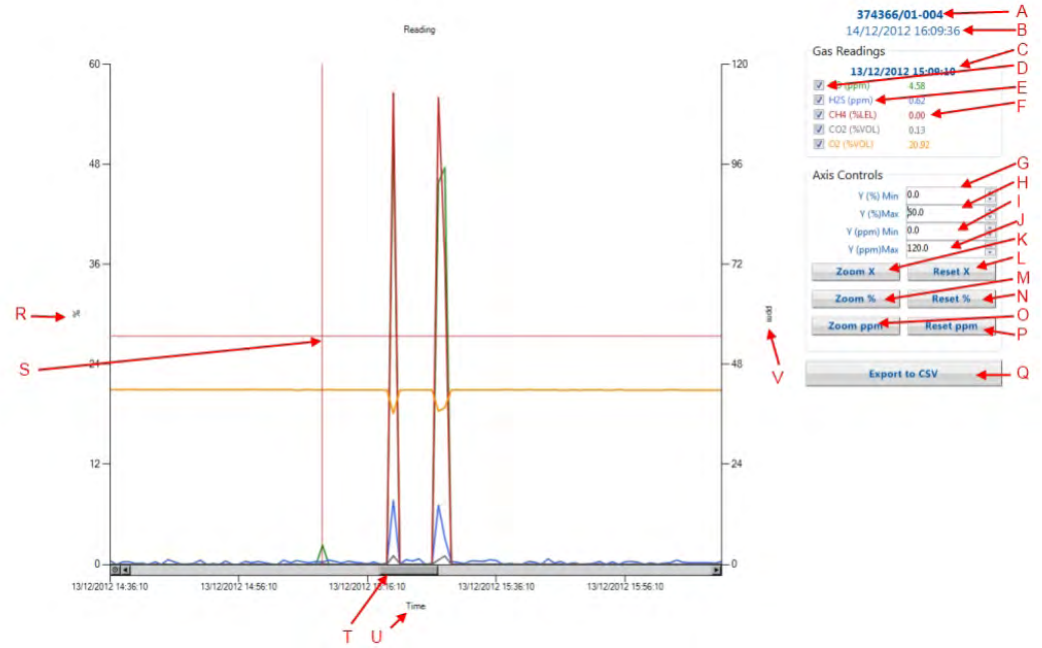
Use the screen to navigate to the support you require.

Fixed Systems / Portables / Support all require an internet connection to be available.

Appendix A: Data logging graph

The data logging screen has the following functions:

Figure 39: Datalogging screen details



A: The serial number of the instrument whose date we are viewing.

B: The date and time that the data we are viewing was retrieved.

C: The date and time of the position of the mouse pointer.

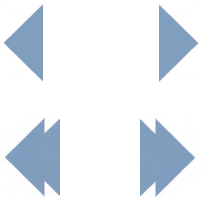
D: A checkbox for enabling/disabling the associated dataseries for viewing.

E: The gas name and unit of the dataseries.

F: The gas level at the date / time specified in ‘C’.

G: The minimum value visible on the % axis.

H: The maximum value visible on the % axis.



I: The minimum value visible on the ppm axis.

J: The maximum value visible on the ppm axis.

K: Zoom in on the X (time) axis.

L: Reset the X (time) axis to view all the data.

M: Zoom data plotted on the % axis.

N: Reset the % axis to the original values*.

O: Zoom data plotted on the ppm axis.

P: Reset the ppm axis to the original values*.

Q: Export all data on the chart to a csv file.

R: The % axis.

S: The position of the mouse.

T: A scrollbar that appears when zooming in. This may be dragged to scroll through the datapoints.

U: The X (time) axis.

V: The ppm axis.

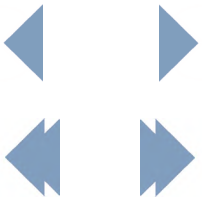
*The original values for the % and ppm axes may not be the same for each set of data that is viewed. This is to ensure that extreme values do not distort the graph and render it unusable.

