TX7000
GasHawk – Personal Gas Monitor

User Manual
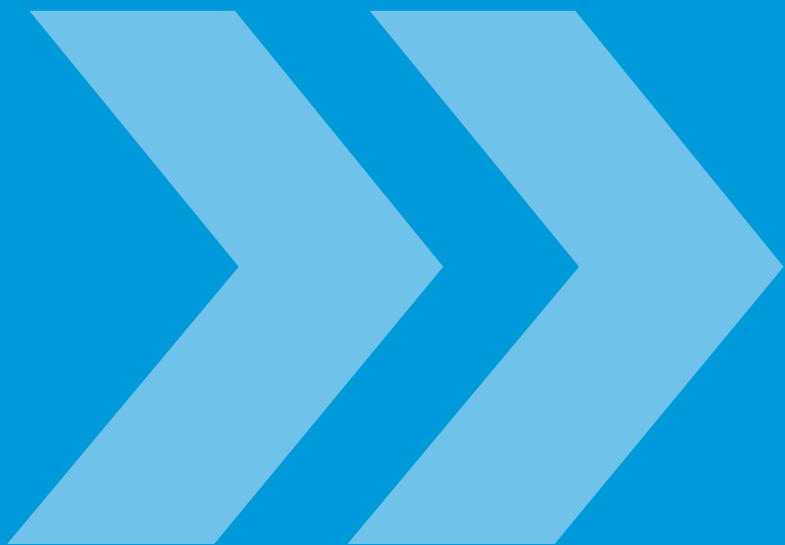
TROLEX

GasHawk TX7000
Contents

GasHawk TX7000
Contents

1. Product Overview

GasHawk is a hand-held personal gas monitor for safety protection of personnel working in potentially hazardous areas.

1.1 Main Features

- Impact resistant construction with resilient shockproof housing sealed to IP67 ingress protection

- Fully sealed gas ports and sounder

- Rechargeable Prismatic Lithium Ion battery with automatic wireless charging

- Hot–swap intrinsically safe battery pack which can be changed in the hazardous area

- Two large push-buttons for intuitive control of all field functions

- Up to six gas sensors in a choice of combinations of toxic and flammable gases

- High intensity wide-angle LED alarm warning indicator and loud audible alarm both modulated to signify alarm severity

- Infra red, non-contact data transfer communications

- Option with integrated remote sampling pump for confined space entry alert

- Large high definition illuminated LCD display providing a bright, clear readout and intuitive message interface

- HawkEye PC application for data log download and setup spreadsheet

- Active atmospheric pressure compensation

- Up to 64 days automatic data logging

1.2   Functions

- Spot reading or continuous reading mode

- Auto Zero

- Two independent adjustable set point gas alarms for HIGH and LOW with function selection for each channel

- Peak signal retention

- Automatic STEL and TWA calculations as defined by EH40 with alarm warnings

- Continuous data logging with time and date stamp and event record

- Time of day clock and calendar with display

- Language options to specification

- Automatic prompts for bump test and calibration due

- Password protected setup controls

- Active battery management for continuous charging, contents display and condition warning alarms

- Pump function alarms

- Confidence beep and flash

1.3   Accessories

- Wireless battery charger powered from a universal voltage mains power supply

- Multi-way charging stations in vertical or horizontal formats

- Bump test station with gas application button for convenient and rapid gas response testing – can be used in the hazardous area subject to local regulations

- Universal docking station – all support functions in one convenient package; bump test, calibration wireless charging and infrared data link for PC implemented setup or data log download

- Complete range of carrying accessories

1.4   Credentials

- International certifications for use in underground mining and industrial hazardous areas with EMC protection

2. Technical Information

Operating temperature:	-20°C to +50°C
Storage temperature:	-20°C to +60°C
Humidity:	0 to 95% RH (non-condensing)
Pressure:	800 mBar to 1100 mBar ambient
Housing:	Moulded polymer with integral resilient over-mould
Ingress protection:	IP67
Nett weight:	350g, 375g with pump
Dimensions:	L156 x W75 x H35
Battery:	Sealed prismatic Lithium Ion with wireless charging. Hot-swap intrinsically safe battery pack can be changed in the hazardous area.
Battery run time:	168 hours with LED IR and electrochemical cells installed 20 hours with catalytic and electrochemical sensor installed
Battery charge time:	6 hours with automatic charge management for continuous standby charging
Display:	52mm x 42mm high definition graphic LCD with automatic power-down and LED rear illumination
Controls:	Two sealed push-buttons for all field functions, profiled for operation with gloved hands
Alarms:	• Flashing wide-angle LED indicator and audible alarm, modulated indication of gas risk present • Audible alarm 95dB at 300mm • Low battery warning • Confidence tone and flash at user defined interval with green flashing LED indicator • Calibration and bump test due prompt • STEL and TWA preset alarms
Data functions:	• Automatic data log of sensor signals, alarm events and parameter changes; 30-64 days dependant on configuration • Real-time clock and display showing HH:MM • Language options to user specification • Peak signal retention for each gas sensor • STEL and TWA auto calculation with prescribed alarm level in accordance with EH40 standards
Pressure compensation	• Active atmospheric pressure compensation for the O_2, CO_2 and infrared CH_4 sensors
T90 response time	• 30 seconds nominal (dependent on the gas type)

2. Technical Information

Setup functions:	• Calibrate ZERO and SPAN • Alarm level 1 and alarm level 2 • Continuous ON mode selection • Password security protection • Display invert • Auto ZERO enable • Gas units of display • Calibration alert interval • Bump test alert interval • Disable a gas sensor • Main display format • Confidence alert • Date and time • Language options • STEL/TWA function • LEL equivalence
PC Communications:	HawkEye PC application for USB data exchange when the GasHawk is loaded into a TX7005 Universal Docking Station. • GasHawk cloning • Data log download • Historical data analysis • Service records • Printout requests
Diagnostics:	• Individual gas sensor display • Calibration due indicator • Bump test due indicator with days remaining • Service due indicator with days remaining • Battery power remaining • Alarm test • Test gas report • Sensor fault • LED fault • Audible fault • Vibration fault • Pump fail

Product options:

TX7000 . ☐☐ . ☐☐ . ☐☐ . ☐☐ . ☐☐

ATEX/IECEx Group I		19
ATEX/IECEx Group II		20

No pump		00
With pump		01

SENSOR A

No Sensor		00
O_2	25% v/v	01

SENSOR B

No Sensor		00
CO	500 ppm	01
CL_2	10 ppm	02
H2	1000 ppm	03
H_2S	100 ppm	04
NO	250 ppm	05
NO_2	20 ppm	06
SO_2	20 ppm	07
CO + H_2S	500 ppm / 200 ppm	08
H_2S + SO_2	100 ppm / 20 ppm	09
CO	2000 ppm	10

SENSOR C

No Sensor		00
CO	500 ppm	01
CL_2	10 ppm	02
H2	1000 ppm	03
H_2S	100 ppm	04
NO	250 ppm	05
NO_2	20 ppm	06
SO_2	20 ppm	07
CO	2000 ppm	08

SENSOR D

No Sensor		00
CH_4	5% v/v IR	04
CH_4	100% LEL (4,4%) IR	05
CH_4	100% LEL (5%) IR	06
CH_4 + CO_2	5% v/v / 5% v/v	07
CH_4 + CO_2	100% LEL (4,4%) / 5% v/v	08
CH_4 + CO_2	100% LEL (5%) / 5% v/v	09
CH_4	5% v/v	10
CH_4	100% LEL (4.4%)	11
CH_4	100% LEL (5%)	12

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3. Preparation

3.1 Contents

No Pump   TX7000.xx.xx.xx.xx.xx.00

1 x GasHawk instrument
Complete with battery pack

1x Test gas hood with flexible tube – 1m long

1x Workwear clip

1x User manual

Checkpoint
• Check that the gas sensor make-up of the instrument is correct for the gas risks anticipated.
• View the gas sensor make-up in the MAIN DISPLAY when the instrument is switched on.

