

ULTRAPROBE 10000

INSTRUCTION MANUAL





V 3.2.01

Table of Contents

1. Introduction
   - Ultrasound Technology Instruction Scholarship Certificate 5

2. Ultraprobe Kit
   Basic Components 5
   A. Plug-In Modules 6
      - Scanning Module 6
      - Contact Module
3. Accessories 6
   A. Standard Accessories 6
      - Headset 6
      - WTG-1 Warble Tone Generator 6
      - Rubber Focusing Probe 7
      - Stethoscope Extension Kit 7
      - BCH-10L Battery Charger 7
      - BCH-WTG Battery Charger 7
      - RAS/RAM Magnetic Transducer 7
   B. Optional Accessories 7
      - LRM-9/10 7
      - CFM-9/10 7
      - UWC-9/10 7
      - DHC-2 Headphones 7
      - TFSM 7
      - TFCM 7
      - UFMTG-1991 7
      - WTG-2SP Warble Pipe Threaded Tone Generator 7
      - BCH-10L 7
      - BCH-WTG2 8
      - HTS-10 8
      - LLA 8
      - RAS/RAM-MT 8

   3. Overview
   A. Pistol Grip Housing 9
      - Display Panel 9
      - Trigger On/Off Switch 9
      - I/O Port 9
      - Line Input 10
      - Battery Compartment/Battery 10
      - Wrist Strap 10
      - Sensitivity Control Dial 10
      - Storage Entry Button 10
      - Head Set Jack 10
      - Recharge Jack 10
      - Line Input Jack 10

4. User Instructions 11
   - Trisonic- Scanning Module 11
   - Method of Airborne Detection 11
   - Headset 11
   - Rubber Focusing Probe 11
   - Stethoscope Module 11
   - Stethoscope Extension Kit 11

- Charging The UP10000 11
- Warble Tone Generator 12
- Charging The Warble Tone Generator 12
- Helpful Hints 12
- Auto Shutdown Battery Feature 12
- Resetting The On Board Computer 12

6. Operational Overview 13
   - Main Display Navigation 13
   - Main Display Information 13
   - Bargraph Display 14
   - Sensitivity Control Dial 14
     - Sensitivity / Volume Adjust 14
     - Frequency Adjust 14
   - Function Field Description 15
   - Yellow Enter Button 15
   - Storage Display Navigation 15
   - Storage Display Information 16
   - ABCD Navigation 16
   - Entering A Test Condition In Storage Display 17
   - Entering Text Using Text Editor 17
   - Alarm Enable/Disable 18
   - Generic Info 18
   - Record Wav 18
   - CF Info 19
   - To Store A Reading 19
   - Storing ABCD Information 19
   - Freezing a Reading on the Display Panel 19

7. Setup Mode
   - Overview Of Setup Mode 20
   - How To Use The Setup Mode 20
   - Menu 01 Data Transfer 20
   - Menu 02 Display Screen 21
   - Menu 03 Application Select 21
   - Menu 04 Module Type Select 22
   - Menu 05 Instrument Setup (Manual or Auto) 22
   - Menu 06 Alarm Enable/Disable 22
   - Menu 07 Set Record Time 22
   - Menu 08 Record WAV on Alarm 22
   - Menu 09 Select Function List 23
   - Menu 10 Text Editor Select 23
   - Menu 11 MORE 23
   - Menu 12 Default Settings 23
   - Menu 13 User Sensitivity Default 24
   - Menu 14 User Frequency Default 24
   - Menu 15 Frequency Adjust (Yes or No) 24
   - Menu 16 Restore Lists 25
   - Menu 17 Set Shut Off Mode 25
   - Menu 18 Set Turn Off Time 25
   - Menu 19 Set WAV Sample Rate 25
   - Menu 20 Display Response 25
   - Menu 21 Comm Flow Control 26
   - Menu 22 Line Input 26
   - Menu 23 Sensitivity Mode 26
   - Menu 24 Headphone Volume 27
   - Menu 25 Enter Inspector ID 27

- Menu 26 Set Time and Date 27
- Menu 27 Date Format Select 27
- Menu 28 Cal Due Date 28
- Menu 29 Standard or Metric Units 28
- Menu 30 Display Mode Select 28
- Menu 31 dB Scale Type Select 28
- Menu 32 dB Offset Value 29
- Menu 33Auto Store to CF 29
- Menu 34 Upgrade UE10K PGM 29
- Menu 35 BACK 30

8. How To Use The Application Select Modes 30
   A. Generic 30
   B. Valves 30
   C. Bearings 31
   D. Electrical 31
   E. Steam 32
   F. Leaks 33

9. General Applications 34
   - Leak Detection, How To Locate Leaks, Shielding Techniques, Low Level Leaks 34 - 36
   - Ultratone™ 37
   - Electric Arc, Corona, Tracking Detection 38
   - Monitoring Bearing Wear 39
   - Detecting Bearing Failure 40
   - Comparative and Historical Trending 40
   - Lack Of Lubrication 40
   - Over Lubrication 41
   - Slow Speed Bearings 41
   - FFT Interface 41
   - General Mechanical Trouble Shooting 41
   - Locating Faulty Steam Traps 42
   - General Steam/Condensate/Flash Steam Confirmation 42
   - Inverted Bucket, Float & Thermostatic, Thermodynamic and Thermostatic 43
   - Inspecting Valves 44
   - ABCD Method 45
   - Underground Leaks 45
   - Leakage Behind Walls 46
   - Partial Blockage 46
   - Flow Direction 46
   - Ultrasound Technology 47
   - Ultraprobe 10,000 Specifications 48
   - Instructions For Setting The Combination Lock On Carrying Case 49

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.

1. 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.

ULTRASOUND TECHNOLOGY INSTRUCTION SCHOLARSHIP CERTIFICATE:
Your Ultraprobe 10000 has many applications ranging from leak detection and electrical inspection to mechanical inspection. It may be used to trend, analyze or just find a problem. How it is used is up to you. As you gain knowledge and learn how many modes of inspection you can cover, you might want to extend your knowledge by enrolling in one of the many training courses offered by UE Training Systems, Inc. A Scholarship certificate is available to you.

2. ULTRAPROBE 10000 KIT





Trisonic™ Scanning Module

A. PLUG-IN MODULES

TRISONIC™ SCANNING MODULE:
This module is utilized to receive air-borne ultrasound 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 airborne 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.



Stethoscope (Contact) 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.

3. ACCESSORIES

A. 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 ULTRAPROBE. In fact, these headphones provide over 23 dB 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 31 additional inches (78.7 cm) 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.)

BCH-WTG BATTERY CHARGER:
This is the standard battery charger for all Warble Tone Generators that are used with the UP10000. The line input is 120 VAC @ 60Hz and the charging time is about 4 hours. (For countries with 220V/50Hz, the BCH-102 is considered a “Standard Accessory”.)

LRM-9/10:
A cone shaped scanning module that increases the detection distance above standard scanning modules. The LRM-9 is ideal for high voltage inspection and for locating leaks at great distances.

RAS/RAM-MT REMOTE MAGNETIC TRANSDUCER
The RAS/RAM- MT is a magnetically mountable contact probe with cable. The probe is applied to a test surface and the RAM (Remote Access Module) is plugged into the front end of the Ultraprobe.

B. OPTIONAL ACCESSORIES

CFM-9/10:
A scanning module used for close proximity leak detection in pressure and vacuum systems.

