Agilent Technologies

Vacuum Products Division

CE

VS Series Leak Detector Wireless Remote Model G8600-60002

OPERATION MANUAL

Manual No. 699909945
Revision D
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VS Series Leak Detector Wireless Remote
Model G8600-60002

Warranty

Products manufactured by Seller are warranted against defects in materials and workmanship for twelve (12) months from date of shipment thereof to Customer, and Seller's liability under valid warranty claims is limited, at the option of Seller, to repair, to replace, or refund of an equitable portion of the purchase price of the Product. Items expendable in normal use are not covered by this warranty. All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Seller, are due or traceable to defects in original materials or workmanship. All obligations of Seller under this warranty shall cease in the event of abuse, accident, alteration, misuse, or neglect of the equipment. In-warranty repaired or replaced parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the repaired or replaced parts. After expiration of the applicable warranty period, Customer shall be charged at the then current prices for parts, labor, and transportation.

Reasonable care must be used to avoid hazards. Seller expressly disclaims responsibility for loss or damage caused by use of its Products other than in accordance with proper operating procedures.

Except as stated herein, Seller makes no warranty, express or implied (either in fact or by operation of law), statutory or otherwise; and, except as stated herein, Seller shall have no liability under any warranty, express or implied (either in fact or by operation of law), statutory or otherwise. Statements made by any person, including representatives of Seller, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon Seller unless reduced to writing and approved by an officer of Seller.

Warranty Replacement and Adjustment

All claims under warranty must be made promptly after occurrence of circumstances giving rise thereto, and must be received within the applicable warranty period by Seller or its authorized representative. Such claims should include the Product serial number, the date of shipment, and a full description of the circumstances giving rise to the claim. Before any Products are returned for repair and/or adjustment, written authorization from Seller or its authorized representative for the return and instructions as to how and where these Products should be returned must be obtained. Any Product returned to Seller for examination shall be prepaid via the means of transportation indicated as acceptable by Seller. Seller reserves the right to reject any warranty claim not promptly reported and any warranty claim on any item that has been altered or has been returned by non-acceptable means of transportation. When any Product is returned for examination and inspection, or for any other reason, Customer shall be responsible for all damage resulting from improper packing or handling, and for loss in transit, notwithstanding any defect or non-conformity in the Product. In all cases, Seller has the sole responsibility for determining the cause and nature of failure, and Seller's determination with regard thereto shall be final.

If it is found that Seller's Product has been returned without cause and is still serviceable, Customer will be notified and the Product returned at Customer's expense; in addition, a charge for testing and examination may be made on Products so returned.

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Preface

Documentation Standards

This manual uses the following documentation standards:

NOTE

Notes contain important information.

CAUTION

Cautions appear before instructions, which if not followed, could cause damage to the equipment or data loss.

WARNING

Warnings appear for a particular procedure or practice which, if not followed correctly, could lead to serious injury or death.

Text

Hard buttons are depicted in text in **bold** text.

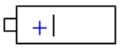
Italics is used for emphasis or to indicate screen text.

Wireless Remote is used for VS Leak Detector Wireless Remote Control HH unit.

Hazard and Safety Information

Operators and service personnel must be aware of all hazards associated with this equipment. They must know how to recognize hazardous and potentially hazardous conditions, and know how to avoid them. The consequences of unskilled, improper, or careless operation of the equipment can be serious. Every operator or service person must read and thoroughly understand operation/maintenance manuals and any additional information provided by Agilent. All warning and cautions must be read carefully and strictly observed. Consult local, state, and national agencies regarding specific requirements and regulations. Address any safety, operation, and/or maintenance questions to your nearest Agilent office.

The common international symbols used in this manual and on the equipment are defined below:

OFF	OFF Supply (Power)		Direct Current
ON	ON Supply (Power)		Indoor, Dry Location Use Only
	Warning, Risk of danger Refer to documentation		No Serviceable Part Inside
	Alternating Current		Positioning Cell (Battery)
	Headphone		DC Input
	Do Not Place in Trash		

Solvents

WARNING

To clean the unit's plastic enclosure, the LCD display and Front Panel buttons, use only a soft cloth slightly dampened with water or a mild soap.

Do NOT use excess water or cleaning solvents of any kind.

Avoid splashing any cleaning solvents into the unit through the openings or the enclosure Front Panel buttons, e.g. the speaker grid, DC Power and Headphone Jacks. Wipe the surface with a dry lint-free cloth.

Do not let any water or other foreign object get inside the equipment. If the Wireless Remote is dropped into water or if water gets into the internal parts, it could result in fire or electrical shock. Remove the battery cells immediately and contact Agilent's service center.

Equipment, General

CAUTION

The performance and operating safety of this equipment can only be guaranteed if it is operated according to normal conditions of use.

CAUTION

Do not leave the Wireless Remote in places with high temperature and high humidity or where temperature and humidity fluctuate greatly.

Avoid dropping or hitting the Wireless remote or subjecting it to severe vibration or impact.

WARNING

Do not use in presence of flammable or explosive gas.

Do not attempt to disassemble or modify the equipment: Wireless Remote, External AC/DC power supply and/or battery charger. Such action could lead to electric shock or injury. Agilent's authorized technician will do any repair work.

WARNING

If an operator notices smoke or an unusual smell or noise, stop using the Wireless Remote immediately, remove the battery cell taking care to avoid burns, and contact the Agilent Service Center.

Remove the battery cells outdoors, away from anything combustible, and avoid touching it with bare hands.

Continued operation could result in fire or burns.

WARNING *Be careful with the strap when carrying the Wireless Remote as it can catch on stray objects, causing injury or damage.*

LCD Display

CAUTION *Do not apply excessive pressure to the LCD display as this may cause smears.*

CAUTION *In general, the lower the temperature, the longer it takes the LCD display to turn on. Performance of the LCD display may deteriorate in low temperature.*

WARNING *If the LCD display breaks, avoid getting any liquid crystal in mouth or eyes. If it gets on the operator hands, feet or clothing, wash it immediately with soap and water.*

Radio

The wireless remote is built around an RF transceiver module operating in 2.4 GHz ISM band. The same type of the RF module used in this unit is built into the Wireless Remote Base Unit for VS Series Leak Detector G8600-68000 (factory installed) and G6800-68001 (field installed).

The wireless remote operates in a point-to-point or point-to-multipoint, client-server or peer-to-peer architecture. One RF transceiver is configured as a server and there can be one or many clients. To establish synchronization between transceivers, the server emits a beacon. Upon detecting a beacon, a client transceiver informs its host and a RF link is established.

WARNING

The Wireless Remote Contains FCC ID: KQL-RM024, IC: 2268C-RM024 RF transceiver module. The enclosed device complies with Part 15 of the FCC Rules and Industry Canada License Exempt RSS Standard(s).

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

To satisfy FCC RF exposure requirements for mobile type transmitting devices, a separation distance of 20 cm or more should be maintained between the antenna of the Wireless Remote and persons during operation, with exception of hands wrist, feet, and ankles. To ensure compliance, operations at closer distance than this distance are prohibited.

An operator should keep the separation distance of 20 cm or more from the RF antenna of the VS Series leak detector with a Wireless Base Station.

Power

The wireless remote is the digital device, which compromise a microprocessor based digital electronics, LCD display and 2.4 GHz, radio module. During RF transmission and software program execution the unit consumes high current pulses from a power source: an external AC/DC power supply or a battery set (4-AA cells, primary or rechargeable types).

External AC/DC Power Supply

Use only UL/CSA and/or International Safety Agency approved external AC/DC power supply, wall-mount plug-in or desktop type, which meet the follow specifications:

Output:

- Voltage: (4.0 to 6.0) VDC
- Current: 1.0 A min.
- Plug:
  - Barrel type: 2.5 mm ID x 5.5 mm OD, Female
  - Barrel's polarization: Internal (+), External (-)

Battery Set Power Supply

The unit uses 4, alkaline, NiMH or other AA size battery set, primary or rechargeable cells batteries, that supply voltage from 4.0 VDC to 6.0 VDC and suitable for the high current pulse application.

The battery set is automatically disconnected when the external AC/DC power supply is connected to the unit.

Service life for a fresh charged 4-AA cells battery set depends on the cell type and the operating schedule of the unit (see Table 1).

The wireless device is capable of operating continuously for eight hours with the backlight OFF, when batteries are fresh.

WARNING

Take the follow actions to maximize battery safety, when using:

- ❑ *Primary: alkaline (Ultra, Ultra+, Industrial or Nickel Oxy) or Lithium/Iron (e2-Lithium) and/or Rechargeable (NiMH) cells:*
  - ❑ *Never use the cells that have physical damage.*
  - ❑ *Never remove plastic film labels from the metal raw cells. They provide electrical insulation.*
  - ❑ *Do not open cell casings.*
  - ❑ *Never short circuit the cells - they may ignite, explode, leak or get hot causing injury.*
  - ❑ *Never mix the cells from different chemistry, capacity, lots and date codes.*
  - ❑ *Don't mix old cells with new ones. This helps ensure the cells do not leak or rupture.*
  - ❑ *Do not insert cells backwards into the unit battery compartment. Confirm the cell's polarity (+) and (-) contacts are correctly oriented in the battery compartment*
  - ❑ *Never dispose of the cells in a fire as it may cause them to explode.*
  - ❑ *Never leave any type of cells in the unit if it is not be used for a long period of time.*
  - ❑ *Never try to charge the primary cells. It may cause explosion or leakage, which may result in bodily injury.*
- ❑ *Rechargeable (NiMH) cells:*
  - ❑ *Do not insert NiMH cells backwards into the charger. Confirm the cell's polarity (+) and (-) contacts are correctly oriented in the charger bay.*
  - ❑ *Never charge NiMH cells with different capacities and date code.*
  - ❑ *Immediately after a fast charge is finished the NiMH cells are hot! Avoid touching the cells using bare hands when replacing them, as it may cause burns*
  - ❑ *Never leave the charger connected to AC power if it is not used.*

When using rechargeable (NiMH) cells, the following will ensure longer battery life:

- ❑ NiMH cells prefer deep discharge and fast-charge. Lingering slow charges cause crystalline formation (memory).
- ❑ Use only an authorized 15-minutes AA NiMH Fast Charger.

