

# ULTRAPROBE® 10000 SD

Instruction Manual

## Safety advisory

### Please read before using your instrument.

#### Warning

Improper use of your ultrasonic detector may result in death or serious injury. Observe all safety precautions. Do not attempt to make any repairs or adjustments while the equipment is operating. Be sure to turn off and LOCK OUT all electrical and mechanical sources before performing any corrective maintenance. Always refer to local guidelines for appropriate lockout and maintenance procedures.

#### SAFETY PRECAUTION:

Although your ultrasonic instrument is intended to be used while equipment is operating, the close proximity of hot piping, electrical equipment and rotating parts are all potentially hazardous to the user. Be sure to use extreme caution when using your instrument around energized equipment. Avoid direct contact with hot pipes or parts, any moving parts or electrical connections. Do not attempt to check findings by touching the equipment with your hands or fingers. Be sure to use appropriate lockout procedures when attempting repairs.

Be careful with loose hanging parts such as the wrist strap or headphone cord when inspecting near moving mechanical devices since they may get caught. Don't touch moving parts with the contact probe. This may not only damage the part, but cause personal injury as well.

When inspecting electrical equipment, use caution. High voltage equipment can cause death or severe injury. Do not touch live electrical equipment with your instrument. Use the rubber focusing probe with the scanning module. Consult with your safety director before entering the area and follow all safety procedures. In high voltage areas, keep the instrument close to your body by keeping your elbows bent. Use recommended protective clothing. Do not get close to equipment. Your detector will locate problems at a distance.

When working around high temperature piping, use caution. Use protective clothing and do not attempt to touch any piping or equipment while it is hot. Consult with your safety director before entering the area.

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# Welcome to the wonderful world of airborne ultrasound inspection

Congratulations, you are about to experience the ultimate in airborne/structure borne ultrasonic inspection. Your Ultraprobe 10000 is equipped with features that will help you inspect in the most challenging environment.

## Introduction

Your Ultraprobe 10000 is a versatile instrument with many features that will make your inspections easy, fast and accurate. As with any new instrument, it is important to review this manual before you begin inspections. While simple to use as a basic inspection tool, there are many powerful features that when understood, will open up a world of opportunities for inspection and data analysis.



# Ultraprobe 10000



## Plug-In Modules

### Trisonic™ Scanning module

This module is utilized to receive air-borne ultra-sound such as the ultrasounds emitted by pressure/vacuum leaks and electrical discharges. There are four prongs at the rear of the module. For placement, align the prongs with the four corresponding jacks in the front end of the pistol housing and plug in. The Trisonic™ Scanning Module has a phased array of three piezoelectric transducers to pick up the air-borne ultrasound. This phased array focuses the ultrasound on one „hot spot“ for directionality and effectively intensifies the signal so that minute ultrasonic emissions can be detected.



*Trisonic Scanning Module*

### Stethoscope (contact) Module

This is the module with the metal rod. This rod is utilized as a „waveguide“ in that it is sensitive to ultrasound that is generated internally such as within a pipe, bearing housing or steam trap. Once stimulated by ultrasound, it transfers the signal to a piezoelectric transducer located directly in the module housing. The module is shielded to provide protection from stray RF waves that have a tendency to effect electronic receiving and measurement. The Stethoscope (Contact) Module can be effectively utilized in practically any environment ranging from airports to broadcasting towers. It is equipped with low noise amplification to allow for a clear, intelligible signal to be received and interpreted. For placement align the four prongs on the back with the corresponding receptacles in the front of the pistol and plug in.



*Stethoscope Module*

## Standard Accessories

### Headset

This heavy-duty headset is designed for use with or without a hardhat and can block out intense sounds often found in industrial environments so that the user may easily hear the sounds received by the UL-TRAPROBE. In fact, these headphones provide over 23dB of noise attenuation.

### WTG-1 Warble tone generator

The WTG-1 Tone Generator is an ultrasonic transmitter designed to flood an area with ultrasound. It is used for a special type of leak test. When placed inside an empty container or on one side of a test item, it will flood that area with an intense ultrasound that will not penetrate any solid but will flow through any existing fault or void. By scanning with the Trisonic Scanning Module, empty containers such as pipes, tanks, windows, doors, bulkheads or hatches can be instantly checked for leakage. This Tone Generator is a WARBLE TONE GENERATOR. This internationally patented transmitter sweeps through a number of ultrasonic frequencies in a fraction of a second to produce a strong, recognizable „Warble“ signal. The warble tone prevents a standing wave condition which can produce false readings and provides for a consistency of testing in practically any material.

### Rubber focusing probe

The Rubber Focusing Probe is a cone-shaped rubber shield. It is used to block out stray ultrasound and to assist in narrowing the field of reception of the “Trisonic“ Scanning Module.

### Stethoscope Extension kit

This consists of three metal rods that will enable a user to reach up to 78 cm (31 additional inches) with the Stethoscope Probe.

### BCH-10L Battery charger

This is the standard battery charger for the UP10000 with a line input of 120VAC @ 60Hz. The charging time is about 4 hours. (For countries with 220 V/ 50 Hz, adaptors are available for the BCH 10L.)

### LRMLS-/10

A cone shaped scanning module that increases the detection distance above standard scanning modules. With the capability of sighting the ultrasound emission with a Laser site, the LRMLS is ideal for high voltage inspection and for locating leaks at great distances.

### RAS/RAM Remote magnetic transducer

The RMT is used as a contact (stethoscope) and is mounted on magnetic metal housings. It is used when probe placement is necessary for consistent trend monitoring or when access is difficult

## Optional Accessories

### CFM-10:

A scanning module used for close proximity leak detection in pressure and vacuum systems.

### UWC-10

The UWC-9/10, Ultrasonic Waveform Concentrator, doubles the detection distance. The UWC-9/10 is great for corona, tracking and arc detection at safe distances. Includes carrying case

### DHC-2

Headphone headset is for Standard Applications that do not require the use of a hard hat

### TFSM: Telescoping Flexible Scanning Module:

A flexible scanning probe that is bent to accommodate odd scanning angles. The telescoping action helps scan hard to reach areas.

### TFCM: Telescoping Flexible Stethoscope (Contact) Module:

A flexible contact probe for structure borne inspection that is bent to accommodate odd test angles. The telescoping action helps get to hard to reach areas.

### UFMTG-1991

The UFMTG 1991 is a multi directional warble tone generator. It has a high power output with a circular transmission pattern of 360°.

### WTG-2SP Warble pipe threaded tone generator

A Warble Tone Generator that is used in test conditions where it is not possible to physically place the standard WTG-1 Warble Tone Generator, such as in pipes or in certain heat exchangers or tanks. Features: 1" NPT male threaded nipple with adapters for ¾" and ½" female nipple with a 10 turn amplitude adjustment dial. Metric adapters available.

### UE-POD

Battery Recharge Pod docking station for charging Ultraprobe Batteries (Lithium Ion only). This optional pod will charge a battery that has been removed from the Ultraprobe 10,000 and is also used to charge extra batteries.

### BCH-WTG2

This is an optional battery charger for use with all Warble Tone Generators. The line input is 220 VAC @ 50Hz and the charging time is about 8 hours.

### HTS-10

Holster set for the UP10000. Includes a utility belt and two holsters, one for the UP10000 and one extra module and rubber focusing probe; the other for accessories.

## Overview

### Pistol-grip housing

#### Display panel

In the Operation Mode the Display Panel will show inspection parameters such as intensity levels (as dB and as a bar graph), Frequency, Battery Level, Sensitivity Level, Sensitivity Value, "Display Mode" and Function Select Field. Intensity levels are shown simultaneously as a numeric dB value and on a sixteen segmented bar graph (with each segment representing 3 dB). The Frequency is adjustable from 20 kHz to 100 kHz. These represent the range of frequency selection capable with the Ultraprobe. The most common frequency used for general leak detection or electrical inspection is 40 kHz. These frequencies may be "tuned in" when performing inspections with any of the Ultra-probe's plug-in modules. The Display Mode indicates the operation mode of the instrument. This is indicated on the display panel as **RT** for *Real Time*, **PH** for *Peak Hold*, **SS** for *Snap Shot*, or **RTO** for *Real Time "Offset"*, **PHO** for *Peak Hold "Offset"* and **SSO** for *Snap Shot "Offset"*. (For additional information about Offset see **dB Scale Select** in the Set Up Mode Section.



- 1 Display Panel
- 2 Sensitivity Control Dial
- 3 Yellow Enter Button

#### Trigger on/off trigger switch

The Ultraprobe is always "off" until the trigger switch is pressed. To operate, press the trigger. To turn the instrument off, release the trigger. The time it takes for the instrument to turn off after release of the trigger can be set in the **Set Turn-Off Time** mode described later. **NOTE:** To save the battery charge, if the instrument is set in the "Trigger Shut Off Mode (Setup menu 17), it will automatically turn off after approximately 1 second to 999 Seconds (time could be adjusted in Setup menu 18).

**Warning: To store any records or sound files, the SD card must be inserted.**

#### Quick change battery

**To insert the battery**, align the battery with the handle (arrow pointing towards the trigger) and push in until the clips snap in place. **To remove the battery**, push firmly on the battery clips with the fingers of one hand while holding your other hand under the handle to catch the released battery.

## Battery

This Ultraprobe uses a lithium ion battery with no memory problems. A full charge will take about 4 hours, however you may charge the unit at any time for short intervals or for a longer period. If it is kept on charge over 4 hours, there will be no harm to the battery.

**NOTE:** When the effective battery charge is used up the instrument shuts down and a message to re-charge the battery will be displayed in the display panel.

## Wrist strap

To protect the instrument, against being dropped accidentally, use the wrist strap.

## Sensitivity control dial

This is one of the most important controls in the unit. In the operation mode it can be used to adjust the sensitivity. When clicked or spun, it can be used to scroll around the screen or to select operation categories or change frequency. In the Set Up Mode it moves the cursor and by clicking sets notations.

## Yellow enter button

This yellow button is used to enter and exit the various operations such as set up mode, text editor, store data or record WAV files.

## Head set jack

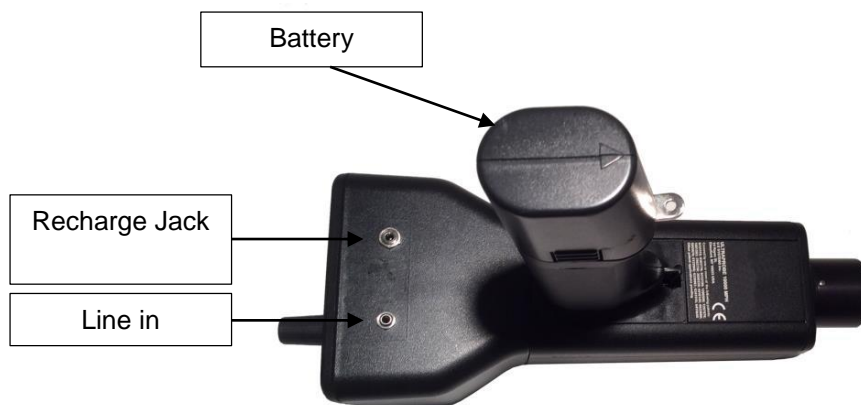
This is where you plug in the headset. Be sure to plug it in firmly until it clicks. This can also be used as an output for a vibration analyzer or notebook computer when used with a proper miniphone to BNC connector.

## Recharge jack

This Jack receives the plug from the recharger. The recharger is designed to plug into a standard electrical receptacle.

## LINE INPUT:

This Input is designed to receive signals from other instruments such as Temperature readings from infrared thermometers. The Instrument will display the readings on the Display Panel



## Users instructions

### Trisonic™ scanning module

1. This module plugs into the front end of the instrument.
2. Align the pins located at the rear of the module with the four jacks in the front end of the Metered Pistol Housing (MPH) and plug in.
3. For general use position the frequency selection to 40 kHz.
4. Start to scan the test area. move to any of the other Menu modes by spinning the Sensitivity Control up or down (clockwise or counter clockwise).
5. When the desired Menu mode is reached, push (Click) the Sensitivity Control in.
6. You may spin to enter and exit any Menu mode in the Set Up mod as long as the trigger on/off switch is pressed.

### Method of airborne detection

The method of air borne detection is to go from the “gross to the fine”. Start at maximum sensitivity (S=70), constantly reducing the sensitivity and following the bar graph amplitude display to the loudest point. If there is too much ultrasound in the area, reduce the sensitivity, place the RUBBER FO-CUSING PROBE (described below) over the scanning module and proceed. Every time the sound level rises to a point where it is difficult to follow, reduce the sensitivity again and again until you are able to follow the test sound to its’ loudest point.

### Headset

The DHC-HH headphones are designed to be worn with hard hats. To use, simply plug the head-set cord into the headset Jack on the pistol housing, and place the headphones over your ears.

### Rubber focusing probe :

To use, simply slip it over the front of the scanning module or the contact module.

**NOTE:** To prevent damage to the module plugs, always remove the module BEFORE attaching and/or removing the Rubber Focusing Probe.

### Stethoscope module:

1. Align the pins located at the rear of the module with the four jacks in the front end of the Metered Pistol Housing (MPH) and plug in.
2. Touch test area.

As with the SCANNING MODULE, go from the “gross” to the “fine”. Start at maximum sensitivity (S=70) on the Sensitivity Selection dial and proceed to reduce the sensitivity until a satisfactory sound level is achieved. At times it may be necessary to utilize the STETHOSCOPE MODULE with the sensitivity level at or near maximum. Occasionally when in this situation stray ultrasound.

### Stethoscope extension kit

1. Remove the Stethoscope Module from the Metered Pistol Housing.
2. Unscrew the metal rod in the Stethoscope Module.
3. Look at the thread of the rod you just unscrewed and locate a rod in the kit that has the same size thread this is the “base piece”.
4. Screw the Base Piece into the Stethoscope Module.
5. If all 78 cm are to be utilized, locate the middle piece. (This is the rod with a female fit-ting at one end) and screw this piece into the base piece.
6. Screw third “end piece” into middle piece.
7. If a shorter length is desired, omit step 5 and screw “end piece” into “base piece”.



## To charge the UP10000

1. Plug recharger cable into recharger jack on the UP10000 and then plug the recharger into a wall receptacle.
2. Make sure that the LED on the charger is blinking when recharging.
3. The LED remains solid when the battery is charged. The instrument may stay connected to the charger without damaging the battery. Charge time is approximately 4 hours.  
**WARNING:** Use the supplied UE Systems recharger (BCH-10L) only. Use of unauthorized rechargers will void the warranty and may degrade or damage the battery.

## Warble Tone Generator (UE-WTG-1)

1. Turn Tone Generator on by selecting either "LOW" for a low amplitude signal (usually recommended for small containers) or "HIGH" for high amplitude. In the High position, the Warble Tone Generator will cover up to 113m<sup>3</sup> (4,000 cubic feet) of unobstructed space.
2. When the Tone Generator is on, a red light (located below the recharge jack in the front) flickers.
3. Place the Warble Tone Generator within the test item/ container and seal or close it. Then scan the suspect areas with the Trisonic™ Scanning Module in the Ultraprobe and listen for where the "warble" ultrasound penetrates. As an example, if the item to be tested is the seal around a window, place the Warble Tone Generator on one side of the window, close it and proceed to scan on the opposite side.
4. To test the condition of the Warble Tone Generator battery, set to the LOW INTENSITY position and listen to the sound through the Ultraprobe at 40 kHz. A continuous warbling sound should be heard. If a "beeping" is heard instead, then a full recharge of the Warble Tone Generator is indicated.

