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# GasCheck Tesla

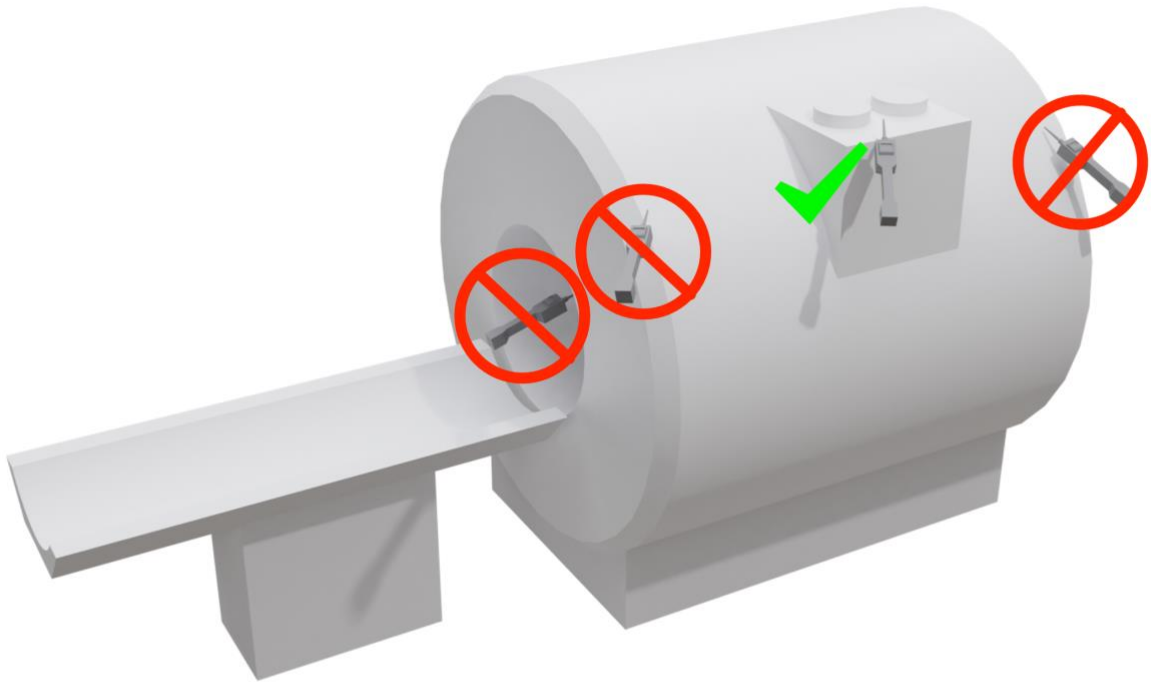
Instrument User Manual V1.2R



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## WARNING



Field Sensitive  
Not to be placed in high field  
regions

**Register your instrument online for extended warranty**

Thank you for purchasing your ION Science instrument.

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

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

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## Declaration of conformity

The EU Authorised Representative of the manufacturer Ion Science limited has sole responsibility, on the date this product accompanied by this declaration is placed on the market, the product conforms to all technical and regulatory requirements of the listed directives

<b>Authorised Representative:</b>	ISM Deutschland GmbH · Laubach 30 · D-40822 Mettmann, Germany
<b>Product:</b>	GasCheck G 1, 2 and 3 (Graphical)
<b>Product description:</b>	Handheld micro thermal conductivity sensor used to detect gas leaks. This instrument has been designed specifically for search and location of non-flammable gases such as helium and CFC's.
<b>Directive:</b>	EMC Directive (2014/30/EU) LVD Directive (2014/35/EU)
<b>Standards:</b>	
<b>EN IEC 61010-1:2010</b>	Safety requirements for electrical equipment for measurement, Control, and laboratory use – Part 1: General requirements
<b>EN ISO/IEC ISO 9001:2015</b>	Quality management systems – Requirements
<b>EN I 61326-1:2013</b>	Electrical Equipment for measurement, control and laboratory use EMC Requirements (Class B and General Immunity)

**Name:** Clemens A. Verley

**Position:** Chief Executive Officer



**Signature:**

**Date:** 31<sup>st</sup> December 2020



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## Statements

### Safety

Please read this manual in full before using the GasCheck Tesla instrument. ION Science Ltd takes no responsibility for damage, injury or death resulting from misuse, misunderstanding or negligence while using this gas detector. Please contact Ion Science Limited via the address below for clarification on any aspect of this manual that is not understood or for additional information required.

This instrument should only be used by qualified or competent persons with suitable knowledge of the hazards relating to the gases contained within equipment or in the local environment.

### Quality Assurance

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

### Responsibility of use

Many gases are hazardous and can cause explosions, poisoning and corrosion resulting in damage to property and life. It is the responsibility of the person using this instrument to ensure it is being used in accordance with this manual and that the instrument is functioning correctly before use.

The GasCheck Tesla can detect a large range of gases but some gases are more difficult to detect.

It is the responsibility of the user to ensure the GasCheck Tesla instrument has the sensitivity to detect the required gas before reaching potentially dangerous levels.

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

### Disposal

Disposal of GasCheck Tesla, its components and any used batteries shall be in accordance with local and national safety and environmental requirements. This includes the European WEEE (Waste Electrical and Electronic Equipment) directive. Ion Science Ltd offers a 'take-back' service. Please contact Ion Science Ltd for more information.

### Calibration Facility

Ion Science Ltd offers a calibration service including the issue of a traceable certificate valid for 12 months. A GasCheck Tesla Calibration Kit offers a means of checking and calibrating the instruments against a known reference, however Ion Science Ltd strongly recommend the instrument is returned to an approved service centre on an annual basis for general maintenance and calibration.

### Legal Notice

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

## Instrument Description

The GasCheck Tesla is a portable, handheld gas leak detector capable of detecting helium leaks within a high magnetic field, typically surrounding Magnetic Resonance Imaging (MRI) scanners and can be effectively used while the machinery is still in operation. GasCheck Tesla is part of a range of gas leak detectors used for detecting gas leaks, and can detect almost all gases to varying degrees.

It is powered by standard AA size batteries and will accept both Alkaline and Nickel Metal Hydride (rechargeable) types. The GasCheck Tesla uses thermal conductivity to detect gas which offers a robust sensor technology that requires practically no maintenance beyond annual servicing.