With Pump   TX7000.xx.xx.xx.xx.xx.01

Additional items included:
1x Pump hood complete

1x 3m long flexible FKM suction tube with fittings

1x Hydrophobic line filter

3.2 Charge the battery

Charger type:	• **TX7001 Charger** • **TX7005 Universal Docking Station**
Power supply:	**Universal mains power supply** **90 – 265V AC 50/60Hz 250mA**
Initial charge:	**10 hours**
Routine charge:	**6 hours**
Charge cycles:	**500 approx**

((●))	⚠️	⏻
>> ▭ = ▭	— — — Fault	——— On

≪	**16:30**	
CH4	%v/v	**0.0**
O2	%v/v	**20.9**
CO	ppm	**0.0**
H2S	ppm	**0.0**
CO2	%v/v	**0.04**
NO	ppm	**0.0**
Battery Charging		

Checkpoint

- Charge periodically to maintain battery condition
- GasHawk may be docked on permanent charge standby
- Only Trolex GasHawk chargers may be used
- Do not charge in the hazardous area
- Transport regulations demand that the TX7010 spare battery pack must be shipped in a fully discharged state. Charge before use.
- Spare batteries are best stored in a low state of charge

3.3 Change the battery

3.4 Clock update

The clock and calendar may need to be updated.

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4. Controls and Indicators

4.1 Layout

Green On LED

Pump inlet cover

Red Alarm LEDs

Gas entry port

Push buttons

LCD readout

Mounting for carrying clips

Hot swap intrinsically safe battery pack

Wireless charging zone
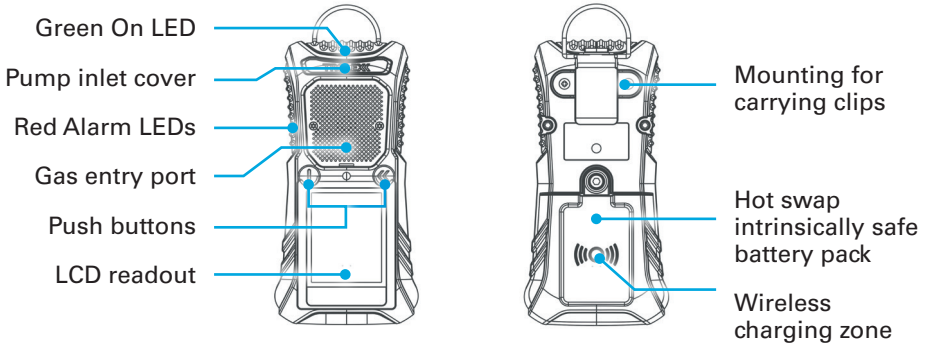
4.2 Main Function Buttons

ON/OFF or select a function

Scroll menus

Double click

Click and hold

Click both together

4.3 Short-cut button functions

	Invert display		Click and hold
	Adjust display contrast		Click and hold both to access...
			...then click to adjust
	Return to MAIN DISPLAY		Click both from any point in a MENU
	Start/Stop pump		Double click
	Section 5.4 >>		

5. Operation

5.1 Menu map

Section 6

```
《        16:30

Switch off            ❶
Facilities            ❶
◀ Back




🔒            ⊙━ 12 DAYS
```

```
            Facilities

Zero in clean air        ❶
Bump test                ❶
Extended bump test       ❶
Calibrate                ❶
Zero CO2 in N2           ❶
◀ Back
```

MAIN DISPLAY
Section 5.3

```
《        16:30

CH4    %v/v    2.5

O2     %v/v    20.9

CO     ppm     50

H2S    ☠       21



🔒            ⊙━ 12 DAYS
```

Section 7

```
              View

About                    ❶
Peak                     ❶
TWA                      ❶
STEL                     ❶
Alarm settings           ❶
Test gas settings        ❶
Bump & Cal diary         ❶
Quick guide              ❶
◀ Back
```

Section 8

```
              Setup

Preferences              ❶
Calibration mode         ❶
CH4                      ❶
O2                       ❶
CO                       ❶
H2S                      ❶

Reset LEL over range     ❶
◀ Back
```

5.2   Switch On/Off

Switch ON

- Hardware condition check list
- Alarm settings for each sensor
- Sensor warming up

- Main display

Switch OFF

| TROLEX |
| 15 A |
| Gas... |
| Versi... 1... |

Hardware check
- LED
- SOUND
- VIBRAT...
- BATTER...
- PUMP

Alarms
- HIGH
- LOW
- STEL
- TWA

% v/v   22.5

Warming up
CH4	...
O2	...
CO	...
H2S	...

《   16:30
CH4   % v/v   2.5
O2
CO
H2S

《   16:30
Switch off
Facilities
‹ Back

12 DAYS
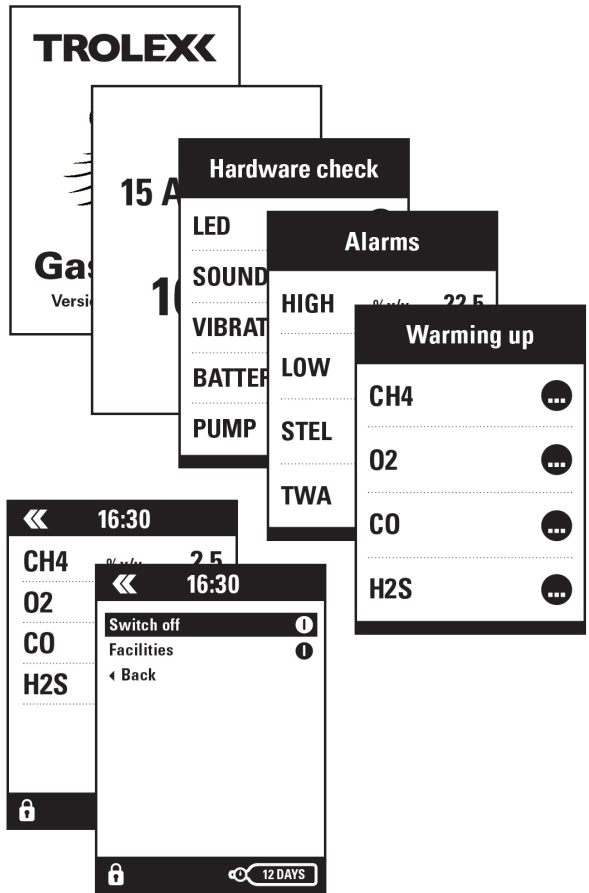
Checkpoint

- The switch ON sequence may be interrupted by FAULT messages.
- If BUMP TEST or CALIBRATE have been MANDATED any further operation of the instrument will be suspended and the FACILITIES screen displayed for resolution.
- Auto zero in clean air may occur in the sequence, where it has been previously set up
- The CONDITION CHECK sequence will not function if the battery pack is less than 50%