- To get the best performance, charge the NiMH cells in the temperature range between +59 °F and +77 °F. If the area too warm, the cells will not be fully charged. If the area is too cold, the cells can permanently loose their ability to charge.
- For best performance let the fresh fast charged NiMH cells cool to room temperature before using it in the unit.
- If not used immediately, remove the NiMH cells from the charger and then apply a topping-charge before use. Do not leave the cells in the charger for more than a few days, even if on trickle charge.
- NiMH cells that have not been used for several months may not receive a full charge the first time. Two or three cycles with deep discharge generally allows them to reach full capacity.
- NiMH cells are best stored in a cool, dry place at normal room temperature.

NOTE

Agilent strongly advises customer to use and replace NiMH cells with Energizer, NH15 (AA,1.2 V, 2200mAh) type.

Agilent strongly advises customers to use and replace the charger with an UL/CSA approved brand and/or vendor, such as: Energizer (www.energizer.com), CH15MN (15-minutes AA NiMH charger) with CH15MN-ADP (AC/DC adapter).

Customers can use equivalent AA NiMH cells and charger only after consultation with Agilent. Failing to do so may void the warranty of the unit.

WARNING

Use of an unauthorized AA NiMH charger and or an AA NiMH cell may result in damage or malfunction of the unit, leading to accidents.

Table 1 Wireless Remote: Recommended Cells and Service Life

MANUFACTURER/ TRADE NAME	MODEL, TYPE, P/N	SERVICE LIFE	CATEGORY
Rechargeable 4-AA Cells with Battery Charger			
Eveready battery co./Energizer www.energizer.com	AA, NH15	~ (12-14) h/cycle, ~500 cycles	NiMH cell, 1.2 V, 2200 mAh
Primary Cells			
Eveready battery co./Energizer www.energizer.com	AA, e^2 Lithium L91	~ (12 - 15)	Lithium/Iron 1.5V, 3000 mAh
Duracell www.duracell.com/oem	AA, Alkaline NX1500	~ (6 -10)	Nickel Oxy Hydroxide Power Pix, NiOx 1.5V, 1500mAh
Panasonic www.panasonic.com	AA, Alkaline ZR6	~ (6 -10)	Nickel Oxy Hydroxide Xtreme Power or Oxiride, 1.5V
Duracell www.duracell.com/oem	AA, Alkaline MX1500	~ (4 - 8)	Ultimate or Ultra Digital 1.5V, 1500 mAh
Panasonic www.panasonic.com	AA, Alkaline AM-3PI	~ (4 - 8)	Industrial, 1.5V
Duracell www.duracell.com/oem	AA, Alkaline MN1500	~ (2 -4)	Ultra$^+$ or Coppertop 1.5V, 1500 mAh

External Headphones

CAUTION

Use mono headphones with a 3.5 mm plug and at least a 32 Ohm impedance, 100 -10000 Hz frequency response.

Agilent strongly advises to use and replace the headphones with an approved brand and/or vendor, such as: Telex EH2, Model 510, Mono Headset with 3.5 mm plug and mylar speakers (www.telex.com).

Radio Compliance

The RF transceiver module in the unit has been tested and found to comply with the limits for:

- A mobile Spread Spectrum Transmitter operating under USA: FCC Part 15C, Section 15.247 and Canada: CAN/IC, RSS-210, Issue 8, December 2010 and
- Class 2 transceiver operating under Europe: R&TTE Directive 1999/5/EC and ETSI EMC Standards: EN 300 328-1 V1.7.1 (2006-10), EN 301 489-1 V1.9.2 (2011-09)), EN 301 489-3 V1.5.1(2012-07) and EN 301 489-17 V2.2.1 (2012-09) that meets regulations for the 2.4 GHz ISM band.
- Taiwan NCC LP0002

These limits are designed to provide reasonable protection against harmful interference when it is operated in a commercial environment.

This equipment generates, uses, and can radiate RF energy, which if not installed and used in accordance with the instructional manual, can cause harmful interference to radio communications.

When this equipment is operated in a commercial environment, operation is subject to the following two conditions:

- This equipment must not cause harmful interference.
- This equipment must accept any interference received, including interference (RF and ESD) that may cause undesired operation.
- Any modifications on the unit made by the user are liable to cause non-compliance with regulations or affect the EMC performance and the safety of the product. Agilent cannot be held responsible for consequences resulting from such intervention.
- The unit can be damaged by:
  - Radio Frequency (RF) and Electrostatic Discharge (ESD) energy inputs that exceed the maximum ratings
  - Immersion in liquids
  - Physical abuse

To avoid electric shock, connect the product power cord of the external AC/DC power supply to a grounded power receptacle. A power cord with a grounding conductor is required.

Agilent Services

Agilent offers:

- ❑ Preventive maintenance services.
- ❑ Overhaul services.
- ❑ Support agreements.
- ❑ On-site support.

Please see our catalog or contact us to learn about available services.

Contacting Agilent

In the United States, you can contact Agilent Customer Service at 1-800-882-7426. See the back cover of this manual for a listing of our sales and service offices.

Visit our web site at:
http://www.chem.agilent.com/en-US/Products/Instruments/vacuum/pages/default.aspx.

Section 1. Introduction to the VS Series Leak Detector Wireless Remote

1.1 The VS Series Leak Detector Wireless Remote

The VS Series Leak Detector Wireless Remote is a convenient means for operating multiple VS series leak detectors. The wireless remote (Model G8600-60002) has the following capabilities:

- ❑ Enter the VS unit into Test and Hold modes.
- ❑ Read the VS unit's leak rate in a linear or logarithmic bar graph.
- ❑ Turn on and read the VS unit's standard leak (internal calibrated leak).
- ❑ Zero the VS unit's leak rate and helium background.
- ❑ Able to operate on 19 different channels, which are selectable at the leak detector. See the *VS Series Helium Mass Spectrometer Leak Detector Operations Manual* for details.
- ❑ The wireless device can operate multiple systems (remote handsets and leak detectors) in a common area, with only one link active at any moment. A leak detector can only communicate with one wireless device at a time.
- ❑ When fully charged, it can communicate with a leak detector from a distance of 100 m, indoors, not through walls or doors.

The wireless is stored on the VS Series leak detector using the bracket provided to hung it to the top-back portion of the leak detector.

1.1.1 Wireless Remote Dimensions and Connections

Figure 1-1 shows the units dimensions with callouts to system connections.

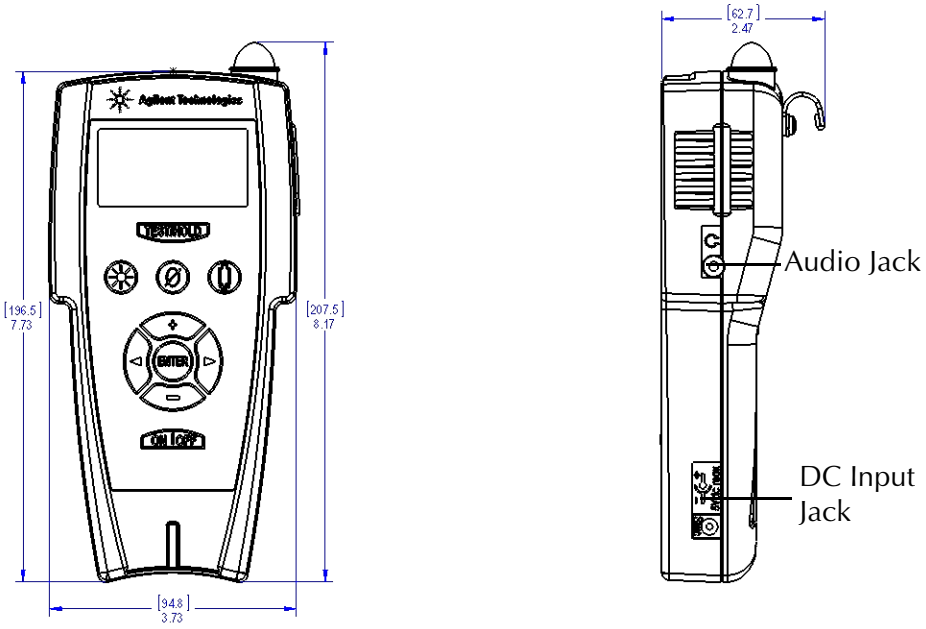


Figure 1-1 Wireless Remote Dimensions, Connections and Controls

1.1.2 Front Panel Display and Controls

The front panel (Figure 1-2) consists of ten *hard* buttons and an LCD display to access the software control screens. Button functionality is discussed after the figure. All operator control and monitoring of results is achieved via the resident software accessed from the Home screen. Figure 1-3 on page 1-6 shows a flow chart of the main sub-screens. Operational discussions are in Section 2 "Operating the Wireless Remote" on page 2-1.