All GasCheck models have an easy to use graphical interface with an intuitive keypad allowing simple function selection and adjustment. The instrument has an LCD display, LED indicator and audible sounder that indicate the detected signal.

Applications where GasCheck instruments are typically used include:

- Medical - used by service technicians during maintenance of Magnetic Resonance Imaging (MRI) scanners and testing of membrane materials and sealing of glove boxes.
- Laboratory applications - detection of leaks from mass spectrometers and chromatograph equipment.
- Quality assurance - testing seal integrity after product manufacture.
- Industrial - leaks from gas cylinders, pipe work and process equipment.
- Pneumatic - valve seal testing.

The GasCheck Tesla is calibrated against a  $5 \text{ E}^{-4}$  cc/s Helium leak to allow volumetric readings and also a 5000ppm helium to allow measurement of concentrations.

Selectable units:

cc/sec	Cubic Centimetres per second offers a reading that indicates the volume of gas escaping into atmosphere from a single point i.e. leakage from a hole in a gas filled vessel or pipe.
ppm	Parts Per Million is a concentration reading. GasCheck Tesla will display the concentration being detected however it is more difficult to gauge the quantity of leakage.
mg/m <sup>3</sup>	Milligrams per meter cubed is also a unit that measures concentration. (See ppm above)
g/yr	Grams per Year is an alternative measure of leak rate.

### NOTES:

GasCheck Tesla is NOT intrinsically safe so should not be using in a potentially explosive environment. Please contact ION Science Ltd for more information or visit [www.ionscience.com](http://www.ionscience.com)

Ambient air pressure, heat and humidity can affect readings.

The GasCheck Tesla range is NOT 'Gas Specific' i.e. it can NOT differentiate between gases. Selecting a specific gas on the GasCheck Tesla allows the instrument to calculate concentrations and leak rates of that gas only if that gas is being detected.

### Packing list

Please remove all packing material and then check the content of the carry case against the list below before use. Should the instrument or any accessory appear damaged or missing then contact the instrument supplier for advise before use.

Item	Qty	Description	Check
1	1	GasCheck Tesla instrument with short probe and nozzle fitted	
2	1	Long probe	
3	1	Box spanner used to change probes	
4	1	Spare battery clip	
5	1	Quick start guide	
6	1	Calibration certificate	



## How GasCheck Tesla works

### Thermal Conductivity

All gases conduct heat but by varying amounts, if an object is heated and then the source of heat is removed, the object will eventually cool down to match ambient air temperature. This action occurs because the ambient air surrounding the object carries the excess heat into the surrounding atmosphere.

This principal is also the same for objects that are cooler than the surrounding ambient air.

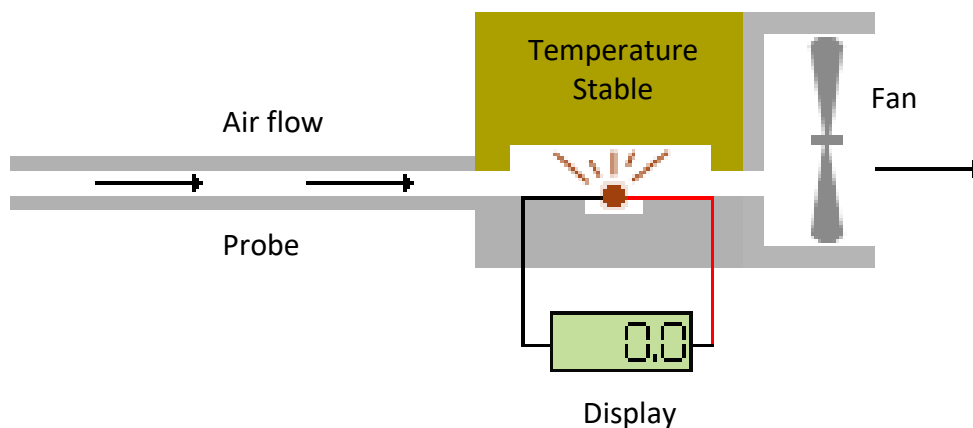
Dissipation of heat into an air atmosphere is known and is a predictable rate however, if the ambient air is replaced with an alternative gas like Helium the rate at which an object cools down changes.

If the object mentioned above had its environment replaced with pure Helium it would cool down to the environment temperature about 6 times faster.

The GasCheck Tesla contains a heated thermistor bead that transmits heat to a block of material that remains at a constant temperature. As air passes through the detector chamber a constant amount of heat passes from the bead to the block. Gases that are different to air will affect the rate at which heat transmits from the bead to the block, these rates of change are measured and displayed as leak rates.

The diagram below shows the basic functionality of the GasCheck Tesla 's Thermal Conductivity sensor.

A fan draws a small flow of gas through the probe and into the sensing chamber. The thermistor bead heats up when electrical power is applied. As air passes through the cell a constant level of heat is transmitted to a Temperature Stable block through the air, this rate of heat transmission is used to 'Zero' the instrument.



When gases with different thermal qualities pass through the chamber the amount of heat being transmitted to the Temperature Stable block changes. These changes are measured, calculated and displayed on GasCheck Tesla as leak rates or gas concentrations.

#### NOTES:

- Some gases have similar thermal properties to that of air, therefore the GasCheck Tesla can only detect larger concentrations of these gases.
- Some gases have positive and other gases negative signals. To simplify the instruments function GasCheck Tesla only displays changes as positive readings.
- The GasCheck Tesla can NOT differentiate between gases! Selecting a specific gas on the GasCheck Tesla allows the instrument to calculate concentrations of that gas only if that gas is being detected.