## To charge the warble tone generator

1. Plug recharger cable into recharger jack on the Warble Tone Generator and then plug the recharger into a wall receptacle.
2. Make sure that the LED on the charger is lit when recharging.
3. The LED turns OFF when the battery is charged.

## Helpful hints

Before you begin your inspection activities, it is suggested that you review the applications section to become familiar with the basic inspection methods.

Here are some helpful hints that should prove useful in some difficult situations.

### If you can't read your display panel while testing:

1. Trigger-release-Trigger method: Take the reading while holding the trigger in. Immediately release the trigger and the reading will be set. Once the trigger is pulled again, the instrument will return to normal operation.  
**NOTE:** This operation can only be performed when the instrument SHUT OFF mode is set at TIMED.
2. Snap Shot Method: If you know you are going to be in a situation where you won't be able to read the display panel, go into Setup Mode and spin to Display Mode (Menu 09). Select Snap Shot and return to Operation Mode. This will hold your reading even while you continue to hold the trigger in. For a quick grab, take a reading, press the trigger in to hold it. For an update or new reading, simply release and press the trigger switch.

## SD Card Operation:

1. If the SD card is removed without turning the instrument off; to prevent data from being lost, immediately reinsert *the same SD card*.
2. If the SD card is removed and replaced with a different SD card while the unit is still on, the data will be written directly onto the new SD card overwriting any data that has been previously placed on that SD card.
3. If the instrument is turned off without reinserting an SD card *all data will be lost*.
4. If there is no SD card inserted into the Ultraprobe, no data will be stored.



## Auto-shutdown battery feature

The Ultraprobe 10000 is equipped with an auto-shutdown feature, which enables the instrument to provide accurate measurement throughout the effective battery charge. If the Ultraprobe 10000 goes into the auto-shutdown mode, A message in the Display Panel will read “RECHARGE BATTERY”, no sound will be heard in the headphones and measurements will not be displayed on the display panel. To restore the Ultraprobe 10000 to its’ normal operating mode, recharge the instrument using the BCH-10L Battery Charger. If the SD Card is installed, on power-down a prompt will appear stating that it is “writing records’ to the card.

## Resetting the on board computer

For security purposes, there is no reset switch on the instrument. Should it be necessary to reset the instrument:, disconnect the battery for one (1) minute and then reconnect the battery or enter SETUP Mode and spin to DEFAULT SETTINGS(Menu 12) and choose the YES prompt to reset to factory default settings.

**WARNING:** Selecting Default Settings erases all records stored in the instrument.

## Operational overview

The Ultraprobe 10000 is an ultrasonic inspection information, storage, sound event recording and retrieval system in a pistol housing. There are two modes that are important to understand:

### Operation mode

The operation mode will be described in detail under the operation mode section. In this mode you will perform all inspection actions such as scanning, probing, “Click and Spin” activities, sound recording and data storage.

**NOTE:** “Click” operations require pressing a dial. “Spin” operations require turning a dial.

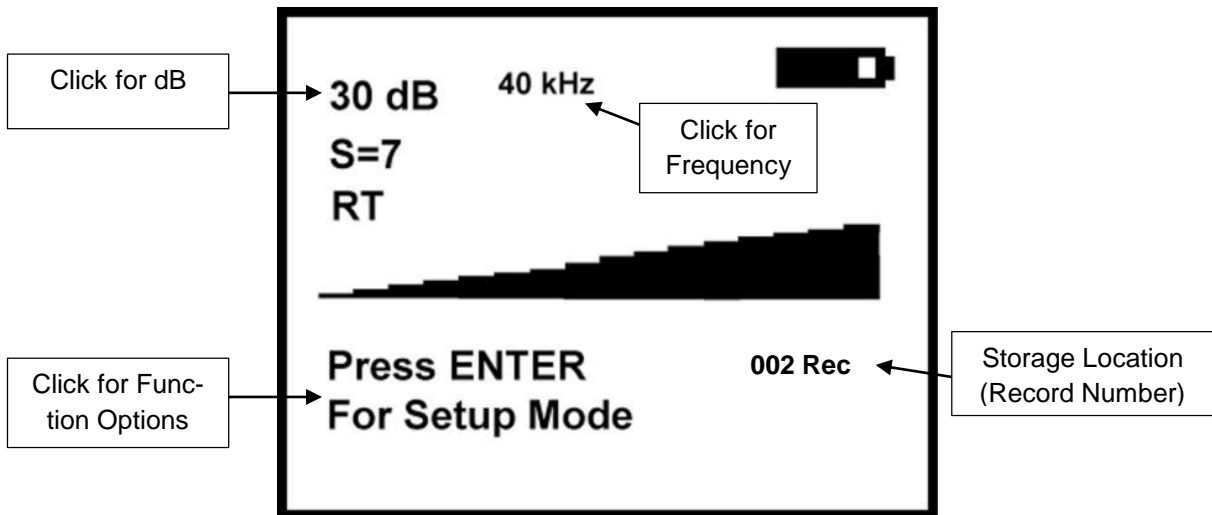
### Setup menu

The setup mode will be described in detail under the Setup Mode section. There are 31 menu options that will be described in that section. To use the set up mode, you must “click” to the bottom of the display column, “spin” to “setup mode and press the yellow button labeled “enter”. For more details, see the SETUP Mode section.

## Operation mode

### Main display navigation

Moving around the Display Panel is easy. Basically three clicks (presses) of the **Sensitivity Dial** will move the cursor on the Display Panel to three key spots: the **Decibel Indicator**, the **Frequency Indicator** and the **Function Selection Indicator**. When an indicator is selected, or “active”, it will blink. When the cursor is moved to the **Decibel Indicator** and the **Decibel Indicator** is blinking, the **Sensitivity Dial** may be spun (rotated) clockwise or counter clockwise to adjust the sensitivity/volume of the instrument. When the cursor is moved to the **Frequency Indicator** and the **Frequency Indicator** is blinking, the **Sensitivity Dial** may be spun to change the frequency. When blinking, the Function Selection, located on the bottom of the screen can be changed by spinning the Sensitivity Dial up or down to select a specific feature which may be entered by pressing the yellow Enter Button.



### Main Display Information:

When the trigger is pressed to turn the instrument on, the Display Panel will display intensity levels simultaneously on a bar graph and as a numerical decibel value. The current selected frequency will also be shown. Remaining Battery Charge is shown in the upper right corner. Immediately under the dB reading is the Sensitivity value which may be used as a reference for comparing readings or for specialized trending purposes. The letters **RT**, **SS** or **PK** note the current display mode. **RT** indicates that the instrument is running in "Real Time", **SS** indicates "Snap Shot" and **PK** indicates "Peak Hold". Should the instrument be set in the Offset Mode, then the letters **RO**, **SO** and **PO** will be displayed. Along the bottom right you will see the record number (identified as 001-399 Rec).

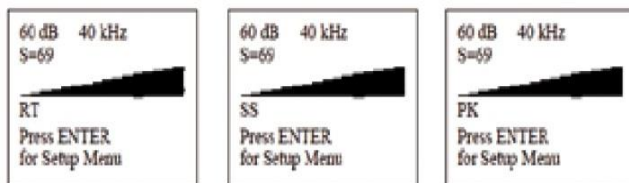
On the bottom line of the display panel, you will find the Function Select Indicate

#### "Press Enter for:"

- Setup Menu:** The various screen and operation functions can be set in this mode
- Text Editor (ON/OFF):** When on text notations can be set using up to 16 alphanumeric characters.
- Alarm (DISABLED ENABLED):** Set (enable) alarm levels in dB or turn the alarm off (disable).
- GENERIC Info:** This function provides inspection information. It can also be set to display specific application information (for example: Leak Info, Bearing Info, Steam Info, Electric Info, Valve Info)
- Storage Display:** The display panel will split in half. The top half will show current test data while the bottom will display stored information.
- Record WAV:** The Ultraprobe 10000 is configured to record heterodyned ultrasounds with this function setting.
- SD INFO:** Information of stored data, recorded WAV files can be viewed here.
- STORE Record:** Use this function to store inspection data. This is a quick way to data log if inspection data is to be saved without viewing previously stored data (as in Storage Display).
- Exit:** Press the Yellow ENTER Button and you will EXIT back to Operation Mode.

### Bar graph display

The bar graph has 16 segments. Each segment equals 3 dB.



## Sensitivity control dial

This is the main control dial. It will function as a cursor control as well as a sensitivity and frequency controller.

### To adjust the sensitivity/ volume

1. Look at the meter. To adjust the sensitivity, the dB (decibel) indicator must blink. The kHz (frequency indicator) must be steady (not blinking).
2. If the frequency indicator is blinking, click in the **Sensitivity Control Dial** until the frequency indicator is steady and the dB (decibel) indicator blinks. This indicates that you are now able to adjust the sensitivity.
3. Once in the Sensitivity mode, turn the **Sensitivity Control Dial** clockwise to increase the sensitivity and counter clockwise to decrease the sensitivity.
4. The **Sensitivity Control Dial** increases/decreases the sensitivity of the instrument simultaneously with the sound level in the headphones. When in range, it moves the bar graph up and down and will adjust the headset volume.

**NOTE:** The instrument needs to be in range for accurate testing.

5. If the sensitivity is too low, a blinking arrow pointing to the right will appear and there will be no numeric dB value visible in the display panel. If this occurs, increase the sensitivity until the arrow disappears (in low level sound environments the arrow will blink continuously and it will not be possible to achieve a dB indication until a higher intensity sound level is sensed).
6. If the sensitivity is too high, a blinking arrow pointing to the left will appear and there will be no numeric dB value visible on the display panel. Reduce the sensitivity until the arrow disappears and the numeric dB value is shown.

**NOTE:** The blinking arrow indicates the direction in which the Sensitivity Control Dial is to be turned.

7. The **Sensitivity Control Dial** controls the bar graph display.
8. Each click of the **Sensitivity Control Dial** changes the sensitivity / volume by 1 dB.

### To adjust the frequency

1. Look at the meter. The kHz indicator must blink to be able to tune the frequency.
2. If it is not blinking, "Click" in the Sensitivity Control Dial until the kHz indicator blinks.
3. When the kHz indicator blinks, change the frequency by rotating the Sensitivity Control Dial up (clockwise) or down (counter clockwise).

### Function field description

- a. **Setup menu:** The various screen and operation functions can be set in this mode
- b. **Text editor (on/off):** When on text notations can be set using up to 16 alphanumeric characters.
- c. **Alarm (disabled/enabled):** Set (enable) alarm levels in dB or turn the alarm off (disable).
- d. **Generic info:** This function provides inspection information. It can also be set to display specific application information (for example: Leak Info, Bearing Info, Steam Info, Electric Info, Valve Info)
- e. **Storage display:** The display panel will split in half. The top half will show current test data while the bottom will display stored information.
- f. **Record wav:** The Ultraprobe 10000 is configured to record heterodyned ultrasounds with this function setting.
- g. **SD INFO:** Information of stored data, recorded WAV files can be viewed here.
- h. **Store record:** Use this function to store inspection data. This is a quick way to data log if inspection data is to be saved without viewing previously stored data (as in Storage Display).
- i. **Exit:** Press the yellow ENTER button and you will EXIT back to Operation Mode.

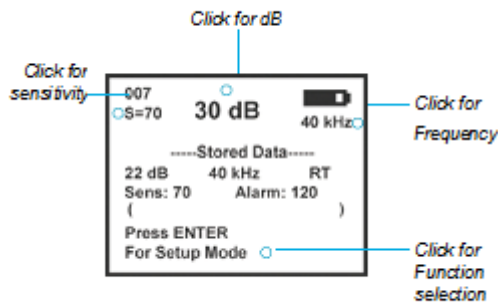
## Yellow enter button

The **Yellow Enter Button** allows you to enter and exit specific menu operations. A message on the bottom of the Display Panel will note when to press this button.

## Storage display navigation

Moving around the **Display Panel** is easy. Basically four clicks (presses) of the **Sensitivity Control Dial** will move the cursor on the **Display Panel** to four key spots: the **Decibel Indicator**, the **Frequency Indicator**, **Storage Location Indicator** and the **Function election Indicator**. When an indicator is selected, or “active”, it will blink. When the cursor is moved to the **Decibel Indicator** and the **Decibel Indicator** is blinking, it may be spun (rotated) clockwise or counter clockwise to adjust the sensitivity / volume of the instrument. When the cursor is moved to the Frequency Indicator and the **Frequency Indicator** is blinking, the Sensitivity Control Dial may be spun to change the frequency. The Storage Location (Record Number) can be changed up or down when it is blinking by spinning the Sensitivity Control Dial. When blinking, the **Function Selection**, located on the bottom of the screen can be changed by spinning the **Sensitivity Control Dial** up or down to select a specific feature which may be entered by pressing the **Yellow Enter Button**.

**Note:** If a storage location has been used during a test run, it will be highlighted in black with white letters as shown:



On the bottom line of the **Display Panel**, you will find the **Function Select Indicator**: “Press Enter for:” (you can use this to enter any of the following function fields) The default function fields are:

- Exit main:** Exits to main display.
- Edit text:** When on text notations can be set using up to 16 alphanumeric characters.
- More:** View additional test information including Date, Time and Module used.
- Param info:** View or change inspection details. It can also be set in the Applications Select menu for specific application information such as Leak Info, Bearing Info, Steam Info, Electric Info, Valve Info)
- Record wav:** The Ultraprobe 10000 is configured to record heterodyned ultrasounds with this function setting.
- SD INFO:** Information of stored data, recorded WAV files can be viewed here.
- Store rec:** Use this function to store inspection data. This is a quick way to data log if inspection data is to be saved without viewing previously stored data (as in Storage Display).

## Storage Display Information

When in the **Storage Display** mode, the basic inspection parameter information can be viewed and stored if desired. To view Parameter Information when in the **Storage Display** mode:

- “Click” the **Sensitivity Control Dial** until the “Press ENTER For” blinks.
- Spin to **Param INFO** and Press (Click) the **Yellow ENTER Button** to enter
- The information display will read: “**Test Results:**” and “**Temperature:**”

## Parameter info (in storage display only)

The **Parameter Info** screen displays the test data relevant to a selected application (ex: bearings, valves, leak, steam). This screen may be used to enter additional data such as test results or temperature. An extension of the **Parameter Information** screen is the **MORE** Function Selection. This will display additional inspection information: Date, Time, Module used and Offset Value (if an offset value has been set). See the APPLICATIONS section for details. Note: this is the same information as will be seen in the basic application information screens. i.e: **generic info** or **bearing info**.

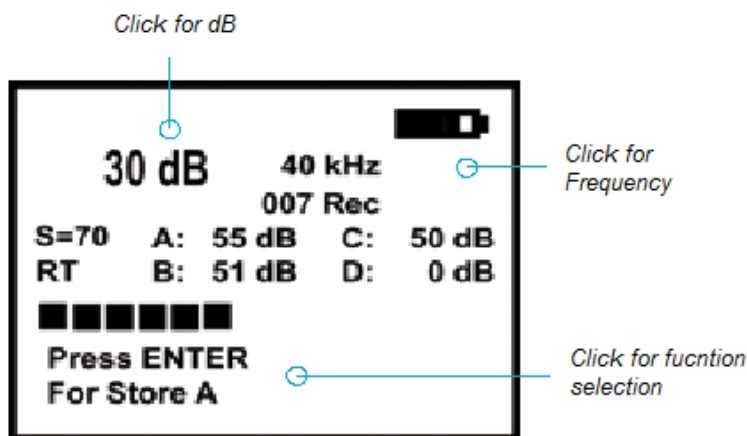
## ABCD navigation

Note: The **ABCD Display** will only work if the “Valve” application has been enabled in the **Setup Mode**. This is described in **SETUP, “Menu 03 Application Select”**. To select the **ABCD Screen**, after the **Valve** Application has been selected, **Select Menu 02, Display Screens** in the **Setup Mode** and spin to **ABCD**.