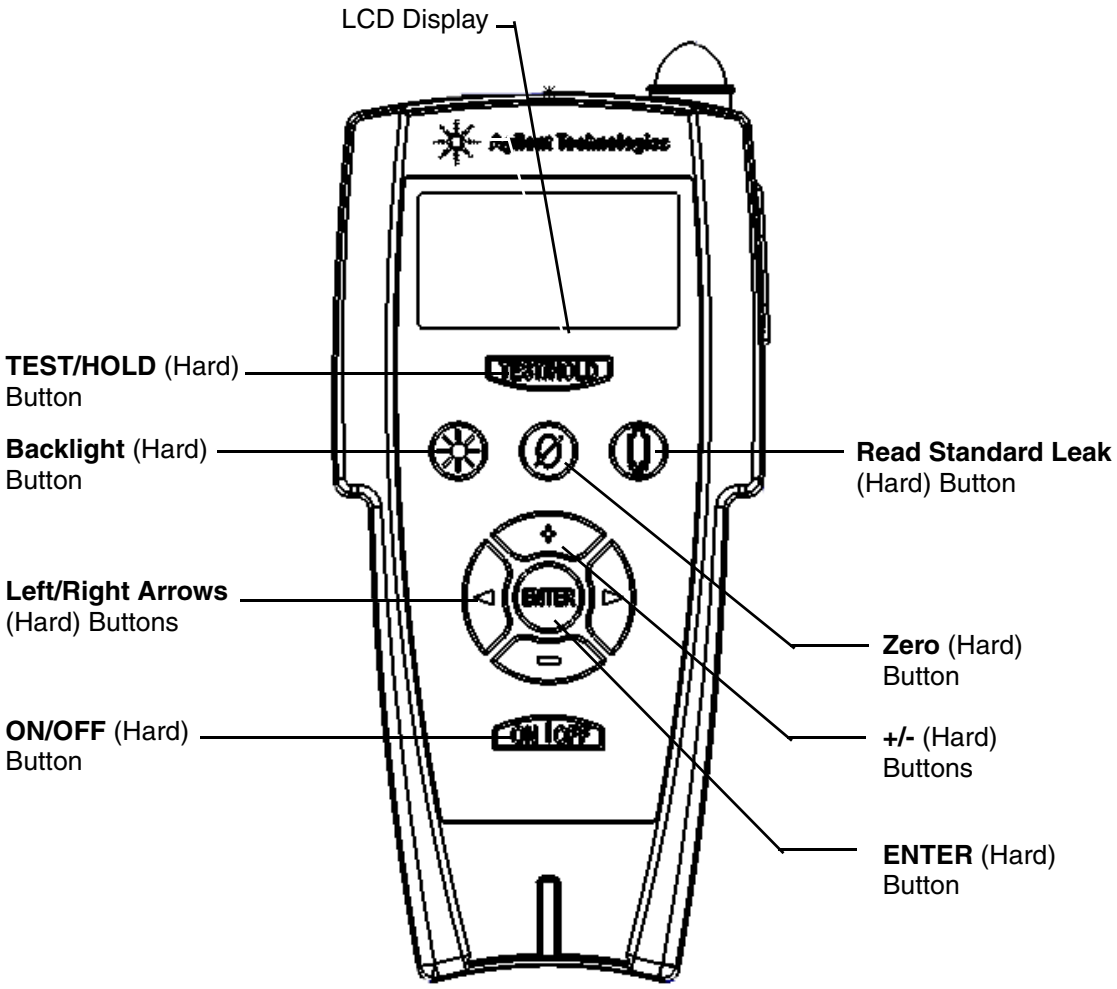


Figure 1-2 Front Panel Displays and Controls

LCD Display

Represents:

- ❑ Leak Rate - in a Bar Graph format with a numeric range indicator
- ❑ Leak Rate, System Status and Parameters - in alphanumeric format
- ❑ Series of screens with the hard key buttons for operator interface

Leak Rate, System Status and Parameters in alphanumeric format:

- ❑ Leak Rate is presented in a scientific notation: XXE-YY with appropriate units
  Where: X .X mantissa is a leak rate value
  E- Y = 10-YY exponent is a leak rate range
  X and Y are any numbers from 0 to 9
- ❑ System Status and/or Mode are represented on the screen in alpha format on the screen and an italic font in this manual
- ❑ Parameters are represented on the screen in alphanumeric format a bold font in this manual.

Leak Rate Bar Graph

The large bar graph displays the leak rate in one of two forms:

- ❑ A linear bar graph - Mantissa (2 divisions per segment, 10 segments per decade)
- ❑ A logarithmic bar graph - Mantissa (2 divisions per segment). The displayable ranges for each of the UNITS that the system can operate in are:
  - ❑ For LOG, display bar graph atm-cc/sec across E-11 to E-3
  - ❑ For LOG, display bar graph mbar-l/sec across E-11 to E-3
  - ❑ For LOG, display bar graph Torr-l/sec across E-11 to E-3
  - ❑ For LOG, display bar graph Pa-m3/sec across E-12 to E-4
  - ❑ For LOG, display bar graph Cubic Ft/year across E-8 to E-0

Over-range and under-range conditions are indicated using:

- ❑ > - To the right side of the bar graph indicates an over-range condition.
- ❑ < - To the left side of the bar graph indicates an under-range condition.

NOTE

The wireless remote automatically displays the same leak rate that the leak detector. Since the wireless remote knows the leak rate units setting for the leak detector, it displays the appropriate ranges for LOG mode.

TEST/HOLD	Toggles the leak detector between the TEST and HOLD sequences.
Backlight	Toggles the backlight for the display ON or OFF.
Left/Right Arrows	Scroll through the screen features.
ON/OFF	ON: A momentary press turns the wireless remote ON.
	OFF: Pressing and holding the OFF button turns the wireless remote OFF. Hold the button down until the display goes blank (approximately three seconds).
Read Standard Leak	Toggles the standard leak ON/OFF for system access.
ZERO	Zeroes out the helium signal indicated on the display.
+/-	These buttons increment/decrement values. On the TOOLS screen, they return the system to the HOME screen icon or the back arrow icon, which allows the user to go back one screen.
ENTER	Selects or accepts a value or change when navigating or performing control functions.

The unit functions through a series of screens, which are navigated as in Figure 1-3.

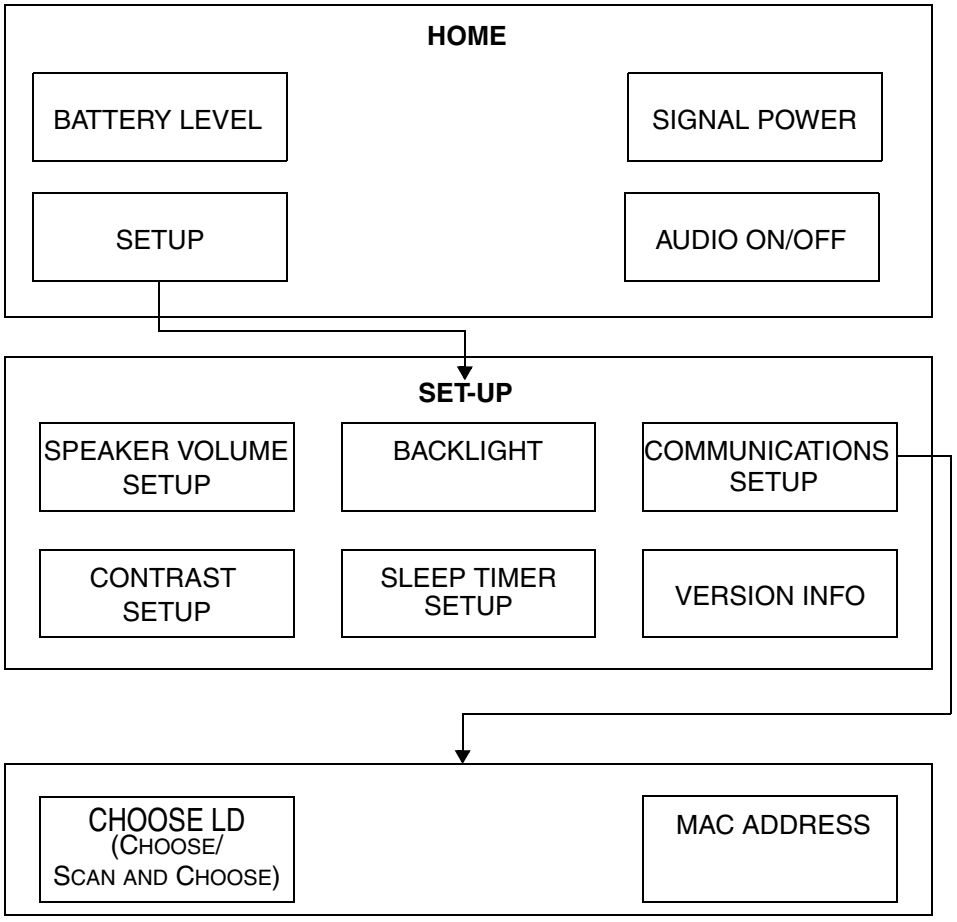


Figure 1-3 Screen Flow

Section 2. Operating the Wireless Remote

2.1 Startup and Shutdown

2.1.1 Startup

To start the wireless remote unit, either:

Battery powered:

- ❑ Press the **ON** button.

External wall-mount plug-in or desktop AC/DC power supply powered:

a. Plug the wall-mount plug-in unit or desktop's leak detector power cord into an appropriate mains power voltage supply receptacle.

b. Insert a 2.5 mm barrel type plug into the DC input of the wireless remote.

c. Press the **ON** button.

If the wireless remote was:

- ❑ Connected in a session to a leak detector at the previous power-down, and it can connect to the same leak detector again, then the remote's display transitions to the HOME screen.
- ❑ Not connected at the previous power-down, or it can no longer establish a session with the same leak detector, the remote goes into Searching mode. Searching mode is also accessed manually via the Setup screen.

NOTE

The term session, used in the operational descriptions, refers to an established, exclusive point-to-point link between the wireless remote and a leak detector.

2.1.2 Shutdown

The wireless remote can be in any mode when shut down.

To shut down the wireless remote:

- ❑ Push and hold the **OFF** button until the LCD display and audio signal go off.

2.2 Screens

Use the LCD display for the initial set-up and configuration of the wireless remote. Once the wireless link is set up and configured for a specific application, leak detector basic operation is controlled primarily using the leak detector **TEST** and **VENT** hard buttons and the leak detector **ZERO** and **STDLK** soft buttons and/or the wireless remote keypad **TEST/HOLD**, **READ STANDARD LEAK**, and **Zero** buttons.

The wireless remote updates the LCD display for leak rate and status approximately once per second.

2.2.1 Basic Functions

Table 2-1 explains the basic on-screen functions used to enter or manipulate values.

Table 2-1 Screen Basic Functional Items

Item	Function
	Appears on screens more than one level from the Home screen. Highlight this button and press the **Enter** button to return directly to the Home screen.
	Saves all values on the screen and exits to the next higher screen.
▶ ◀	Scrolls through menu selection screens when there is more than one screen choice.

Table 2-2 explains the status messages that appear on the wireless remote Home screen.