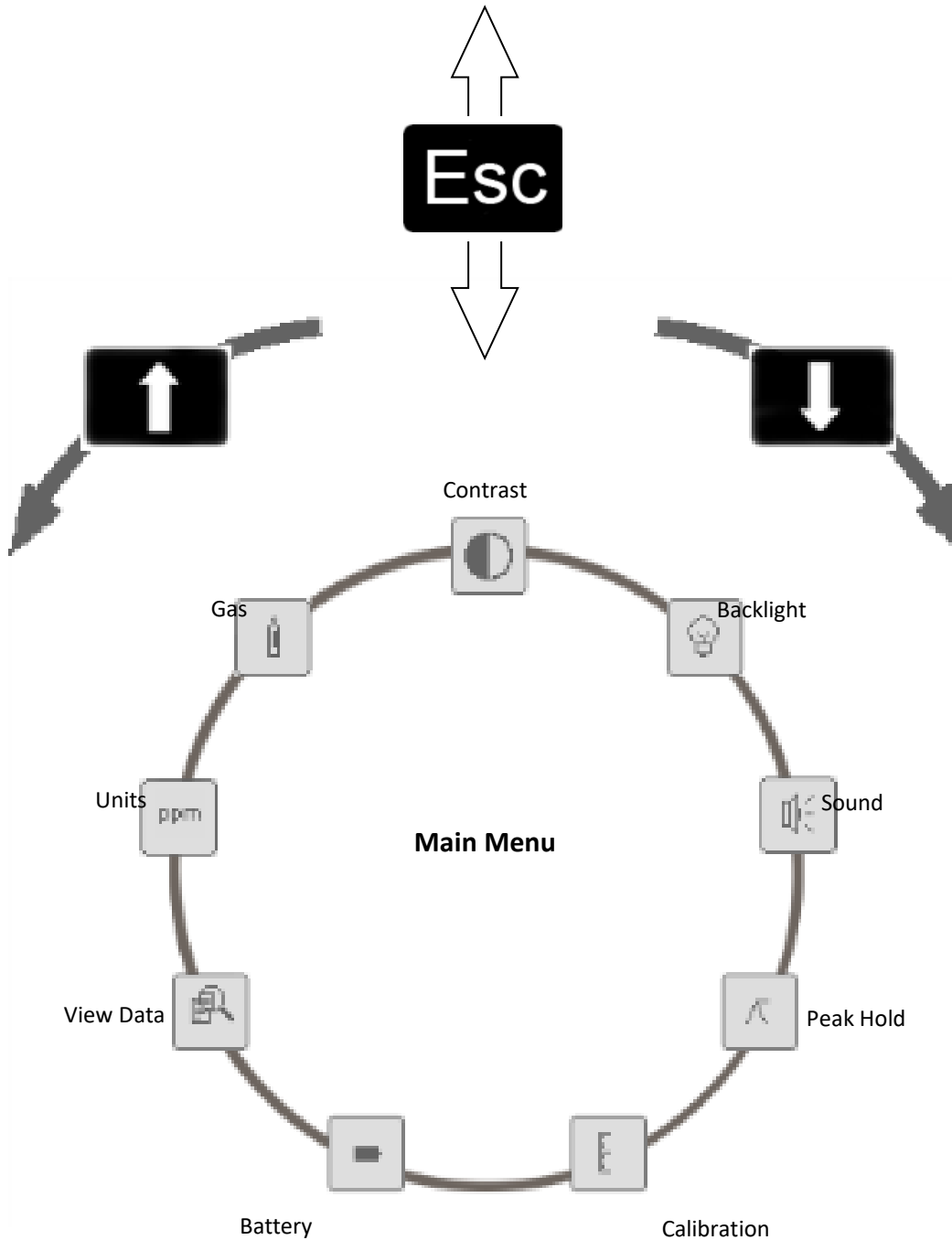
### Instrument main menu

Once the GasCheck Tesla has run through its 'Start up' routine it will display its normal 'Running screen' used when locating gas leaks. Before using the instrument the various settings should be set and adjusted to suit the application.

Pressing the 'Esc' key while viewing this 'Running screen' will access the instruments Main Menu. Repeated pressing of the 'Esc' returns back to the 'Running screen'.

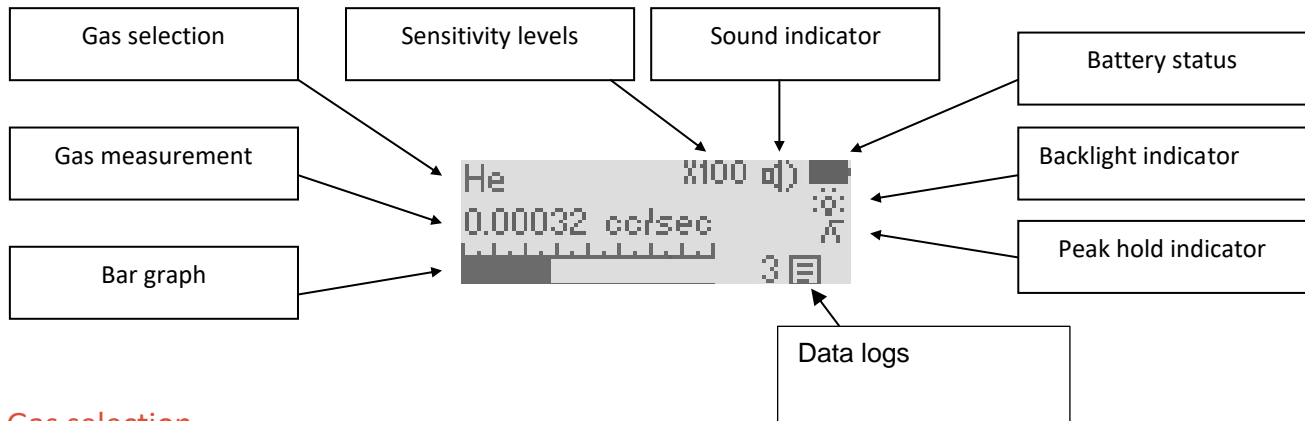


Running screen



## Running screen

GasCheck Tesla displays the 'Running screen' whenever the instrument is being used to detect leaking gas, the illustration below outlines the various information and icons.



### Gas selection

The GasCheck Tesla displays the gas being measured in the top left of the running screen. The GasCheck Tesla will display the gas as selected at the factory, however the Tesla has a range of gases that can be selected via an internal gas table.

### Sensitivity

GasCheck Tesla has three (3) sensitivity levels, X100 (times one hundred) is most sensitive, X10 (times ten) is mid-range and X1 (times one) is least sensitive. See the sensitivity of various gases on the table under 'Functions (continues), Gas Selection'.

### Battery status

When the battery symbol is filled in the battery is full, when just an outline is displayed the battery is exhausted.

### Backlight

The backlight symbol shows the status of the backlight even in bright daylight.

### Gas measurement

The GasCheck Tesla measures the leak rate of gas leakage in which ever units are selected.

### Sound indication

This symbol shows if the sounder is on or off, if the semi-circle (on the right) of the symbol is present then the sound is switched on, if not the sounder is switched off. The beep that occurs with each key press cannot be switched off.

### Bar graph

The bar graph increases as gas is detected. This graph is not scaled and should be used for indication only. When gas is detected and the bar graph has reached its maximum level, a different sensitivity level can be selected to give a wider detection range.