Moving around the **Display Panel** is easy. Basically three clicks (presses) of the **Sensitivity Control Dial** will move the cursor on the **Display Panel** to three key spots: the **Decibel Indicator**, the **Frequency Indicator**, and the **Function Selection Indicator**.

When an indicator is selected, or “active”, it will blink. When the cursor is moved to the **Decibel Indicator** and the **Decibel Indicator** is blinking, it may be spun (rotated) clockwise or counter clockwise to adjust the sensitivity/volume of the instrument.

When the cursor is moved to the **Frequency Indicator** and the **Frequency Indicator** is blinking, the **Sensitivity Control Dial** may be spun to change the frequency. When blinking, the **Function Selection**, located on the bottom of the screen can be changed by spinning the **Sensitivity Control Dial** up or down to select a specific feature which may be entered by pressing the **Yellow Enter Button**. Each A,B,C and D **dB** entry will be stored separately by clicking the **Yellow ENTER** button to store.



On the bottom line of the display panel, you will find the Function Select Indicator: “**Press Enter for:**” (You can use this to enter any of the following default fields) The default function fields are:

- STORE(A)
- STORE (B)
- STORE (C)
- STORE (D)
- SETUP MENU
- TEXT EDITOR (ON/OFF)
- ALARM (DISABLED ENABLED)
- VALVE INFO
- STORAGE DISPLAY
- RECORD WAV
- (SD INFO )SD Card
- STORE RECORD AND EXIT

### How to use the operational features entering a test condition in storage display

1. **Spin** to **Test**, the condition default is **OK** and will blink slowly. If it is necessary to change the test condition.
2. **Click** with the **Sensitivity Control Dial** and the condition (**OK**) will blink rapidly.
3. **Spin** to select a condition indication. The choices are; **OK**, **CHK** (for check) and a series of **TR1-TR9**, which can be used as codes for other conditions. These codes can be changed in the Ultratrend software and uploaded to the Ultraprobe.
4. To Set, **Click** the **Sensitivity Control Dial** (the condition will blink slowly).
5. Spin to **Temperature** should a Temperature en-try be desired.
6. **Click** on the **Temperature** setting (it will blink rap-idly) Spin to the left to select a "100" reading (ex 200,300)and to the Right to select a "tens reading" (ex: 50)
7. Click to set
8. Press Enter to store the information or
9. Spin to **EXIT** and click to exit.

```

001          43dB
S=33        30kHz
---STORED DATA---
62 dB    30 kHz    RT
Sens 69    Alarm 84
ENTER for Param INFO
  
```

```

Press ENTER GENERIC
To store    001
Test Results: OK
Temperature: 150 F
  
```

Additional information can be viewed by clicking the **Sensitivity Control Dial** until the **ENTER For** blinks. Spin to **MORE** and press the **Yellow Enter Button** to enter. There you will see the following information represented as an example below:

```

DATE: 01/01/03
TIME 08:30:43
Module Type: SCM
Offset: 00 dB
Press ENTER to Store
Press Sens. to Exit
  
```

### Entering text using text editor

1. There is space to enter 16 characters of alpha-numeric text.
2. To enter text, the **Text Edit** feature must be set to **ON** (refer to **SET UP MODE 08**). If text is **ON**, click the **Sensitivity Control Dial** to the bottom of the **Display Panel** until **Press ENTER For** is blinking. Spin to **Edit Text** and press **Enter**.
3. The text icon will blink. If the field has no entry, the screen will be blank.
4. The **Sensitivity Control Dial** can be used to scroll through the alphabet, **A-Z**, a space character and then through numbers **0-9**
5. Move back through numbers (**9-0**) and then back down the alphabet (**Z-A**).
6. Spin the **Sensitivity Dial** clockwise to move up through numbers and then through the
7. Alphabet starting with A or spin counter clockwise to move back through numbers (**9-0**) and then back down the alphabet (**Z-A**).
8. To enter a character, spin the **Sensitivity Control Dial** to the desired character and then click to move the cursor to the next of 16 positions.



9. Continue until through or until all 16 fields are filled.
10. If an error in recording a letter or number occurs, click the **Sensitivity Control Dial** and the cursor will move to the right. Continue clicking the **Sensitivity Dial** and the cursor will “wrap” around to the right until the desired location is reached. As explained above, spin the
11. **Sensitivity Dial** until the corrected entry is displayed and “click” the **Sensitivity Control Dial** to enter the text character. When the text is correct, click the **Yellow Enter Button** to save and store the text. The instrument will return to the **Operation Mode**.

Gear 12345  
Press ENTER to Exit

## Alarm enable/disable


While in the Operation mode, this function selection will display **Alarm Disabled** if no alarm level has been set. If an alarm level has been set, it will show the set level in **dB**. To enable the alarm, see **alarm enable/disable** in the **setup mode** below.

**WARNING:** If the alarm value is changed, the new dB alarm value will be stored in the record and will overwrite the previous value.

The alarm **dB** level stored in the current record can be viewed in the main display. It can be changed. To do so:

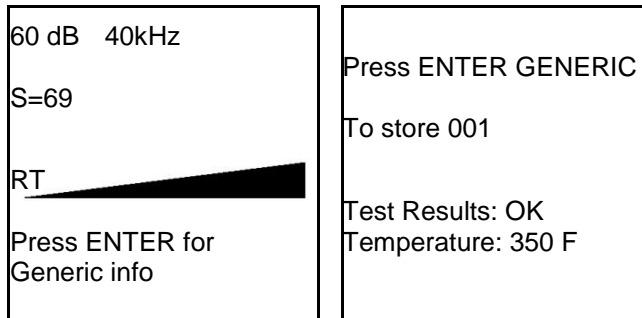
1. Click down to the bottom of the **Display Panel** until **PRESS ENTER FOR:...** is blinking
2. Spin to **Alarm** (the **dB** value will be shown)
3. Click to **Enter**
4. Spin to the desired **dB** alarm level

Click the **Yellow ENTER Button** to exit

<p>60 dB 40kHz</p> <p>S=69</p>  <p>RT</p> <p>Press ENTER for Alarm</p>	<p>Set Alarm Value</p> <p>Current Alarm Value ( 120 dB )</p> <p>Press ENTER for Setup Menu</p>
-----------------------------------------------------------------------------------------------------------------------------------------------------------	--------------------------------------------------------------------------------------------------------

## Generic info

1. To view **Generic Info**, click the **Sensitivity Control Dial** to the bottom of the Display Panel until “**Press ENTER For**” is blinking. Spin to **Generic Info** and press Enter.
2. To enter a test condition:
3. Spin to **Test** the condition default is **OK** and will blink slowly. If it is necessary to change:
4. Click with the **Sensitivity Control Dial** and the condition (**OK**) will blink rapidly.
5. Spin to select a condition indication. The choices are; **OK**, **CHK** (for check) and a series of **TR1-TR9** which can be use as codes for other conditions.
6. To Set, Click the **Sensitivity Control Dial** (the condition will blink slowly)
7. Spin to **Temperature** should a Temperature entry be desired
8. Click on the **Temperature** setting (it will blink rap-idly) Spin to the left to select a “100” reading (ex 200, 300) and to the Right to select a “tens” reading (ex: 50)
9. Click to set
10. Press **Enter** to store the information or
11. Spin to **EXIT** and click to exit.



## Record WAV

To Record a **WAV** (sound file) click the **Sensitivity Control Dial** to the bottom of the **Display Panel** until “**Press ENTER For**” is blinking. Spin to **Record WAV** and press **Enter**.

Be sure the Compact Flash Card is inserted into the slot on the Ultraprobe and keep the Trigger Switch pulled on (or set the Timed Off mode as described in Setup Menu 16 and 17 to shut off at a pre-determined time, ex: 30 seconds.) or set to Trigger Off mode (see setup mode 17 Shut Off Mode).

1. When ready to record, click the Sensitivity Dial and **Hold it in** for the duration of time you wish to record.
2. When through, release the **Sensitivity Control Dial**.
3. You can preset the time of recording in Setup Mode 7 for: Manual (as above), 5, 10,15, 20, 25, 30 seconds.
4. Press **Enter** to playback/review the sound you have recorded.
5. Press **Sensitivity Control Dial** to Continue on to the next screen
6. Press **Enter** to **Save** the recording or if you do not wish to save the recording, press
7. **Sensitivity Control Dial** to Exit.
8. When through **saving a recording**, press the **Sensitivity Control Dial** to Exit.

## SD info

This feature allows you to view file records stored on the SD Card. When a record is stored or a sound is recorded and a **WAV** file is saved, two files are written to the SD Card and stored to the associated record number: a text file which contains all stored record fields and the **WAV** file. When SD info is selected, 3 selections will be viewed on the screen. You may click the Sensitivity Dial to select/enter any of these.

1. Free Space & Info (This will display the number of Bytes Free and the Remaining Recording time on the card).
2. Display Files (The files stored on the SD card)
3. Delete Files

To delete a file:

- a. Click to enter, the File Number will blink.
- b. Press **Sens** to **DELETE** or Spin to the next file (the file you wish to delete)
- c. If you don't want to delete a file, press **ENTER** to exit.
4. Play SD WAV file: plays the stored WAV file.

**WARNING:** Never remove or insert the SD Card with the instrument turned on.

## To store a reading:

1. Continue to “**Click**” the **Sensitivity Control Dial** to move the indicator to the bottom of the meter until **PRESS ENTER FOR:** is blinking. Then **Spin** the dial until **STORE Record** is displayed. press the **Yellow Enter Button**. This puts the instrument in the Data Storage mode. In the data storage mode the **Display Panel** changes.
2. The screen will display the following: Save To Record (the current record number is displayed, (for example **003**) (This allows you to determine whether to store the information in this particular rec-



ord location or to change the location.) **Turn SENS.: Change** (If you want to change the store location this prompts you to turn (Spin) the **Sensitivity Control Dial** to change the location). Press the **Sensitivity Control Dial to EXIT** (If you do not wish to store the information, Click the Sensitivity Control Dial to return to operation mode) **Click (Press) Enter** to Store (If you want to store the information, Click **Enter**, a screen will pop up to confirm the information has been stored.

3. To view previously stored information, Click the

**Sensitivity Control Dial** to the bottom of the **Display Panel** until “**PRESS ENTER FOR**” is blinking and spin to **Storage Display**. Press Enter to view the stored data. To view information in other storage locations, click the **Sensitivity Control Dial** until the storage number blinks. The storage number in the **Storage Display** mode is located in the upper left corner. Spin the **Sensitivity Control Dial** to the desired storage location.

If you wish to view all stored information during inspections, you may set the screen to **Storage Display**. Click the **Sensitivity Control Dial** until “**PRESS ENTER FOR**” is blinking. If **Storage Display** is not shown, spin until **Storage Display** is shown and blinking. Click the **Yellow Enter button**. The **Display Screen** will be split. All inspection data will be displayed on the top half while the stored information will be displayed on the bottom half of the **Display Screen**.

## Storing ABCD information

To Store information when the ABCD Function has been set:

1. When Click **ENTER** for Store **(A)** is blinking, press **ENTER**
2. Then Click **ENTER** for Store **(B)** will then blink, press **ENTER**
3. Then Click **ENTER** for Store **(C)** will blink, press **ENTER**
4. Then Click **ENTER** for Store **(D)** will blink, press **ENTER**
5. The function will then shift to **STORE DATA**
6. Press **ENTER** and all four **dB** levels will be stored at the selected Record Number.

42 dB	25 kHz
	002 Rec
S=60 A: 0dB	C: 0dB
B: 0dB	D: 0dB
Press ENTER for Store (A)	

## Freezing a reading on the display panel

If in a test situation where it is difficult to view the display panel, when in the Timed Off Mode the decibel reading can be frozen for viewing. If using the Stethoscope Module, continue to touch the test point and then release the trigger. Remove the instrument and view the panel. Be sure to view within the set timed off period (ex: within 5 seconds if set for 5 second off) If in the scanning mode, point at target, release the trigger as described.

## Setup mode

There are 31 functions that can be set to either change the display screens or the format of data entry and collection.

1 Add/Remove SD Card	17 Set Shut Off Mode
2 Display Screens	18 Set Turn Off Time
3 Application Select	19 Display Response
4 Module type select	20 Line Input Select
5 Instrument Setup (Manual or Auto)	21 Sensitivity Mode
6 Alarm Enable/Disable	22 Headphone Volume
7 Set Record Time	23 Enter Inspector ID
8 Record WAV on Alarm	24 Set time and Date
9 Select Function List	25 Date Format Select
10 Text Editor Select	26 Cal Due Date
11 MORE (moves to second level)	27 Standard or Metric Units
<b>SECOND LEVEL SET UP MODE</b>	28 Display Mode Select
12 Default Settings	29 dB Scale Type Select
13 User Sensitivity Default	30 dB Offset Value
14 User Frequency Default	31 BACK (moves to First level)
15 Frequency Adjust (Yes or No)	
16 Restore Lists	

## How to use the setup mode

There are two ways to enter the **Set Up Mode**:

### While in Operation Mode

1. Click down to move the cursor to the bottom of the Display Screen until
2. **PRESS ENTER FOR** is blinking
3. Spin to **Setup Mode**
4. **Click the Yellow ENTER button**

### While the instrument is off

1. Click both the **Yellow ENTER button** and the **Sensitivity Control Dial** at the same time. Only after these two controls have been pressed, then squeeze the trigger.

**NOTE:** Hold the Trigger in during any of the Set Up Mode operations.

2. When in the first Menu mode: **Data Transfer**, you may move to any of the other Menu modes by spinning the **Sensitivity Dial** up or down (clockwise or counter clockwise).
3. When the desired **Menu mode** is reached, Click the **Sensitivity Control Dial** in.
4. You may **Spin and Click** to enter and exit any

**Menu mode** in the **Set Up mode** as long as the trigger on/off switch is pressed.

## Menu 01 Add/Remove SD Card

1. Be sure to insert the SD card *before* turning the Ultraprobe on. The Group data will be read by the Ultraprobe on power up.
2. On power down (off), all data and WAV files are stored on the SD card.
3. The Add/Remove SD Card function allows users to change the card while the unit is on.
4. While the power is on, a warning will advise against removal (unless Menu 01 is selected).
5. There is a risk of losing data if the SD card is removed without activating Menu 01.

Menu 01 Add/Remove SD Card  Press ENTER to exit
----------------------------------------------------------

Menu 01 Select  Add/Remove SD Card Press ENTER to exit
-----------------------------------------------------------------

### To Transfer Data from Ultratrend to the Ultraprobe through the SD Card

1. If the Ultraprobe is off, insert the SD card, then power up.
2. If the Ultraprobe is on, enter Menu 01, select Add/Remove SD Card
3. Insert SD Card
4. Press the yellow Enter button to Exit

## Menu 02: Display Screens:

There are two **Display Screens** to use when in the Operating Mode: **Main** and **Storage**. A third screen, **ABCD indicator**, is available when either the “Valves” or “Bearings” Application is selected. The **Main screen** is the standard mode. It displays current inspection data: **dB, frequency, battery status, sensitivity setting and Operation Mode**

### (Real Time, Snap Shot or Peak Hold).

The **Storage** mode splits the screen so that the main menu information is displayed along with stored data for a selected storage location.