Appendix B: Fleet Management download table

The table below indicates orange for the values ***excluded*** during a Fleet Management Download:

Value	Excluded
Identification	
Serial Number	
Build Date	
Part Number	
Backlight Control	
Bump Call interval	
Bump Lock	
Bump Test Interval Intermittent Ground	
Calibration Due Date	
Calibration Due Lockout	
Confidence Enable	
Confidence Interval	
Display Contrast	
Global Bump Test Enable	On
Global Follow On Cal Enable	
Instrument Time	
Logging Interval	60
Max Pump Current	
OEM Code	
Pellistor Saver Disable	
Pellistor Saver Level	
Pumped	
Pump Stall Current	
Splash Screen One Enable	
Splash Screen One Image Index	
Splash Screen Two Image Index	
Splash Screen One Text One	
Splash Screen One Text Two	
Splash Screen Two Enable	
Splash Screen Two Text One	
Splash Screen Two Text Two	

Value	Excluded
Startup Zero Action	
Prevent Switch Off In Alarm	
User Config Adjust	
Zero WBG Enable	
Selected User	
User One	
User Two	
User Three	
User Four	
User Five	
Positive Safety	
Alarm 1 Has Occurred	
Alarm 2 Has Occurred	
Battery Is Low	
Default Safety	
LTWA Has Occurred	
Sensor Out Of Bump Test Period	
Sensor Out Of Cal Period	
STWA Has Occurred	
Sensor Overrange	
Bay	
Sensor Type	
Sensor Manufacturer	
Sensor Model	
Sensor Life	
Channel	
Auto Zero Span Level	
Log Threshold	
Alarm 1 Latching	
Alarm 1 Level	
Alarm 1 Type	
Alarm 2 Level	
Alarm 2 Type	
Alarm LTWA	



Value	Excluded
Alarm STWA	
Bump Gas Level	
Bump Stabalise Time	
Bump Test Enable	
Bump Test Group	
Bump Test Limits	
Cal Ambient Level	
Calibration Interval	
Calibration Level	
Cal Zero Level	
Damping	
Display Name	
Display Units	
Follow On Cal Enable	
Range	
Sensor ID	
Startup Time	
Zero Suppression	
Zero WBG Capable	
Linearisation Data	
Temperature Comp Data	
Ideal Gain	
Gain Rise Factor	
Ideal Gain Limit	
Limit Gain Factor	
Cal Original Gain	
User Gain	
Switch Gain	
ADC Gain	
Load Switch	
Biased	
Cal Due Date	
Bump Due Date	
Battery Age Scalar	

Appendix C: License level functions

The table below indicates orange for the functions ***available*** for each license level:

Functionality	Service	Fleet	Calibration Technician	Standard
Configuration Page	■	■	■	■
Instrument Settings Page	■	■	■	
Serial Number	■			
Confidence Strategy	■	■	■	
Confidence Interval	■	■	■	
Action on Startup	■	■		
Bump Test Intermittent Interval	■	■	■	
Bump Calibration Interval	■	■	■	
Next Calibration Due				
Lock on Calibration Due	■	■	■	
Prevent Switch Off in Alarm	■	■	■	
Enable Bump Testing	■	■	■	
Calibrate After Bump Fail	■	■	■	
Allow User Config Adjustment	■	■	■	
Pumped Strategy	■			
Lock on Bump Failure	■	■	■	
Splash 2 Enabled	■	■		
Backlight Control	■	■	■	■
Threshold Logging Enabled	■	■	■	■
Log Interval	■	■	■	■
Sensors Page	■	■	■	■
Sensor Type	■			
Channel ID				
Gas	■			
Display Name	■	■	■	
Display Units	■			
Bump Test Enabled	■	■	■	
Bump Test Timeout	■	■		
Bump Test Level	■	■	■	
Bump Test +/- Deviation	■	■	■	

Functionality	Service	Fleet	Calibration Technician	Standard
Bump Test Group	■	■	■	
Enable Follow-on Cal	■	■	■	
Correction Factor	■	■	■	
Zero Gas Capable	■			
Init Gain/Bias	■			
Startup Stability Time	■			
Alarm 1 Threshold	■	■	■	
Alarm 1 Direction	■	■	■	
Alarm 1 Latching	■	■	■	
Alarm 2 Threshold	■	■	■	
Alarm 2 Direction	■	■	■	
STWA Threshold	■	■	■	
LTWA Threshold	■	■	■	
Background Gas Level	■			
Calibration Interval	■	■	■	
Threshold Value	■	■	■	■
Positive Safety Page	■	■	■	■
Reset Positive Safety State	■	■	■	■
Delete Profile from Database	■	■	■	■
Save Profile to Database	■	■	■	■
Save Profile to Instrument	■	■	■	■
Instrument Customisation Page	■	■	■	■
Save Splash 2 Image to Instrument	■	■		
Save Splash message to Instrument	■	■		
Save Sounder config to Instrument	■	■	■	■
User Configuration Page	■	■	■	■
Change active user	■	■	■	■
Change usernames	■	■	■	
Save config to Instrument	■	■	■	■
Language Options Page	■	■	■	■
Download language to Instrument	■	■	■	■
Set Instrument Date and Time	■	■	■	■
Fleet Management Page	■	■		