### Peak hold

When selected, peak hold displays the maximum measurement on the display. Pressing the ENTER key resets the reading but also logs the peak reading in memory.

## Functions

### Contrast

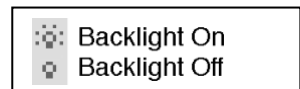


Use this function to adjust the contrast of the GasCheck Tesla's LCD (Liquid Crystal Display). Significant variations in ambient light conditions can cause the display to appear too dark or faint. When this function is selected a number will appear to the right of the Contrast symbol as a percentage. Use the Up and Down keys to adjust the display contrast to the desired level. When satisfied with the desired level selected, press the Esc key to exit to the main menu.

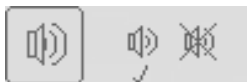
### Backlight



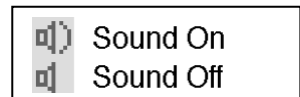
The user can select either Backlight On or Backlight Off. In daylight the user may not be able to determine if the backlight is On or Off therefore a symbol on the main running screen shows the status. When the backlight is 'ON' it significantly reduces battery life. Backlight OFF = 40hrs of use, Backlight ON = 20hrs of use.



### Sound



The GasCheck Tesla has an audible sounder that increases frequency as detected gas levels increase. This sounder can be switched On and Off. Use the Up or Down key to move the 'tick' to the desired position and then press the 'Esc' key to return to the Main Menu.



An audible 'beep' can also be heard whenever the key pad is pressed. This beep can be switched off.

### Peak hold

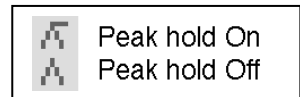


When selected, this function holds the highest detected reading on the display until the 'ENTER' key is pressed.

Select Peak hold On or Off using the 'Up or Down' key and then press 'Esc' key to exit to the 'Main menu'.

When using the GasCheck Tesla, press the ENTER key to clear the held reading.

The reading held on screen will be logged when the 'ENTER' key is pressed.

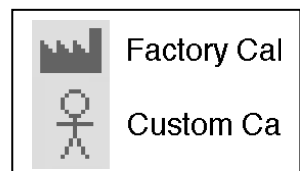


**WARNING:** ZEROing the instrument in a contaminated environment will result in false readings.

### Calibration



There are two Calibration settings that can be selected; Factory and Custom. Factory calibration is carried out shortly after manufacture and cannot be adjusted, however Custom calibration offers the ability to calibrate the instrument between annual Factory calibrations. The GasCheck Tesla Zero's its reading at switch on, therefore the Custom calibration routine only has one stage. Also see the 'Calibration' section of this manual.



## Functions

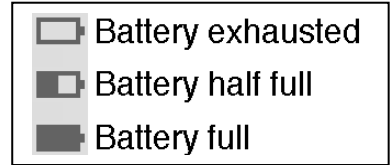
### Battery selection



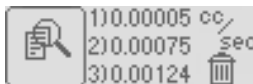
The GasCheck Tesla will operate using AA size batteries in either Alkaline (non-rechargeable) or Nickel Metal Hydride (Rechargeable).

Select the battery type using the 'Up or Down' key and then press the 'Esc' key to exit to the Main menu.

Failing to select the correct battery type will not damage the instrument or affect its ability to detect gas, however it will cause the battery indicator to read incorrectly.



### View Data



The GasCheck Tesla instrument has the ability to data log 10 readings within its internal memory. To store a reading press the 'ENTER' key while on the main Running screen. When readings are stored in memory a symbol will appear on the Main viewing screen.



When the memory is full the 'Data' symbol will flash. The stored data can be viewed by scrolling through the logged readings using the 'Up and Down' keys. To delete the stored data press and hold the 'ENTER' key, the 'Trash can' symbol will flash, continue holding the 'ENTER' key until the data is deleted. Press the 'Esc' key to exit to the Main menu.

### Units



GasCheck Tesla instruments have the capability of displaying detected readings in a variation of units; ppm, cc/s, mg/m<sup>3</sup> and g/yr.

Use the 'Up and Down' keys to select the desired unit and then press the 'Esc' key to exit to the main menu.

Please note: *the Custom Calibration routine automatically selects the type a calibration depending on this setting. See the 'Calibration' section of this manual.*

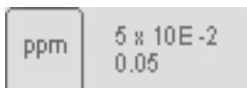
**cc/sec** = Cubic Centimetres per second offers a volumetric leak rate that directly measures the volume of a gas escaping from a given point, it is also known as ml/sec (millilitres per second). The GasCheck Tesla can typically detect Helium leaks down to 0.0005 of a cubic centimetre per second.

**ppm** = Parts per million, this unit indicates a concentration but can't be used to quantify a volume of gas leakage.

**mg/m<sup>3</sup>** = Milligrams per meter cubed, like ppm this unit is also concentration so can't be used to quantify a volume of gas leakage.

**g/yr** = Grams per year offers an alternative volumetric leak rate that directly measures the volume of a gas escaping from a given point.

### Display



GasCheck Tesla instruments have the capability of displaying cc/sec and g/yr readings in either decimal or exponent form. (Readings in ppm and mg/m<sup>3</sup> can only be displayed in decimal form.)

Use the 'Up and Down' keys to select the desired unit. Press the 'Enter' key to display the next screen. Use the 'Up and Down' keys to select the desired display and then press the 'Esc' key twice to exit to the main menu.

## Functions

### Gas selection



GasCheck Tesla is calibrated using Helium gas at manufacture, however other gases can be detected and measured using a gas table within the instrument.

Although GasCheck Tesla can't differentiate between gases it can quantify other gases using response factors stored in its internal gas table. Gas groups 1, 2, 3, 4 and 5 offer a generic sensitivity.

The following list indicates minimum sensitivity for specific gases. For advice on gases not listed please contact Ion Science Ltd.