Table 2-2 Status Messages

Icon	Meaning
TEST, HOLD, VENT, ROUGHING or *CALIBRATING*	Indicates the leak detector is in this mode
STANDARD LEAK	Indicates the leak detector is reading the internal calibrated leak.
NO CONNECTION	Indicates the connection has failed. This may be momentary or it may indicate that the: ❑ wireless remote's signal is obstructed. ❑ wireless remote's is out of range. ❑ leak detector is not configured for wireless communication. ❑ leak detector is off.

2.2.2 Home Screen

This screen appears on power up if the wireless remote establishes a wireless link to a leak detector.

On the *Home* screen, a highlighted pointer appears on of the selected function: Linear or Log Rate, Tools and Speaker icons.

To select a function:

1. Press the ▶ , ◀ , + or - hard buttons to move the pointer around the screen and highlight an item.
2. Press the **ENTER** button to select that function.

To set the volume on/off:

1. Press the ▶ , ◀ , + or - to select the speaker icon on the *Home* screen.
2. Press the **ENTER** button once to set the speaker off.
3. Press the **ENTER** button again to return the speaker to on. The volume level is restored to the level it was at prior to being turned off.

The *Home* screen displays a summary of the following status, configuration settings and icons (Figure 2-1):

1. Digital leak rate
2. Leak rate bar graph
3. Linear (3a) or Log scale (3b)
4. Exponent range
5. Battery power level icon
6. Tools icon
7. Speaker icon
8. RF signal strength icon
9. Leak detector status message

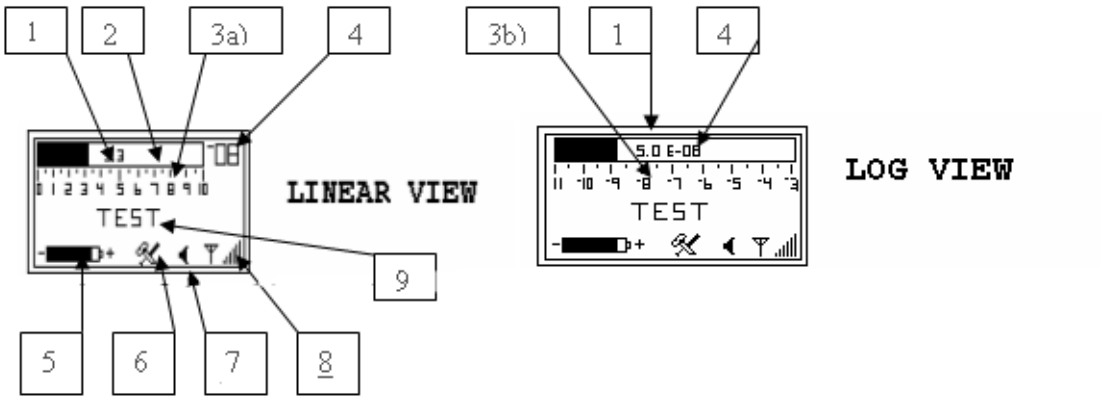


Figure 2-1 Home Screen - Linear and Log Views

1, 2, 3a, 3b and 4 - Leak Rate Display

The wireless remote displays leak rate in either LOG or Linear modes. The wireless remote automatically displays the same leak rate that the leak detector is displaying. Since the wireless remote knows the leak rate units setting for the leak detector, it displays the appropriate ranges for LOG mode.

When the helium leak rate signal is either *Under* or *Over* range, a single arrow: ◀ or ▶ blinks within the leak rate bar graph to indicate that condition.

Figure 2-2 Home Screen - Under and Over Indicators

5 - Battery Power Level Icon

The battery power level indicator appears only on the Home screen and represents the voltage level of the battery. When the battery voltage is depleted to less then ¼ of the indicator length (black filled rectangle) be prepared to change the battery cells.

6 - Tools Icon

The Tools icon appears only on the *Home* screen and accesses the six various Set Up and Information screens. The *Tools* screens include:

- ❑ Speaker Volume (page 2-7)
- ❑ Backlight (page 2-8)
- ❑ Communications Setup (page 2-10)
- ❑ Contrast Setup (page 2-19)
- ❑ Sleep Timer (page 2-21)
- ❑ Version (page 2-24)

7 - Speaker Icon

The speaker icon appears only on the *Home* screen and accesses the audio ON/OFF function.

8 - RF Signal Strength Icon

The RF signal strength icon appears only on the Home screen and represents the strength of RF analogue signal. If the wireless remote is too far from the host leak detector, the RF signal will be weak or undetectable (vertical bars).

9 - Leak Detector Status

The current leak detector operating state appears below the test port pressure reading Linear or Log Bar Graph (Figure 2-3).

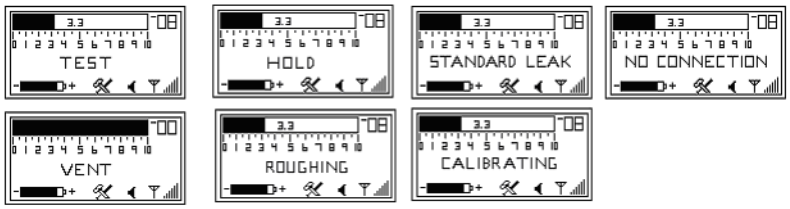


Figure 2-3 Operating State Status Messages

2.2.3 Speaker Volume Setup Screen

Use this screen to setup the desired level of the volume when the speaker is turned on.

Audio Volume — When the leak rate bar graph display is set to Linear mode:

- ❑ The audio signal increases from a low to high frequency as the leak rate increases within each decade.
- ❑ The pitch cycles low to high as it passes through each decade. The audio response corresponds directly to the size of the leak.

To set the volume:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* setup screen appears (Figure 2-4).

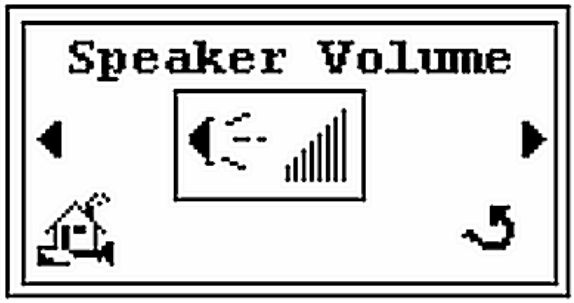


Figure 2-4 Speaker Volume Setup Screen

2. Press **Enter** and the configuration screen appears (Figure 2-5).

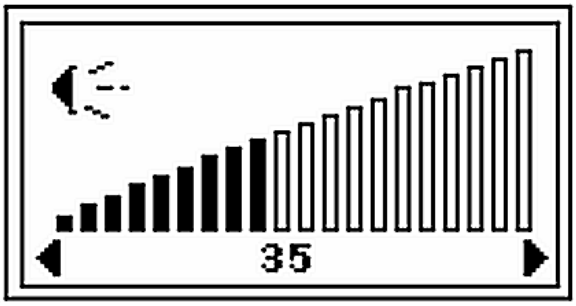


Figure 2-5 Speaker Volume Setup Configuration Screen

3. Press the ▶ , ◀ buttons to set desired volume.
4. Press **Enter** and Figure 2-4 reappears.
5. Press the ▶ , ◀ to highlight the *Home* screen icon  and press **Enter** and the Home screen reappears.

2.2.4 Backlight Screen

Use this screen to setup the desired level for the LCD backlight intensity.

To set the backlight intensity level:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* setup screen appears (Figure 2-4).

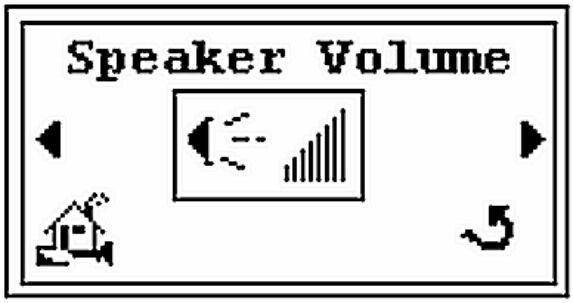


Figure 2-6 Speaker Volume Setup Screen

2. Press the ▶ once and the *Backlight* screen appears (Figure 2-7).

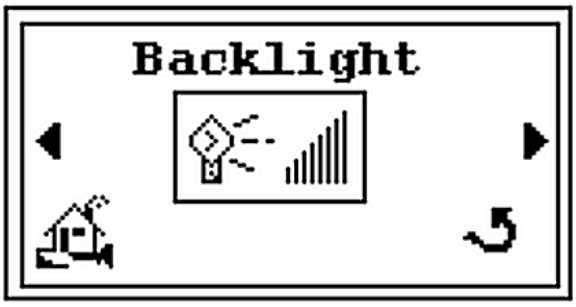


Figure 2-7 Backlight Screen

3. Press **Enter** and the configuration screen appears (Figure 2-8).

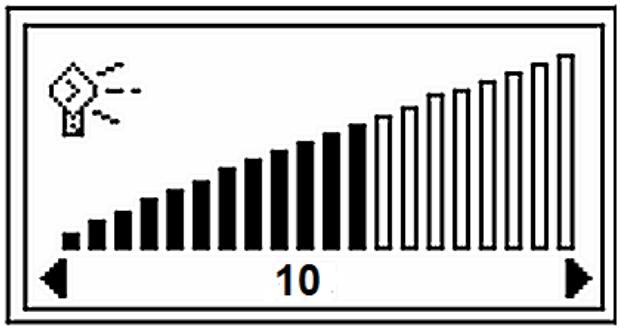


Figure 2-8 Backlight Setup Configuration Screen

4. Press the ▶ , ◀ buttons to set desired backlight intensity level (e.g. 0 to 30).
5. Press **Enter** and Figure 2-7 reappears.
6. Press the ▶ , ◀ to highlight the *Home* screen icon and press **Enter** and the *Home* screen reappears.

2.2.5 Communication Setup Screen

Use this *Setup* screen (Figure 2-9) to choose the leak detector that the wireless remote is associated with, if there is more than one potential leak detector host. The first choice allows you to select a wireless remote from the known list of available leak detectors. The second choice allows you to search for all available leak detectors and present a selection list of leak detector MAC sub-addresses.