5.3 Main display

Function heartbeat

Type of gas

Units of gas

Continuous mode

Clock

Gas concentration

Low alarm

High alarm

Days remaining to calibration

CH4	%v/v	2.5
O2	%v/v	20.9
CO	ppm	50
H2S	☠	21

12 DAYS

Four Gas Format

CH4	%v/v	22.5
O2	%v/v	55
CO	!	2.5
H2S	ppm	15
SO2	ppm	3

12 DAYS

Five Gas Format
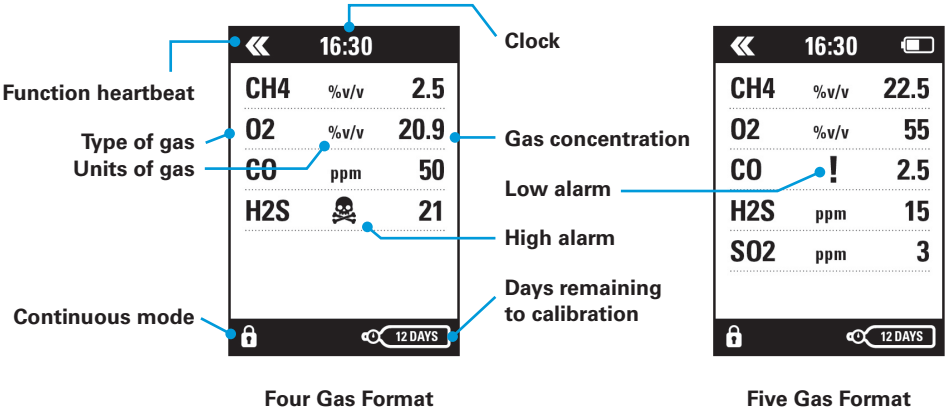
Checkpoint

System alerts

System alerts may occur at this point if a fault is present and will prevent any further operation.

⚠ **LED fault**

Display illumination

The display illumination will automatically switch down to low level standby after a short period. It can also be setup to switch completely OFF dependant upon which power saving mode is selected.

🄋 Click to restore display

Alternative overview format

16:30

△ SAFE

12 DAYS

5.3.1 Alarms and messages

Gas alarms

Each gas sensor fitted has two independently adjustable alarm warning levels.

Some toxic gas sensors also have an independently adjustable TWA alarm warning level, plus an independently adjustable STEL alarm warning alarm warning level.

		LED	Audible	Vibrator	Display (Typical)
GAS	Low	⚡ • • • ⚡	♪ • • • ♪	Z • • • Z	CO ❗ 10
	High	⚡⚡⚡	♪ ♪ ♪	Z • • • Z	CO ☠ 20
TWA	High	⚡⚡⚡	♪ ♪ ♪	Z • • • Z	CO △TWA 30
STEL	High	⚡⚡⚡	♪ ♪ ♪	Z • • • Z	CO △STEL 200
MUTE	🅾	⚡⚡⚡	————	————	CO ☠ 20

Oxygen sensors have two independently adjustable CRITICAL alarms:
one for HIGH (Excess)
one for LOW (Depletion)

		LED	Audible	Vibrator	Display (Typical)
OXYGEN	Low ❗	⚡⚡⚡	♪ ♪ ♪	Z Z Z	O2 ☠ 19
	High ☠	⚡⚡⚡	♪ ♪ ♪	Z Z Z	O2 ☠ 23

Checkpoint

- LOW alarms can be set up to AUTO RESET or to LATCH

- HIGH alarms will always LATCH

- Audible alarms can be MUTED

- LATCHED alarms can be RESET when the gas concentration has receded   **Section 8.1.6 >>**

5.3.2   System and diagnostic alerts

	LED	Audible	Vibrator	Display
Confidence alert	⚡ • • • ⚡	♪ • • • ♪	—	—
Sensor fault			—	❗ Sensor fault
LED fault				❗ LED fault
Audible fault				❗ Audible fault
Vibrator fault				❗ Vibrator fault
Battery low Battery min Shut down	⚡⚡ • • • ⚡⚡	♪♪ • • • ♪♪	Z —— ——	🔋 🔋❌
Days to calibration 1 day to calibration Overdue	— — —	— — —	— — —	12 days 1 day 0 days
Continuous ON mode	—	—	—	🔒
Pump blocked	⚡	♪	—	🚫 Pump blocked
Calibration is overdue and is mandated				❗ Calibration required
Bump test is overdue and is mandated				❗ Bump test required

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5.4   Pump operation

Some versions of the GasHawk are fitted with an integral pump for assisted gas infusion in confined space entry applications.
TX7000.xx.xx.xx.xx.xx.01

1. Lift the pump inlet cover

2. Clip the pump hood over the gas entry grill ensuring that the gas entry inlet is fully engaged

3. Connect the suction tube

4. Double click to Start/Stop the pump

Checkpoint

- A pump alarm will be generated if the suction tube is blocked, or the filter in the pump hood is blocked.

  Section 10.3 >>

- The increased power requirement of the pump will reduce the normal battery run-time dependant on frequency of use.

- Gas concentration reading can be diluted in conditions where air may be drawn into the intake pipe along with the subject gas.

Telescopic Probe

Trolex accessory TX7012 Telescopic Probe can be used to support the flexible suction tube to aid access into restricted locations and confined space applications:

- Extend the Telescopic Probe to the required length

- Push the suction tube through the clamping ring into the Telescopic Probe and feed-in up to a positive stop.

- Hand tighten the clamping ring to hold the tube in position

Checkpoint
• When extending or collapsing the Telescopic Probe, move each section one-at-a-time, to the desired length. Rapid end-to-end pulling and pushing may stress and damage the sliding couplings.
• Apply light lubricating oil to the Probe when required to ensure smooth operation.

Line Filter

A disposable Hydrophobic line filter should be fitted to the end of the flexible suction tube or the Telescopic Probe to prevent water or particle ingress.