Name	Abbreviation	Minimum sensitivity cc/sec (ml/sec)	Minimum sensitivity cc/sec (ml/sec)
Hydrogen	H2	7.7 E-6 cc/sec	0.0000077 cc/sec
Helium	He	1.0 E-5 cc/sec	0.000010 cc/sec
Refrigerant R12	R12	2.7 E-5 cc/sec	0.000027 cc/sec
Refrigerant R1301	R1301	2.4 E-5 cc/sec	0.000024 cc/sec
Refrigerant R134a	R134a	5.8 E-5 cc/sec	0.000058 cc/sec
Refrigerant R22	R22	2.6 E-5 cc/sec	0.000026 cc/sec
Refrigerant R11	R11	3.2 E-5 cc/sec	0.000032 cc/sec
Sulphur Hexafluoride	SF6	2.2 E-5 cc/sec	0.000022 cc/sec
Carbon dioxide	CO2	4.0 E-5 cc/sec	0.000040 cc/sec
Methane	CH4	2.9 E-5 cc/sec	0.000029 cc/sec
Argon	Ar	3.5 E-5 cc/sec	0.000035 cc/sec
Oxygen	O2	2.9 E-4 cc/sec	0.000290 cc/sec
Refrigerant R502	R502	3.0 E-5 cc/sec	0.000030 cc/sec
Refrigerant R404a	R404a	3.2 E-5 cc/sec	0.000032 cc/sec
Refrigerant R407c	R407c	3.3 E-5 cc/sec	0.000033 cc/sec
Refrigerant R410a	R410a	3.2 E-5 cc/sec	0.000032 cc/sec
Refrigerant R507	R507	3.8 E-5 cc/sec	0.000038 cc/sec

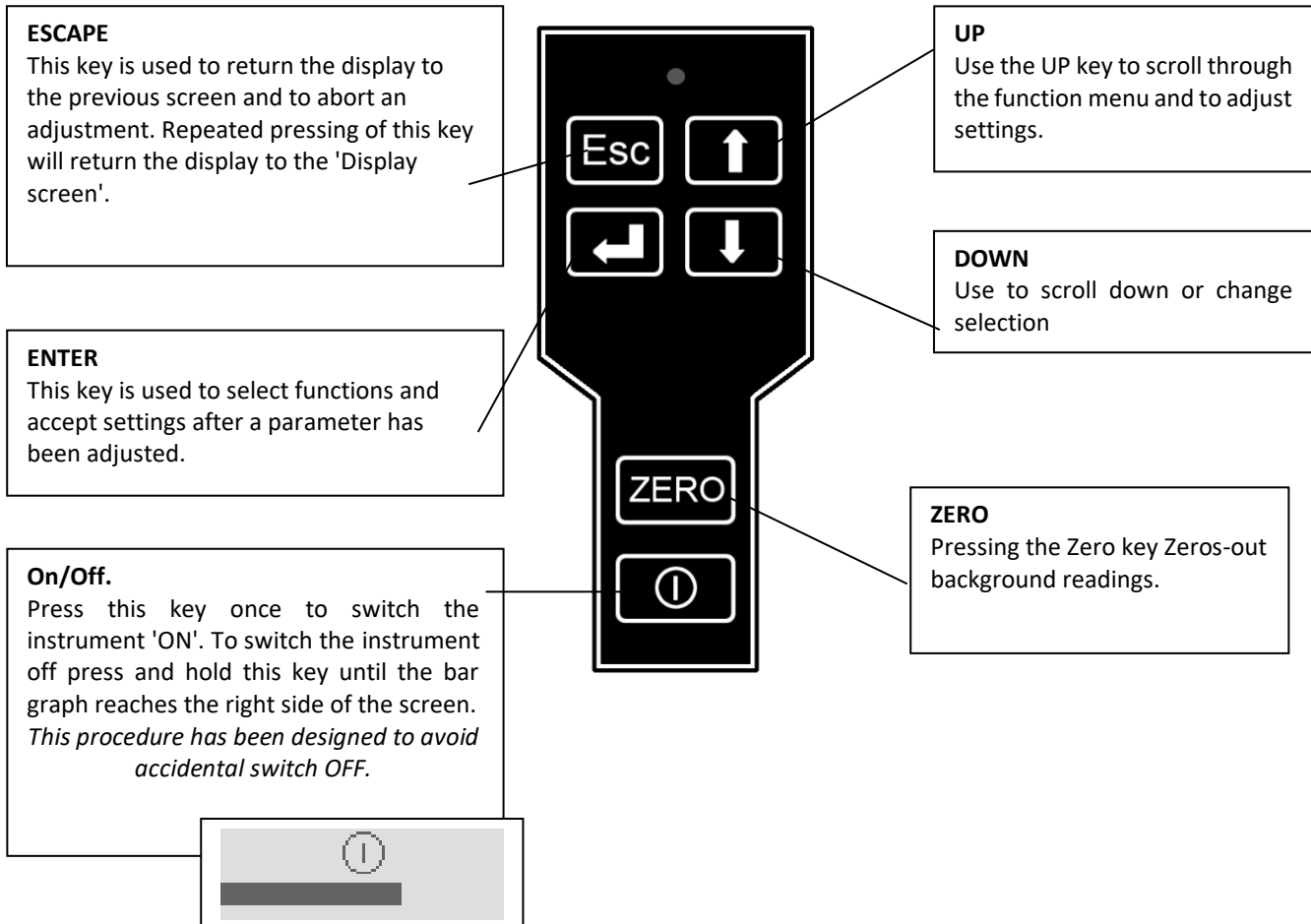
To select an alternative gas, use the 'Up and Down' keys to select the desired gas and then press the 'ENTER' key to confirm the selection, at which point a tick will appear. Press the 'ENTER or Esc' key to exit into the 'Main menu'.

If the gas to be detected does not appear in the instrument's internal gas table then one of the five 'Gas Groups' can be selected. 'Gas Groups' have a variation of sensitivities. (Group 1 being high sensitivity through to Group 5 being low sensitivity) Contact Ion Science Ltd for advice. Gas groups allow the instrument to calculate leak rates with reasonable accuracy.

## Getting started

### The Keypad

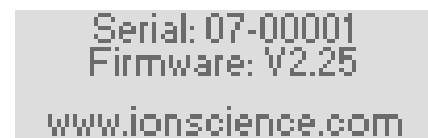
All GasCheck Tesla models have the same keypads, the following section explains the general functionality of each key:-



When the GasCheck Tesla first switches on it will display its model number and the Gas that it has been calibrated with.



A second screen then displays the instrument's serial number, the instrument's firmware version and Ion Science web address.



A third screen appears to indicate the GasCheck Tesla is Zeroing its signal.



Once the Zero routine is complete the instrument displays its running screen and is ready for use.