UWC-9/10:
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.

LLA:
Liquid Leak Amplifier case. It holds 12 8 oz. Bottles of Liquid Leak Amplifier (For *Ultrasonic Bubble Testing*).

\

4. OVERVIEW

A. 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 Ultraprobe'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.



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 (set up 17), it will automatically turn off after approximately 5 minutes.

I/O PORT:
This is the RS232 port for upload/download information transfer, including heterodyned sound output. Align the pins from the cable and plug in. Note: before downloading data be sure the cable is connected to both the I/O port and to the computer or other hardware (vibration analyzer, tape recorder, etc.). This connection may also be used for sound recording, vibration analyzer and notebook computer download. In this manner, the sounds, as they are recorded, can be simultaneously listened to through the headphones.

I/O CONNECTOR DIAGRAM

Pin 1 – N/A
Pin 2 - RX
Pin 3 - TX
Pin 4 - DTR
Pin 5 - GND
Pin 6 – N/A
Pin 7 - RTS
Pin 8 - CTS
Pin 9 – N/A

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.

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 recharge 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 JACK:
This jack is provided to connect other instrument outputs to the Ultraprobe 10000.



5. 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.

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 FOCUSING 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 headset 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 may interfere with clear reception and be confusing. If this occurs, place the RUBBER FOCUSING PROBE over the Stethoscope probe to insulate against the 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 31" (78.7 cm) are to be utilized, locate the middle piece. (This is the rod with a female fitting 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.
4. **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 4,000 cubic feet (113.3 cu. meters) 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 SHUTOFF 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.

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 (BCH-10L2 for 220 V operation). If the Compact Flash Card is installed, on power-down a prompt will appear to store records to the compact flash card. The instrument can be preset to automatically store all records onto the card automatically at shutdown.

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 re-set to factory default settings. **WARNING: Selecting Default Settings erases all records stored in the instrument.**

6. 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:

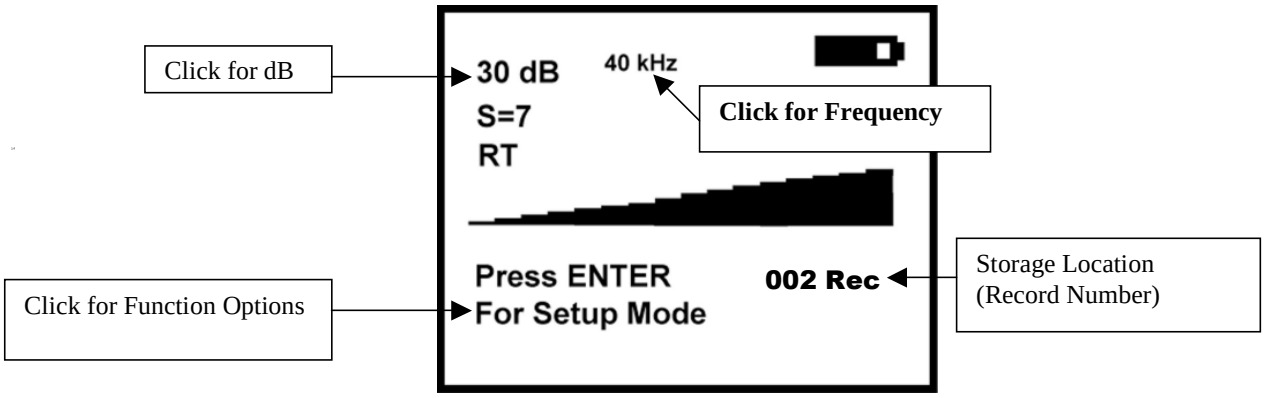
OPERATION MODE:
The operation mode will be described in detail under the operation mode section. In this mode you will perform all inspection actions such as scanning, probing, "Click and Spin" activities, sound recording and data storage. NOTE: "**Click**" operations require ***pressing*** a dial. "**Spin**" operations require ***turning*** a dial.

SET UP MODE:
The setup mode will be described in detail under the Set Up Mode section,. There are 24 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.

A. OPERATION MODE

1. MAIN DISPLAY NAVIGATION

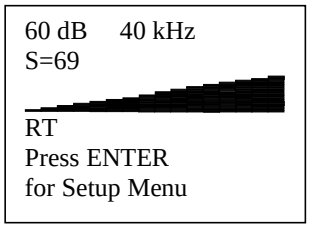
Moving around the Display Panel is easy. Basically three clicks (presses) of the **Sensitivity Dial** will move the cursor on the **Display Panel** to three key spots: the **Decibel Indicator**, the **Frequency Indicator** and the **Function Selection Indicator**. When an indicator is selected, or "active",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



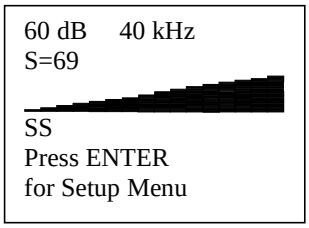
Main Display Information:
When the trigger is pressed to turn the instrument on, the Display Panel will display intensity levels simultaneously on a bar graph and as a numerical decibel value. The current selected frequency will also be shown. Remaining Battery Charge is shown in the upper right corner. 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 Indicator: "**Press Enter for:"** (you can use this to select any of the following function fields.) The default function fields are:

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. **CF INFO** (Compact Flash): Information of stored recorded WAV files and record time 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.

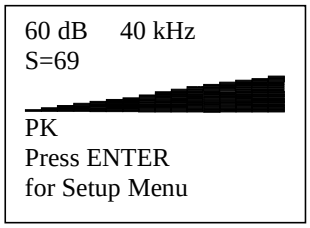
BAR GRAPH DISPLAY:
The bar graph has 16 segments. Each segment equals 3 dB.



Real Time = RT



Snap Shot = SS



Peak Hold = PK

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. 2If 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

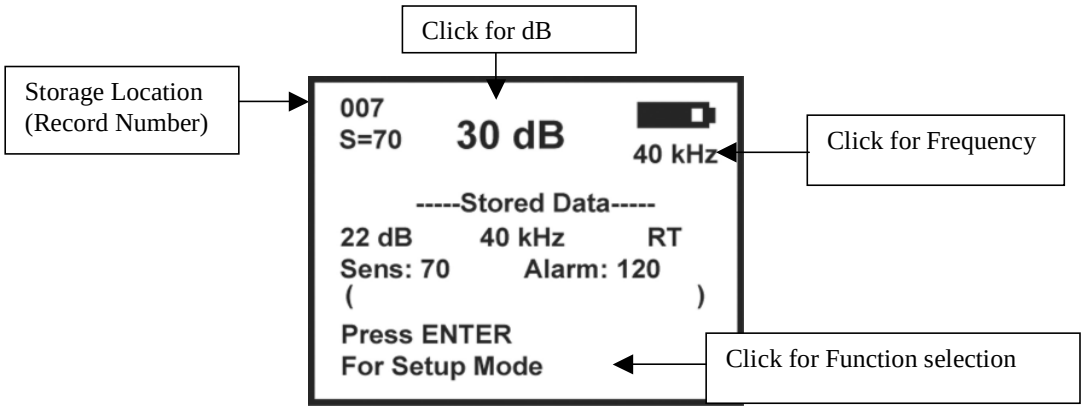
a. **SETUP MENU** : The various screen and operation functions can be set in this mode
b. **TEXT EDITOR** (ON/OFF): When on text notations can be set using up to 16 alphanumeric characters.
c. **ALARM** (DISABLED ENABLED): Set (enable) alarm levels in **dB** or turn the alarm off (disable).
d. **GENERIC 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. **CF INFO** (Compact Flash): Information of stored recorded WAV files and record time 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 Pa**nel will note when to press this button.