1. Follow the steps to Enter the Setup Mode as described earlier.
2. Spin to Menu 02: Display Screens
3. Click the **Sensitivity Control Dial** to enter

### Display Screens.

1. Spin the **Sensitivity Control Dial** to change from **Main to Storage**, (or to **ABCD**) then
2. Click the **Sensitivity Control Dial** to select.

Menu 02 Select Display Screens  Press ENTER to exit
--------------------------------------------------------------

Display Screens Display=(MAIN)
-----------------------------------

Display Screens Display=(STORAGE )
------------------------------------------

Display Screens Display=(ABCD)
-----------------------------------

### Menu 03: Application Select

In Application Select, choose the specific application you wish to use for your inspection. This will adjust the display panel and will save information in a format compatible with specialized Ultratrend software.

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Click the Sensitivity **Control Dial** to enter the **Application Select menu**
3. Spin to the application you wish to enable
4. Click the Sensitivity **Control Dial** to select
5. Press **Enter** To change the operation mode to the newly selected Application, Click The **Sensitivity Control Dial** to change

Generic enable
Valves disable
Bearing disable
Electrical disable
Steam disable
Leak disable

### Menu 04: Module Type Select

Your reports can reflect the module used for your inspection. You can choose: **SCM** (Scanning Module), **STM** (Stethoscope Module), **UWC** (The Parabolic Dish) **CFM** (Close Focus Module), **LRM** (Long Range Module) or **OTH** (Other). To select a **Module Type**

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to Menu 12: **Module Type Select**
3. Click to Enter
4. Spin to select a **Module**
5. Click to set
6. Press the **Yellow ENTER** button to exit

Menu 12 Select
Module Type Select
Press ENTER to Exit

Module Type Select
Module = (STM)

### Menu05: Instrument Setup

There are two choices for Instrument Setup:

*Manual and Auto.*

### Menu 06: Alarm Enable/Disable

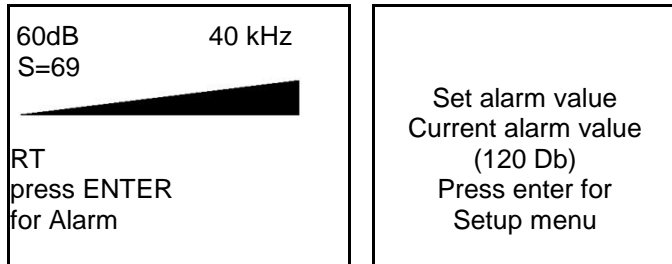
To Enable or Disable the **Alarm**

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to **Menu 05, Alarm Enable**
3. Click the **Sensitivity Control Dial** to enter
4. Spin to select **Enable or Disable**
5. Click to set The **Alarm dB** level can be set when Enable is selected and the instrument is

In the **Operation Mode**. To do so:

- Click down to bottom of the meter until **PRESS ENTER FOR:** is blinking
- Spin to **Alarm Enable**

- Click to **Enter**
- Spin to the desired **dB Alarm** level
- Click the **Yellow ENTER button** to exit



### Menu 07: Set Record Time

The recording time can be preset using this feature. The selections are: Manual (hold the sensitivity dial in for as long as you wish to record while recording) 5, 10, 15, 20, 25, 30 seconds. To Select a recording time:

1. Follow the steps to Enter the Setup Mode as described earlier
2. Spin to Menu 07, Set Record Time
3. Click the Sensitivity Control Dial to enter
4. Spin to select manual or desired record time
5. Click to set

### Menu 08: Record WAV on Alarm

When an alarm level is exceeded during an inspection, the instrument will launch into the alarm mode and will use the preset record time modes as described above in Menu 07 Set Record Time.

1. Follow the steps in Enter the Setup Mode as described earlier
2. Spin to Menu 08, Record WAV on Alarm
3. Click the Sensitivity Control Dial to enter
4. Spin to select YES or NO

### Menu 09: Select Function List

The items selected from the function list will be displayed on the Function Bar of the Main Display panel or on the Storage Display during operation modes.

You can select all or none. Be advised that if Setup Mode is turned off, when you return to the operation mode, it will not be displayed on the function bar. If there is a need to return to the setup mode, you will have to revert to option b in the "How to use setup mode" section explained above.

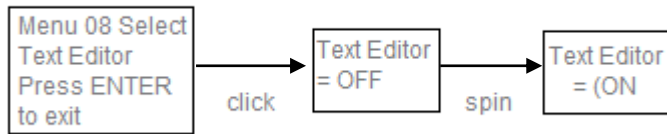
1. Follow the steps in Enter the Setup Mode as described earlier
2. Spin to Menu 09, Select Function List
3. Click the Sensitivity Control Dial to enter.
4. Select Main Menu List or Storage Menu list
5. Spin to the Function you wish (add or remove)
6. The Function will default to YES, to deselect, Spin to NO
7. Click to set

### Menu 10: Text Editor Select

Text Editor will enable or disable text entry during the operation mode. If text notes are to be manually entered, select the ON mode. If text has been preset in the Ultratrend™ software or if text entry is not needed, select OFF. The Text Editor can be set by entering the Setup Mode.

1. Spin to Text Editor.
2. Click the Sensitivity Control Dial to enter the Text Editor enable mode.

3. Spin the Sensitivity Control Dial to select OFF or ON.
4. Click the Yellow ENTER button to exit.



## Menu 11: More

This moves the setup menu into the next level: Items 12 through 31 Click the Sensitivity Control Dial to move to the next level of Setup Menus.

## Menu 12: Default Settings

This mode allows users to retain or to delete the information stored in the instrument. The instrument will reset to original factory default settings. In addition there are user defined defaults that can be set when with this setup option.

### Factory Defaults

Confirm **YES** means that the onboard computer will default to original factory settings and **all stored data will be deleted**. Confirm **NO** retains all stored data and current instrument settings.

### The Factory Default Settings:

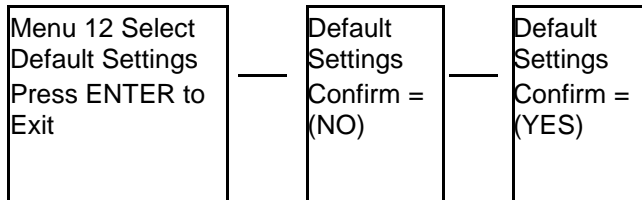
- Maximum Sensitivity (S= 70)
- Frequency = 40 kHz
- Display Mode = Real Time
- Display Screen = Main
- Application Select = Generic spin
- Instrument Setup = Manual
- STD or Metric Units = STD
- dB Scale = Relative
- Offset Value = 0
- Text Editor = ON
- Alarm = Disabled
- Module Type Select = SCM
- Display Response = Medium
- Sensitivity Mode = Manual
- Headphone Volume = 99%
- Turn off Time = 5 Seconds
- Shut off Mode = Timed

### The user defined Default Settings can be:

- User Sensitivity Default (see Setup Menu 13)
- User Frequency (see Setup Menu 14)
- Frequency Adjust (see Setup Menu 15)

### To select Default Settings:

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to **Menu12: Default Settings**
3. Click to Enter
4. Spin to “**YES**” or “**NO**”
5. Click to set
6. Press the **Yellow ENTER button** to exit



### Menu 13: Sensitivity Default

The user can select a default sensitivity level ranging from 0-70

1. Follow the steps to Enter the Setup Mode as described earlier.
2. Spin to **Menu 13: Sensitivity Default**
3. Click to Enter
4. Spin to **selected sensitivity level**
5. Click to set
6. Press the **Yellow ENTER button** to exit.

### Menu 14: User Frequency Default

This is the frequency to which the instrument will automatically default when turned on.

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to **Menu 14: Frequency Default**
3. Click to Enter
4. Spin to **desired frequency**
5. Click to set
6. Press the **Yellow ENTER button** to exit

### Menu 15: Frequency Adjust

Select **YES** to manually change frequency during operations. Select **NO** to fix a selected (default) frequency to be used during all inspections.

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to **Menu 15: Frequency Adjust**
3. Click to Enter
4. Spin to **YES or NO**
5. Click to set
6. Press the **Yellow ENTER button** to exit

## Menu 16: Restore Lists

Selecting Restore Lists resets inspection codes to original factory set codes listed in Ultratrend DMS and in the Ultraprobe 10,000.

This change will effect only the current information stored locally on the Ultraprobe and can be changed again when downloaded to

Ultratrend DMS. **YES** will restore the lists to the original factory lists, **NO** will retain current codes.

1. Follow the steps to Enter the Setup Mode as described earlier.
2. Spin to Menu 16: Restore Lists
3. Click to Enter
4. Spin to YES or NO
5. Click to set
6. Press the Yellow ENTER button to exit.

## Menu 17: Set Shutoff Mode Shutdown = Timed Trigger

There are two selections to control how to turn the instrument off: Either by a **Timed** turn-off (as in-Menu 16) or when the **trigger** is released: **Trigger**. In **Trigger Mode**, when the trigger is pressed to turn the Ultraprobe on, the instrument will stay on until the trigger is pulled a second time.

To set the **Shutoff Mode**:

1. Follow steps to Enter the **Setup Mode** as de-scribed above
2. Spin to **Menu 17: Set Shut off Mode**
3. Click to Enter
4. Spin to “**Timed**” or “**Trigger**”
5. Click to set
6. Press the **Yellow ENTER button** to exit

Menu 17 Select Set Shut off Mode Press ENTER to Exit
---------------------------------------------------------------

Set Shut off Mode Shutoff = (Trigger)
------------------------------------------

## Menu 18: Set Turnoff Time Turn off = 1-995 seconds, 1Hr, 2, 3, 4 default is 5 seconds

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to **Menu 18: Set Turn off Time**
3. Click to Enter
4. Spin to the desired time (1 seconds to 995 seconds up to 4 hours)  
The Factory default is 5 seconds.)
5. Click to set
6. Press the **Yellow ENTER button** to exit

Menu 18 Select Set Turn off Time Press ENTER to Exit
---------------------------------------------------------------

Set Turn off Time Turn off = (005) Sec.
-----------------------------------------------



## Menu 19: Display Response

You can control the speed at which the bar graph moves and the meter responds to reflect a dB level. There are three choices: Slow, **Medium**, Fast. The instrument defaults to Slow. To select a response speed:

1. Follow the steps to Enter the Setup Mode as de-scribed earlier
2. Spin to Menu 19: **Display Response**
3. Click to Enter
4. Spin to select **Slow, Medium or Fast**
5. Click to set
6. Press the **Yellow ENTER button** to exit.

Menu 19 Select
Display Response
Press ENTER to Exit

Display Response
Response = (SLOW)

## Menu 20: Line Input

With line input you can enter data such as Temperature from an external source. The source must have a DC millivolt output. To input the data:

1. Connect the cable from the Thermometer to the Ultraprobe Line Input jack
2. Enter Setup Mode
3. Spin to Menu 20: "**Line Input**"
4. Click the Sensitivity dial in to enter
5. Disabled will blink, Spin to Temp Probe
6. Click to set

Menu 20
Select
Comm Flow Control

Line Input Select
Line In = Temp Probe

### When ready to enter temperature:

1. **Connect the cable from the Thermometer to the Ultraprobe Line Input jack.**
2. Click the Sensitivity Dial until the cursor moves do the bottom of the **Display Panel** until Press **Enter** for is blinking
3. Spin until the specific **Application Info** is blinking (e.g.: Generic or Steam)
4. Press **Enter** to enter the Application Info screen
5. Spin to Temperature
6. Turn on the Thermometer and take the temperature measurement and hold the reading
7. Click (the temperature numerals will blink rapidly) and the data will be entered
8. (Optional) Click to re-enter the data
9. Press **Enter** to save: the temperature will be stored
10. NOTE: If you wish to move the data to an-other location the store screen will prompt you to spin to the desired location and then to press **Enter** again
11. You will be given a prompt to press **Enter** to **Exit**
12. Click to exit

This blinks slowly
↓
Temperature:000

Click once to
↓
Temperature:230

If you don't want
spin to EXIT and click

You need to use the proper cable connection for this input. The Line Input Jack Specifications are: 1/8" phone jack, tip positive, sleeve negative. Input level is 0-5 V DC maximum. Input resistance is 50 k OHMS. Transfer function: 1 mV DC/degree (°C or °F). Input range: 10° to 475° (°C or °F)

### Menu 21: Sensitivity Mode MANUAL / AUTOMATIC (Auto Sens. 0 to 70 up or down)

The instrument's sensitivity can be adjusted manually or automatically. In the manual mode, if a sensed ultrasound is too loud or too soft, or out of range, the inspector must adjust the sensitivity up or down using the **Sensitivity Control Dial**. In automatic, the inspector can pre-select a sensitivity level that will represent a percentage of the scale displayed on the bar graph. The levels are 0 to 99 (%). For loud environments, the range will be down scaled, while for inspections where high sensitivity is required; the level can be scaled up. For recording sounds, as an example, the automatic scale should be set at 50 or lower. At 50 the instrument will attempt to maintain a 50% of scale reading on the bar graph. If the sound level is too low, the bar graph level will drop below 50%. If the level is high, the instrument will attempt to maintain an average of 50% on the bar graph. The volume level will also rise and fall in relation to the set sensitivity level.

To select an automatic response:

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to **Menu 21 Sensitivity Mode**
3. Click to Enter
4. Spin from **Manual to Automatic**
5. Spin to the percent of scale desired
6. Click to exit
7. Press the **Yellow ENTER button** to exit.

Menu 21 Select Sensitivity Mode  Press ENTER to Exit	Sensitivity Mode AUTOMATIC  Auto Sens = (70)
---------------------------------------------------------------	-------------------------------------------------------

### Menu 22: Headphone Volume (Volume= 99%) or lower

Here you can set the comfort level of the head-phone volume. The setting can range from 0 to 99% of the volume.

To select the volume level of your headphones:

1. Follow the steps to Enter the Setup Mode as described earlier
2. Spin to **Menu 22: Headphone Volume**
3. Click to Enter
4. Spin to the desired volume level
5. Click to set
6. Press the **Yellow ENTER button** to exit.

Menu 22 Select Headphone Volume  Press ENTER to Exit	Headphone Volume Volume = (99%)
---------------------------------------------------------------	------------------------------------

## Menu 23: Enter Inspector ID

The Inspector ID number is set for 3 alphanumeric positions.

1. Follow the steps to Enter the Setup Mode as described earlier
2. To enter **Inspector ID**, Click the **Sensitivity Dial**
3. Spin the **Sensitivity Dial** to select the alpha-numeric value
4. Click to set. The cursor will roll over to the next position

Press the **Yellow ENTER button** to exit.

Enter Inspector ID  
Inspector = (000)  
Press ENTER to exit

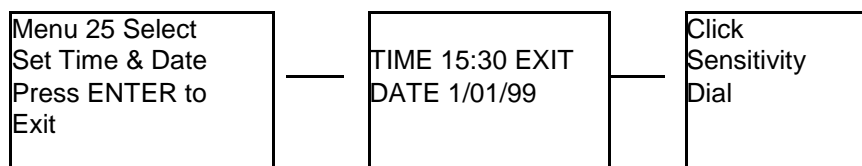
## Menu 24: Set Time and Date

1. Follow the steps to Enter the **Setup Mode** as described earlier.
2. Spin to **Menu 24: Set Time and Date**
3. Click to Enter (EXIT Blinks), .
4. Spin to desired **Month** or **Day** or **Year** and Click (selected number will blink rapidly).
5. Spin to select a new value
6. Click to set.
7. Spin to **TIME** setting and click on either **Hour** or **Minute** (the displayed number will blink rapidly).
8. Once an **Hour** or **Minute** has been selected, spin to select a new value.
9. Click to Set.
10. When through, Spin the **Sensitivity Control Dial** until **EXIT** flashes.
11. Click the **Sensitivity Control Dial** again and return to the **Set Up Mode**.
12. Press the **Yellow ENTER button** to exit.