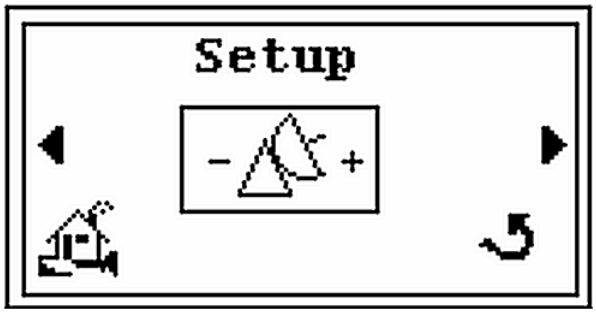


Figure 2-9 Communications Setup - Initial

Use this screen to navigate to the three sub-screens to:

- Use the *SELECT* screen to choose a leak detector from a list of leak detectors within communications range that are is not already connected. While up to 10 leak detectors MAC addresses can be configured at one time, only one connection can be active (Section 2.2.5.1 “Choose Leak Detector” on page 2-11).
- Use the *Search* screen to scan the area for available leak detector RF channels (from 1 to 19) and then choose a leak detector from a list of leak detectors within communications range (Section 2.2.5.2 “Scan and Choose a Leak Detector” on page 2-14).
- Use the *MAC addresses* screen to verify the leak detector and wireless remote addresses (Section 2.2.5.3 “MAC Address Verification” on page 2-16).

2.2.5.1 Choose Leak Detector

The following appears on this screen (Figure 2-10):

- ❑ The number on the left (e.g. *8*) is the leak detector channel number.
- ❑ The string on the right (e.g.*11:3C:0C*) is the lower three byte portion of the leak detector MAC address. The MAC information is used to identify potential host leak detectors, or, if more than one leak detector is set to the same channel, selecting the leak detector via MAC address.

Once the desired MAC channel is shown in the *Choose LD* screen, pressing **ENTER** causes the wireless remote to attempt to establish a session with that leak detector. The leak detector and wireless remote MAC addresses are viewed in the *MAC Address* screen (see Section 2.2.5.3 “MAC Address Verification” on page 2-16).

Figure 2-10 Choose LD Screen

To choose from an existing list:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* screen appears (Figure 2-11).

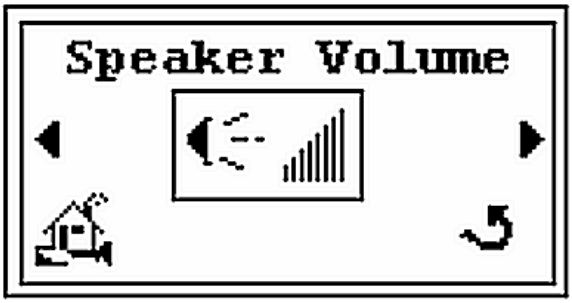


Figure 2-11 Speaker Volume Setup Screen

2. Press the ▶ and the *Backlight* screen appears (Figure 2-12).

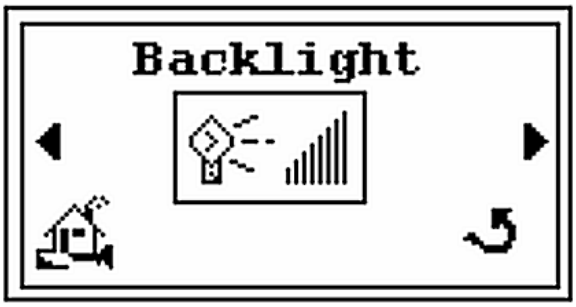


Figure 2-12 Backlight Screen

3. Press the ▶ and the *Setup* screen appears (Figure 2-13).

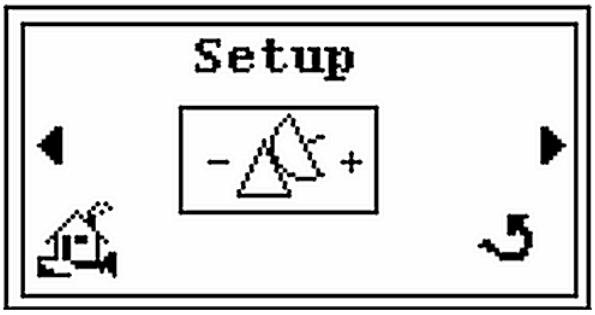


Figure 2-13 Setup Screen

4. Press **Enter** and the *Select* screen appears (Figure 2-14).

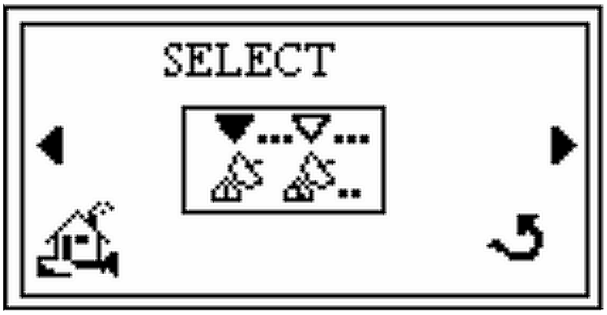


Figure 2-14 Select Screen

5. Press **Enter** and the *Choose LD* screen appears (Figure 2-15).

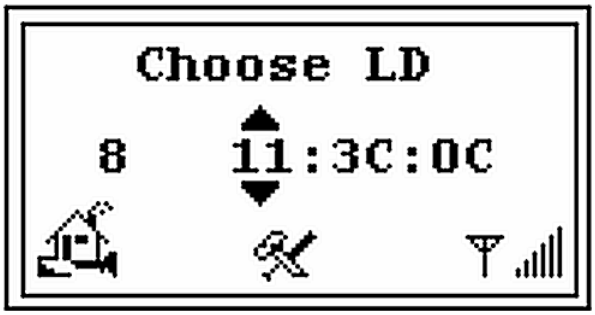


Figure 2-15 Choose LD Screen

6. Press the ▶ , ◀ buttons to select the leak detector from the list of available leak detectors (e.g. *23:3C:0C*).
7. Press **Enter** and the *Link* screen appears (Figure 2-16) for one to three seconds and then the *Home* screen reappears.

Figure 2-16 Link Screen

NOTE

*If the Choose LD process finds a leak detector that is currently in session with another remote, the leak detector won't allow a new session and Figure 2-17 appears. Press the **ENTER** button to establish the new session.*

Figure 2-17 No Available LD

2.2.5.2 Scan and Choose a Leak Detector

To search for a new list and choose a leak detector from the *Home* screen:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* screen appears (Figure 2-18).

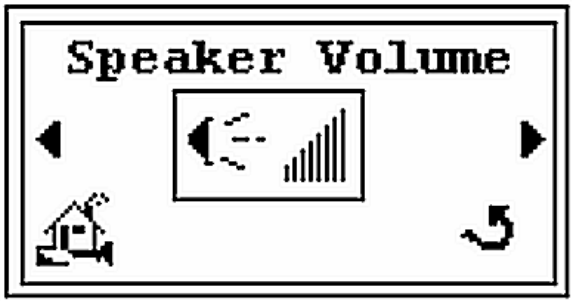


Figure 2-18 Speaker Volume Setup Screen

2. Press the ▶ and the *Backlight* screen appears (Figure 2-19).

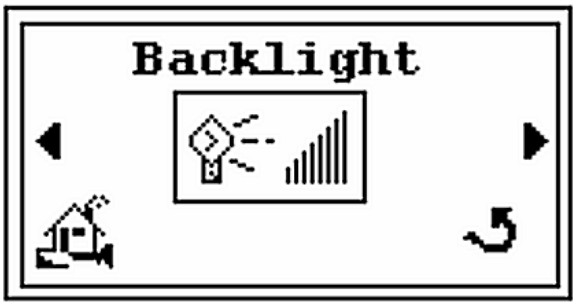


Figure 2-19 Backlight Screen

3. Press the ▶ and the *Setup* screen appears (Figure 2-20).

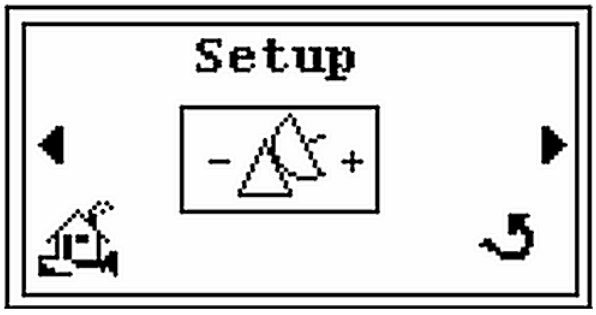


Figure 2-20 Setup Screen

4. Press **Enter** and the *Select* screen appears (Figure 2-21).

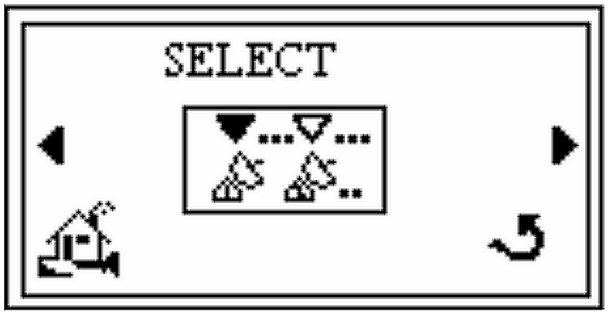


Figure 2-21 Select Screen

5. Press the ▶ and the *Search* screen appears (Figure 2-22).

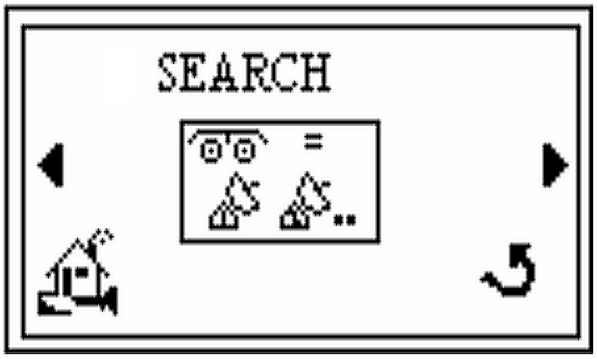


Figure 2-22 Search Screen

6. Press **Enter** and the *Searching* screen appears (Figure 2-23) followed by the *Choose LD* screen (Figure 2-24).

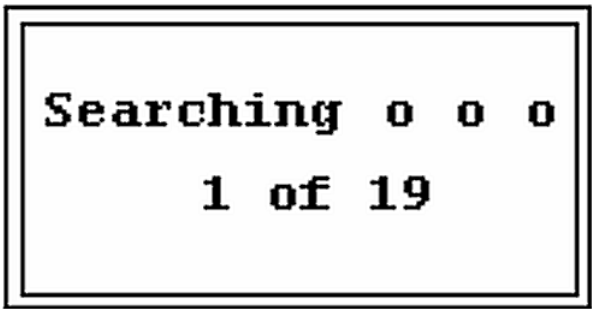


Figure 2-23 Searching Screen

Figure 2-24 Choose LD Screen

7. Press the + or - hard buttons and choose from the leak detector list (e.g. channels # 8 or #12).
8. Press **Enter** and the *Link* screen appears (Figure 2-25) for one to three seconds and then the *Home* screen reappears.