2. 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 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. 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:** **007**



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:

a. **EXIT MAIN**: Exits to main display.
b. **EDIT TEXT**: When on text notations can be set using up to 16 alphanumeric characters.
c. **MORE**: View additional test information including Date, Time and Module used.
d. **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**)

e. **RECORD WAV**: The Ultraprobe 10000 is configured to record heterodyned ultrasounds with this function setting.
f. **CF INFO** (Compact Flash): Information of stored recorded WAV files and record time can be viewed here.
g. **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:

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

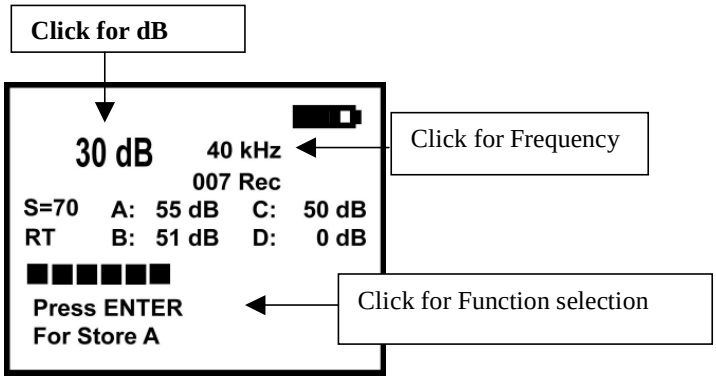
PARAMETER INFO (in Storage Display only)

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**.

3. 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.



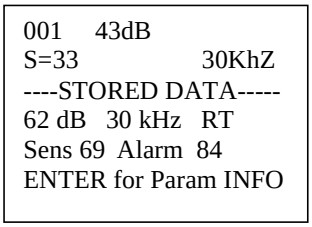
On the bottom line of the display panel, you will find the Function Select Indicator: "**Press Enter for:"** (you can use this to enter any of the following default fields) The default function fields are:

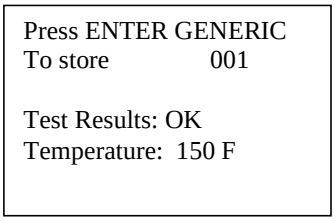
a. STORE (A)
b. STORE (B)
c. STORE (C)
d. STORE (D)
e. SETUP MENU
f. TEXT EDITOR (ON/OFF)
g. ALARM (DISABLED ENABLED)
h. VALVE INFO
i. STORAGE DISPLAY
j. RECORD WAV
K. CF INFO (COMPACT FLASH)
L. STORE RECORD AND EXIT

HOW TO USE THE OPERATIONAL FEATURES

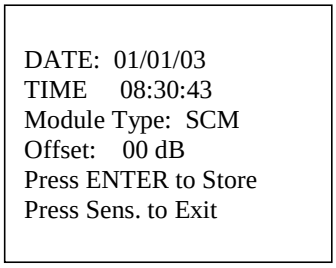
ENTERING A TEST CONDITION IN STORAGE DISPLAY

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 entry be desired
6. **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)
7. Click to set
8. Press Enter to store the information or
9. Spin to **EXIT** and click to exit.





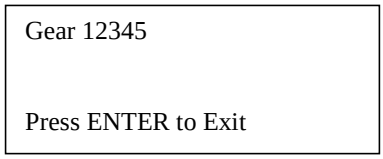
Additional information can be viewed by clicking the **Sensitivity Control Dial** until the **ENTER For** Blinks. Spin to **MORE** and press the **Yellow Enter Button** to enter. There you will see the following information represented as an example below:



ENTERING TEXT USING TEXT EDITOR:

TO ENTER TEXT IN THE TEXT FIELD:

1. There is space to enter 16 characters of alphanumeric 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**. move back through numbers (**9**-**0**) and then back down the alphabet (**Z**-**A**).
5. Spin the **Sensitivity Dial** clockwise to move up through numbers and then through the alphabet starting with **A** or spin counter clockwise to move back through numbers (**9**-**0**) and then back down the alphabet (**Z**-**A**).
6. 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.
7. Continue until through or until all 16 fields are filled.
8. 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 **Sensitivity Dial** until the corrected entry is displayed and "click" the **Sensitivity Control Dial** to enter the text character.
9. When the text is correct, click the **Yellow Enter Button** to save and store the text. The instrument will return to the **Operation Mode**.

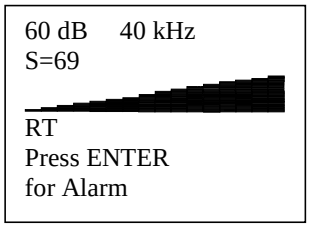


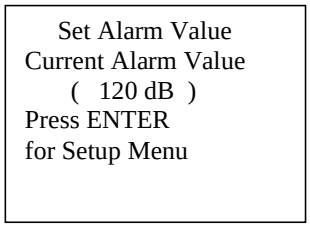
ALARM ENABLE/DISABLE
While in the **Operation mode**, this function selection will display **Alarm Disabled** if no alarm level has been set. If an alarm level has been set, it will show the set level in **dB**. To enable the alarm, see **ALARM ENABLE/DISABLE** in the **SETUP MODE** below.

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:

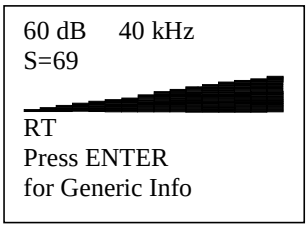
1. Click down to the bottom of the **Display Panel** until **PRESS ENTER FOR**:… is blinking
2. Spin to **Alarm** (the **dB** value will be shown)
3. Click to **Enter**
4. Spin to the desired **dB** alarm level
5. Click the **Yellow ENTER Button** to exit

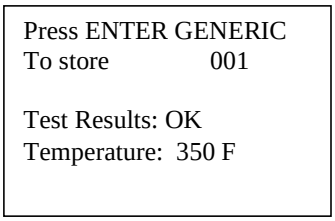




GENERIC INFO:

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 **SensitivityControl 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 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 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 **Sensitivity Control Dial** to Exit.
7. When through **saving a recording**, press the **Sensitivity Control Dial** to Exit.

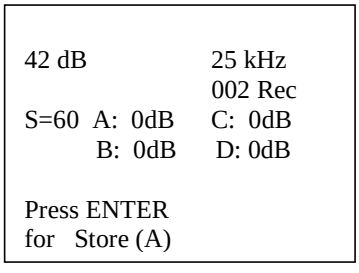
CF INFO
This feature allows you to view file names stored on the Compact Flash Card. When a sound is recorded and a **WAV** file is saved, two files are written to the Compact Flash Card: a text file which contains all stored record fields for the specific record number associated with the **WAV** file and the **WAV** file. When CF info is selected, 5 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 CF 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. Delete ALL Files
5. EXIT to MAIN
WARNING: Never remove or insert the Compact Flash 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 record 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.
4. 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. 2. If ***Storage Display*** is not shown, spin until ***Storage Display*** is shown and blinking. 3. 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.