**NOTE:** To change the date format from US Standard to International Standard see Menu 25 Date Format.

## Menu 25: Date Format

The **Date Format** can be changed from the US standard (month/day/year) to the **International Format:** (day/month/year).



To change the Date Format:

1. Follow the steps to Enter the Setup Mode as described earlier
2. Spin to **Menu 25: Date Format**
3. Click to Enter
4. The date format, **mm/dd/yy**, will blink
5. Spin the **Sensitivity Control Dial** to **dd/mm/yy**
6. Click the **Sensitivity Control Dial** to exit

## Menu 26: Cal Due Date

Shown as **Cal Due Date** in the menu, this date is set at the factory and displays the recommended Re-calibration/service date. This is one mode that cannot be changed by a user. It is only set at the factory after a service has been performed.

**NOTE:** This information cannot be changed by the user.

## Menu 27: STD or METRIC Units

To change the data units:

1. Follow the steps to Enter the Setup Mode as described earlier.
2. Spin to **Menu 27 STD** or **Metric Units**
3. Click to **Enter**
4. Spin to **STD** or **Metric**
5. Click to set
6. Click the **Yellow ENTER button** to exit.

## Menu 28: Display Mode

There are three modes to choose in **Display Mode**:

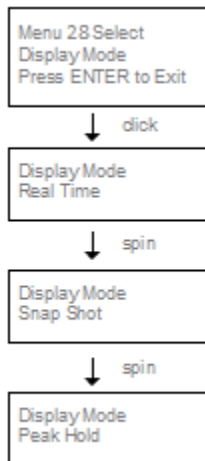
**Real Time, Snapshot and Peak Hold.** **Real Time** is the standard operation of the instrument. For basic inspection operations choose **Real Time**. Snapshot is a very useful mode for inspections that require a comparison of measurements. Snapshot holds a specific reading on the display. The display can be updated by pressing the ENTER button to hold and change a reading. An example of this operation mode would be to locate the loudest point in a machine. By pointing the instrument at a loud signal and pressing the ENTER button, the sound intensity level will be displayed on the panel and held for comparison until the ENTER button is pressed again, as the instrument is scanned around other points on the machine. The meter will remain constant while the audio levels change. Another example is performing a quick comparison of multiple bearings by pressing the ENTER button often to update and compare sound levels.

**Peak Hold** displays and holds the peak value for comparison.

It changes only when a higher ultrasound level is sensed. The bar graph will move up and down to display sound intensities, but the **Peak Hold dB** reading in the upper left corner will remain constant. A thin vertical line on the bar graph indicates the peak intensity of the bar graph. The **Peak Hold dB** reading can be reset by using the "**Clear Peak Value**" function which is automatically listed in the **Function Bar** during the **Peak Hold Mode** or by turning the instrument off or by changing the frequency.

To select **Display Mode**:

1. You must be in the **Setup Mode**.
2. Spin to **Display Mode** (Menu 28 Blinks).
3. Click the **Sensitivity Control Dial** to enter **Display Mode**.
4. Spin the **Sensitivity Control Dial** until the de-sired setting (**Real Time, Snap Shot or Peak Hold**) appears and blinks.
5. Click the **Sensitivity Dial** to set and return to **Set Up Mode**.
6. Press the **Yellow ENTER button** to exit.



## Menu 29: dB Scale Type Select (relative or offset)

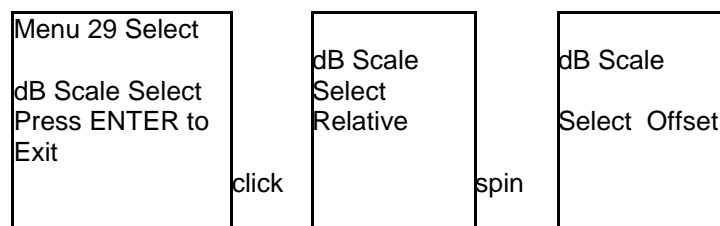
**dB Select** has two settings from which to choose.

These settings will determine the baseline **dB** reference level of the instrument.

Once selected, all test results will be based on the selected baseline **dB** level. There are two scales:

### Relative and dB offset.

**Relative** sets the instrument to the 0 dB of the instrument's internal minimal detection value and is the factory default setting.



**dB offset** is a **dB** level that is a new minimum reference level set by the user. This value may be any dB level above the natural 0 **dB** of the instrument. Once set, the preset level must be subtracted from the reading to determine an accurate dB increase. (EG: if "10" is the dB offset value and a subsequent reading is 25 **dB**, then the increase is 15 **dB**.)

To select a dB reference scale:

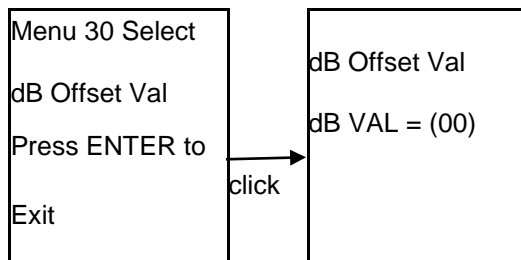
1. Enter the **Setup Mode**
2. Spin to **dB Scale Select (Menu 29)** blinks).
3. Click in the **Sensitivity Control Dial**.
4. Spin the **Sensitivity Control Dial** to the desired scale (Relative or Offset).
5. Click the **Sensitivity Control Dial** to set.
6. Press the **Yellow ENTER** button to exit.

### Menu 30: dB offset value

This position is selected to set the **dB scale** for readings to be taken in **dB offset scale**.

To set the **dB offset scale**:

1. Follow the steps to Enter the **Setup Mode** as described earlier
2. Spin to **dB Offset Val** (value) (Menu 30 blinks) and click in the **Sensitivity Control Dial**
3. The **dB Val** (00) will blink
4. Spin the Sensitivity **Control Dial** to the desired dB value level
5. Click the Sensitivity **Control Dial** to set
6. Press the **Yellow ENTER button** to exit



1. Turn on **Ultraprobe**

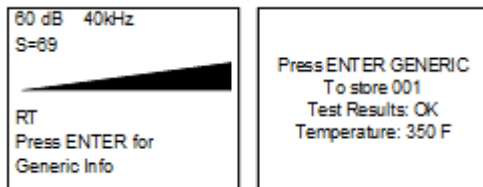
### Menu 31: BACK

This changes the Setup screen back to the 1st level (Menus 1-11).

## HOW TO USE THE APPLICATION SELECT MODES

### Generic

1. To view Generic Info, click the Sensitivity Dial to the bottom of the Display Panel until "Press ENTER For" is blinking. Spin to Generic Info and press Enter
2. To enter a test condition
3. Spin to Test: the condition default is OK and will blink slowly. If it is necessary to change:
4. Click with the Sensitivity Control Dial and the condition (OK) will blink rapidly
5. Spin to select a condition indication. The choices are; OK, CHK (for check) and a series of TR1-TR9, which can be used as codes for other conditions
6. To Set, Click the Sensitivity Control Dial (the condition will blink slowly)
7. Spin to Temperature should a Temperature entry be desired
8. Click on the Temperature setting (it will blink rapidly) Spin to the left to select a "100" reading (ex 200, 300) and to the Right to select a "tens" reading (ex: 50)
9. Click to Set
10. Press Enter to store the information or
11. Spin and Click to Exit



If Parameter Info has been selected in the Storage Display function, the identical data and data entry as described above will be shown. Additional information such as date, time, module used and a command for data storage will be shown in the MORE function.

#### Field entry list for generic:

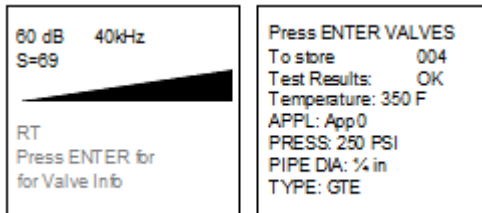
Test Results: OK, CHK, TR2-TR9

### Valves

**NOTE:** To use the ABCD Display Screen after Valves Application has been set, spin to Menu 02, Display Screens.

Click to enter and spin to ABCD. Click to select and press ENTER to Exit.

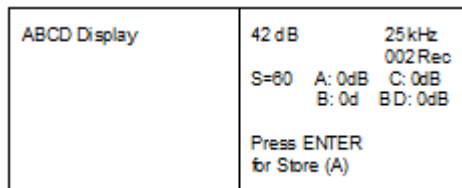
1. To view Valves Info, click the Sensitivity Dial until the cursor moves to the bottom of the Display Panel and "Press ENTER For" is blinking. Spin to Valve Info and press Enter.
2. To enter a test condition:
3. Spin to the Test condition, default is OK and will blink slowly. If it is necessary to change:
4. Click with the Sensitivity Dial and the condition (OK) will blink rapidly.
5. Spin to select a condition indication. The choices are; OK, CHK(for check) and a series of TR1-TR9 which can be use as codes for other conditions.
6. To Set, Click the Sensitivity Dial (the condition will blink slowly)
7. Spin to Temperature should a Temperature entry be desired
8. Click on the Temperature setting (it will blink rapidly) Spin to the left to select a "100" reading (ex 200, 300) and to the Right to select a "tens" reading (ex: 50)
9. Click to set
10. To enter PIPE Diameter, spin to PIPE DIA and click to enter
11. Spin to desired Pipe Diameter
12. Click to Set
13. To set valve TYPE, spin to TYPE
14. Click to enter and spin to the desired Type
15. Click to set
16. Press Enter to store the information and: spin to EXIT and click to exit.



### Field entry list for valves

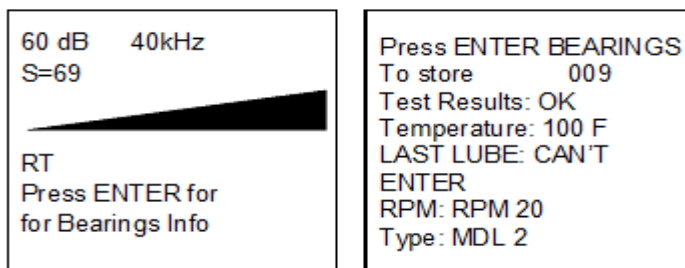
Test Results selection: OK / CHK / TR1 to TR6 TYPE selection: GTE / BLL / BFY / GLB / NDL / SFR / BYPAOV / OTH.

**NOTE:** If Storage Display is selected the ABCD Screen will not be seen. However, the Parameters Information function can be used to input data of test results as described above.



### Bearings

1. To view Bearings Info, click the Sensitivity Dial and move the cursor to the bottom of the Display Panel until “Press ENTER For” is blinking. Spin to Bearings Info and press Enter.
2. To enter a test condition:
3. Spin to Test; the condition default is OK and will blink slowly. If it is necessary to change:
4. Click with the Sensitivity Dial and the condition (OK) will blink rapidly.
5. Spin to select a condition indication. The choices are; OK, BAD, LUB.
6. To Set, Click the Sensitivity Dial (the condition will blink slowly)
7. Spin to Temperature should a Temperature entry be desired.
8. Click on the Temperature setting (it will blink rapidly) Spin to the left to select a “100” reading (ex 200, 300) and to the Right to select a “tens” reading (ex: 50)
9. Click to set
10. Press Enter to store the information and Spin to EXIT and click to exit.



### Field entry list for bearings

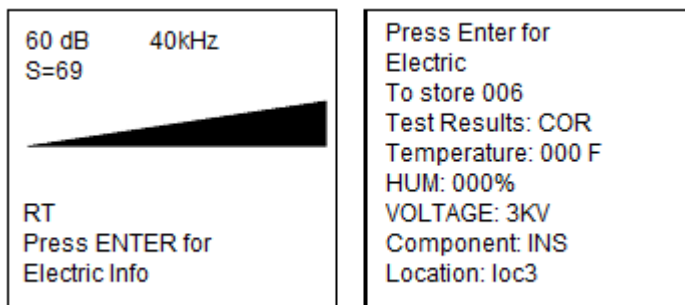
Test Results: OK/BADLUB/ TEMPERATURE RPM: RPM2 to RP25 Type: MDL0 toMDL9

### Electrical

1. To view Electrical Info, click the Sensitivity Dial until the cursor moves to the bottom of the Display Panel until “Press ENTER For” is blinking. Spin to Electric Info and press Enter.
2. To enter a test condition:
3. Spin to Test Results: the condition default is COR and will blink slowly. If it is necessary to change:
4. Click with the Sensitivity Dial and the condition (COR) will blink rapidly.
5. Spin to select a condition indication. The choices are; COR, TRK, ARC, PD, MEC (Mechanical looseness)
6. To Set, Click the Sensitivity Dial (the condition will blink slowly)
7. Spin to Temperature should a Temperature entry be desired



8. Click on the Temperature setting (it will blink rapidly) Spin to the left to select a "100" reading (ex 200, 300) and to the Right to select a "tens" reading (ex: 50)
9. Click to set
10. Spin to Humidity
11. Click to enter
12. Spin to VOLTAGE
13. Click to enter and spin to the desired Voltage
14. Click to set
15. Spin to Component
16. Click to enter
17. Spin to desired Location
18. Click to set
19. Spin to desired Location
20. Click to set
21. Press Enter to store the information and Spin and click to exit.



If Parameter Info has been selected in the Storage Display function, the identical data and data entry as described above will be shown. Additional information such as date, time, module used and a command for data storage will be shown in the MORE function.

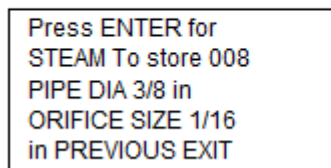
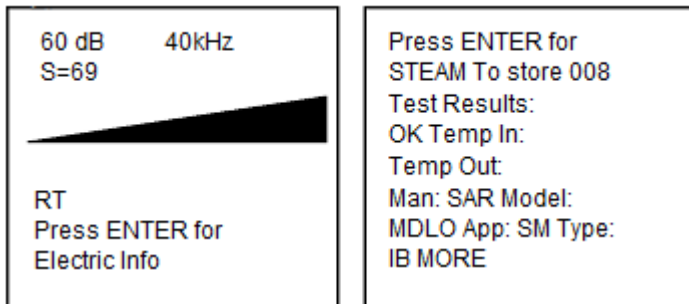
#### Field entry list for electrical

TEST RESULTS: COR/TRK/ARC/PD/MEC VOLTAGE: 120V-750 KV  
 COMPONENT: INS/SGR/TFR/BSR/TER/DCT LOCATION: Loc0 to Loc9

#### Steam

1. To view Steam Info, click the Sensitivity Control Dial to move the cursor to the bottom of the Display Panel until "Press ENTER For" is blinking. Spin to Steam Info and press Enter.
2. To enter a test condition:
3. Spin to Test: the condition default is OK and it will blink slowly. If it is necessary to change:
4. Click with the Sensitivity Control Dial and the condition (OK) will blink rapidly.
5. Spin to select a condition indication. The choices are; OK, LEK/BLW/NIS/PLG/SIZ/OTH
6. To Set, Click the Sensitivity Control Dial (the condition will blink slowly)
7. Spin to Temperature In
8. Click on the Temperature setting (it will blink rapidly) Spin to the left to select a Click on the Temperature setting (it will blink rapidly) Spin to the left to select a v. "100" reading (ex 200, 300) and to the Right to select a "tens reading (ex: 50)
9. Click to set
10. Spin to Temperature Out
11. Click on the Temperature setting (it will blink rapidly) Spin to the left to select a "100" reading (ex 200, 300) and to the Right to select a "tens" reading (ex: 50)
12. Click to set
13. Spin to Man( Manufacturer)
14. .Click to enter and Spin to the desired Manufacturer. The choices are: SAR/ARM/BES/NIC
15. Spin to Model
16. Click to Enter and spin to a Model code. The choices are codedMDL0 toMDL9
17. Click to set
18. Spin to Application and click to enter
19. Spin to select an Application. The choices are: SM/AH/RAD/HE/TR

20. Click to set
21. Spin to Type
22. Click to enter and spin to select. The choices are: IB/TD/TH/FT
23. Spin to MORE
24. Spin to PIPE DIAMETER
25. Click to enter
26. Spin to the desired diameter
27. Click to set
28. Spin to ORIFICE SIZE
29. Click to enter and spin to desired ORIFICE SIZE
30. Click to set
31. To return to previous screen, spin to PREVIOUS and Click or
32. Press Enter to store the information and Spin and Click to exit.