Figure 2-25 Link Screen

2.2.5.3 MAC Address Verification

Use this screen to see the MAC addresses of both the leak detector and the wireless remote that is communicating with the leak detector. If the MAC address of the previous leak detector is unknown, the display leaves the leak detector MAC address blank.

To view and verify the MAC addresses from the *Home* screen:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* screen appears (Figure 2-26).

Figure 2-26 Speaker Volume Setup Screen

2. Press the ▶ and the *Backlight* screen appears (Figure 2-27).

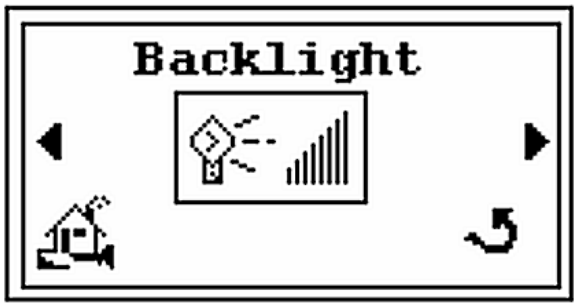


Figure 2-27 Backlight Screen

3. Press the ▶ and the *Setup* screen appears (Figure 2-28).

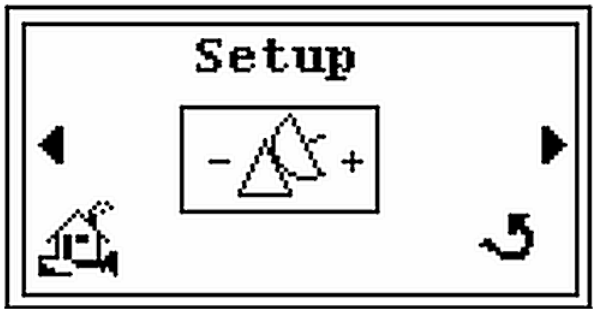


Figure 2-28 Setup Screen

4. Press **Enter** and the *Select* screen appears (Figure 2-29).

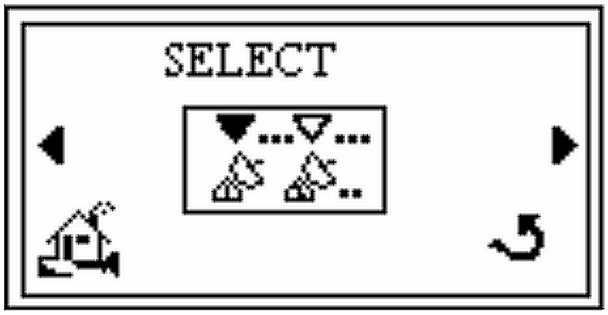


Figure 2-29 Select Screen

5. Press the ▶ and the *Search* screen appears (Figure 2-30).

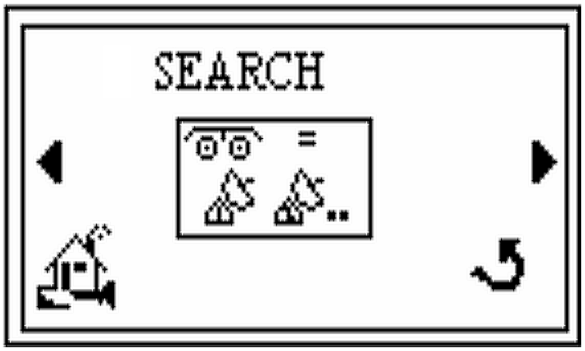


Figure 2-30 Search Screen

6. Press the ▶ and the *Mac Addresses* screen appears (Figure 2-31).

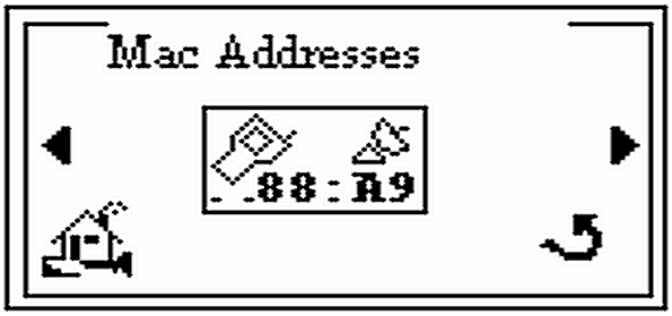


Figure 2-31 MAC Addresses Screen

7. Press **Enter** and the *Mac Addresses* screen appears (Figure 2-32), for example.

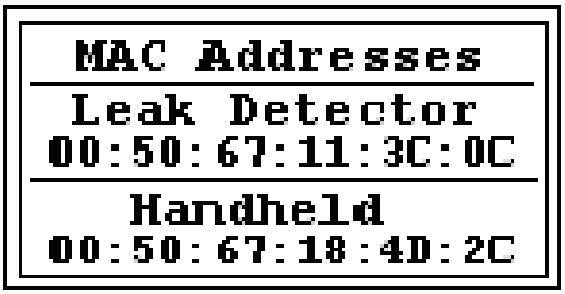


Figure 2-32 Verify MAC Addresses Screen

8. Press **Enter** and the *Mac Addresses* screen reappears (Figure 2-31).
9. Press the ▶ , ◀ to highlight the *Home* screen icon and press **Enter** and the *Home* screen reappears.

2.2.6 Contrast Setup Screen

Use this screen to setup the desired level for the LCD display contrast.

To set the contrast level:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* screen appears (Figure 2-33).

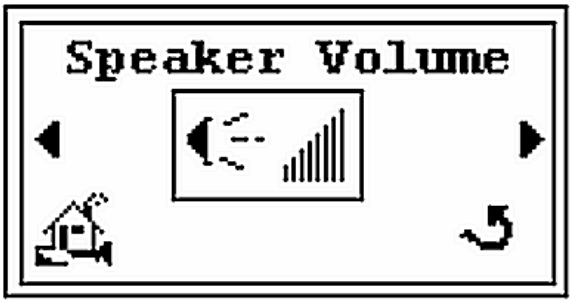


Figure 2-33 Speaker Volume Setup Screen

2. Press the ▶ and the *Backlight* screen appears (Figure 2-34).

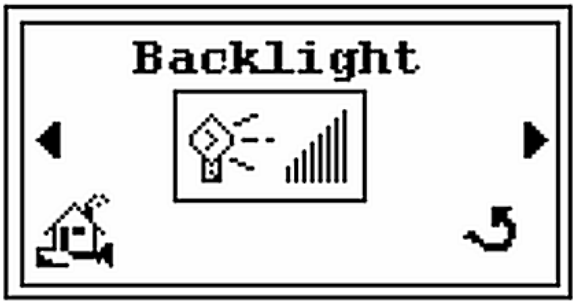


Figure 2-34 Backlight Screen

3. Press the ▶ and the *Setup* screen appears (Figure 2-35).

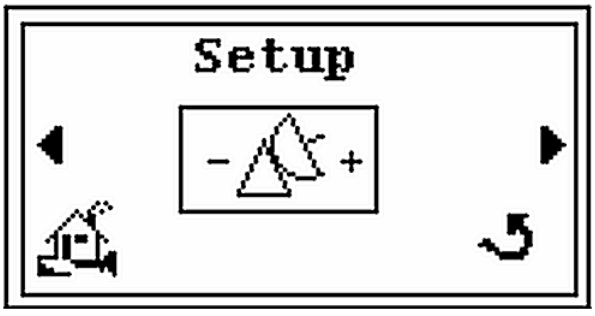


Figure 2-35 Setup Screen

4. Press the ▶ and the *Contrast* screen appears (Figure 2-36).

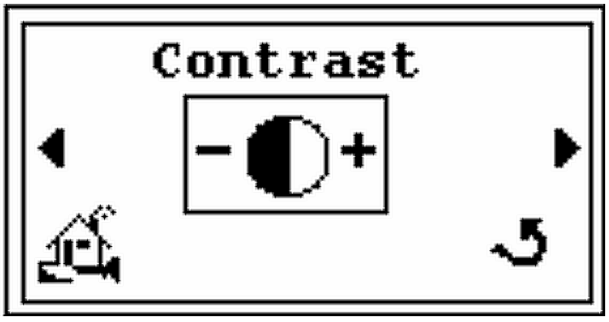


Figure 2-36 Contrast - Initial Screen

5. Press **Enter** and the configuration screen appears (Figure 2-37).

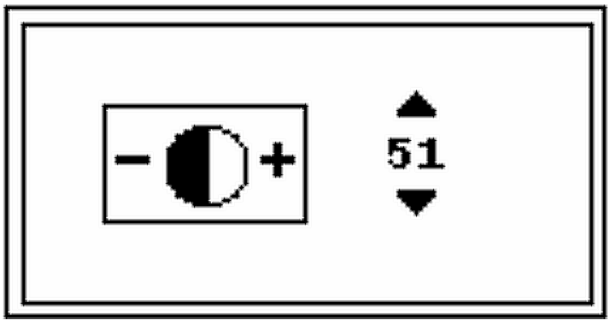


Figure 2-37 Contrast - Configuration

6. Press the + or - hard buttons to set the desired contrast level (e.g. *51*).
7. Press **Enter** and the *Contrast* screen reappears (Figure 2-36).
8. Press the ▶ , ◀ to highlight the *Home* screen icon and press **Enter** and the *Home* screen reappears.