## Using GasCheck Tesla

### The GasCheck Tesla instrument

**WARNING:** Before switching the GasCheck Tesla on, ensure the ambient air is clean as the instrument automatically Zero's the sensor at switch on. After the instrument has run through its start-up routine, adjust the instrument settings to the desired levels. Check the instruments sensitivity using a CalCheck or calibration kit.

Switch the GasCheck Tesla on by pressing the ON/OFF key. After the instrument has completed its Zero routine it will enter its normal running screen. (see right)



Ensure the instrument is on the X100 (times one hundred) range, while on the main running screen use the UP and DOWN key to adjust between sensitivity ranges. X100 is most sensitive, X1 is the least sensitive.

Gas leaks tend to occur at pneumatic joints or welded seams, hold the GasCheck Tesla at a 45° angle to the object being tested and drag the probe along the seam or joint at a rate of approximately 25mm per second.

When a leak is detected the bar graph will start to fill and the frequency of the audio output will increase but will reduce as the probe moves away from the leak. Return the probe to the suspected leaking area and move slowly along the same area until the leak is located, once located the probe should be held at the leak until the numeric reading stabilizes.

The bar graph offers a graphical indication only and should not be used to measure a leak, you may find that the graph completely fills however the numeric reading will continue to increase.

Variation in temperature, humidity and background gas may result in a constant level being detected on the instrument. To reset to Zero, hold the instrument away from the source of contamination and then press the ZERO key. The instruments display will return to a near zero reading.

The following things will affect the instruments reading:-

- \* Breath of the instrument user contains both CO2 and moisture;
- \* Barometric air pressure and background temperature;
- \* Sources of cold and heat.


## GasCheck Tesla fan current monitor

Even with magnetic shielding in place, in the presence of strong magnetic fields, the fan inside the GasCheck Tesla will degrade. This degradation is permanent and results in the current drawn by the fan increasing.

There are also temporary effects where the local magnetic field will cause the current drawn by the fan to increase. These effects disappear when the instrument is removed from the magnetic field.

The software inside the GasCheck Tesla prevents leak detection measurements from being taken when the fan is permanently damaged, or if the local field is too high.

The GasCheck Tesla can monitor the current consumed by the fan as it draws air through the detector chamber. This allows the end user to see how much damage has occurred to the fan inside the unit due to the magnetic field. If the current is too high, the unit displays an error message preventing the operator from making measurements of the leak rate.

Refer to Figure 6. The fan current indicator can be found in the bottom left hand corner of the 'Zeroing' screen. The number can range from around 200 units or below on a new unit and can rise to 600 units before the unit displays the error message shown in Figure 7. The 'Zeroing' screen can be accessed at any time by holding down the  and zeroing the GasCheck Tesla.


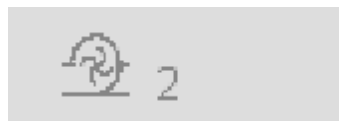
Once the error message is displayed, it will remain on the screen until the  is pressed and the fan current has returned to an acceptable level. In the event of the fan current constantly exceeding 600 units, for example if the GasCheck Tesla fan has reached the end of its working life, the unit will not display the leak rate and the GasCheck Tesla should be returned to Ion Science for servicing.

Figure 6 – Fan current indicator



Figure 7 – Fan current limit exceeded indicator





## Probe options

In some applications the grey probe cover may restrict access to the area under test, the grey probe cover can be removed by pulling it off way from the instrument **1**. When the grey cover is removed great care should be taken when using the instrument and the following precautions noted:-

- \* Do not remove the semi-transparent probe sleeve, this sleeve ensures the metal inner probe remains 1 mm from the surface of the test area avoiding accidental dirt and moisture ingress.
- \* Do not touch the probe and especially the brass sensor housing. Heat from fingers can result in significant changes in signal causing false readings.
- \* Avoid placing the probe on wet or dirty surfaces, blockage of the probe will result in instrument failure.

Some applications may require a longer probe to gain access to pneumatic joints and seems to be tested, the GasCheck Tesla is also supplied with a 300mm probe that can be changed by the user. To change probes carefully follow the following steps:-

- \* Switch the instrument OFF
- \* Remove the outer grey probe cover **1**
- \* Place the box spanner (supplied with the instrument) over the existing probe so the spanner fits over the brass nut **2**, unscrew the probe counter-clockwise direction. **3**
- \* Withdraw the spanner and probe assembly **4**

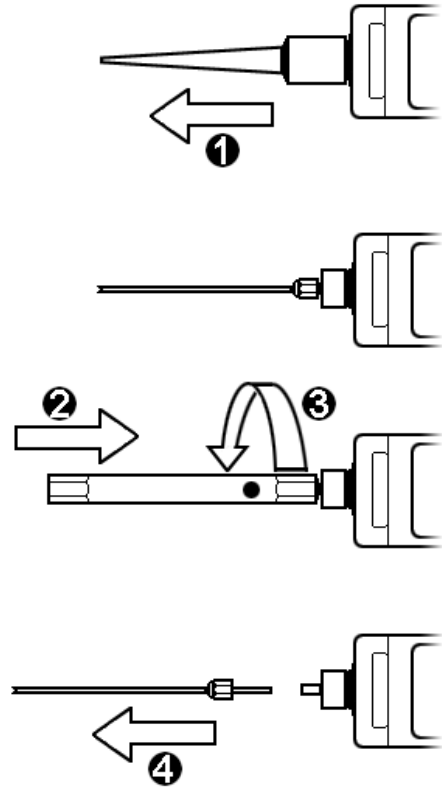
To refit the short or the long probe follow the steps above but in reverse order.

**CAUTION:** When using the box spanner to tighten the probe nut, ensure the nut is firmly tightened however do not use additional tools as the tread may become damaged.

Should a probe become blocked, first remove the probe from the instrument. Then, use dry, clean compressed air to blow out the blockage from the instrument end of the probe.

**CAUTION:** The instrument has been factory calibrated using the standard short capillary which sets a certain flow rate into the detector. The long capillary by nature of its construction has a different flow to improve the time response in detection. This will change the calibration of the instrument when the long probe is used instead of the short capillary. Thus the long probe is only to be used in finding leaks in difficult places where the standard short probe cannot reach. The readings given by the long probe are only qualitative and the reading given by the display is only to be taken as being relative to another value given by another leak site while using the long probe.