Storage Display function, the identical data and data entry as described above will be shown. Additional information such as Date, Time, Module used and a command for data storage will be shown in the MORE function.

#### Field entry list for steam

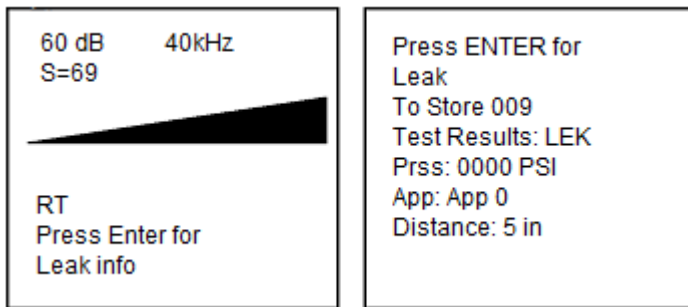
Test Results: OK/LEK/BLW/NIS/PLG/SIZ/OTH Man: SAR/ARM/BES/NIC/ Model: MDLO to MDL9 App: SM/AH/RAD/HE/TR/ Type: IB/TD/TH/FT/ PIPE DIA: 1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1.00, 1.25, 1.50, 2.00, 2.50, 3.00, 3.50, 4 up to 36 in.

ORIFICE SIZE 1/32, 1/16, 3/32, 1/8, 5/32, 3/16, 7/32, 1/4, 9/32, 10/32, 11/32, 3/8, 13/32

#### Leaks

1. To view Leak Info, click the Sensitivity Control Dial to move the cursor to the bottom of the Display Panel until "Press ENTER For" is blinking. Spin to Leak Info and press Enter
2. Spin to Test Results: the condition default is LEK and will blink slowly. If it is necessary to change:
  3. Click with the Sensitivity Control Dial and the condition (LEK) will blink rapidly.
  4. Spin to select a condition indication. The choices are; LEK, CHK, OK
  5. To Set, Click the Sensitivity Control Dial (the condition will blink slowly)
  6. Spin to Pressure
  7. Click on Pressure to enter and spin to desired pressure (PSI or BAR)
  8. Click to Set
  9. Spin to Application (codes as APP0-APP9)
  10. Click to Enter and Spin to desired Application
  11. Click to Set
  13. Spin to Distance
  14. Click to Enter

15. Spin to select Distance
16. Click to Set
17. Press Enter to store the information and Spin and Click to exit.



If Parameter Info has been selected in the Storage Display function, the identical data and data entry as described above will be shown. Additional information such as Date, Time, Module Used and a command for Data Storage will be shown in the MORE function.

#### Field entry list for leaks

Test Results: LEK/CHK/OK Press:0000 PSI (BAR) App: App0-9  
 Distance: 5 in, 6 in, up to 15 in, then 2 ft to 30 ft (38 CM , 1M, 1.5M 2M, 2.5M up to 10M)

**NOTE:** All Field Entry Lists shown above are the factory lists that can be changed/customized in the Ultratrend Software. After the changes have been completed, they may be uploaded to the Ultraprobe 10000.

## Ultraprobe applications

### Leak detection

This section will cover airborne leak detection of pressure and vacuum systems. (For information concerned with internal leaks such as in Valves and Steam Traps, refer to the appropriate sections).

What produces ultrasound in a leak? When a gas passes through a restricted orifice under pressure, it is going from a pressurized laminar flow to low pressure turbulent flow (Fig. 1). The turbulence generates a broad spectrum of sound called "white noise". There are ultrasonic components in this white noise. Since the ultrasound will be loudest by the leak site, the detection of these signals is usually quite simple.

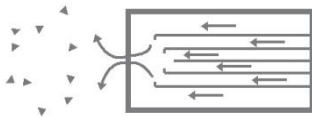


Figure 1: Pressure Leak



Figure 2: Vacuum Leak

A leak can be in a pressurized system or in a vacuum system. In both instances, the ultrasound will be produced in the manner described above.

The only difference between the two is that a vacuum leak will usually generate less ultrasonic amplitude than a pressure leak of the same flow rate. The reason for this is that the turbulence produced by a vacuum leak is occurring within the vacuum chamber while the turbulence of a pressure leak is generated in the atmosphere (Fig.2).

What type of gas leak will be detected ultrasonically? Generally any gas, including air, will produce a turbulence when it escapes through a restricted orifice. Unlike gas specific sensors, the Ultraprobe is sound specific. A gas specific sensor is limited to the particular gas it was designed to sense (e.g., helium). The Ultraprobe can sense any type of gas leak since it detects the ultrasound produced by the turbulence of a leak. Because of its versatility, the Ultraprobe may be utilized in a wide variety of leak detection. Pneumatic systems may be checked, pressurized cables, such as those utilized by telephone companies, may be tested. Air brake systems on railroad cars, trucks, and buses may be checked. Tanks, pipes, housings, casings and tubes are easily tested for leakage by pressurizing them. Vacuum systems, turbine exhausts, vacuum chambers, material handling systems, condensers, oxygen systems can all easily be tested for leakage by listening for the turbulence of the leak.

### How to locate leaks

1. Use the SCANNING MODULE.
2. Start off with the sensitivity selection at 70 (Maximum).
3. Begin to scan by pointing the module towards the test area. The procedure is to go from the "gross" to the "fine" more and more subtle adjustments will be made as the leak is approached.
4. If there is too much ultrasound in the area, reduce the sensitivity setting and continue to scan.
5. If it is difficult to isolate the leak due to competing ultrasound, place the RUBBER FOCUSING
6. PROBE over the scanning module and proceed to scan the test area.
7. Listen for a "rushing" sound while observing the meter. Follow the sound to the loudest point. The meter will show a higher reading as the leak is approached.

8. In order to focus in on the leak, keep reducing the sensitivity setting and move the instrument closer to the suspected leak site until you are able to confirm a leak.



### To confirm a leak

Position the Scanning Module, or the rubber focusing probe (if it is on the scanning module) close to the suspect leak site and move it, slightly, back and forth, in all directions. If the leak is at this location, the sound will increase and decrease in intensity as you sweep over it. In some instances, it is useful to position the rubber focusing probe directly over the suspect leak site and push down to "seal" it from surrounding sounds. If it is the leak, the rushing sound will continue. If it is not the leak site, the sound will drop off.

### Overcoming difficulties

1. Competing Ultrasounds If competing ultrasounds make it difficult to isolate a leak, there are two approaches to be taken:
  - a. Manipulate the environment. This procedure is fairly straight forward. When possible, turn off the equipment that is producing the competing ultrasound or isolate the area by closing a door or window.
  - b. Manipulate the instrument and use shielding techniques. If environmental manipulation is not possible, try to get as close to the test site as possible, and manipulate the instrument so that it is pointing away from the competing ultrasound. Isolate the leak area by reducing the sensitivity of the unit and by pushing the tip of the rubber focusing probe up to the test area, checking a small section at a time.

### Shielding techniques

Since ultrasound is a high frequency, short wave signal, it can usually be blocked or "shielded".

**NOTE:** When using any method, be sure to follow your plant's or company's safety guidelines. Some common techniques are:

- a. Body: Place your body between the test area and the competing sounds to act as a barrier
- b. Clip Board: Position the clip board close to the leak area and angle it so that it acts as a barrier between the test area and the competing sounds
- c. Gloved Hand: (USE CAUTION) using a gloved hand, wrap the hand around the rubber focusing probe tip so that the index finger and the thumb are close to the very end and place the rest of the hand on the test site so that there is a complete barrier of the hand between the test area and the background noise. Move the hand and instrument together over the various test zones.
- d. Wipe rag: This is the same method as the "gloved hand" method, only, in addition to the glove, use a wipe rag to wrap around the rubber focusing probe tip. Hold the rag in the gloved hand so that it acts as a "curtain", i.e., there is enough material to cover the test site without blocking

the open end of the rubber focusing probe. This is usually the most effective method since it uses three barriers: the rubber focusing probe, the gloved hand and the rag.

- e. Barrier: When covering a large area, it is sometimes helpful to use some reflective material, such as a welders curtain or a drop cloth, to act as a barrier. Place the material so that it acts as a "wall" between the test area and the competing sounds. Sometimes the barrier is draped from ceiling to floor, at other times, it is hung over railings.

## Low level leaks

In ultrasonic inspection for leakage, the amplitude of the sound often depends upon the amount of turbulence generated at the leak site. The greater the turbulence, the louder the signal, the less the turbulence, the lower the intensity of the signal. When a leak rate is so low that it produces little, if any turbulence that is "detectable", it is considered "below threshold". If a leak appears to be of this nature:

1. Build up the pressure (if possible) to create greater turbulence.
2. Use the UE-CFM-10 Close Focus Module. Specifically designed for low level leaks, the unique scanning chamber is designed to receive low level signals with reduced signal distortion and provides easier recognition of a low level leak. For more information, call the factory.

## Tone Test (Ultratone)

The **Tone Test** is an ultrasonic method for non-destructive testing which is used when it is difficult to pressurize or draw a vacuum in a system. This ultrasonic test is applicable to a wide range of items, including: CONTAINERS, TUBES, PIPES, HEAT EXCHANGERS, WELDS, GASKETS, SEALS, DOORS, WINDOWS, or HATCHES.

The test is conducted by placing an ultrasonic transmitter, called TONE GENERATOR, inside (or on one side) of the test item. The warble pulse-signal from the TONE GENERATOR will instantly "flood" the test item and penetrate any existing leak hole. Depending on configuration and material, even thin spots in certain metals can be vibrated by the signal. By scanning for sonic penetration on the exterior surface (or opposite side) of the test item with the Ultraprobe, the leak will be detected. It will be heard as a high pitched warble, similar to bird chirping.

The **Tone Test** incorporates two basic components: a TONE GENERATOR (an ultrasonic transmitter), and the Trisonic Scanning Module in the Ultraprobe. To conduct the test:

1. Make certain the test item has no fluids or contaminants such as water, mud, sludge, etc. that can block the path of the transmitted ultrasound.
2. Place the Tone Generator within the container, (if it is a room, door or window to be tested, place the Tone Generator on one side pointing in the direction of the area to be tested) and close, or seal so that the Tone Generator is enclosed within.
3. NOTE: The size of the test area will determine the amplitude selection of the Tone Generator. If the item to be tested is small, select the LOW position. For larger items, use the HIGH position. Scan the test area with the Ultraprobe as outlined in LEAK DETECTION procedure.

When positioning the Tone Generator, place the transducer facing and close to the most crucial test area. If a general area is to be checked, position the Tone Generator so that it will cover as wide an area as possible by placing it in the "middle" of the test item. How far will the sound travel? The Tone Generator is designed to cover approximately 4000 cubic feet (113 cu meters) of uninterrupted space. This is slightly larger than the size of a tractor trailer. Placement is dependent upon such variables as the size of the leak to be tested, the thickness of the test wall and the type of material tested (i.e. is it sound absorbent or sound reflective?). Remember, you are dealing with a high frequency, short wave signal. If the sound is expected to travel through a thick wall, place the Tone Generator close to the test zone, if it is a thin metallic wall, move it farther back and use "low". For uneven surfaces it may be necessary to use two people. One person will move the Tone Generator slowly close to and around the test areas while another person scans with the Ultraprobe on the other side.

Do not use the Tone test in a complete vacuum.

Ultrasound will not travel in a vacuum. Sound waves need molecules to vibrate and conduct the signal.

There are no moveable molecules in a complete vacuum.

If a partial vacuum is to be drawn where there are still some air molecules to vibrate, then the Tone Test may be implemented successfully.

In a laboratory, a form of the Tone Test is utilized in seal leaks of an electron beam microscope. The test chamber has been fitted with a specially designed transducer to emit the desired tone and a partial vacuum is created. A user then scans all seams for sonic penetration. The Tone Test has also been effectively utilized to test tanks before they are put on line, piping, refrigerator gaskets, caulking around doors and windows for air infiltration testing, heat exchangers for leaking tubes, as a Q.C. test for automobile wind noise and water leaks, on aircraft to test for problems associated with cabin pressure leaks and glove boxes for seal integrity defects.

UE SYSTEMS provides a variety of optional Warble Tone Generators. They are:

1. WTG2SP Warble Pipe Tone Generator with a 1" male threaded nipple to adapt to various pipe fittings. It is used to test areas where the standard Tone Generators cannot be placed such as in small pipes, sealed tanks or heat exchangers (see page 7 optional accessories, WTG-2SP).
2. UFMTG-1991 Multidirectional Tone Generator has four transducers that cover 360°. A Specially designed suction cup enables users to place the unit on a variety of surfaces, metal, plastic or glass. The UFMTG-1991 is used to detect leaks in unusual or large enclosures. Some applications include: testing bulkheads in ships, expansion joints in power plants and windshields in automobiles.



*Optional Pipe Threaded  
Tone Generator  
UE-WTG2SP*



## Transformers, switchgear another electrical apparatus



### Electric arc, Corona, Tracking Detection

There are three basic electrical problems that are detected with the Ultraprobe 10000:

**Arcing:** An arc occurs when electricity is conducted to “ground”. Lightning is a good example.

**Corona:** When voltage on an electrical conductor, such as an antenna or high voltage transmission line exceeds the threshold value of the air around it, air begins to ionize and form a blue or purple glow.

**Tracking:** Often referred to as „baby arcing“, it follows the path of damaged insulation.

The Ultraprobe 10000 can be used in low (below 15 kV), medium (15 kV – 115 kV) and high voltage systems (above 115 kV).

When electricity escapes in high voltage lines or when it „jumps“ across a gap in an electrical connection, it disturbs the air molecules around it and generates ultrasound. Most often this sound will be perceived as a crackling or „frying“ sound, in other situations it will be heard as a buzzing sound. Typical applications include: insulators, cable, switchgear, buss bars, relays, circuit breakers, pot heads, junction boxes. In substations, components such as insulators, transformers and bushings may be tested.

Ultrasonic testing is often used in enclosed switchgear. Since ultrasound emissions can be detected by scanning around door seams and air vents, it is possible to detect serious faults such as arcing, tracking and corona without taking the switchgear off line as in an infrared scan. However, it is recommended that both tests be used with enclosed switchgear.

**NOTE:** When testing electrical equipment, follow all your plant or company safety procedures. When in doubt, ask your supervisor. Never touch live electrical apparatus with the Ultraprobe or it's accessories.