2.2.7 Sleep Timer Setup

Use this feature to adjust the time (in minutes) that the unit operates without user activity before shutting down. If the buttons on the keypad are not pressed for a sleep timer amount of time, the unit automatically shuts down to save battery life. The range is from *1* to *60* minutes. When set to *OFF*, the sleep timer never automatically shuts the wireless remote down.

To set the sleep timer:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* screen appears (Figure 2-38).

Figure 2-38 Speaker Volume Setup Screen

2. Press the ▶ and the *Backlight* screen appears (Figure 2-39).

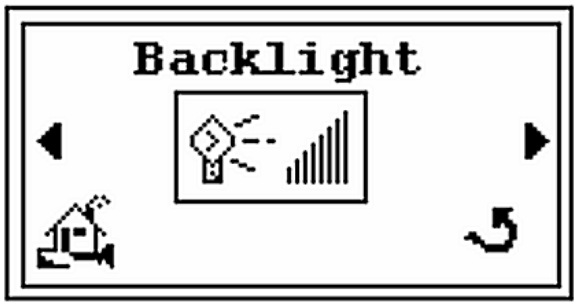


Figure 2-39 Backlight Screen

3. Press the ▶ and the *Setup* screen appears (Figure 2-40).

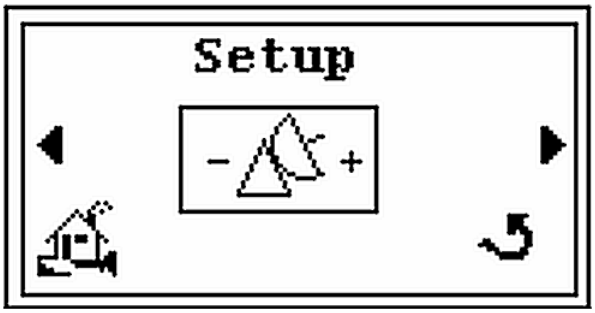


Figure 2-40 Setup Screen

4. Press the ▶ and the *Contrast* screen appears (Figure 2-41).

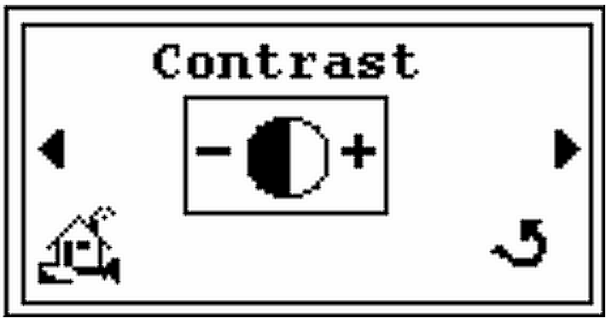


Figure 2-41 Contrast - Initial Screen

5. Press the ▶ and the *Sleep Timer* screen appears (Figure 2-42).

Figure 2-42 Sleep Timer Screen

6. Press **Enter** and the configuration screen appears (Figure 2-43).

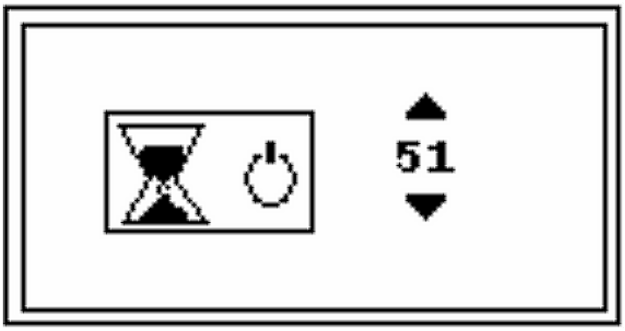


Figure 2-43 Sleep Timer Configuration Screen

7. Press the + or - hard buttons to set the desired sleep time from *1* to *60* minutes or *OFF* (infinite time *ON*).
8. Press **Enter** and the *Sleep Timer* screen reappears (Figure 2-42).
9. Press the ► , ◄ to highlight the *Home* screen icon and press **Enter** and the *Home* screen reappears.

2.2.8 Version Info

Use this feature to verify the versions of the Firmware and Radio module of the Wireless Remote.

To see the Version Info:

1. Press the ▶ , ◀ , + or - hard buttons to highlight the *Home* screen Tools icon  and press **Enter** and the *Speaker Volume* screen appears (Figure 2-44).

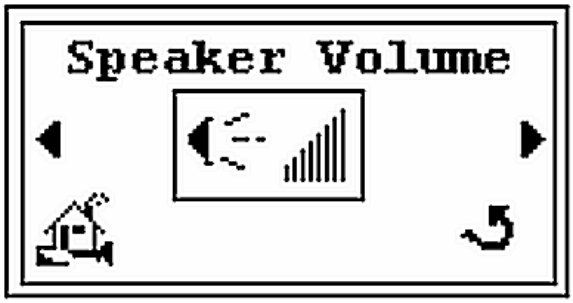


Figure 2-44 Speaker Volume Setup Screen

2. Press the ▶ and the *Backlight* screen appears (Figure 2-45).

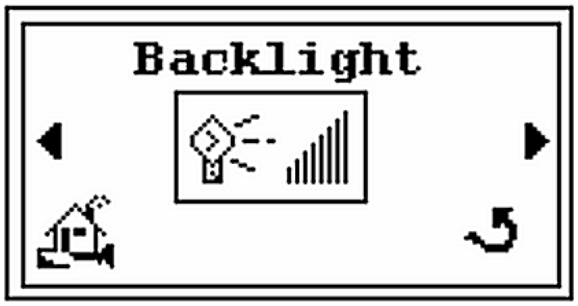


Figure 2-45 Backlight Screen

3. Press the ▶ and the *Setup* screen appears (Figure 2-46).

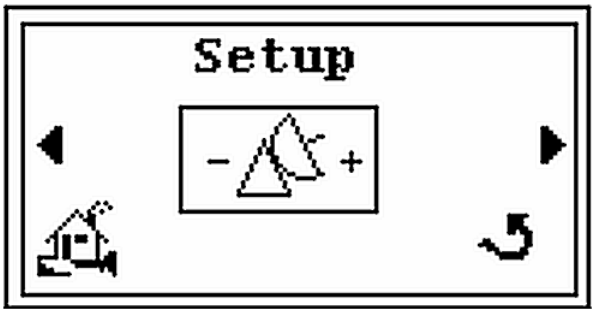


Figure 2-46 Setup Screen

4. Press the ▶ and the *Contrast* screen appears (Figure 2-47).

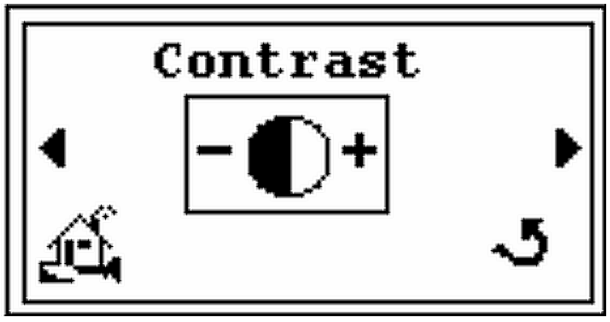


Figure 2-47 Contrast - Initial Screen

5. Press the ▶ and the *Sleep Timer* screen appears (Figure 2-48).

Figure 2-48 Sleep Timer Screen

6. Press the ▶ and the *Version* screen appears (Figure 2-49).

Figure 2-49 Version - Initial Screen

7. Press **Enter** and the information screen appears (Figure 2-50).

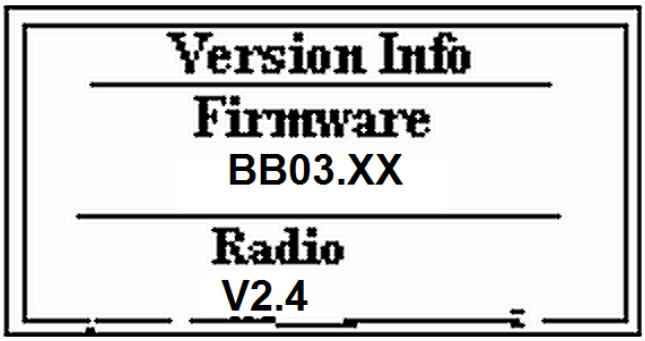


Figure 2-50 Version - Information Screen

NOTE *Firmware BB03.04 and Radio 1.3 or higher.*

8. Press **Enter** and the *Version* screen reappears (Figure 2-49).
9. Press the ▶ , ◀ to highlight the *Home* screen icon and press **Enter** and the *Home* screen reappears.

Appendix A. Specifications

A.1 Specifications

The specifications for the unit are provided in Table A-1.

Table A-1 Wireless Remote Specifications

Specifications	Definition
Radio Type	ISM band, 2404 -2431 MHz, FHSS (US/Canada/Europe)
Channels	19 (used to create independent networks) One Wireless remote unit can operate with up to 10 VS LD without *cross talk* or interference
Output Power	50 mW typical (conducted, no antenna)
Effective Isotropic Radiated Power	100 mW typical (EIRP with 2 dBi gain 2.4 GHz dipole antenna)
Operational Range	Up to 100 m (328'), indoors, based on 2 dBi gain antenna
Power Requirements	❑ Average power: ≤ 1.0 W ❑ Battery Supply: ❑ 4 (four) AA size cells ❑ Type: Primary e^2 (alkaline or Lithium/Iron) or Rechargeable NiMH cells suitable for the high current pulse application ❑ Battery Voltage: (4.0 to 6.0 VDC) ❑ Operating Life: ≤ 12 hours (depend on the cell type and the operating schedule of the VSLDWRC unit) ❑ External AC/DC Supply (Wall Plug-In or Desktop type): ❑ Output: (4.0-6.0) VDC, 1 A min ❑ Plug: ❑ Barrel type, 2.5 mm ID x 5.5 mm OD, female ❑ Barrel polarization: Internal (+), External (-) See Table 1 for the recommended battery cells and AC/DC supplies types.