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.

6. SETUP MODE

OVERVIEW OF SETUP MODE

There are 35 functions that can be set to either change the display screens or the format of data entry and collection.

1	Data Transfer	18	Set Turn Off Time
2	Display Screens	19	Set WAV Sample Rate
3	Application Select	20	Display Response
4	Module type select	21	Communication Flow Control
5	Instrument Setup (Manual or Auto)	22	Line Input Select
6	Alarm Enable/Disable	23	Sensitivity Mode
7	Set Record Time	24	Headphone Volume
8	Record WAV on Alarm	25	Enter Inspector ID
9	Select Function List	26	Set time and Date
10	Text Editor Select	27	Date Format Select
11	MORE (moves to second level)	28	Cal Due Date
	SECOND LEVEL SET UP MODE	29	Standard or Metric Units
12	Default Settings	30	Display Mode Select
13	User Sensitivity Default	31	dB Scale Type Select
14	User Frequency Default	32	dB Offset Value
15	Frequency Adjust (Yes or No)	33	Auto Store to CF
16	Restore Lists	34	Upgrade UE10K PGM
17	Set Shut Off Mode	35	BACK (moves to first level)

HOW TO USE THE SETUP MODE

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

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

b. 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 Data Transfer

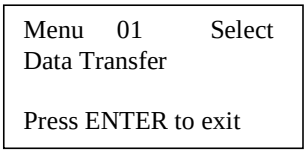
NOTE: Before downloading data, be sure the Ultraprobe is connected to the computer.

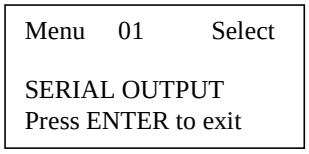
To download data from the Ultraprobe to your computer:

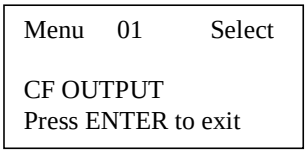
1. Follow the steps to Enter the **Setup Mode** as described earlier.
2. The first selection to be displayed on the screen will be **Menu 01**, **Data Transfer**.
3. Click the **Sensitivity Control Dial** to enter. You Can output data from either the Serial Port or from the CF card (Note: you will only transfer txt data, not .wav files to Ultratrend DMS)
4. Spin to SERIAL OUTPUT. SERIAL Output will blink.
5. Connect the RS 232 cable to the computer and to the Ultraprobe
6. Open Ultratrend DMS
7. Select Communication
8. Configure the Port
9. Test the Connection
10. Select Download Group and all the data will be transferred to the PC. (NOTE: For software management, refer to Ultratrend DMS^{Tm} Instructions.)

To Transfer data from the CF card:

1. Spin to CF Output
2. CF OUTPUT will blink
3. Click the Sensitivity Dial to transfer data from the Ultraprobe to the CF Card
4. Turn the Ultraprobe 10000 off
5. Remove the CF Card
6. Install the CF Card into the CF Care Reader
7. In the **Ultratrend DMS** software, select **Communications** and Select **IMPORT RECORDS**
8. Follow the instructions to import the records to the desired Group.







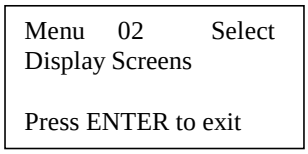
To Transfer Data from Ultratrend to the Ultraprobe through the Compact Flash Card

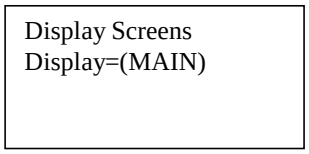
1. Spin to CF Input
2. CF INPUT will blink
3. Click the Sensitivity Dial to transfer data from the **Compact Flash Card** to the **Ultraprobe**

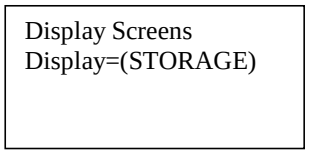
Menu 02: Display Screens:

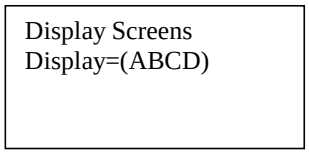
There are two **Display Screens** to use when in the Operating Mode: **Main** and **Storage**. A third screen, **ABCD indicator**, is available when either the "**Valves**" or "**Bearings**" Application is selected.
The **Main screen** is the standard mode. It displays current inspection data: **dB, 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 O2: Display Screens
3. Click the **Sensitivity Control Dial** to enter **Display Screens**.
4. Spin the **Sensitivity Control Dial** to change from **Main** to **Storage**, (or to **ABCD**) then
5. Click the **Sensitivity Control Dial** to select.





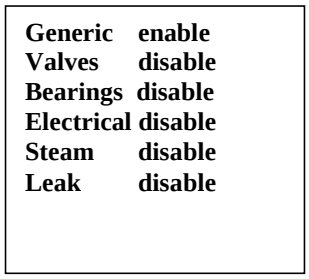




Menu 03: Application Select

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**
6. To change the operation mode to the newly selected Application, Click The **Sensitivity Control Dial** to change.

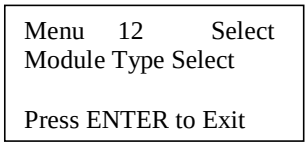


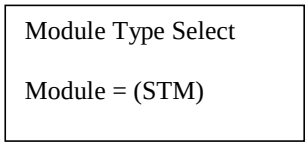
Menu 04: Module Type Select

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.





Menu05: Instrument Setup

There are two choices for Instrument Setup: Manual and Auto.

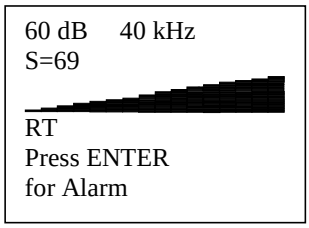
Menu 06: Alarm Enable/Disable

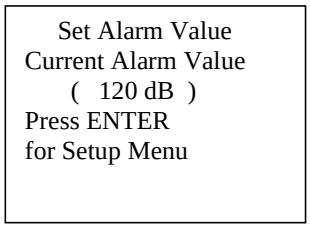
To Enable or Disable the **Alarm**,

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,

1. Click down to bottom of the meter until **PRESS ENTER FOR**:… is blinking
2. Spin to **Alarm Enable**
3. Click to **Enter**
4. Spin to the desired **dB Alarm** level
6. 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.