The method for detecting electric arc and corona leakage is similar to the procedure outlined in leak detection. Instead of listening for a rushing sound, a user will listen for a crackling or buzzing sound. In some instances, as in trying to locate the source of radio/TV interference or in substations, the general area of disturbance may be located with a gross detector such as a transistor radio or a wideband interference locator. Once the general area has been located, the scanning module of the Ultraprobe is utilized with a general scan of the area. The sensitivity is reduced if the signal is too strong to follow. When this occurs, reduce the sensitivity to get a midline reading on the meter and continue following the sound until the loudest point is located.



Determining whether a problem exists or not is relatively simple. By comparing sound quality and sound levels among similar equipment, the problem sound will tend to be quite different. On lower voltage systems, a quick scan of bus bars often will pick up arcing or a loose connection. Checking junction boxes can reveal arcing. As with leak detection, the closer one gets to the emission site, the louder the signal.

If power lines are to be inspected and the signal does not appear to be intense enough to be detectable from the ground, use UE Systems UWC-10 Ultrasonic Waveform Concentrator (a parabolic reflector) which will double the detection distance of the Ultraprobe and provide pinpoint detection. The UWC-10 is recommended for those situations in which it may be considered safer to inspect electrical apparatus at a distance. The UWC-10 is extremely directional and will locate the exact site of an electrical discharge. Another accessory is the LRM-10- Long Range Module which also increases the detection distance of the Ultraprobe. The basic difference is that the LRM is a one-hand operation but has a slightly wider detection area (11°) versus the UWC 10 (5°).

## Monitoring bearing wear

Ultrasonic inspection and monitoring of bearings is by far the most reliable method for detecting incipient bearing failure. The ultrasonic warning appears prior to a rise in temperature or an increase in low frequency vibration levels. Ultrasonic inspection of bearings is useful in recognizing:

- a. The beginning of fatigue failure.
- b. Brinelling of bearing surfaces.
- c. Flooding of or lack of lubricant

In ball bearings, as the metal in the raceway, roller or ball bearing begins to fatigue, a subtle deformation begins to occur. This deforming of the metal will produce irregular surfaces, which will cause an increase in the emission of ultrasonic sound waves. Changes in amplitude from the original reading is indication of incipient bearing failure. When a reading exceeds any previous reading by 12 dB, it can be assumed that the bearing has entered the beginning of the failure mode.

This information was originally discovered through experimentation performed by NASA on ball bearings. In tests performed while monitoring bearings at frequencies ranging from 24 through 50 kHz, they found that the changes in amplitude indicate incipient (the onset of bearing failure before any other indicators including heat and vibration changes. An ultrasonic system based on detection and analysis of modulations of bearing resonance frequencies can provide subtle detection capability; whereas conventional methods are incapable of detecting very slight faults. As a ball passes over a pit or fault in the race surface, it produces an impact. A structural resonance of one of the bearing components vibrates or „rings“ by this repetitive impact. The sound produced is observed as an increase in amplitude in the monitored ultrasonic frequencies of the bearing.

Brinelling of bearing surfaces will produce a similar increase in amplitude due to the flattening process as the balls get out of round. These flat spots also produce a repetitive ringing that is detected as an increase in amplitude of monitored frequencies.

The ultrasonic frequencies detected by the Ultraprobe are reproduced as audible sounds. This “heterodyned” signal can greatly assist a user in determining bearing problems. When listening, it is recommended that a user become familiar with the sounds of a good bearing. A good bearing is heard as a rushing or hissing noise. Crackling or rough sounds indicate a bearing in the failure stage. In certain cases a damaged ball can be heard as a clicking sound whereas a high intensity, uniform rough sound may indicate a damaged race or uniform ball damage. Loud rushing sounds similar to the rushing sound of a good bearing only slightly rougher, can indicate lack of lubrication. Short duration increases in the sound level with „rough“ or „scratchy“ components indicate a rolling element hitting a „flat“ spot and sliding on the bearing surfaces rather than rotating. If this condition is detected, more frequent examinations should be scheduled



## Detecting bearing failure

There are two basic procedures of testing for bearing problems: COMPARATIVE AND HISTORICAL. The comparative method involves testing two or more similar bearings and „comparing“ potential differences. Historical testing requires monitoring a specific bearing over a period of time to establish its history. By analyzing bearing history, wear patterns at particular ultrasonic frequencies become obvious, which allows for early detection and correction of bearing problems.

### For comparative test:

1. Use contact (stethoscope) module.
2. Select desired frequency. (If only one frequency is to be monitored, consider using 30 kHz.)
3. Select a „test spot“ on the bearing housing and mark it for future. Touch that spot with the contact module. In ultrasonic sensing, the more mediums or materials ultrasound has to travel through, the less accurate the reading will be. Therefore, be sure the contact probe is actually touching the bearing housing. If this is difficult, touch a grease fitting or touch as close to the bearing as possible.
4. Approach the bearings at the same angle, touching the same area on the bearing housing.
5. Reduce sensitivity to hear the sound quality more clearly.
6. Listen to bearing sound through headphones to hear the „quality“ of the signal for proper interpretation.
7. Select same type bearings under similar load conditions and same rotational speed.
8. Compare differences of meter reading and sound quality.

Procedure for bearing history (historical): Before starting with the HISTORICAL method for monitoring bearings, the COMPARATIVE method must be used to determine a baseline.

1. Use basic procedure as outlined above in steps 1-8.
2. Save the reading for future reference.
3. Compare this reading with previous (or future readings). On all future readings, adjust frequency to the original level. If the decibel level has moved up 12 dB over the base line, it indicates the bearing has entered the incipient failure mode. Lack of lubrication is usually indicated by an 8 dB increase over baseline. It is usually heard as a loud rushing sound. If lack of lubrication is suspected, after lubricating, retest. If readings do not go back to original levels and remain high, consider bearing is on the way to the failure mode and recheck frequently.

## Lack of Lubrication:

To avoid lack of lubrication, note the following:

1. As the lubricant film reduces, the sound level will increase. A rise of about 8 dB over baseline accompanied by a uniform rushing sound will indicate lack of lubrication.
2. When lubricating, add just enough to return the reading to base line.
3. Use caution. Some lubricants will need time to uniformly cover the bearing surfaces. Lubricate a small amount at a time. DO NOT OVER LUBRICATE

## Over Lubrication:

One of the most common causes of bearing failure is over-lubrication. The excess pressure of the lubricant often breaks, or “pops” bearing seals or causes a build up of heat, which can create stress and deformity.

## To avoid over lubrication:

1. Don't lubricate if the base line reading and base line sound quality is maintained.
2. When lubricating, use just enough lubricant to bring the ultrasonic reading to baseline.
3. As mentioned above, use caution. Some lubricants will need time to uniformly cover the bearing surfaces.



*Proper Lubrication  
Reduces Friction  
Levels*



*Lack of Lubrication  
Increases Amplitude*

## Slow speed bearings

Monitoring slow speed bearings is possible with the Ultraprobe 10000. Due to the sensitivity range and the frequency tuning, it is quite possible to listen to the acoustic quality of bearings. In extremely slow bearings (less 25 RPM), it is often necessary to disregard the display and listen to the sound of the bearing. In these extreme situations, the bearings are usually large (1/2" and up) and greased with high viscosity lubricant. Most often no sound will be heard as the grease will absorb most of the acoustic energy. If a sound is heard, usually a crackling sound, there is some indication of deformity occurring. On most other slow speed bearings, it is possible to set a base line and monitor as described.

## FFT Interface

The Ultraprobe may be interfaced with FFT's via the UE-MP-BNC-2 Miniphone to BNC connector or the UE DC2 FFT Adapter. The Miniphone plug is inserted into the headphone jack of the Ultraprobe and the BNC connector is attached to the analog-in connector of the FFT. There are also two accessories that connect to an FFT via the Ultraprobe I/O port. They are the 5PC MP (using a Miniphone connector to the FFT) and the 5PC-BNC (using a BNC connector to the FFT). These connectors enable an FFT to receive the heterodyned, (translated) low frequency sound information detected from the Ultraprobe. In this instance it can be used to monitor and trend bearings, including low speed bearings. It can also extend the use of the FFT to record all types mechanical information such as leaking valves, cavitation, gear wear, etc.

## General mechanical trouble shooting

As operating equipment begins to fail due to component wear, breakage or misalignment, sonic and more importantly, ultrasonic shifts occur. The accompanying sound pattern changes can save time and guess work in diagnosing problems if they are adequately monitored. Therefore, an ultrasonic history of key components can prevent unplanned downtime. And just as important, if equipment should begin to fail in the field, the ULTRAPROBE can be extremely useful in trouble shooting problems.

### TROUBLE SHOOTING:

1. Use the contact (stethoscope) module.
2. Touch test area(s): listen through headphones and observe the meter.
3. Adjust sensitivity until mechanical operation of the equipment is heard clearly.
4. Probe equipment by touching various suspect areas.
5. To focus in on problem sounds, while probing, reduce sensitivity gradually to assist in locating the problem sound at its' loudest point. (This procedure is similar to the method outlined in LEAK LOCATION, i.e., follow the sound to its loudest point.)



**NOTE:** In diagnosing any type of mechanical equipment, it is important to understand how that equipment operates. Being able to interpret sonic changes is dependent on a basic understanding of the operations of the particular equipment being tested. As an example, in some reciprocal compressors, the diagnosis of a valve problem in the inlet manifold is dependent on recognizing the distinctive clicking sound of a good valve vs. the muffled click of a valve in a „blow-by“ mode.

In gearboxes, before missing gear teeth may be detected as an abnormal click, the normal sounds of gears must be understood. In pumps, certain pumps will have surges, which may confuse inexperienced operators by the constant shifting of the intensity levels. The surge pattern must be observed before a lower, consistent bar graph reading can be recognized as the true reading.

## Locating faulty steam traps

An ultrasonic test of steam traps is a positive test. The main advantage to ultrasonic testing is that it isolates the area being tested by eliminating confusing background noises. A user can quickly adjust to recognizing differences among various steam traps, of which there are three basic types: [mechanical](#), [thermostatic](#) and [thermodynamic](#).

When testing steam traps ultrasonically:

1. Determine what type of trap is on the line. Be familiar with the operation of the trap. Is it intermittent or continuous drain?
2. Try to check whether the trap is in operation (is it hot or cold? Put your hand near, but do not touch the trap, or, better yet, use a non-contact infrared thermometer).
3. Use the contact (stethoscope) module.
4. Try to touch the contact probe towards the discharge side of the trap. Press the trigger and listen.
5. Listen for the intermittent or continuous flow operation of the trap. Intermittent traps are usually the inverted bucket, thermodynamic (disc) and thermostatic (under light loads). Continuous flow: include the float, float and thermostatic and (usually) thermostatic traps. While testing intermittent traps, listen long enough to gauge the true cycle. In some cases, this may be longer than 30 seconds. Bear in mind that the greater the load that comes to it, the longer period of time it will stay open.

In checking a trap ultrasonically, a continuous rushing sound will often be the key indicator of live steam passing through. There are subtleties for each type of trap that can be noted.

Use the sensitivity levels of the Sensitivity election Dial to assist your test. If a low pressure system is to be checked, adjust the sensitivity UP toward 8; if a high pressure system (above 100 psi) is to be checked, reduce the sensitivity level. (Some experimentation may be necessary to arrive at the most desirable level to be tested.) Check upstream and reduce the sensitivity so that the meter reads about 50% or lower, then touch the trap body downstream and compare readings.

## General steam/condensate/flash steam confirmation

In instances where it may be difficult to determine the sound of steam, flash steam or condensate,

1. Touch at the immediate downstream side of the trap and reduce the sensitivity to get a mid-line reading on the meter (about 50%).
2. Move 15-30 cm downstream and listen. Flashing steam will show a large drop off in intensity while leaking steam will show little drop off in intensity.





## INVERTED BUCKET TRAPS

Inverted Bucket Traps normally fail in the open position because the trap loses its prime. This condition means a complete blow-through, not a partial loss. The trap will no longer operate intermittently. Aside from a continuous rushing sound, another clue for steam blow-through is the sound of the bucket clanging against the side of the trap.

## FLOAT AND THERMOSTATIC

A Float and Thermostatic trap normally fails in the "closed" position. A pinhole leak produced in the ball float will cause the float to be weighted down or water hammer will collapse the ball float. Since the trap is totally closed no sound will be heard. In addition, check the thermostatic element in the float and thermostatic trap. If the trap is operating correctly, this element is usually quiet; if a rushing sound is heard, this will indicate either steam or gas is blowing through the air vent. This indicates that the vent has failed in the open position and is wasting energy.

## THERMODYNAMIC (DISC)

Thermodynamic traps work on the difference in dynamic response to velocity change in the flow of compressible and incompressible fluids. As steam enters, static pressure above the disc forces the disc against the valve seat. The static pressure over a large area overcomes the high inlet pressure of the steam. As the steam starts to condense, the pressure against the disc lessens and the trap cycles. A good disc trap should cycle (hold-discharge-hold) 4-10 times per minute. When it fails, it usually fails in the open position, allowing continuous blow-through of steam.

## THERMOSTATIC TRAPS

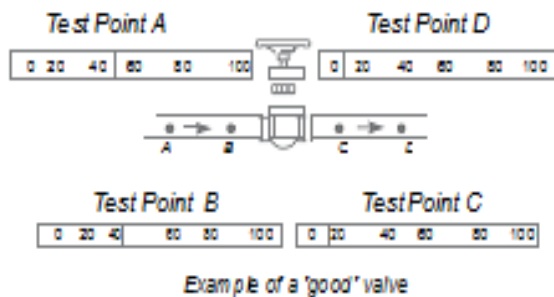
Thermostatic (bellows & bimetallic) operate on a difference in temperature between condensate and steam. They build up condensate so that the temperature of condensate drops down to a certain level below saturation temperature in order for the trap to open. By backing up condensate, the trap will tend to modulate open or closed depending on load. In a bellows trap, should the bellows become compressed by water hammer, it will not function properly. The occurrence of a leak will prevent the balanced pressure action of these traps. When either condition occurs, the trap will fail in its natural position either opened or closed. If the trap fails closed, condensate will back up and no sound will be heard. If the trap fails open, a continuous rushing of live steam will be heard. With bimetallic traps, as the bimetallic plates set due to the heat they sense and the cooling effect on the plates, they may not set properly which will prevent the plates from closing completely and allow steam to pass through. This will be heard as a constant rushing sound.

**NOTE:** A complimentary Steam Trap Trouble Shooting Guide is available. Visit our website [www.uesystems.eu](http://www.uesystems.eu)



## Locating faulty valves

Utilizing the contact (stethoscope) module in the Ultraprobe, valves can easily be monitored to determine if a valve is operating properly. As a liquid or gas flows through a pipe, there is little or no turbulence generated except at bends or obstacles. In the case of a leaking valve, the escaping liquid or gas will move from a high to a low pressure area, creating turbulence on the low pressure or "down-stream" side. This produces a white noise. The ultrasonic component of this "white noise" is much stronger than the audible component. If a valve is leaking internally, the ultrasonic emissions generated at the orifice site will be heard and noted on the meter. The sounds of a leaking valve seat will vary depending upon the density of the liquid or gas. In some instances it will be heard as a subtle crackling sound, at other times as a loud rushing sound. Sound quality depends on fluid viscosity and internal pipe pressure differentials. As an example, water flowing under low to mid pressures may be easily recognized as water. However, water under high pressure rushing through a partially open valve may sound very much like steam. To discriminate: reduce the sensitivity, touch a steam line and listen to the sound quality, then touch a water line. Once you have become familiar with the sound differences, continue your inspection.