**WARNING:** Ensure safety guidelines are adhered to when using compressed air.  
(Ion Science Ltd takes no responsibility for injury or damage caused by misuse of compressed air equipment)



## Detecting leaks

### Overview

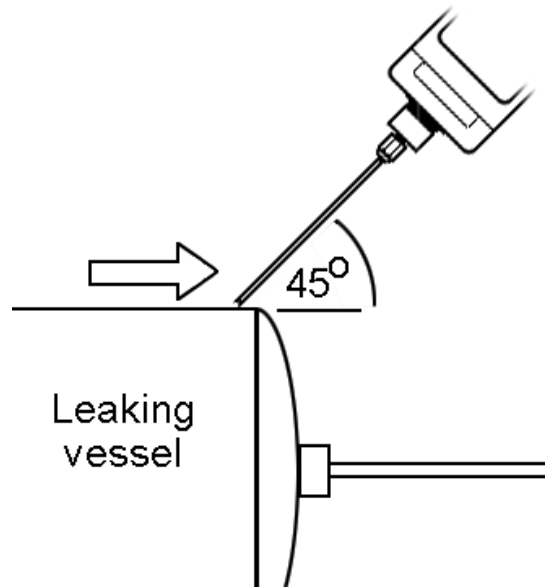
The GasCheck Tesla is suitable for detecting leaks around the outside of the MRI scanner. It is not suited to detection of leaks within the centre of the MRI scanner.

Hold the GasCheck Tesla in one hand and draw the instrument probe along the area to be checked at approximately 25mm per second. When a leak is detected retrace the route of the probe at a slower rate until the leak is located.

Once located hold the instrument over the leak until the measurement stabilises. The reading can be logged by pressing the ENTER key.

Some readings may be larger than the instrument can detect and the measurement units will be replaced by '99999' on the display, in which case use the UP or DOWN keys to adjust the instrument's sensitivity.

When detecting very small leaks or when detecting gasses less sensitive than a rate of 10mm per second may be required.



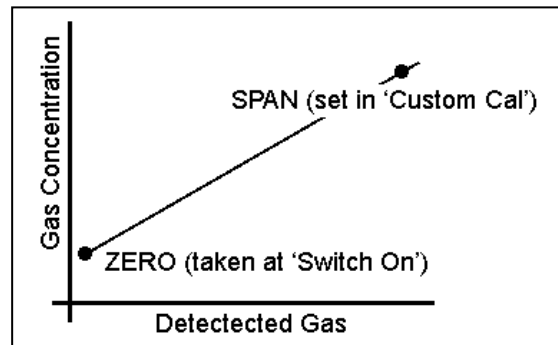
The outer grey probe cover can be removed to allow better access to restricted areas, if the outer probe is removed the following points should be noted:-

- Avoid bending the inner probe as this will affect the GasCheck Tesla's accuracy.
- Avoid placing the probe in liquid or dirt as the probe can become blocked.
- Care should also be taken to ensure the brass sensor housing component remains at a constant temperature. Avoid touching the brass sensor block with fingers.
- GasCheck Tesla can detect changes in Humidity and Carbon dioxide, therefore avoid breathing on the probe.
- The thin white tube that covers the inner probe should not be removed, this tube ensures a 1mm gap is maintained between the probe and the surface being tested.

## Calibration

### Over view

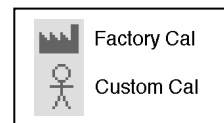
The GasCheck Tesla has two selectable calibration settings; Factory and Custom. 'Factory Calibration' is carried out at Ion Science Ltd/ Authorised Service Centres during the instruments manufacture, it can be selected and used but can not be changed. The GasCheck Tesla is calibrated against a 5000 ppm Helium concentration and a 0.0005cc/sec (5 E<sup>-4</sup>) Helium leak rate. 'Custom Calibration' gives the user the ability to calibrate the instrument, this facility may offer improved accuracy over the 'Factory Calibration' if the Barometric air pressure differs from that stated on the instruments Calibration certificate.



### Selecting Factory or Custom Calibration



To select either Factory or Custom Calibration select the Calibration screen and user the UP and DOWN keys to move the 'tick / check' under the desired symbol, then Press the 'Esc' key to exit into the main menu.



'Custom Calibration' can only be selected and used after the instrument has been calibrated by the user, to do this move the 'tick / check' under the 'Custom Cal' symbol and press the ENTER key.

The GasCheck Tesla requires either 5000 ppm Helium concentration or a 0.0005cc/sec (5 E<sup>-4</sup> cc/sec) leak rate as a reference. The GasCheck Tesla automatically selects the type of Calibration media based on which units the instrument already has selected.

If the GasCheck Tesla is used to detect leaks measured using 'ppm or mg/m<sup>3</sup>' units then the instrument must be calibrated using a 5000 ppm Helium concentration.

If the GasCheck Tesla is used to detect leaks measured using 'cc/sec' units then the instrument must be calibrated using a 0.0005 cc/sec (5 E<sup>-4</sup>) Helium leak.

### Calibration procedure using 'ppm' units

Please read this entire procedure before proceeding with this calibration routine.



- \* Fill an empty (uncontaminated) sample bag with 5000 ppm Helium gas before starting the calibration procedure. Also remove the outer grey probe from the GasCheck Tesla.
- \* Select the 'Custom Cal' symbol from the instruments menu. An option appears allowing the adjustment of the 'ppm' value to ensure the instrument matches the gas concentration being used. Use the UP and DOWN keys to adjust between 4900 and 5100 ppm.
- \* Ensure the instrument is in clean air and then press the ENTER key, the instrument will Zero, this will take a few seconds but once complete a 'Ready' message will appear.
- \* Insert the instruments probe fully into the sample bag containing the gas and press the ENTER key. The instrument will automatically sequence through the cold and hot stages of calibration but when finished gives a summary of values.
- \* Press the ENTER key to return back to the calibration option screen. Press the ESC key to start using the instrument or press the ENTER key to calibrate again.

**NOTE:** To avoid errors in calibration the following points should be noted:-

- Avoid bending the inner probe as this will affect the GasCheck Tesla 's accuracy.
- GasCheck Tesla can detect changes in Humidity and Carbon dioxide, therefore avoid breathing on the probe.
- Avoid pressurizing the sample bag as this will cause significant errors in reading

## Calibration

### Calibration procedure using 'cc/sec' units

Please read this entire procedure before proceeding with this calibration routine.