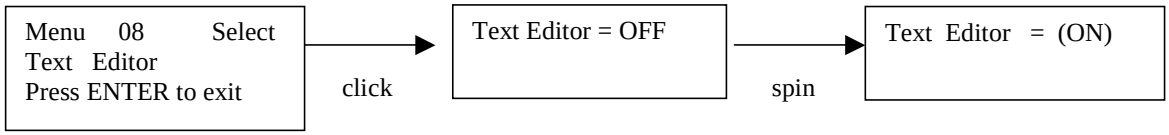
1. Follow the steps in Enter the **Setup Mode** as described earlier
2. Spin to **Menu 09**, **Select Function List**
3. Click the Sensitivity Control Dial to enter.
4. Select Main Menu List or Storage Menu list
5. Spin to the Function you wish to change (add or remove)
6. The Function will default to 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 35
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 re-set 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**
- **Instrument Setup = Manual**
- **STD or Metric Units = STD**
- **dB Scale = Relative**
- **Offset Value = 0**

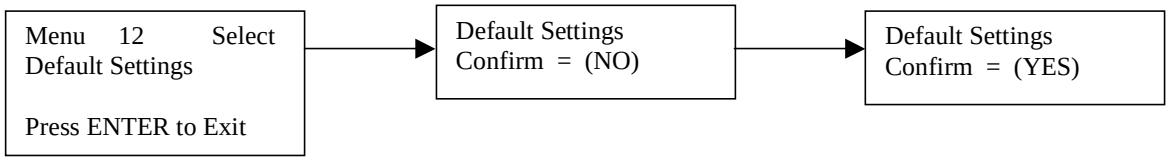
- **Text Editor = ON**
- **Alarm = Disabled**
- **Module Type Select = SCM**
- **Display Response = Medium**
- **Sensitivity Mode = Manual**
- **Headphone Volume = 99%**
- **Turnoff Time = 5 Seconds**
- **Shutoff Mode = Timed**

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.

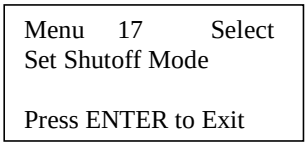
1. Follow the steps to Enter the **Setup Mode** as described earlier.
2. Spin to **Menu 16**: **Restore Lists**
3. Click to Enter
4. Spin to **YES or NO**
5. Click to set
6. Press the **Yellow ENTER button** to exit.

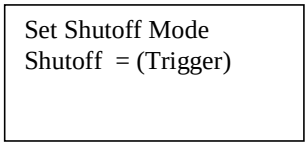
Menu 17: Set Shutoff Mode Shutdown = Timed Trigger

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**:

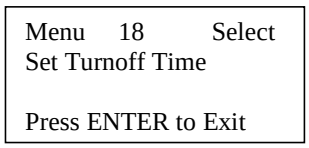
1. Follow steps to Enter the **Setup Mode** as described above.
2. Spin to **Menu 17**: **Set Shutoff Mode**
3. Click to Enter
4. Spin to **"Timed"** or **"Trigger"**
5. Click to set
6. Press the **Yellow ENTER button** to exit.

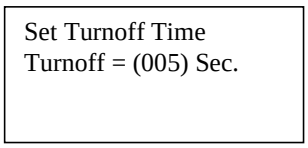




Menu 18: Set Turnoff Time Turn off = 0-3 minutes preset at 5 seconds

1. Follow the steps to Enter the **Setup Mode** as described earlier.
2. Spin to **Menu 18**: **Set Turnoff Time**
3. Click to Enter
4. Spin to the desired time (0 seconds to 300 Seconds (5 minutes) The Factory default is 5 Seconds.)
5. Click to set
6. Press the **Yellow ENTER button** to exit.





Menu 19: Set WAV Sample Rate

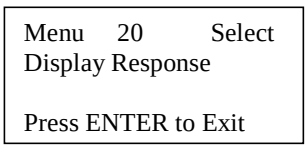
The instrument recording sample rate is normally 16000 Hz. It can be changed to a slower rate of 11025 Hz.

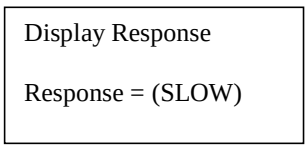
1. Follow the steps to Enter the Setup Mode as described earlier.
2. Spin to **Menu 19**: **Set WAV Sample Rate**
3. Click to Enter
4. Spin to desired rate
5. Click to set
6. Press the **Yellow ENTER button** to exit.

Menu 20: 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 described earlier.
2. Spin to Menu 20: **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 21: Comm Flow Control Off On

Note: If you're not using hardware handshaking flow control, keep this option OFF.

1. Follow the steps to Enter the Setup Mode as described earlier.
2. Spin to **Menu 21**: **Comm Flow Control**
3. Click to Enter
4. Spin to ON or OFF
5. Click to set
6. Press the **Yellow ENTER button** to exit.

Comm Flow Control OFF CTS is 1 DTR is 1	Comm Flow Control ON CTS is 1 DTR is 1

Menu 22: Line Input

With line input you can enter data such as Temperature from an external source. The source must have a DC milivolt 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 22: "**Line Input**"
4. Click the Sensitivity dial in to enter
5. Disabled will blink, Spin to **Temp Probe**
6. Click to set

Menu 22 Select Comm Flow Control	Line Input Select Line In = Temp Probe

When ready to enter temperature:

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

This blinks slowly ▼ Temperature:000	Click once to enter temp. ▼ Temperature:230	If you don't want to save the data, 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 (^{o}C or ^{o}F). Input range: 10^{o} to 475^{o} (^{o}C or ^{o}F)

Menu 23: Sensitivity Mode MANUAL / AUTOMATIC (Auto Sens. (0 to70 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 23 Sensitivity Mode**
3. Click to Enter
4. Spin from **Manual** to **Automatic**
5. Spin the percent of scale desired
6. Click to exit

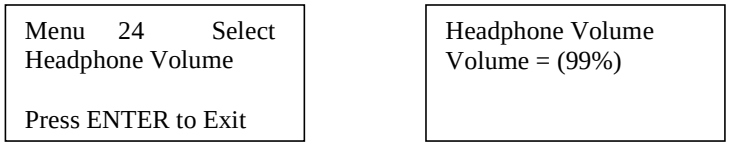
Menu 23 Select Sensitivity Mode Press ENTER to Exit	Sensitivity Mode AUTOMATIC Auto Sens = (70)

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

Menu 24: Headphone Volume (Volume= 99%) or lower

Here you can set the comfort level of the headphone volume. The setting can range from 00 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 24**: **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.

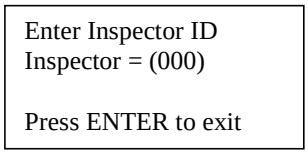


Menu 25: Enter Inspector ID

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 alphanumeric value.
4. Click to set. The cursor will roll over to the next position.

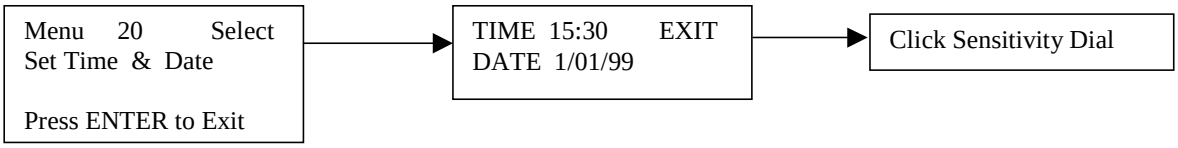
Press the **Yellow ENTER button** to exit.



Menu 26: Set Time and Date

1. Follow the steps to Enter the **Setup Mode** as described earlier.
2. Spin to **Menu 20**: **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 20 Date Format**.

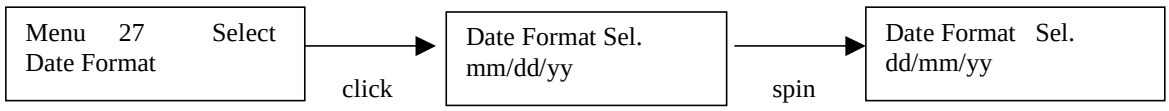


Menu 27: Date Format

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 27**: **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



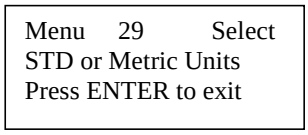
Menu 28: Cal Due Date

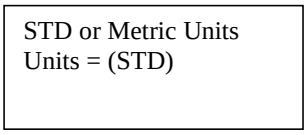
Shown as **Cal Due Date** in the menu, this date is set at the factory and displays the recommended Recalibration/service date. This is one mode that cannot be changed by a user. It is only set at the factory after a service has been performed. NOTE: This information cannot be changed by the user.