A properly seated valve will generate no sound. In some high pressure situations, the ultrasound generated within the system will be so intense that surface waves will travel from other valves or parts of the system and make it difficult to diagnose valve leakage. In this case it is still possible to diagnose valve blow-through by comparing sonic intensity differences by reducing the sensitivity and touching just upstream of the valve, at the valve seat and just downstream of the valve.

### Procedure for valve check

1. Use stethoscope module.
2. Touch downstream side of valve and listen through headset.
3. When necessary, if there is too much sound, reduce sensitivity.
4. For comparative readings, usually in high pressure systems:
  - a. Touch upstream side and reduce sensitivity to minimize any sound (usually bring the meter to a midline "50 %" reading).
5. Touch valve seat and/or downstream side. Compare sonic differentials. If the valve is leaking, the sound level on the seat or down-stream side will be equal to or louder than the upstream side.

### ABCD Method

The ABCD method is recommended to check for the potential of competing ultrasounds downstream that may carry back to the area of inspection and give a false indication of a valve leak. For the ABCD method,

1. Refer to steps 1-5 above.
2. Mark two equidistant points upstream (these will be point A and Point B) and compare them to two equidistant points downstream (point C and point D) The sound intensity of points A and B are compared with test points C and D. If point C is higher than points A and B, the valve is considered leaking. If point D is higher than point C, this is an indication of sound being transmitted from another point downstream.

## Confirming valve leakage in noisy pipe systems

Occasionally in high pressure systems, stray signals occur from valves that are close by or from pipes (or conduits) feeding into a common pipe that is near the downstream side of a valve.

This flow may produce false leak signals.

In order to determine if the loud signal on the down-stream side is coming from a valve leak or from some other source:

- Move close to the suspected source (i.e., the conduit or the other valve).
- Touch at the upstream side of the suspected source.
- Reduce sensitivity until the meter displays a midline ("50 %") reading.
- Touch at short intervals ( such as every 15-30cm and note the meter changes.
- If the sound level decreases as you move towards the test valve, it indicates that the valve is not leaking.
- If the sound level increases as you approach the test valve, it is an indication of a leak in the valve.

## MISCELLANEOUS PROBLEM AREAS

### UNDERGROUND LEAKS

Underground leak detection depends upon the amount of ultrasound generated by the particular leak. Some slow leaks will emit very little ultrasound. Compounding the problem is the fact that earth will tend to insulate ultrasound. In addition, loose soil will absorb more ultrasound than firm soil. If the leak is close to the surface and is gross in nature, it will be quickly detected. The more subtle leaks can also be detected but with some additional effort. In some instances it will be necessary to build up pressure in the line to generate greater flow and more ultrasound. In other cases it will be necessary to drain the pipe area in question, isolate the area by valving it off and inject a gas (air or nitrogen) to generate ultrasound through the leak site. This latter method has proven very successful. It is also possible to inject a test gas into the test area of the pipe without draining it. As the pressurized gas moves through the liquid into the leak site, it produces a crackling sound, which may be detected.

#### PROCEDURE:

1. Use **Contact** (Stethoscope) Module.
2. Start Frequency Selection at 20-25kHz.
3. Touch surfaces over ground - **DO NOT JAM** probe to ground. Jamming can cause probe damage.

In some instances it will be necessary to get close to the "source" of the leak. In this situation, use a thin, sturdy metal rod and drive it down close to, but not touching, the pipe. Touch the contact probe to the metal rod and listen for the leak sound. This should be repeated approximately every 1-3 feet until the leak sound is heard. To locate the leak area, gradually position the rod until the leak sound is heard at its loudest point. An alternative to this is to use a flat *metal disc or coin* and drop it on the test area. Touch the disc and listen at 20 **kHz**. This is useful when testing concrete or asphalt to eliminate scratching sounds caused by slight movements of the stethoscope module on these surfaces.

### LEAKAGE BEHIND WALLS

1. Look for water or steam markings such as discoloration, spots in wall or ceiling, etc.
2. If steam, feel for warm spots in wall or ceiling or use a non-contact infrared thermometer.
3. Set **Frequency** to 20 **kHz** and use **Contact** (Stethoscope) Module.
4. Listen for leak sounds. The louder the signal the closer you are to the leak site.

### PARTIAL BLOCKAGE:

When partial blockage exists, a condition similar to that of a bypassing valve is produced. The partial blockage will generate ultrasonic signals (often produced by turbulence just down stream). If a partial blockage is suspected, a section of piping should be inspected at various intervals. The ultrasound generated within the piping will be greatest at the site of the partial blockage.



**PROCEDURE:**

1. Use **Contact** (Stethoscope) Module.
2. Touch downstream side of suspected area and listen through headset.
3. Start test at 40 **kHz**. If the sound appears weak or confusing, change the frequency. As an example, try to test at 30 **kHz**., then 20 **kHz**.
4. When necessary, if there is too much sound, reduce sensitivity.
5. Listen for an increase in ultrasound created by the turbulence of partial blockage.

**FLOW DIRECTION**

Flow in piping increases in intensity as it passes through a restriction or a bend in the piping. As flow travels upstream, there is an increase in turbulence and therefore the intensity of the ultrasonic element of that turbulence at the flow restriction. In testing flow direction, the ultrasonic levels will have greater intensity in the DOWNSTREAM side than in the UPSTREAM side.

**PROCEDURE:**

1. Use **Contact** (Stethoscope) Module.
2. Start test in 40 **kHz**. If it is difficult hearing the flow signal, adjust the Frequency to 30 **kHz** or to 25 **kHz**.
3. Begin test at maximum sensitivity level.
4. Locate a bend in the pipe system (preferably 60 degrees or more).
5. Touch one side of bend and note **dB** reading.
6. Touch other side of bend and note **dB** reading.
7. The side with the higher (louder) reading should be the downstream side.

**NOTE:** Should it be difficult to observe a sound differential, reduce sensitivity and test as described until a sonic difference is recognized.

## Ultrasound Technology

The technology of ultrasound is concerned with sound waves that occur above human perception. The average threshold of human perception is 16,500 Hertz. Although the highest sounds some humans are capable of hearing is 21,000 Hertz, ultrasound technology is usually concerned with frequencies from 20,000 Hertz and up. Another way of stating 20,000 Hertz is 20 kHz, or KILOHERTZ. One kilo Hertz is 1,000 Hertz.



Figure A

Since ultrasound is a high frequency, it is a short wave signal. Its' properties are different from audible or low frequency sounds. A low frequency sound requires less acoustic energy to travel the same distance as high frequency sound (Fig. A).

The ultrasound technology utilized by the Ultra-probe is generally referred to as Airborne ultrasound. Airborne ultrasound is concerned with the transmission and reception of ultrasound through the atmosphere without the need of sound conductive (interface) gels. It can and does incorporate methods of receiving signals generated through one or more media via wave guides.

There are ultrasonic components in practically all forms of friction. As an example, if you were to rub your thumb and forefinger together, you will generate a signal in the ultrasonic range. Although you might be able to very faintly hear the audible tones of this friction, with the Ultraprobe it will sound extremely loud.

The reason for the loudness is that the Ultraprobe converts the ultrasonic signal into an audible range and then amplifies it. Due to the comparative low amplitude nature of ultrasound, amplification is a very important feature.

Although there are obvious audible sounds emitted by most operating equipment, it is the ultrasonic elements of the acoustic emissions that are generally the most important. For preventative maintenance, many times an individual will listen to a bearing through some simple type of audio pick-up to determine bearing wear.

Since that individual is hearing ONLY the audio elements of the signal, the results of that type of diagnosis will be quite gross. The subtleties of change within the ultrasonic range will not be perceived and therefore omitted.

When a bearing is perceived as being bad in the audio range it is in need of immediate replacement.

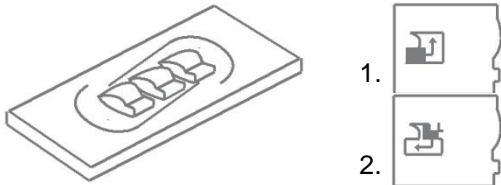
Ultrasound offers a predictable diagnostic capacity. When changes begin to occur in the ultrasonic range, there is still time to plan appropriate maintenance. In the area of leak detection, ultrasound offers a fast, accurate method of locating minute as well as gross leaks. Since ultrasound is a short wave signal, the ultrasonic elements of a leak will be loudest and most clearly perceived at the leak site. In loud factory type environments, this aspect of ultrasound makes it even more useful.

Most ambient sounds in a factory will block out the low frequency elements of a leak and thereby render audible leak inspection useless. Since the Ultraprobe is not capable of responding to low frequency sounds, it will hear only the ultrasonic elements of a leak. By scanning the test area, a user may quickly spot a leak. Electrical discharges such as arcing, tracking and corona have strong ultrasonic components that may be readily detected. As with generic detection, these potential problems can be detected in noisy plant environments with the Ultraprobe.

## Instructions for setting combination on carrying case

The combination is factory set at ,0-0-0,, Setting your personal combination:

1. Open the case. Looking at the back of the lock inside the case you will see a change lever. Move this change lever to the middle of the lock so that it hooks behind the change notch (picture 1).
2. Now set your personal combination by turning the dials to the desired combination (i.e. birthday, phone no. etc)
3. Move the change lever back to the normal position (picture 2).
4. To lock, rotate one or more dials. To open the lock, set your personal combination. International patents pending.



## APPENDIX A

### Sensitivity Calibration

#### Ultrasonic Tone Generator Method Ultraprobe 10000

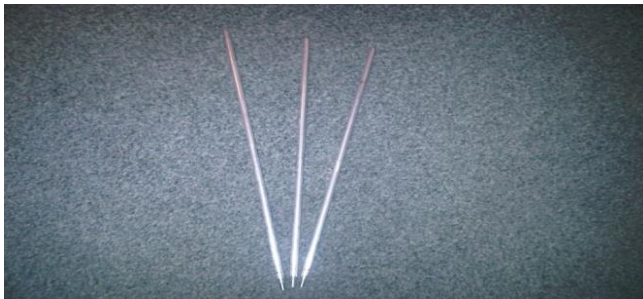
It is advisable to check the sensitivity of your instrument before proceeding with your inspection. To assure reliability keep a record of all your sensitivity validation tests and be sure to keep your Warble Tone Generator charged.

Procedure:

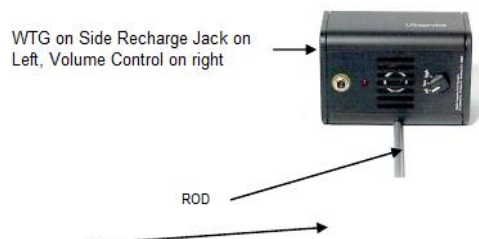
1. Create a chart or use the one below:

Sensitivity Validation					
Scanning Module	Date	Serial #	TG setting	Frequency	DB
Contact Module	Date	Serial #	TG setting	Frequency	DB

- A. For the Scanning Module, insert it into the front end of the instrument.
  2. Select 30 kHz as the test frequency and note "30" in the Frequency box for the Scanning Module in the Sensitivity Validation Chart
  3. Plug in the Headphones and adjust the ear pieces so that they are opened up and place them on the test table
  4. In your kit select the longest of the Stethoscope extension probe rods.



5. Place an "L" in the Rod used box of your Sensitivity Validation Chart
6. Place the Tone generator on the side with the front facing you.



7. Place the rod in the middle of the transducer are (as above)
8. Select a volume level on the Warble Tone Generator (Low or High).
9. Note the level (L or H) in the TG box of the Sensitivity Validation chart.
10. Turn the Ultraprobe 10000 on its' side so that it will rest flat on the test table with the handle facing you and the Scanning Module facing the Tone Generator.

11. Slide the Ultraprobe gently so that the front faceplate touches the Rod and that the rod is touching the face plate while touching the side of the Scanning Module. Align the Scanning
12. Module so that the center of the module is facing the center of the Tone Generator Transducer (see below).



13. Adjust the sensitivity until the intensity bar graph is at mid-line and displays the decibel
14. level.
15. Note and record the decibel reading in the dB box of your Sensitivity Validation chart.

B. For the Contact (Stethoscope) Module, insert the Module into the Front End of the Instrument:

1. Select 40 kHz as the test frequency and note "40" in the Frequency box for the Contact Module in the Sensitivity Validation Chart
2. Plug in the Headphones and adjust the ear pieces so that they are opened up and place them on the test table
3. Place the Warble Tone Generator flat facing up with the recharge jack facing you at 90°.
4. Select a volume level on the Warble Tone Generator (High or Low).
5. Note the level (H or L) in the TG box of the Sensitivity Validation chart.
6. With the handle facing you, align the tip of the contact probe with the recharge jack and allow the probe to rest on the jack. **DO NOT PRESS DOWN!** (NOTE: NEVER USE THE ALUMINUM EXTENSION PROBE RODS THEY WILL SHORT OUT THE BATTERY OF THE WTG)
7. Adjust the sensitivity until intensity bar graph is at mid-line
8. Note and record the decibel in the dB box of your Sensitivity Validation chart.



For all tests:

Whenever you perform a Sensitivity Validation Test, review the data in the Sensitivity Validation chart and repeat the test using the same rod/module, frequency, and Warble Tone Generator volume setting. Look for a change in the decibel reading. A change of greater than 6 dB will indicate a problem.

## Ultraprobe® 10,000 Specifications

<b>Construction</b>	Hand-held pistol type made with coated aluminum and ABS plastic
<b>Circuitry</b>	Solid State Analog and SMD Digital Circuitry with temperature compensation and true RMS conversion
<b>Frequency Range</b>	20 KHz to 100 KHz (tunable in 1 KHz increments)
<b>Response Time</b>	< 10 ms
<b>Display</b>	64x128 LCD with LED Backlight
<b>Memory</b>	400 storage locations
<b>Battery</b>	Lithium NIMH Rechargeable
<b>Operating Temperature</b>	0°C to 50°C (32°F to 122°F)
<b>Outputs</b>	Calibrated heterodyned output, decibel (dB) frequency, RS-232 data output
<b>Probes</b>	Trisonic™ Scanning Module and Stethoscope Module, Long Range Module and RAS/RAM
<b>Headset</b>	Deluxe noise attenuating headphones For hard hat use
<b>Indicators</b>	dB, Frequency, Battery Status and 16 Segment Bar Graph
<b>Sensitivity</b>	Detects 0.127 mm (0.005") diameter leak @ 0.34 bar (5 psi) at a distance of 15.24 m (50 ft.)
<b>Threshold*</b>	$1 \times 10^{-2}$ std. cc/sec to $1 \times 10^{-3}$ std. cc/sec.
<b>Dimensions</b>	Complete kit in Zero Halliburton aluminum carrying case 55 x 47 x 20 cm (21.5" x 18.5" x 8")
<b>Weight</b>	Pistol Unit: 1.1 kg (2.35 lbs.) Complete carrying case: 8.6 kg (19 lbs)
<b>Warranty</b>	1-year parts/labor standard 5 years with returned, completed warranty registration
<b>Display Modes</b>	Real Time, Snap Shot, Peak Hold, Storage Display and Application Specific * Depends on leak configuration

Ultraprobe 10,000 kit: meets and exceeds ASTM E1—2-2011 requirements for Leak Detection Covered by one or more of the following patents: 051115, 0303776, 0315199, 1206586, 1297576, 1881263, 2562758, 2689339, 4416145, 4823600, 5955670, 6122966, 6339961, 6341518, 6415645 & and others pending.

UE Systems is committed to continual product improvement therefore specifications are subject to change without notice. Warranty details are available by request.

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