6. Facilities

Selection and control of the ancillary functions when required
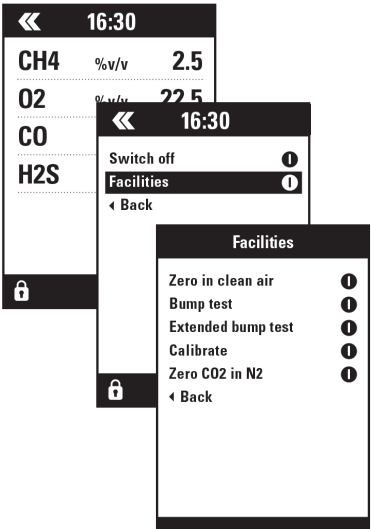
6.1 Enter a password

A password may be requested for Facilities menu if security is active. Factory default 1959.

≪	Enter a digit	▢ ▢ ▢ ▢
▯	Confirm and step	

6.2   Zero in clean air

All gas sensors will be simultaneously reset to Zero assuming clean air.

Zero in clean air can also be setup to occur automatically during the switch ON routine

Section 5.2 and 8.1.13 >>

- Progressive display of each sensor status

- The SUCCESS event is logged in the main log register

Warming up		
CH4	%v/v	•••
O2	%v	
CO	PP	
H2S	PP	
Please		

Zero in clean air		
CH4	✓	PASS
O2	✓	
CO	✓	
H2S	✓	
Please		

Zero in clean air

Success

✓

Any key to return
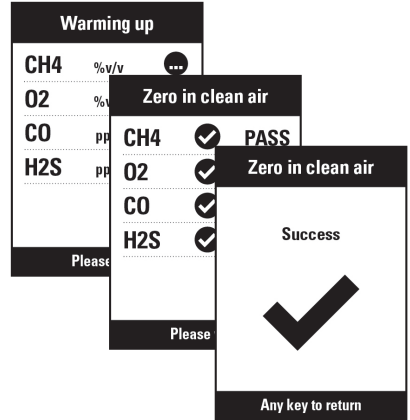
Individual sensor result listing, alternates with a FAILED alert

The FAILED alert is logged in the main log register

CALIBRATE THE INSTRUMENT AS SOON AS POSSIBLE

Zero in clean air

Failed

✗

Any key to ret

Zero in clean air		
CH4	✓	PASS
O2	✗	FAIL
CO	✓	PASS
H2S	✓	PASS

Any key to return
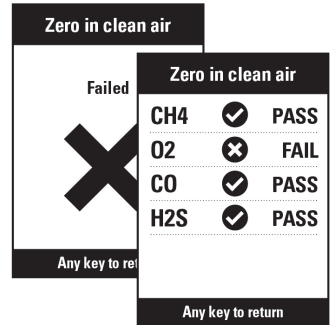
Checkpoint

- IF CALIBRATE has been MANDATED in the setup menu, it will not be possible to use the instrument on the next occasion that it is switched ON, until calibration has been performed.

Section 8.2.2 >>   **Section 8.2.3 >>**

Calibration required

!

Calibrate before use

Any key to return

Checkpoint

- Ensure that the local atmosphere is clean and free of subject gases

- Zero in clean air will set a CO_2 sensor to 0.4% CO_2

- Options are available to set the oxygen 'zero' at either 20.8% v/v or 20.9% v/v

Section 8.4 >>

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6.3 Bump Test

Apply a test gas for each type of sensor installed to check the overall functional response.

The test gas concentration values must be initially set up and must concur with the values marked on the gas canister.

Section 8.2.4 >>

The Bump Test event can be OPTIONAL or MANDATED
Section 8.2.1 and 7.7 >>

The BUMP TEST DUE interval can be setup
Section 8.2.6 >>

Connect on of the gas ports of the Test Gas Hood to the Test Gas Canister

Switch on gas supply

Each gas sensor attains 30% full scale value within 30 seconds

The SUCCESS event is logged in the Bump and Calibration diary, and in the Main Log Register

Individual sensor results log alternates with a FAIL alert

The FAILED event is logged in the bump and Calibration diary, and in the main Log Register

CALIBRATE THE INSTRUMENT AS SOON AS POSSIBLE
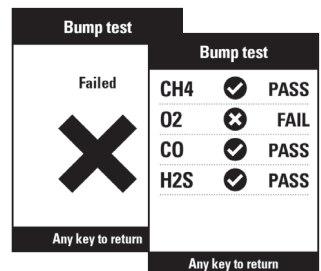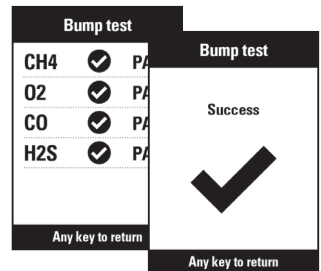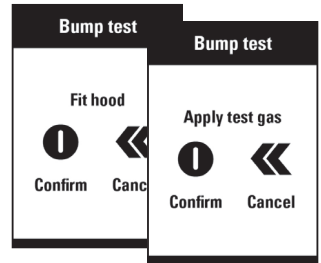
Checkpoint

- If CALIBRATE has begun MANDATED in the setup menu, it will not be possible to use the instrument on the next occasion that it is switched ON, until calibration has been done

  Section 8.2.2 >>   **Section 8.2.3 >>**

- All ACTIVE sensors must qualify for a successful bump test

- Audible and visual alarms will be generated during the bump test where alarm set-points are exceeded.

- A second gas port is available on the test gas hood for exhausting the gas to a ventilated area if required.

- The bump test procedure described assumes a single gas canister - one for each gas sensor. Mixed gas sources may also be used, calibrated for the range of sensors installed.

CH_4
+
O2
+
CO
+
H_2S
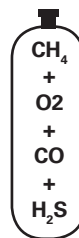
6.4 Extended bump test

An extended bump test is the same procedure as a standard bump test.
Sensor response qualification: Attain 90% FS within 60 seconds.

Checkpoint

- A longer bump test is inherently more accurate, as response is extended over a wider scale range.

- Test time will be increased, so more test gas will be consumed.

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6.5 Calibrate

There are two methods of calibration using calibrated test gas:

1. Use a Trolex TX7005 Universal Docking Station

2. Manual calibration using the standard test gas hood supplied with the instrument.

- The test gas concentration values must be initially set up and must concur with the values marked on the gas canister.

  Section 8.2.1 and 7.6 >> The CALIBRATION event can be OPTIONAL or MANDATED.

  Section 8.2.2 >> **Section 8.2.3 >>**

- The CALIBRATION DUE interval can be setup.