Functionality	Service	Fleet	Calibration Technician	Standard
Save config to Database	■	■		
Copy config to Instrument	■	■		
Instrument Upgrade Page	■			
Save config to Database	■			
Write config to Instrument	■			
Calibration Page	■	■	■	
Gas Calibration Page	■	■	■	
View Output Graph	■	■	■	
Initial Zero	■			
Field Zero	■	■	■	
Initial Cal	■			
Field Cal	■	■	■	
Speedy Bump	■	■	■	
Smart Bump	■	■	■	
Save Cal Data	■	■	■	
Print Cal Report	■	■	■	
Mute	■	■	■	
Log to CSV	■			
Cal Due Date Controls	■	■	■	
Pump Calibration Page	■			
Battery Calibration Page	■			
Logging Page	■	■	■	■
Upload Event Log	■	■	■	■
Upload Data Log	■	■	■	■
Device Summary Page	■	■	■	■
Reporting Page	■	■	■	■
View Event Logs	■	■	■	■
View Data Logs	■	■	■	■
View Calibration Reports	■	■	■	
Change Cal Report Settings	■	■	■	

Appendix D: PID Correction Factors

Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Acetaldehyde C_2H_4O	10.23	4.86
Acetone C_3H_6O	9.69	0.72
Acrolein C_3H_4O	10.22	4.00
Allyl alcohol C_3H_6O	9.63	2.07
Allyl chloride C_3H_5Cl	10.05	4.50
Ammonia H_3N	10.18	8.50
Amyl acetate, n- $C_7H_{14}O_2$	9.9	1.80
Amyl alcohol $C_5H_{12}O$	10	3.20
Aniline C_6H_7N	7.7	0.50
Anisole C_7H_8O	8.21	0.47
Asphalt, petroleum fumes	9	1.00
Benzaldehyde C_7H_6O	9.49	0.86
Benzene C_6H_6	9.24	0.50
Benzenethiol C_6H_5SH	8.32	0.70
Benzonitrile C_7H_5N	9.62	0.71
Benzyl alcohol C_7H_8O	8.26	1.25
Benzyl chloride C_7H_7Cl	9.14	0.55
Benzyl formate $C_8H_8O_2$	9.32	0.77
Biphenyl $C_{12}H_{10}$	8.23	0.40
Bis(2,3-epoxypropyl) ether $C_6H_{10}O_3$	9.6	3.00
Bromobenzene C_6H_5Br	8.98	0.70
Bromoethane C_2H_5Br	10.29	5.00
Bromoethyl methyl ether, 2- C_3H_7OBr	10	2.50
Bromoform $CHBr_3$	10.48	2.80
Bromopropane, 1- C_3H_7Br	10.18	1.30
Butadiene C_4H_6	9.07	0.83
Butadiene diepoxide, 1,3- $C_4H_6O_2$	10	4.00

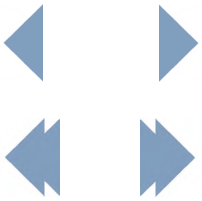
Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Butanol, 1- $C_4H_{10}O$	10.04	4.01
Butene, 1- C_4H_8	9.58	1.00
Butoxyethanol, 2- $C_6H_{14}O_2$	8.6	1.10
Butyl acetate, n- $C_6H_{12}O_2$	10	2.42
Butyl acrylate, n- $C_7H_{12}O_2$	8.6	1.50
Butyl mercaptan $C_4H_{10}S$	9.15	0.54
Butylamine, 2- $C_4H_{11}N$	8.6	0.90
Butylamine, n- $C_4H_{11}N$	8.71	1.00
Camphene $C_{10}H_{16}$	8.1	0.45
Carbon disulfide CS_2	10.08	1.40
Carbon tetrabromide CBr_4	10.31	3.00
Chlorine dioxide ClO_2	10.36	1.00
Chloro-1,3-butadiene, 2- C_4H_5Cl	8.79	3.20
Chlorobenzene C_6H_5Cl	9.07	0.45
Chloroethyl methyl ether, 2- C_3H_7ClO	9	2.60
Chlorotoluene, o- C_7H_7Cl	8.83	0.45
Chlorotoluene, p- C_7H_7Cl	8.69	0.50
Cresol, m- C_7H_8O	8.97	1.05
Cresol, o- C_7H_8O	8.97	1.05
Cresol, p- C_7H_8O	8.97	1.05
Crotonaldehyde C_4H_6O	9.73	1.00
Cumene C_9H_{12}	8.75	0.59
Cyclohexane C_6H_{12}	9.86	1.16
Cyclohexanol $C_6H_{12}O$	10	2.91
Cyclohexanone $C_6H_{10}O$	9.4	1.04
Cyclohexene C_6H_{10}	8.95	0.75
Cyclohexylamine $C_6H_{13}N$	8.37	0.98
Cyclopentane C_5H_{10}	10.52	4.00
Decane, n- $C_{10}H_{22}$	9.65	1.04

Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Diacetone alcohol $C_6H_{12}O_2$	9	0.80
Dibromochloromethane $CHBr_2Cl$	10.59	10.00
Dibromoethane 1,2- C_2H_4Br2	9.45	2.00
Dichloro-1-propene, 2,3- $C_3H_4Cl_2$	10.5	1.40
Dichlorobenzene o- $C_6H_4Cl_2$	9.06	0.50
Dichloroethene, 1,1- $C_2H_2Cl_2$	10	0.95
Dichloroethene, cis-1,2- $C_2H_2Cl_2$	9.66	0.80
Dichloroethene, trans-1,2- $C_2H_2Cl_2$	9.65	0.70
Dichloroethylene 1,2- $C_2H_2Cl_2$	9.65	0.75
Dicyclopentadiene $C_{10}H_{12}$	8	0.81
Diesel Fuel	8	0.75
Diethyl ether $C_4H_{10}O$	9.53	0.88
Diethyl sulphide $C_4H_{10}S$	8.43	0.50
Diethylamine $C_4H_{11}N$	8.01	1.40
Diethylaminopropylamine, 3- $C_7H_{18}N_2$	9	0.80
Diisobutylene C_8H_{16}	8.8	0.64
Diisopropyl ether $C_6H_{14}O$	9.2	0.68
Diisopropylamine $C_6H_{15}N$	7.73	0.70
Diketene $C_4H_4O_2$	9.6	2.20
Dimethoxymethane $C_3H_8O_2$	9.7	1.40
Dimethyl cyclohexane, 1,2- C_8H_{16}	9.41	1.05
Dimethyl disulphide $C_2H_6S_2$	7.4	0.23
Dimethyl ether C_2H_6O	10.03	1.30
Dimethyl sulphide C_2H_6S	8.69	0.50
Dimethylamine C_2H_7N	8.24	1.40
Dimethylaniline, NN- $C_8H_{11}N$	7.12	0.60
Dimethylethylamine, NN- $C_4H_{11}N$	9	0.80
Dimethylformamide C_3H_7NO	9.13	0.90
Dimethylheptan-4-one, 2,6- $C_9H_{18}O$	9.04	0.80

Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Dimethylhydrazine, 1,1- $C_2H_8N_2$	8.05	1.00
Dioxane 1,2- $C_4H_8O_2$	9.2	1.50
Dioxane 1,4- $C_4H_8O_2$	9.13	1.50
Diphenyl ether $C_{12}H_{10}O$	8.09	0.80
Divinylbenzene $C_{10}H_{10}$	8.2	0.40
Epichlorohydrin C_3H_5ClO	10.2	8.00
Epoxypropyl isopropyl ether, 2,3- $C_6H_{12}O_2$	10	1.10
Ethanol C_2H_6O	10.43	8.72
Ethanolamine C_2H_7NO	10.47	3.00
Ethoxyethyl acetate, 2- $C_6H_{12}O_3$	10	3.63
Ethyl acetate $C_4H_8O_2$	10.01	3.63
Ethyl acrylate $C_5H_8O_2$	10.3	2.00
Ethyl benzene C_8H_{10}	8.76	0.54
Ethyl butyrate $C_6H_{12}O_2$	9.9	0.95
Ethyl hexyl acrylate, 2- $C_{11}H_{20}O_2$	9	1.00
Furfural C_5H_4O2	9.21	1.39
Furfuryl alcohol $C_5H_6O_2$	9.9	2.00
Gasoline vapors	9.9	1.05
Gasoline vapors 92 octane	9.9	0.80
Glutaraldehyde $C_5H_8O_2$	9.6	0.90
Heptan-2-one $C_7H_{14}O$	9.33	0.73
Heptan-3-one $C_7H_{14}O$	9.02	0.75
Heptane n- C_7H_{16}	9.92	2.06
Hexan-2-one $C_6H_{12}O$	9.34	0.80
Hexane n- C_6H_{14}	10.13	3.28
Hexene, 1- C_6H_{12}	9.44	0.90
Hydrazine H_4N_2	8.93	3.00
Hydrogen sulfide H_2S	10.46	4.00
Hydroquinone $C_6H_6O_2$	7.94	0.80