Menu 29: 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 29 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.



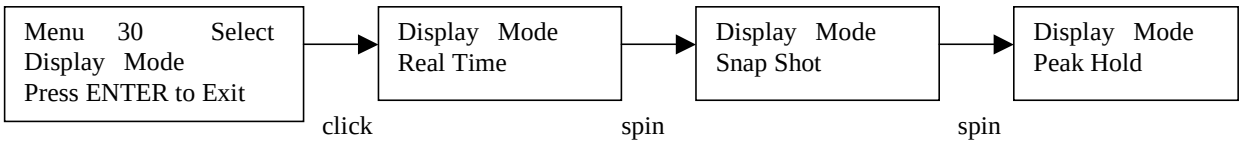


Menu 30: Display Mode

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 30 Blinks).
3. Click the **Sensitivity Control Dial** to enter **Display Mode**.
4. Spin the **Sensitivity Control Dial** until the desired 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.



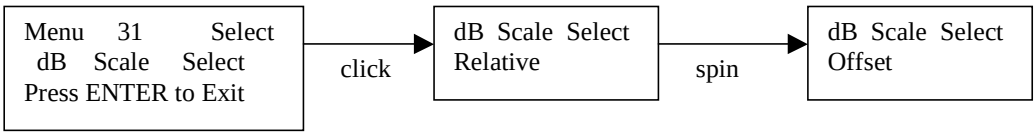
Menu 31: dB Scale Type Select (relative or offset)

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:

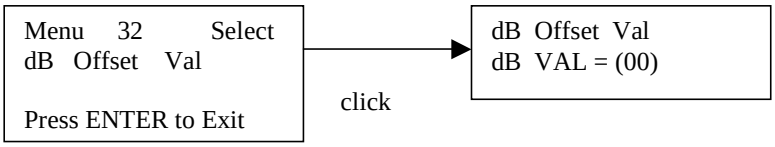
1. Enter the **Setup Mode**
2. Spin to **dB Scale Select** (**Menu 31** blinks).
3. Click in the **Sensitivity Control Dial**.
7. Spin the **Sensitivity Control Dial** to the desired scale (Relative or Offset).
8. Click the **Sensitivity Control Dial** to set.
9. Press the **Yellow ENTER button** to exit.



Menu 32: 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 32 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.



Menu 33: Auto Store to CF

On Power Off the instrument will automatically download all records from the instrument to the Compact Flash Card. **YES** will set the Auto Store feature. If **NO** is selected, if the power should fail (e.g. battery discharges) data will not be saved to the Compact Flash Card.
To select this feature:

1. Follow the steps to Enter the **Setup Mode** as described earlier.
2. Spin to **Auto Store to CF** (Menu 33 blinks)
3. Click in the **Sensitivity Control Dial**.
4. Spin the **Sensitivity Control Dial** to YES or NO
5. Click the **Sensitivity Control Dial** to set

Menu 34 Upgrade UP 10K PGM

This will be used for all future upgrades. This option enables users to upgrade firmware on-board the instrument using the Compact Flash Card.

Please Note:
1. Be sure the instrument is fully charged before any Compact flash Card upgrade procedures.
2. ***Do NOT*** remove the Compact Flash Card during the upgrade process.

To Upgrade:

1. Turn off **Ultraprobe**
2. Insert **Compact Flash Card**
3. Turn on **Ultraprobe**
4. Enter Setup mode
5. Spin to 34 Upgrade UE 10K
6. Click the **Sensitivity Control Dial**

After the upgrade process the instrument will shut down and revert to all **Factory Default Settings** (see Menu 12: Default Settings)

Menu 35: BACK

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

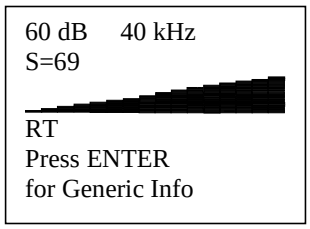
In order to Exit to Program, you must be in the first level of the Setup Mode.

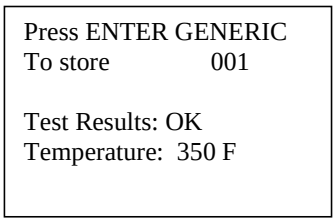
Press (Click) the **Yellow ENTER button** and you will exit to **Operations Mode**.

8. HOW TO USE THE APPLICATION SELECT MODES

A. 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**.





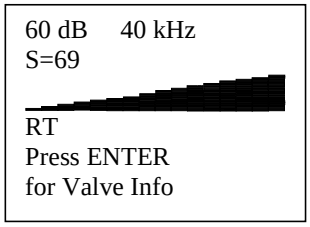
If **Parameter Info** has been selected in the **Storage Display** function, the identical data and data entry as described above will be shown. Additional information such as date, time, module used and a command for data storage will be shown in the MORE function.

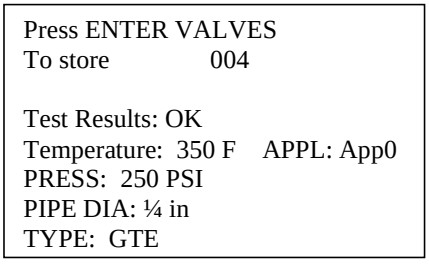
FIELD ENTRY LIST FOR GENERIC:
Test Results: OK, CHK, TR2-TR9

B. 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.

ABCD Display

42 dB 25 kHz
002 Rec
S=60 A: 0dB C: 0dB
B: 0dB D: 0dB

Press ENTER
for Store (A)

C. 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.

60 dB 40 kHz
S=69



RT
Press ENTER
for Bearings Info

Press ENTER BEARINGS
To store 009

Test Results: OK
Temperature: 100 F
LAST LUBE: CAN'T ENTER
RPM: RPM 20 Type: MDL 2

FIELD ENTRY LIST FOR BEARINGS:

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

D. 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.

60 dB 40 kHz
S=69



RT
Press ENTER
for Electric Info

Press ENTER for ELECTRIC
To store 006
Test Results: COR
Temperature: 000 F HUM: 000%
VOLTAGE: 3KV
Component: INS
Location: loc3

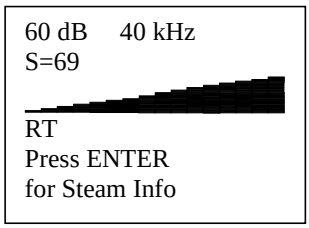
If **Parameter Info** has been selected in the
Storage Display function, the identical data
and data entry as described above will be shown.
Additional information such as date, time,
module used and a command for data storage will be shown in the MORE function.