  Section 8.2.5 >>

  ≪ Scroll to MANUAL CALIBRATION

  ❶ Select

```
           Calibration
 Insert into ATU          ❶
 Manual calibration       ❶
 ◄ Back
```

- Connect one of the gas ports of the Test Gas Hood to the Test Gas Canister

```
      Calibrate
      Fit hood
   ❶        ≪
 Confirm   Cancel
```

```
         Calibrate
       Apply test gas
     ❶          ≪
   Confirm     Cancel
```

- Switch on gas supply

- Each gas sensor is calibrated within a fixed time limit

- The SUCCESS event is logged in the Bump and calibration diary and the main Log Register.
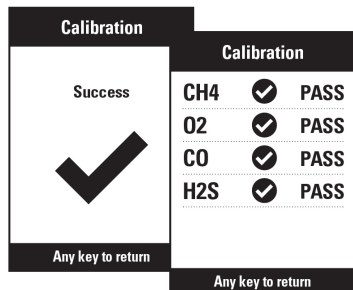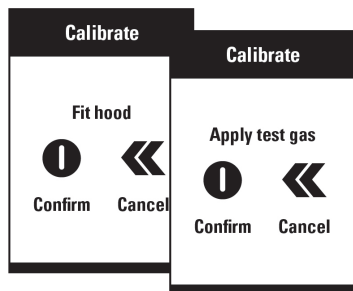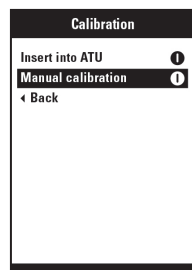
```
       Calibration
        Success

          ✔

   Any key to return
```

```
         Calibration
    CH4   ✔   PASS
    O2    ✔   PASS
    CO    ✔   PASS
    H2S   ✔   PASS

      Any key to return
```

- Individual sensor results listing alternates with a FAIL alert

- The FAILED event is logged in the Bump and Calibration Diary, and in the Main Log Register

- SERVICE THE INSTRUMENT AS SOON AS POSSIBLE

Calibration	
CH4	FAIL
O2	PASS
CO	PASS
H2S	FAIL

Calibration
Failed

Any key to return

Checkpoint

- A second gas port is available on the test gas hood for exhausting the gas to a ventilated area if required.

- The calibration procedure described assumes a single gas canister - one for each gas sensor. Mixed gas sources may also be used calibrated for the range of sensors installed.

CH_4 + O2 + CO + H_2S

TROLEX
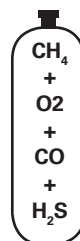
6.6 Zero CO2 in N2

When a CO2 sensor is fitted it should be reset to zero using Nitrogen gas in place of the normal fresh air method.

« Scroll to Zero CO2 in N2

❶ Select

- Warm up

- Connect one of the gas ports of the Test Gas Hood to the Test Gas Canister

- Switch ON gas supply

- The gas sensor will zero within a fixed time period

- The SUCCESS event is logged in the Bump and Calibration diary and the main Log Register

- Individual sensor results listing, alternates with a FAIL alert

- The FAILED event is logged in the Bump and Calibration Diary, and in the Main Log Register

- SERVICE THE INSTRUMENT AS SOON AS POSSIBLE
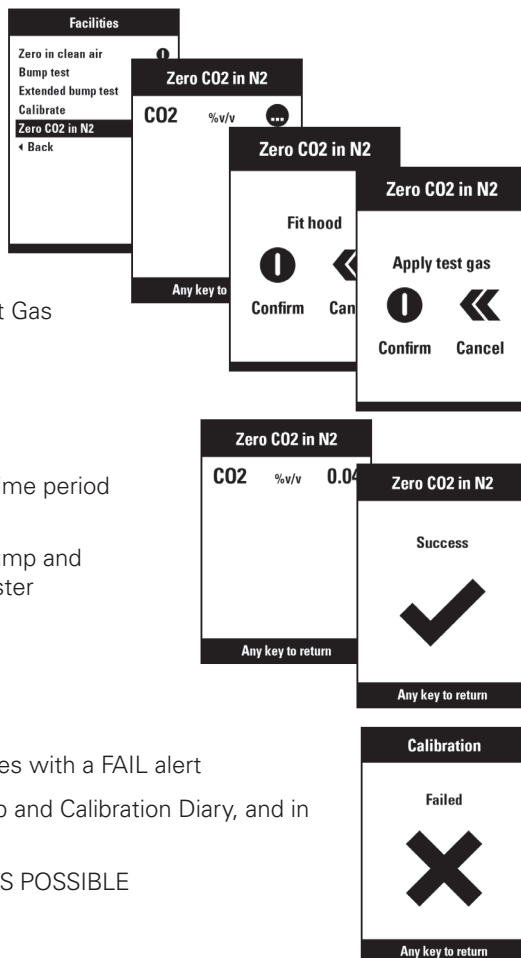
Checkpoint

- A second gas port is available on the test gas hood for exhausting the gas to a ventilated area if required.

7. View

- Double click to view menu

- System information, setup data and current stored data can be viewed.

- Displayed data cannot be changed

- Auto step BACK after a short period

View	
About	❶
Peak	❶
TWA	❶
STEL	❶
Alarm settings	❶
Test gas settings	❶
Bump & Cal diary	❶
Quick guide	❶
◄ Back	

About	
Hardware version	
Rev C	
Software Version	
v1.5.9e	
Gas Configuration	
CH4	O2
CO	H2S
Days	
Bump Due	146 Days

7.1 ABOUT

- View system data and software versions

7.2 PEAK

- View peak sensor values attained since last reset

- Reset PEAK values to Zero

Peak		
CH4	%v/v	0.0

TWA		
CH4	%v/v	0.0

STEL		
CH4	%v/v	0.0
O2	%v/v	0.0
CO	ppm	0.0
H2S	ppm	0.0
Reset STEL		❶
◄ Back		

7.3 TWA

- View the TIME WEIGHTED AVERAGE accumulated values

- Reset TWA accumulated values to Zero

7.4 STEL

- View SHORT TERM EXPOSURE LIMIT accumulated values

- Reset STEL accumulated values to Zero

Checkpoint

A PASSWORD may be required for the reset PEAK, reset TWA and reset STEL functions if security is active

Factory default: 1959

Section 8.1.8 >>

7.5   Alarm Settings

- Select which sensor is to be viewed

- Momentarily trigger all alarm set points to test response of the alarm systems

CH4 and LEL alarms

- View the preset alarm levels

- View the alternative flammable gas substitute

- The sensor has been DISABLED and is not active ☑

Section 8.3 >>

O2 Alarms

- View the preset alarm levels

- View selected clean air default value

- The sensor has been DISABLED and is not active ☑

Section 8.4 >>

CO Alarms

- View the present alarm levels

- View the TWA and STEL alarm levels

- The sensor has been DISABLED and is not active ☑

Section 8.5 >>

H2S Alarm levels

- View the preset alarm levels

- View the TWA and STEL alarm levels

- The sensor has been DISABLED and is not active ☑

Section 8.6 >>

Alarm settings	
CH4	❶
O2	❶
CO	❶
H2S	❶
Trigger all alarms	❶
◄ Back	

CH4		
LOW alarm	%v/v	2.0
HIGH alarm	%v/v	2.0
LEL gas		Methane
Sensor disabled		☐
◄ Back		

O2		
LOW alarm	%v/v	18.0
HIGH alarm	%v/v	23.0
Clean air default	%v/v	
Sensor disabled		☐
◄ Back		

CO		
LOW	%v/v	75
HIGH	%v/v	100
TWA	ppm	xx
STEL	ppm	xx
Sensor disabled		☐
◄ Back		

H2S		
LOW	%v/v	75
HIGH	%v/v	100
TWA	ppm	xx
STEL	ppm	xx
Sensor disabled		☐
◄ Back		

Trigger all alarms

7.6 Test Gas Values

- View the preset expected test gas values to be applied to each gas sensor

- A test gas has been INCLUDED ☑

  Section 8.2.4 >>

Test gas settings		
CH4	%v/v	☐
O2	%v/v	☐
CO	ppm	☐
H2S	ppm	☐
◄ Back		

7.7 Bump and Calibration diary

View information about:

- Bump Test and Calibration status
- Last Bump Test date
- Days remaining to next Bump Test
- Last Calibration date
- Calibration Due Days remaining

Bump & Calibration diary	
CH4	❶
O2	❶
CO	❶
H2S	❶
◄ Back	

7.8 Quick guide

- Brief overview of push button operations

⦗«⦘	Scroll down	❶ + ⦗«⦘	Back from a menu
❶	Select	⦗«⦘	**Hold:** Invert display
⦗«⦘ / ⦗«⦘	View	❶ + ⦗«⦘	**Hold:** Access contrast
❶ + ⦗«⦘	Setup		
❶ / ❶	Pump stop-start		

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8. Setup

Click both for setup menu **❶ + ⫷**

- Setup the functional parameters of GasHawk

- Setup the calibration parameters

- Setup each sensor alarm function

- Reset a LEL catalytic sensor that has previously 'Latched' after an over-range condition

Setup	
Preferences	❶
Calibration mode	❶
CH4	❶
O2	❶
CO	❶
H2S	❶
Reset LEL over range	❶
◁ Back	

Checkpoint

- A password will be requested for access to the SETUP menu if security is enabled

[●] [●] [●] [●] Factory default: 1959

Section 8.1.8 and 8.1.9 >>

8.1 Preferences

Select which functions are to be setup to user preference

Preferences	
Continuous on mode	☐
Main display	❶
Confidence beep	❶
Confidence flash	❶
Alarm latch	☐
Disable vibrator	☐
Require password	❶
Change password	❶
◁ Back	
▼	

Preferences	
Time & date	❶
Username	❶
Language	❶
STEL period	15
Autozero	☐
Invert display	☐
LEL units	%v/v
Factory default	❶
LCD powersave	☐
◁ Back	

8.1.1 Continuous ON mode 🔒

It will not be possible to switch OFF GasHawk

A Require Password will be automatically activated to prevent ☑
access to SETUP functions

8.1.2 Main display

Change the normal main display format to an overview SAFE icon ☑

Section 5.3 >>

8.1.3 Confidence beep ♪

Set the interval of the confidence beep

| OFF |
| 15s |
| 30s |
| 45s |
| 60s |

8.1.4 Confidence flash ⚡

Set the interval of the confidence flash

| OFF |
| 15s |
| 30s |
| 45s |
| 60s |

8.1.5 Disable vibrator Ψ

Switch the vibrator OFF for power saving ☑

8.1.6 Alarm latch

Set LOW alarm signals to LATCH until reset
(a HIGH alarm signal will always LATCH until reset) ☑
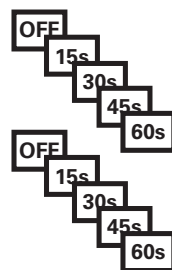
Checkpoint

Click and hold to MUTE an audible alarm

Click and hold to RESET a LATCHED alarm when the gas concentration has receded.

8.1.7 Invert display

180° display rotation for inverted viewing ☑

8.1.8 Require password

A password will be requested where security is applied ☑

TROLEX

8.1.9 Change password

Enter a four digit password

 Enter digits

 Confirm and step

8.1.10 Time & Date

Set the time and date

 Step through each field

 Select a field

 Increment the characters

 Set Date/Time

8.1.11 Language

Select the display language

8.1.12 STEL Period

Set the STEL sampling period
Selectable: 5 to 15 minutes

8.1.13 Auto zero start up

- Auto zero of all sensors will be done during the start up period when GasHawk is switched ON

- An additional auto zero progress display will appear in the start up routine

---

Change password

Factory default   **1** **9** **5** **9**

« Enter digit
❶ Confirm and step

Save
◂ Back

Time & date

Time: **HH**:MM
Date: DD:MM:YYYY
Set date/time   ❶

English
Russian
Chinese
Other

---

5 • • • 15

☑

8.1.14 LEL Units

Select the units of LEL for flammable gas sensors

```
%v/v
    %LEL
```
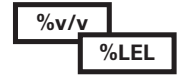
8.1.15   Factory default

 Request factory reset default

 Click to confirm

```
Factory default

Are you sure

Confirm   Cancel
```
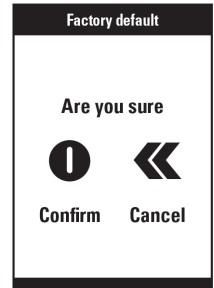
8.1.16   LCD power save

The LCD display will automatically switch OFF completely
after a short period to save battery power

☑

Checkpoint
Click to restore the display illumination

TROLEX

8.2 Calibration mode

Setup the required calibration and bump test operating parameters

8.2.1 Mandate bump ☑

GasHawk operation will be suspended when next switched on until a bump test is done, if the bump test interval has expired

8.2.2 Mandate calibration if fail ☑

GasHawk operation will be suspended when next switched on, until a calibration is done, if a gas sensor is out of range

8.2.3 Mandate calibration when due ☑

GasHawk operation will be inhibited, when next switched ON, until a calibration is performed, if the calibration interval has expired

8.2.4 Test gas values

Set up the values of each test gas concentration that will be applied to the sensors for bump test and calibration purposes

A test gas can be excluded where a mixed test gas canister is being used, where one or more of the required test gases are absent

≪	Scroll to the gas value to be setup e.g.	**1.3**
❶	Highlight the gas value	**1.3**
≪	Increment a digit	**2.3**
❶	Traverse the digits	**2.30**

Checkpoint

❶≪ Click both to delete last digit **2.3**

The available gas value adjustment range is limited to safe minimum and maximum limits appropriate to each gas type. Invalid gas value settings will not be entered.

Exit highlight

Scroll to gas status

Click to INCLUDE a gas

Repeat setup for each gas

8.2.5 Calibration intervals

Set up the calibration time intervals to be applied to each gas sensor

Calibration intervals	
CH4	180 days
O2	180 days
CO	180 days
H2S	180 days
◄ Back	

Scroll to the sensor to be set up

Highlight the time interval   **180 days**

Increment the interval   **7 days**

Exit highlight

Repeat setup for each sensor

7 days
30 days
60 days
180 days
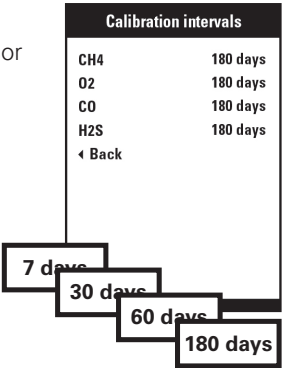
Checkpoint

Days remaining to calibration also displayed on the MAIN DISPLAY

12 days

Section 5.3 >>

8.2.6 Bump test intervals

Setup the bump test time intervals to be applied to each gas sensor.