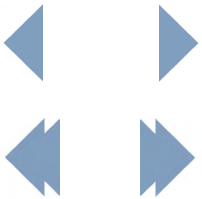
Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Iminodi(ethylamine) 2,2- $C_4H_{13}N_3$	9	0.90
Iminodiethanol 2,2'- $C_4H_{11}NO_2$	9	1.60
Indene C_9H_8	8.81	0.46
Iodine I_2	9.31	0.15
Iodoform CH_{I3}	9.25	1.50
Iodomethane CH_3I	9.54	0.40
Isobutane C_4H_{10}	10.57	8.00
Isobutanol $C_4H_{10}O$	10.12	3.50
Isobutyl acetate $C_6H_{12}O_2$	9.9	2.26
Isobutyl acrylate $C_7H_{12}O_2$	9.5	1.30
Isobutylene C_4H_8	9.24	1.00
Isobutyraldehyde C_4H_8O	9	1.20
Isooctane C_8H_{18}	9.86	1.09
Isopentane C_5H_{12}	10.32	6.00
Isoprene C_5H_8	8.85	0.70
Isopropanol C_3H_8O	10.17	4.35
Isopropyl acetate $C_5H_{10}O_2$	9.99	2.20
Isopropyl chloroformate $C_4H_7O_2Cl$	10.2	1.60
Jet Fuel JP-4	9	0.75
Jet Fuel JP-5	9	0.65
Jet Fuel JP-8	9	0.65
Kerosene	8	0.83
Ketene C_2H_2O	9.617	3.00
Mesitylene C_9H_{12}	8.41	0.34
Methacrylic acid C_4H_6O2	10.15	2.30
Methoxyethanol, 2- $C_3H_8O_2$	9.6	2.70
Methoxyethoxyethanol, 2- $C_5H_{12}O_3$	10	1.40
Methoxymethylethoxy-2-propanol $C_7H_{16}O_3$	9.3	1.30
Methoxypropan-2-ol $C_4H_{10}O_2$	9.4	3.00

Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Methoxypropyl acetate $C_6H_{12}O_3$	9	1.20
Methyl acetate $C_3H_6O_2$	10.27	5.19
Methyl acrylate $C_4H_6O_2$	10.25	3.40
Methyl bromide CH_3Br	10.54	1.90
Methyl cyanoacrylate $C_5H_5O_2N$	10	0.77
Methyl ethyl ketone C_4H_8O	9.51	0.77
Methyl isobutyl ketone $C_6H_{12}O$	9.3	0.80
Methyl isothiocyanate C_2H_3NS	9.25	0.60
Methyl mercaptan CH_4S	9.44	0.70
Methyl methacrylate $C_5H_8O_2$	9.7	1.60
Methyl propyl ketone $C_5H_{10}O$	9.39	0.79
Methyl sulphide C_2H_6S	8.69	0.50
Methyl t-butyl ether $C_5H_{12}O$	9.24	0.80
Methyl-2-propen-1-ol, 2- C_4H_8O	9.6	1.06
Methyl-2-pyrrolidinone, N- C_5H_9NO	9.17	0.90
Methyl-5-hepten-2-one, 6- $C_8H_{14}O$	9.4	0.80
Methylamine CH_5N	8.97	1.40
Methylbutan-1-ol, 3- $C_5H_{12}O$	9.8	3.40
Methylcyclohexane C_7H_{14}	9.85	1.10
Methylcyclohexanol, 4- $C_7H_{14}O$	9.8	2.40
Methylcyclohexanone 2- $C_7H_{12}O$	9.2	0.95
Methylheptan-3-one, 5- $C_8H_{16}O$	9.1	0.75
Methylhexan-2-one, 5- $C_7H_{14}O$	9.28	0.75
Methylhydrazine CH_6N_2	8	1.30
Methylpent-3-en-2-one, 4- $C_6H_{10}O$	9	0.72
Methylpentan-2-ol, 4- $C_6H_{14}O$	9.8	2.80
Methylpentane-2,4-diol, 2- $C_6H_{14}O_2$	9	4.00
Methylpropan-2-ol, 2- $C_4H_{10}O$	9.7	3.50
Methylstyrene C_9H_{10}	8.2	0.53



Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Mineral spirits	9	0.80
Naphthalene $C_{10}H_8$	8.14	0.44
Nitric oxide NO	9.27	8.00
Nitroaniline 4- $C_6H_6N_2O_2$	8.85	0.80
Nitrobenzene $C_6H_5NO_2$	9.92	1.70
Nitrogen trichloride NCl_3	10.22	1.00
Nonane, n- C_9H_20	9.72	1.27
Octane, n- C_8H_{18}	9.8	1.59
Octene, 1- C_8H_{16}	9.43	0.70
Pentan-2-one $C_5H_{10}O$	9.38	0.79
Pentan-3-one $C_5H_{10}O$	9.31	0.80
Pentandione, 2,4- $C_5H_8O_2$	8.85	0.75
Pentane, n- C_5H_{12}	10.35	7.89
Phenol C_6H_6O	8.51	1.20
Phenyl-2,3-epoxypropyl ether $C_9H_{10}O_2$	8.6	0.80
Phenylenediamine, p- $C_6H_8N_2$	6.89	0.60
Picoline, 3- C_6H_7N	9.04	0.90
Pinene, alpha $C_{10}H_{16}$	8.07	0.32
Pinene, beta $C_{10}H_{16}$	8.1	0.32
Piperylene C_5H_8	8.6	0.67
Propene C_3H_6	9.73	1.40
Propionaldehyde C_3H_6O	9.95	1.69
Propionic acid $C_3H_6O_2$	10.24	8.00
Propyl acetate, n- $C_5H_{10}O_2$	10.04	2.50
Propylene oxide C_3H_6O	10.22	7.00
Propyleneimine C_3H_7N	9	1.30
Pyridine C_5H_5N	9.25	0.75
Pyridylamine 2- $C_5H_6N_2$	9	0.80
Styrene C_8H_8	8.4	0.44

Volatile Gas	Ionisation Potential	Crowcon Correction Factor, 10.6ev Lamp only
Terpinolene $C_{10}H_{16}$	8.1	0.47
Tert-butanol $C_4H_{10}O$	9.8	2.63
Tetrabromoethane, 1,1,2,2- $C_2H_2Br_4$	10	2.00
Toluene C_7H_8	8.82	0.51
Toluene-2,4-diisocyanate $C_9H_6N_2O_2$	8.82	1.60
Trichloroethylene C_2HCl_3	9.45	0.62
Triethylamine $C_6H_{15}N$	7.5	0.90
Trimethylamine C_3H_9N	7.82	0.50
Trimethylbenzene mixtures C_9H_{12}	8.41	0.34
Trimethylbenzene, 1,3,5- C_9H_{12}	8.39	0.34
Turpentine $C_{10}H_{16}$	8	0.60
Undecane, n- $C_{11}H_{24}$	9.56	0.92
Vinyl acetate $C_4H_6O_2$	9.19	1.10
Vinyl bromide C_2H_3Br	9.8	1.00
Vinyl chloride C_2H_3Cl	9.99	2.10
Vinyl-2-pyrrolidinone, 1- C_6H_9NO	9	0.90
Xylene mixed isomers C_8H_{10}	8.56	0.43
Xylene, m- C_8H_{10}	8.56	0.44
Xylene, o- C_8H_{10}	8.56	0.60
Xylene, p- C_8H_{10}	8.44	0.46
Xylidine, all $C_8H_{11}N$	7.5	0.70



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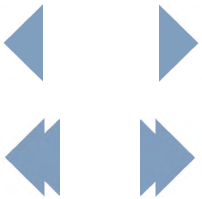

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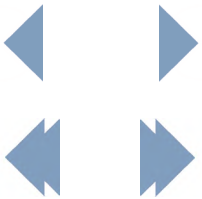

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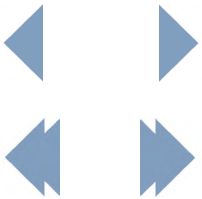

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