- Follow the instructions of the CalCheck unit, the pointer of the pressure gauge must rest over the green segment.
- Select the 'Custom Cal' symbol from the instrument's menu.
- Ensure the instrument is in clean air and then press the ENTER key, the instrument will Zero, this will take a few seconds but once complete a 'Ready' message will appear.
- Insert the instruments probe into the CalCheck's outlet and press the ENTER key. The instrument will automatically sequence through the cold and hot stages of calibration but when finished gives a summary of values.
- Pressing the ENTER key will return back to the calibration option screen. Press the ESC key to start using the instrument or press the ENTER key to recalibrate again.

**NOTE:**

-GasCheck Tesla can detect changes in Humidity and Carbon dioxide, therefore avoid breathing on the probe.

Part No.	Description	Used
A-21500	0.0005 cc/sec Helium Calibration kit	For when GasCheck Tesla is used with cc/s units

**WARNING:** Great care should be taken to ensure the calibration gas is neither pressurised or restricts flow to the instruments probe. Changes in flow of gas to the sensor will result in significant errors in readings.

## Replacing batteries

Before using the GasCheck Tesla instrument ensure the batteries are fitted correctly or ensure NiMH (rechargeable) batteries are fully charged before use.

To fit or replace batteries you must first remove the battery cover from the rear of the instrument.

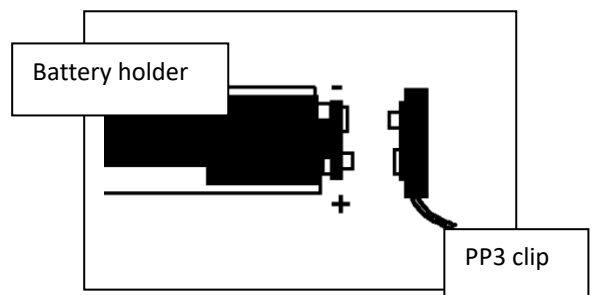
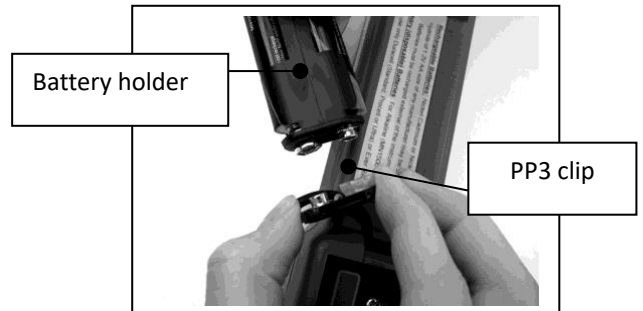
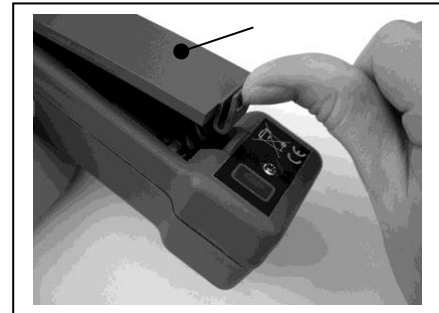
This can be done by prising open the battery clip with a finger nail or screw driver.

Removing the battery cover will reveal a battery holder, which requires 4 x AA size batteries. Before removing old batteries or fitting new ones unclip the battery holder from the instrument by prising apart the PP3 type clip shown in the illustration.

Once the battery holder is disconnected from the instrument, the batteries can be removed or replaced. However, care must be taken when refitting the batteries to ensure they are the correct polarity, polarity markings are moulded on to the battery holder plastic.

The battery holder can be reconnected to the GasCheck Tesla by firmly pressing the two halves of the PP3 clip together. Care should be taken to ensure the polarity is correct, see the PP3 diagram (right).

The battery pack is then laid within the instrument and the battery cover refitted, be careful not to trap wires when refitting the battery cover.



## Instrument specification

Operating temperature	0 to 50 °C	32 to 122 °F
Storage temperature	-25 to 70 °C	-13 to 158 °F
Instrument case	Polyurethane	
Dimensions	L.390 x W.60 x H.50 mm	L15.35" x W2.35" x 2.0 "
Weight	0.5 kg	1.0 lb.
Ingress ratings	IP20	
Length of long probe	300 mm	12"
Detection type	Thermal conductivity	
Detection time to T90	1 sec (short probe)	9 sec (long probe)
Clear down time	1 sec (short probe)	9 sec (long probe)
Battery type	Alkaline or NiMH AA (Qty 4)	
Battery life at 20 °C (68 °F).	40 Hours (20 hours when using the backlight)	

## Replacement parts

<b>Part</b>	<b>Item Number</b>
Long probe	A-08045
Short probe	A-08043
Replacement battery holder 3000	1/BH-01
Nozzle	08024CPC8
Box Spanner	A-08029
<b>Accessory</b>	<b>Item Number</b>
CalCheck	A-21500 (specifying gas, leak rate and pressure)

## Instrument warranty and service

### Warranty

Standard Warranty can be extended to up to 2 years on the GasCheck Tesla when registering your instrument via our website: [www.ionscience.com](http://www.ionscience.com)

To receive your Extended Warranty, you need to register within one month of purchase (Terms and Conditions apply). You will then receive a confirmation email that your Extended Warranty Period has been activated and processed.

Full details, along with a copy of our Warranty Statement can be found by visiting: [www.ionscience.com](http://www.ionscience.com)

### Service

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

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

[Find](#) your local distributor by visiting: [www.ionscience.com](http://www.ionscience.com)



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## Manual log

Manual Version	Amendment	Date updated	Instrument Firmware	PC Software
GasCheck Tesla V1.1	Manual created	20/03/13	V1.39	N/A
GasCheck Tesla V1.1R	Logo	31/07/17	V1.39	N/A
GasCheck Tesla V1.2	Declaration of Conformity Update, image update on page 7, spelling, grammar.	02/04/20	V1.42	N/A
GasCheck Tesla V1.2R	Declaration of Conformity Update	09/12/20	V1.42	N/A

**Disclaimer:** Information in this [manual, document...] is subject to change without notice and does not represent a commitment on the part of Ion Science. No claims, promises or guarantees are made about the accuracy, completeness, or adequacy of the information contained herein.

## Addendum

- GasCheck Tesla is suitable for use in magnetic field strengths of  $\leq 2T$  at least 2m from an MRI opening. – 19<sup>th</sup> March 2021
- It's possible to use the instrument in higher magnetic fields but please contact ION Science for more information if your magnetic field is  $> 2T$ . – 19<sup>th</sup> March 2021