Bump test intervals	
CH4	180 days
O2	180 days
CO	180 days
H2S	180 days
◄ Back	

Scroll to the sensor to be set up

Highlight the time interval   **180 days**

Increment the interval   **7 days**

Exit highlight

Repeat setup for each sensor

7 days
30 days
60 days
180 days

TROLEX
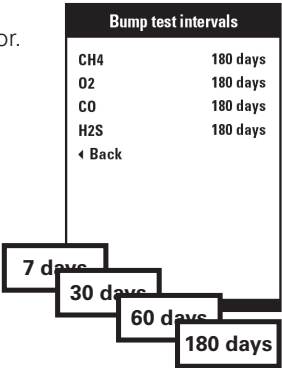
8.3 CH4 LEL alarms

Set the low alarm level
Set the high alarm level
Select an alternative flammable gas
Disable the sensor when not active ☑

CH4 alarms

LOW alarm	%v/v	2.0
HIGH alarm	%v/v	2.0
LEL gas		Methane

Disable sensor ☐
‹ Back

Methane
Propane
Butane
Ethylene
Propene
Acetylene
Cyclopropane
Cyclohexane
Benzene
Toluene

8.4 O2 alarms

Set the low alarm level
Set the high alarm level
Select clean air default value
Disable the sensor when not active ☑

O2 alarms

LOW alarm	%v/v	2.0
HIGH alarm	%v/v	2.0
Clean air default		

Disable sensor ☐
‹ Back

8.5 CO alarms

Set the low alarm level
Set the high alarm level
Disable the sensor when not active ☑

CO alarms

LOW alarm	%v/v	2.0
HIGH alarm	%v/v	2.0
TWA	%v/v	2.0
STEL	%v/v	2.0

Disable sensor ☐
‹ Back

8.6 H2S alarms

Set the low alarm level
Set the high alarm level
Disable the sensor ☑

H2S alarms

LOW alarm	%v/v	2.0
HIGH alarm	%v/v	2.0
TWA	%v/v	2.0
STEL	%v/v	2.0

Disable sensor ☐
‹ Back

8.7 Reset LEL alarms

A catalytic flammable gas sensor will LATCH in the HIGH condition when the LEL point is exceeded.

Reset when the gas has receded

8.8   Default alarm levels

The follow are default alarm values as programmed by Trolex. These are taken from accepted industry best-practice at time of publishing, but should always be reviewed in accordance with local legislation prior to deployment of GasHawk

Gas	Low alarm	High alarm	STEL	TWA
O2	19.5% v/v	23% v/v	N/A	N/A
CO (500ppm)	25ppm	100ppm	100ppm	25ppm
CO (2000ppm)	25ppm	100ppm	100ppm	25ppm
CH4 (all sensors)	0.5% v/v	1.5% v/v	N/A	N/A
H2S	10ppm	15ppm	15ppm	10ppm
CO2	0.5% v/v	1.5% v/v	0.5% v/v	1.5% v/v
NO	25ppm	100ppm	15ppm	5ppm
NO2	2ppm	5ppm	5ppm	2ppm
SO2	2ppm	5ppm	5ppm	2ppm
H2	10ppm	15ppm	N/A	N/A

9. Data Logging and Data Communications

The TX7005 Universal Docking Station provides bump test, calibration and battery charging all in one convenient table-top package. The Trolex HawkEye PC application and USB data exchange also enables the GasHawk data-log to be downloaded with PC setup and cloning of GasHawk operating functions. An SD card slot is also available for data to be stored as an independent record.

10. Maintenance

10.1 Service and Calibration

GasHawk should be calibrated in compliance with appropriate statutory requirements, or at least every 6 months, to ensure accurate response. A prompt will appear on the display.

Recalibrate the instrument if necessary.

Contact our Product Support Department, or your local distributor, for a choice of service and calibration options to suit individual requirements

10.2 Annual Safety Check

The instrument is crucial to personal safety and it is recommended that it be returned to our Product Support Department, or to your local distributor, for an annual safety check.

Itemised details of this safety check can be supplied on request.

11. Precautions

11.1 Operating Safety

The instrument must be operated in accordance with the operating data to maintain safety, reliability, and to preserve the intrinsic safety integrity.

Gas monitoring procedures should always be carried out in accordance with the regulations of Safety Authorities and in compliance with any local mandatory safety regulations.

11.2 Hazardous Areas

Do NOT dismantle the instrument whilst in a hazardous area

11.3 Evacuation

If the instrument alarm initiates due to dangerous levels of gas concentration, leave the area immediately and implement statutory safety procedures.

11.4 Battery Charging

Recharging of the battery must only be carried out using the Trolex charger supplied with the instrument. Do not charge the battery in a hazardous area.

11.5 Flammable gas sensors

It is good safety practice to perform a sensitivity test of the instrument before each day's use with a known concentration of methane between 25% and 50% LEL (1.25% and 2.5% v/v). Accuracy must be within 10% of actually reading (section 6.3).

If not, the instrument should be recalibrated.

Catalytic combustion gas sensors positively react to the presence of oxygen in the atmosphere ad should only be used for gas concentration up to the Lower Explosive Limit (LEL).

After this point, the output of the sensor becomes non-linear and may erroneously indicate that the gas concentration is below the explosive limit.

They should not be used in oxygen enriched atmospheres and conversely, severe oxygen deficiency. This will affect the sensitivity of the sensor.

Catalytic combustion gas sensors can detect a wide range of flammable gases but they cannot discriminate between individual gases. They will respond to most, or all, of the flammable components present in the atmosphere without distinguishing between them.

If the atmosphere to be monitored contains gas that dilutes or displaces the air, this may reduce the response of the catalytic sensor. Similarly, steam laden atmospheres and condensation can reduce the sensitivity.

The response of the catalytic combustion sensors can be affected by airborne contaminants which will reduce the sensitivity. Substances such as silicones, tetraethyl lead, sulphur compounds and phosphate can cause permanent degradation and halogenated carbons may cause temporary inhibition.

Exposure to high concentrations of flammable gas greater than the LEL can affect the sensitivity of catalytic combustion sensors and the calibration should be checked after such exposure.

Be aware that most flammable gases and vapours are also toxic at low percentages of LEL.

11.6 Toxic Gas Sensors

It is good safety practice to perform a sensitivity test of the instrument before each day's use with a known test concentration of the subject gas.

Recalibrate if necessary.

Electrochemical gas sensors contain an electrolyte that is gradually consumed during use. The average life is about two years, dependant on the duty cycle. The response should be checked at regular intervals.

Electrochemical gas sensors for toxic gases can be affected by other interfering gases which may displace the subject gas being monitored. Steam laden atmospheres and condensation can also reduce sensitivity.

Be aware that some toxic gases are also 'flammable' at high percentage concentrations.

11.7 Servicing and Repair

The instrument is certified intrinsically safe and must be serviced and repaired at Trolex, or a service agent approved by Trolex, in order to preserve the intrinsically safe integrity. Substitution of components and any additions or changes to the product will invalidate the Product Warranty and may contravene the terms of intrinsically safe certificate.