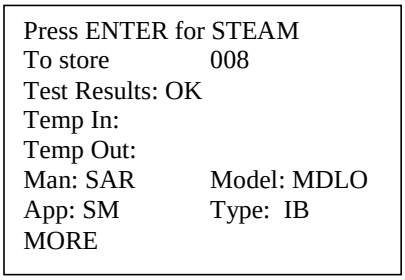
FIELD ENTRY LIST FOR ELECTRICAL:

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

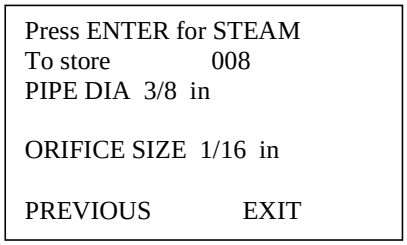
E. Steam

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 **"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 coded **MDL0** to **MDL9**
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.



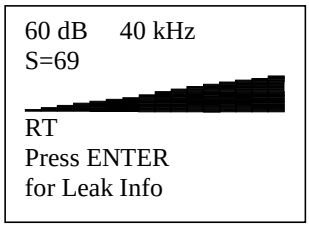
If **Parameter Info** has been selected in the
Storage Display function, the identical data
and data entry as described above will be shown.
Additional information such as **Date**, **Time**,
Module used and a command for data storage will be shown in the **MORE** function.

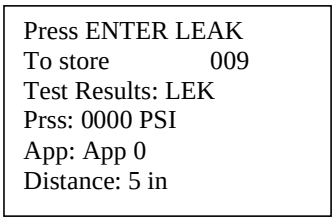
FIELD ENTRY LIST FOR STEAM:

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, ¼, 3/8, 1/2, ¾, 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, ¼, 9/32, 10/32, 11/32, 3/8, 13/32

F. 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. To enter a test condition:
3. Spin to **Test Results**: the condition default is **LEK** and will blink slowly. If it is necessary to change:
4. Click with the **Sensitivity Control Dial** and the condition (**LEK**) will blink rapidly.
5. Spin to select a condition indication. The choices are; **LEK, CHK, OK**
6. To Set, Click the **Sensitivity Control Dial** (the condition will blink slowly)
7. Spin to **Pressure**
8. Click on **Pressure** to enter and spin to desired pressure (**PSI** or **BAR**)
9. Click to Set
10. Spin to **Application** (codes as **APP0-APP9**)
11. Click to Enter and Spin to desired **Application**
12. Click to Set





13. Spin to **Distance**
14. Click to Enter
15. Spin to select **Distance**
16. Click to Set
10. 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.

APPENDIX I
GENERAL APPLICATIONS



1. 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.

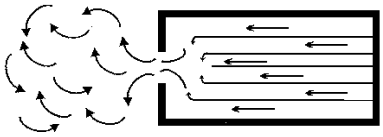


Figure 1: Pressure Leak

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).

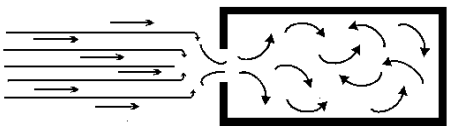


Figure 2: Vacuum Leak

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.

A. HOW TO LOCATE LEAKS

1. Use the TRISONIC SCANNING MODULE.

2. Start at 40 kHz. If too much background noise is present, try some of the shielding methods listed below.

3. Start off with the sensitivity at Maximum (S=70).

4. Begin to scan by pointing the module towards the test area. The procedure is to go from the "gross" (loudest) to the "fine" (refined sound discrimination)- more and more subtle adjustments will be made as the leak is approached.

5. If there is too much ultrasound in the area, reduce the sensitivity setting until you are able to determine the direction of the loudest sound and continue to scan.

6. Move closer to the test area as you scan

7. Continue to make adjustments with the sensitivity as needed in order to determine the direction of the leak sound.

8. If it is difficult to isolate the leak due to competing ultrasound, place the RUBBER FOCUSING PROBE over the scanning module and proceed to scan the test area.

9. Listen for a "rushing" sound while observing the meter.

10. Follow the sound to the loudest point. The Display will show a higher reading as the leak is approached.

11. In order to focus in on the leak, observe the display for the highest reading or keep reducing the sensitivity (headphone volume) setting and move the instrument closer to the suspected leak site until you are able to confirm a leak.

B. TO CONFIRM A LEAK:

Position the Trisonic 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

C. 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 straightforward. 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. In some extreme instances, when the leak check is difficult at 40 kHz, try to "tune in" to the leak sound by "tuning out" the problem sound. In this instance adjust the frequency until the background sound is minimized and then proceed to listen for the leak.

1. 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.

f. **Frequency Tuning**: If there are situations where a signal may be difficult to isolate, it may be helpful to utilize the Frequency Tuning. Point the Ultraprobe toward the test area and gradually adjust the frequency until the weak signal appears to be clearer and then follow the basic detection methods previously outlined.

2. 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.Utilize LIQUID LEAK AMPLIFIER.
This patented method incorporates a UE Systems product called LIQUID LEAK AMPLIFIER, or LLA for short. LLA is a uniquely formulated liquid substance that has special chemical properties. Used as an ultra sonic "bubble test, a small amount of LLA is applied to a suspected leak site, It produces a thin film through which the escaping gas will pass. When it comes in contact with a low flow of gas, it quickly forms a large number of small "soda-like" bubbles that burst as soon as they form. This bursting effect produces an ultrasonic shock wave that is heard as a crackling sound in the headphones. In many instances the bubbles will not be seen, but they will be heard. This method is capable of obtaining successful leak checks in systems with leaks as low as $lxl0^{-6}$ ml/sec.

NOTE: The low surface tension of the LLA is the reason small bubbles form. This can be negatively changed by contamination of the leak site with another leak fluid which can block LLA or cause large bubbles to form. If contaminated, clean the leak site with water, solvent or alcohol (check with plant regulations before selecting a decontaminating cleaning agent).

3. 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.

D. 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.

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.

3. 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 place 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^{o}. 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.



TRANSFORMERS, SWITCHGEAR AND OTHER ELECTRICAL APPARATUS

E. 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”. This is over a high current pathway. 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. This is where air is the only pathway to ground.

Tracking: Often referred to as "baby arcing", it follows the path of damaged insulation over a low current pathway.

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 its’ 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 wide-band 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 mid-line 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 the tracking from 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 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 (10^o) versus the **UWC** (5^o).

2. 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 8 dB with no substantial change in the sound quality, it can indicate lack of lubricant. If the reading exceeds a baseline 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 Methods . The Comparative Method involves testing two or more similar bearings and "comparing" potential differences. Historical Method 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



Lack of Lubrication
Increases Amplitude Levels

SLOW SPEED BEARINGS

Monitoring slow speed bearings is possible with the Ultraprobe 9000. 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 low level sound will be heard as the grease will absorb most of the acoustic energy. If a high level 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

There are two accessories that connect to an FFT via the Ultraprobe I/O port. They are the **9PC MP** (using a Miniphone connector to the Computer or Recording Device) and the **9PC-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.

3. GENERAL MECHANICAL TROUBLE SHOOTING

As operating equipment begins to fail due to component wear, breakage or misalignment, ultrasonic shifts occur. The accompanying sound pattern changes can save time and guesswork 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 display. 3. Adjust Sensitivity Dial until mechanical operation of the equipment is heard clearly and the bar graph can fluctuate. 4. Probe equipment by touching various suspect areas. 5. If competing sounds in equipment being tested present a problem, try to "tune in" to the problem sound by: a. Probing equipment until the potential problem sound is heard. b. Adjust Frequency slowly until the problem sound is heard more clearly. 6. 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.)