Table A-1 Wireless Remote Specifications (Continued)

Specifications	Definition	
LCD display	❑ Viewing Area: 27.5 mm x 55.4 mm ❑ Viewing Angle: ≥ 30° ❑ Color: Silver/Gray ❑ Adjustable Contrast and Backlight control ❑ Display Update Rate: 1 Hz	
Agency Identification Numbers	❑ US/FCC ID: KQL-RM024 ❑ CAN/IC: 2268C-RM024 ❑ EUR/ETSI EN: CE ❑ Taiwan: CCAI13LP3400T1, CCAI13LP3330T3	
Regulatory	Safety: ❑ Low Voltage Directive (LDV) 73/23/EEC:1973 as Amended 93/68/EEC:1993 EMC: ❑ Electromagnetic Compatibility (EMC) Directive 89/336/EEC:1989 as Amended by 93/68/EEC:1993 ❑ Radio and Telecommunication Terminal Equipment (R&TTE Directive, 1999/5/EC: 1999 For particular Safety and EMC Standards see Declaration of Conformity	
Internal Speaker	❑ Impedance: 8.0 Ohm ❑ Frequency Response: 200-6000 Hz ❑ Sound Level: > 85 dB min @ 1.0 Ft	
Headphones	❑ Mono, 3.5 mm male plug ❑ Impedance: > 32.0 Ohm ❑ Frequency Response: 100-10000 Hz Note: stereo headphones can be used with a 3.5 mm mono male to stereo female adapter, the adapter will not produce stereo sound.	
Installation	Indoor use only. Altitude up to 2000 m (6,400'). Material Group III, POLLUTION DEGREE 2 according to IEC 61010-1:2001	
Temperature	Operating	+12° C to +40° C
	Storage	-20 °C (-4 °F) to +60 °C (140 °F), Relative humidity: 0% to 95%, non-condensing
Operating Humidity	Maximum relative humidity (HR) 80% for temperatures up to +31 °C decreasing linearly to 50% relative humidity at +40 °C	
Dimensions	261.3 [10.3] x 94.8 [3.7] x 62.8 [2.5] mm [inch]	
Weight	≤ 0.5 kg with batteries installed.	

Agilent Technologies

Vacuum Products Division
Instructions for returning products

Dear Customer:

Please follow these instructions whenever one of our products needs to be returned.

1) Complete the attached Request for Return form and send it to Agilent Technologies (see below), taking particular care to identify all products that have pumped or been exposed to any toxic or hazardous materials.

2) After evaluating the information, Agilent Technologies will provide you with a Return Authorization (RA) number via email or fax, as requested.
Note: Depending on the type of return, a Purchase Order may be required at the time the Request for Return is submitted. We will quote any necessary services (evaluation, repair, special cleaning, eg).

3) Important steps for the shipment of returning product:
   - Remove all accessories from the core product (e.g. inlet screens, vent valves).
   - Prior to shipment, drain any oils or other liquids, purge or flush all gasses, and wipe off any excess residue.
   - If ordering an Advance Exchange product, please use the packaging from the Advance Exchange to return the defective product.
   - Seal the product in a plastic bag, and package product carefully to avoid damage in transit. You are responsible for loss or damage in transit.
   - Agilent Technologies is not responsible for returning customer provided packaging or containers.
   - Clearly label package with RA number. Using the shipping label provided will ensure the proper address and RA number are on the package. Packages shipped to Agilent without a RA clearly written on the outside cannot be accepted and will be returned.

4) Return only products for which the RA was issued.

5) Product being returned under a RA must be received within 15 business days.

6) Ship to the location specified on the printable label, which will be sent, along with the RA number, as soon as we have received all of the required information. Customer is responsible for freight charges on returning product.

7) Return shipments must comply with all applicable Shipping Regulations (IATA, DOT, etc.) and carrier requirements.

RETURN THE COMPLETED REQUEST FOR RETURN FORM TO YOUR NEAREST LOCATION:

EUROPE:	NORTH AMERICA:	PACIFIC RIM:
Fax: 00 39 011 9979 330		
Fax Free: 00 800 345 345 00	Fax: 1 781 860 9252	please visit our website for individual
Toll Free: 00 800 234 234 00	Toll Free: 800 882 7426, Option 3	office information
vpt-customercare@agilent.com	vpl-ra@agilent.com	http://www.agilent.com

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please read important policy information on Page 3 that applies to all returns.

1) CUSTOMER INFORMATION

Company Name:	**Contact Name:**
Tel: **Email:**	**Fax:**
Customer Ship To:	**Customer Bill To:**
Europe only: **VAT reg. Number:**	USA/Canada only: ☐ **Taxable** ☐ **Non-taxable**

2) PRODUCT IDENTIFICATION

Product Description	Agilent P/N	Agilent S/N	Original Purchasing Reference

3) TYPE OF RETURN (**Choose one from each row** and supply Purchase Order if requesting a billable service)

3A. ☐ Non-Billable ☐ Billable ➡ New PO # (hard copy must be submitted with this form):

3B. ☐ Exchange ☐ Repair ☐ Upgrade ☐ Consignment/Demo ☐ Calibration ☐ Evaluation ☐ Return for Credit

4) HEALTH and SAFETY CERTIFICATION

AGILENT TECHNOLOGIES CANNOT ACCEPT ANY PRODUCTS CONTAMINATED WITH BIOLOGICAL OR EXPLOSIVE HAZARDS, RADIOACTIVE MATERIAL, OR MERCURY AT ITS FACILITY.
Call Agilent Technologies to discuss alternatives if this requirement presents a problem.

The equipment listed above (check one):

☐ **HAS NOT** pumped or been exposed to any toxic or hazardous materials. OR
☐ **HAS** pumped or been exposed to the following toxic or hazardous materials. If this box is checked, the following information must also be filled out. Check boxes for all materials to which product(s) pumped or was exposed:

☐ Toxic ☐ Corrosive ☐ Reactive ☐ Flammable ☐ Explosive ☐ Biological ☐ Radioactive

List all toxic/hazardous materials. Include product name, chemical name, and chemical symbol or formula:

_____

NOTE: If a product is received at Agilent which is contaminated with a toxic or hazardous material that was not disclosed, **the customer will be held responsible** for all costs incurred to ensure the safe handling of the product, and **is liable** for any harm or injury to Agilent employees as well as to any third party occurring as a result of exposure to toxic or hazardous materials present in the product.

Print Name: **Authorized Signature: .....** **Date:**

5) FAILURE INFORMATION:

Failure Mode (REQUIRED FIELD. See next page for suggestions of failure terms):
Detailed Description of Malfunction: (Please provide the error message)
Application (system and model):

I understand and agree to the terms of Section 6, Page 3/3.
Print Name: **Authorized Signature: .....** **Date:**

Agilent Technologies

Vacuum Products Division
Request for Return Form
(Health and Safety Certification)

Please use these Failure Mode to describe the concern about the product on Page 2.

TURBO PUMPS and TURBO CONTROLLERS

APPARENT DEFECT/MALFUNCTION		POSITION	PARAMETERS	
- Does not start	- Noise	- Vertical	Power:	Rotational Speed:
- Does not spin freely	- Vibrations	-Horizontal	Current:	Inlet Pressure:
- Does not reach full speed	-Leak	-Upside-down	Temp 1:	Foreline Pressure:
- Mechanical Contact	-Overtemperature	-Other:	Temp 2:	Purge flow:
- Cooling defective	-Clogging	.....	OPERATING TIME:	

ION PUMPS/CONTROLLERS

- Bad feedthrough	- Poor vacuum
- Vacuum leak	- High voltage problem
- Error code on display	- Other

VALVES/COMPONENTS

- Main seal leak	- Bellows leak
- Solenoid failure	- Damaged flange
- Damaged sealing area	-Other

LEAK DETECTORS

- Cannot calibrate	-No zero/high backround
- Vacuum system unstable	- Cannot reach test mode
- Failed to start	- Other

INSTRUMENTS

- Gauge tube not working	- Display problem
- Communication failure	- Degas not working
- Error code on display	- Other

SCROLL AND ROTARY VANE PUMPS

- Pump doesn't start	- Noisy pump (describe)
- Doesn't reach vacuum	- Over temperature
- Pump seized	- Other

DIFFUSION PUMPS

- Heater failure	- Electrical problem
- Doesn't reach vacuum	- Cooling coil damage
- Vacuum leak	- Other

Section 6) *ADDITIONAL TERMS*

Please read the terms and conditions below as they apply to all returns and are in addition to the Agilent Technologies Vacuum Product Division – Products and Services Terms of Sale.

- Customer is responsible for the freight charges for the returning product. Return shipments must comply with all applicable **Shipping Regulations** (IATA, DOT, etc.) and carrier requirements.
- Customers receiving an Advance Exchange product agree to return the defective, rebuildable part to Agilent Technologies **within 15 business days**. Failure to do so, or returning a non-rebuildable part (crashed), will result in an invoice for the non-returned/non-rebuildable part.
- Returns for credit toward the purchase of new or refurbished Products are subject to prior Agilent approval and may incur a restocking fee. Please reference the original purchase order number.
- Units returned for evaluation will be evaluated, and a quote for repair will be issued. If you choose to have the unit repaired, the cost of the evaluation will be deducted from the final repair pricing. A Purchase Order for the final repair price should be issued within 3 weeks of quotation date. Units without a Purchase Order for repair will be returned to the customer, and the evaluation fee will be invoiced.
- A Special Cleaning fee will apply to all exposed products per Section 4 of this document.
- If requesting a calibration service, units must be functionally capable of being calibrated.

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