11.8 Disposal

Exhausted batteries and some gas sensor cells contain mildly corrosive substances and must be disposed of in the correct manner. Make sure that the battery is completely discharged before disposal.

For guidance regarding end-of-life disposal of a GasHawk unit, please contact the Environmental Management Representative at Trolex Ltd.

11.9 Contamination

The instrument is sealed against the ingress of dust and water.

It will even tolerate temporary immersion in water but should be removed as quickly as possible to avoid contamination of the gas sensing ports.

Ensure that the ports are completely dry and free of contamination before further use.

11.10 Aggressive Chemicals

The housing of the instrument is a combination of polycarbonate with a TPE overmould. These materials are selected for durability and resistance to normal external contaminants. Consider the integrity of the housing if it is exposed to aggressive chemicals which may be encountered in the hazardous area.

11.11 Atmospheric Pressure Variations

The response of O_2, CO2 and infrared CH_4 sensors can be affected by changes in atmospheric pressure so active pressure compensation is incorporated to maintain stability over natural variations.

Abnormal rapid changes in pressure, such as passing through an air lock, may cause a temporary shift in the O_2 reading. Allow several seconds for the sensor to equalise and ensure that oxygen levels are adequate during this period.

11.12 Condensation

The accuracy of infrared sensors can be temporarily reduced by the formation of condensation.

The sensor will accommodate normal day-to-day variations but rapid changes of temperature and humidity from a cold condition to a hot and humid environment should be avoided – allow several minutes for the instrument temperature to equalise before use.

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12. Accessories

Bump Test Station

TX7004

- Input ports for test gas connections.

- Gas application push button for convenient and safe operation.

- No electrical power required – can be used in any location.

- Single or dual gas input channels.

Universal Docking Station

TX7005

- Combined bump test, Calibration and Charging with PC datacomms in a convenient simple to use package

- Single or dual input ports for a test gas connections

- USB datacomms, data-log transfer using Trolex HawkEye PC application tool.

- Instrument setup from PC and cloning function

- Gas application switches for convenient and safe operation.

- USB connecting lead

- Universal mains power supply 90–265V AC 50/60Hz 250mA

- Secure in-vehicle docking for rough terrain applications.

Pump hood filters

P5593.87 (pack of 5)

- Annular filters for fitting in to the pump hood

Line filters

P5593.88 (pack of 5)

- Hydrophobic line filter cassette to prevent moisture ingress into the suction tube.

13. Certification and conformity

13.1 European Union and International Certification

⟨Ex⟩	ATEX (European Union) certification for use in underground mines and surface industry with explosive gas atmospheres.
IECEx	IECEx (International) certification for use in underground mines and surface industry with explosive gas atmospheres.
CE	Complies with ATEX Directive 2014/34/EU Complies with EMC Directive 2014/30/EU

13.1.1 Underground mines

Product Code:	Ex Certificate Number:	Ex Certification Code:
TX7000.19.xx.xx.xx.xx.xx.xx.xx	CML 15ATEX2122X IECEx CML 15.0062X	I M1 Ex ia I Ma -20 °C ≤ Ta ≤ +50 °C
TX7000.19.xx.xx.xx.07.xx.xx.xx TX7000.19.xx.xx.xx.08.xx.xx.xx TX7000.19.xx.xx.xx.09.xx.xx.xx (when used with Ex d Sensor)	CML 15ATEX2122X IECEx CML 15.0062X	I M1 Ex ia d I Ma -20 °C ≤ Ta ≤ +50 °C
TX7000.19.xx.xx.xx.01.xx.xx.xx TX7000.19.xx.xx.xx.02.xx.xx.xx TX7000.19.xx.xx.xx.03.xx.xx.xx (when used with Ex da Sensor)	CML 15ATEX2122X IECEx CML 15.0062X	I M1 Ex ia da I Ma -20 °C ≤ Ta ≤ +50 °C

13.1.2 Surface industry with explosive gas atmospheres

Product Code:	Ex Certificate Number:	Ex Certification Code:
TX7000.20.xx.xx.xx.xx.xx.xx.xx	CML 15ATEX2122X IECEx CML 15.0062X	II 1G Ex ia IIC T4 Ga -20 °C ≤ Ta ≤ +50 °C
TX7000.20.xx.xx.xx.07.xx.xx.xx TX7000.20.xx.xx.xx.08.xx.xx.xx TX7000.20.xx.xx.xx.09.xx.xx.xx (when used with Ex d Sensor)	CML 15ATEX2122X IECEx CML 15.0062X	II 2G Ex ia d IIC T4 Gb -20 °C ≤ Ta ≤ +50 °C
TX7000.20.xx.xx.xx.01.xx.xx.xx TX7000.20.xx.xx.xx.02.xx.xx.xx TX7000.20.xx.xx.xx.03.xx.xx.xx (when used with Ex db Sensor)	CML 15ATEX2122X IECEx CML 15.0062X	II 2G Ex ia db IIC T4 Gb -20 °C ≤ Ta ≤ +50 °C

13.1.3 The following Conditions of Certification and Special Conditions for Safe Use apply to the above ATEX and IECEx Certificates:

i. No precautions against electrostatic discharge are necessary for portable equipment that has an enclosure made of plastic, metal or a combination of the two, except where a significant static-generating mechanism has been identified. Activities such as placing the item in a pocket or on a belt, operating a keypad or cleaning with a damp cloth, do not present a significant electrostatic risk. However, where a static-generating mechanism is identified, such as repeated brushing against clothing, then suitable precautions shall be taken, e.g. the use of anti-static footwear.

ii. The equipment must only be re-charged in the safe (non-hazardous) area.

13.1.4 Environmental Protection

♲	Waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Check with your Local Authority or retailer for recycling advice.

13.2 Australia and New Zealand – PENDING

IECEx	IECEx (International) certification for use in underground mines and surface industry with explosive gas atmospheres in Australia (including Queensland) and New Zealand.
NSW GOVERNMENT	Plant Design Registration for New South Wales in Australia including Performance Testing for Oxygen, Flammable and Toxic gases.

13.3 Eurasian Customs Union – PENDING

EHC	EAC certification for use in underground mines and surface industry with explosive gas atmospheres in Eurasian Customs Union (Russia, Kazakhstan Armenia, Belarus, Kyrgyzstan) including Pattern Approval Certificate for Measuring Instruments.

13.4 India DGMS - PENDING

	Directorate General of Mines Safety (DGMS) certification for use in coal, metalliferous and oil mines in India.

13.5 South Africa – PENDING

	MASC (IA) certification for use in underground mines and surface industry with explosive gas atmospheres in South Africa including Performance Testing for Flammable gases.

Disclaimers

The information provided in this document contains general descriptions and technical characteristics of the performance of the product. It is not intended as a substitute for and is not to be used for determining suitability or reliability of this product for specific user applications. It is the duty of any user or installer to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use. Trolex shall not be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments, or find errors in this publication, please notify us at marketing@trolex.com.

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only Trolex or its affiliates should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Trademarks

Patent pending.

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