MONITORING OPERATING EQUIPMENT In order to understand and keep ahead of potential problems in operating equipment, it is necessary to establish base data and observe shifts in that data. This can be accomplished by data logging readings directly into the Ultraprobe or by recording sounds via the **Compact Flash Card** (see **Record WAV** in **Operational Overview**)

PROCEDURE:

1. Select key locations to be monitored and make permanent reference marks for future testing
2. Follow steps 1-2 as outlined above in the **General Mechanical Trouble Shooting** section.
3. Select a frequency for the test.
4. Save by hitting **Yellow Enter button** (refer to **Operation Mode**: **Yellow Enter Button** for description).

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.

4. 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? Use a non-contact infrared thermometer to determine this.
3. Use the Contact (Stethoscope) Module.
4. Set Frequency to 25 kHz.
6. Try to touch the contact probe towards the discharge side of the trap. Press the trigger and listen.
7. 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 Dial** to assist your test. If a low-pressure system is to be checked, adjust the sensitivity UP: 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 to hear the trap sounds more clearly and touch downstream to compare readings.

FREQUENCY SELECTION Occasionally it may be necessary to "tune in" to a steam trap. In some systems, specifically float type traps under low or moderate pressure load, a wide orifice will not produce too much ultrasound. If this is the case touch the trap on the downstream side. Adjust the frequency: start at 25 kHz. and listen for a lower frequency trickling sound of water. For other subtle trap sounds, such as determining the difference of condensate vs. steam sounds, try to listen at 40 kHz. If this proves difficult, gradually rotate the Frequency Selection Dial down (counterclockwise) until the specific sounds are heard. Steam will have a light, gaseous sound; condensate will have additional overtones to its rushing sound.

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 hear the sounds more clearly.
2. Move 6 - 12 inches (15.2-30.5 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 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.

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) 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 (bellows & bi-metallic) 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 falls closed, condensate will back up and no sound will be heard. If the trap falls 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. Contact UE Systems directly by phone or fax.



5. 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 "downstream" 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:
1. Reduce the sensitivity. 2. Change the frequency to 25 kHz and listen.

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 (see "Confirming Valve Leakage In Noisy Pipe Systems).

PROCEDURE FOR VALVE CHECK

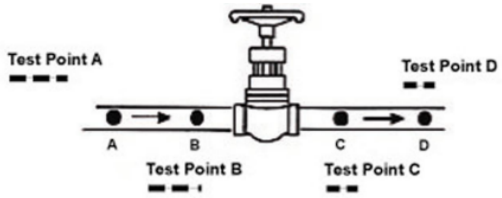
1. Use **Contact** (Stethoscope) Module.
2. Touch downstream side of valve and listen through headset.
3. Start test at 40 **kHz**. If the sound appears weak or confusing, change the frequency. As an example, try to test at 30 **kHz**. then 20 **kHz**.
4. When necessary, if there is too much sound, reduce sensitivity.
5. For comparative readings, usually in high pressure systems:
   a. Touch two equidistant points on the upstream side (test points A and B). Reduce sensitivity to get a **dB** reading in each. .
   b. Touch valve seat and/or downstream side.
   c. Compare sonic differentials. If the valve is leaking, the sound level on the seat or downstream side will be equal to or louder than the upstream side.
6. In some instances, such as in noisy background or low viscosity fluids, it will be helpful to adjust the frequency to adequately interpret valve sounds.

   To do this:
   a. Touch upstream of the valve and, in the **Frequency Select Mode**, gradually Spin the **Sensitivity Control Dial** until the stray signals are minimized or until the desired fluid flow is heard clearly.

b. Touch the upstream side, valve seat, downstream sides (as described above) and compare differences.

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.



Example Of A Good Valve

For the **ABCD** method,

1. Refer to steps 1-5 in **Valve Checking**.
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 down stream side of a valve. This flow may produce false leak signals. In order to determine if the loud signal on the downstream side is coming from a valve leak or from some other source:

1. Move close to the suspected source (i.e., the conduit or the other valve).
2. Touch at the upstream side of the suspected source.
3. Reduce sensitivity until the sounds are clearer.
4. Touch at short intervals (such as every 6 - 12 inches (15-30.5 cm) and note the meter changes.
5. If the sound level decreases as you move towards the test valve, it indicates that the valve is not leaking.
6. 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 20-25**kHz.**
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 kilohertz is 1,000 Hertz.

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)

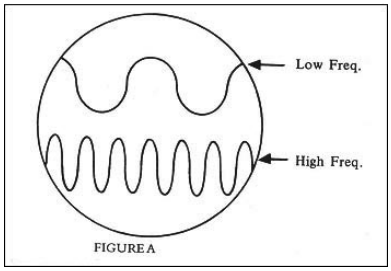


FIGURE A

The ultrasound technology utilized by the Ultraprobe 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 leak detection, these potential problems can be detected in noisy plant environments with the Ultraprobe.

Ultraprobe 10000 Specifications

Construction: Hand-held pistol type made with coated aluminum and ABS plastic

Circuitry: Solid State Analog and SMD Digital Circuitry with temperature compensation and true RMS conversion

Frequency Range: 20 KHz to 100 KHz (tunable in 1 KHz increments)

Response Time: < 10 ms

Display: 64 x 128 LCD with LED Backlight

Memory: 400 storage locations

Battery: Lithium Ion Rechargeable

Operating Temperature: 32°F to 122°F (0°C to 50°C)

Output(s) Calibrated heterodyned output, decibel (dB), frequency, RS-232 data output

Probes: Trisonic Scanning Module, Stethoscope Module & Long Range Module

Headset: Deluxe noise attenuating headphones - Hard Hat Version

Indicators: dB, Frequency, Battery Status, and 16 Segment Bar Graph

Sensitivity: Detects .005" (.127 mm) diameter leak @ 5psi (.34 bar) at a distance of 50 ft. (15.24 m)

Threshold: 1×10^{-2} std. cc/sec to 1×10^{-3} std. cc/sec.

Dimensions: Complete kit in Zero Halliburton aluminum carrying case 21.5" x18.5" x 8" (55 x 47 x 20 cm)

Weight: Pistol Unit: 2.35 lbs. (1.1 kg)
Complete carrying case: 19 lbs. (8.6 kg)

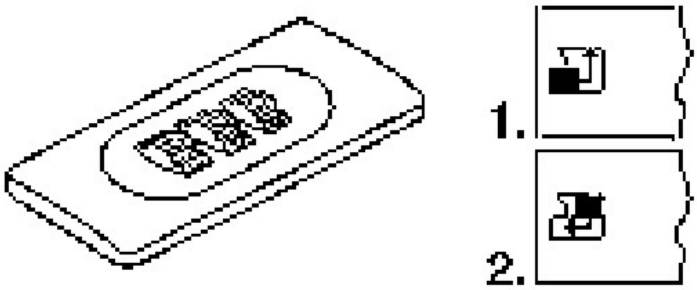
Warranty: 1 year parts/labor standard, 5 years with returned completed warranty registration.

Display Modes: Real Time, Snap Shot, Peak Hold, Storage Display, Application specific

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.

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.



14 Hayes Street
Elmsford, NY 10523 USA

Tel: 914-592-1220
Fax: 347-2181
Email: info@uesystems.com
Web page: http://www.uesystems.com

©2009 UE Systems, Inc. All rights reserved