ULTRAPROBE® 201

Instruction Manual

Safety advisory

Please read before using your instrument.

Warning

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

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

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

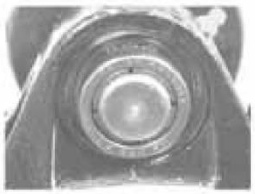
When inspecting electrical equipment, use caution. High voltage equipment can cause death or severe injury. Do not touch live electrical equipment with your instrument. Use the rubber focusing probe with the scanning module. Consult with your safety director before entering the area and follow all safety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

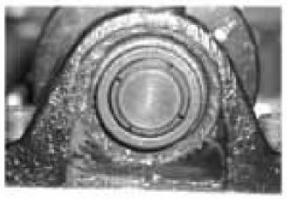
When working around high temperature piping, use caution. Use protective clothing and do not attempt to touch any piping or equipment while it is hot. Consult with your safety director before entering the area.

Theory

Ultrasound consists of high frequency sound waves that are above the hearing limits of human perception. Generically ultrasonic frequencies are considered to start at 20,000 cycles per second (20 kilohertz or 20 kHz). Most ultrasonic instrumentation used for equipment condition analysis includes frequencies that range from 20 to 100 kHz. Instruments such as the Ultraprobe 201 Grease Caddy use an electronic process called “heterodyning” to allow for accurate translation of ultrasound produced by operating equipment into the audible range where users can hear these sounds through headphones and observe the amplitude of the sound on a meter. The short wave, high frequency nature of ultrasound offers many advantages for instruments used to inspect operating equipment

1. The amplitude of generated ultrasounds will fall off rapidly as the sound travels from its’ source providing a “localized” signal that can be detected and monitored with relative ease in most noisy environments.
2. The subtle nature of this signal provides for early warning of potential failure modes.
3. Increases in friction of rolling elements can be detected and used as an indication of low lubrication levels.
4. Using base line information, amplitude levels can be used as a guide for determining when and when not to lubricate a bearing.
5. The heterodyned signal helps users hear when grease is entering the bearing and recognize when to stop lubricating.





Monitoring bearing wear

In a bearing, normal bearing loads cause an elastic deformation of the elements in the contact area, which give a smooth elliptical stress distribution. But bearing surfaces are not perfectly smooth.

For this reason, the actual stress distribution in the contact area will be affected by a random surface roughness. In the presence of a lubricant film on a bearing surface, there is a dampening effect on the stress distribution and the acoustic energy produced will be low.

Should lubrication be reduced to a point where the stress distribution is no longer present, the normal rough spots will make contact with the race surfaces and increase the acoustic energy. These normal microscopic disuniformities will begin to produce wear and the possibilities of small fissures may develop which contributes to the „Pre-Failure“ condition. Therefore, a side from normal wear, the fatigue or service life of a bearing is strongly influenced by the relative film thickness provided by an appropriate lubricant.

Ultrasonic inspection and monitoring of bearings is by far the most reliable method for detecting early stages of bearing failure and conditions such as lubrication starvation. 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 the beginning stages of fatigue failure related to 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.

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.

When listening to a bearing, 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. Louder rushing sounds similar to that of a good bearing only slightly rougher, can indicate lack of lubrication.

A change in amplitude from the original base line reading can be an indication of:

a. lack of lubrication or
b. incipient bearing failure.

When a reading exceeds any previous reading by 8-10 dB with no change in the sound quality (a “rushing” noise) this is an indication of lubrication starvation, an increase of greater than 12 dB can be considered to be an indication of the beginning of the failure mode.

Component assembly magnetic mount sensor

Basic components

Your kit consists of the following parts:

A Grease Caddy Assembly
B Clamp
C Sensor Assembly – Magnetic Sensor and Cable with Acoustic Shield

Component Assembly Instructions

1. Attach the Ultraprobe 201 Grease Caddy A to the grease gun, using Clamp B.
2. Connect cable from Sensor Assembly to input of Grease Caddy

Before you begin testing, it is advisable to familiarize yourself with the basic components of your kit.

UE Systems Grease Caddy Docking Station Mounting Instructions

Docking Station:
Note the Raised disc with the logo.
This is to face *away* from the grease gun.

1. Remove tip of grease gun

2. Line up indent facing grease gun

3. Srew on Docking Station and tighten

4. Screw on grease gun tip and tighten

NOTE: Do not use Docking Station when using rubber or plastic tubes.

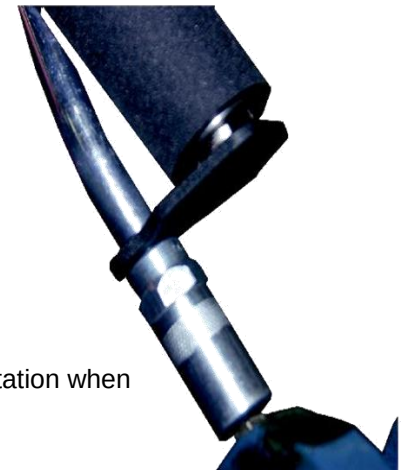
UE Systems Grease Caddy Docking Station Mounting Instructions

Completed setup

Close up view

Ready to use

Keep Magnetic on Docking Station when greasing



NOTE: Do not use Docking Station when using rubber or plastic tubes.

Metered Housing

The main component of the Ultraprobe 201 is the metered housing. From back to front, let‘s examine each part.

- On and OFF buttons. To turn the instrument ON, push the ON button in. Once pressed the instrument will stay on and then automatically turn off after 5 minutes (this will extend the battery charge and active use of the instrument). To turn the instrument OFF before 5 minutes have elapsed, press the OFF button.
- Bar graph Display: The display consists of a ten segment LED bar graph that will indicate ultrasonic signal strength. A low number of LEDs indicate a low level of ultrasound. Conversely more intense ultrasonic signals will display more LEDs.
- Battery Level Light: This red light turns on only when the batteries need to be recharged.
- Sensitivity Selection Dial: There are eight (8) sensitivity levels which read out in related decibels of „0“ to „70“. As the dial is turned to the right, to „0“, the sensitivity of the instrument increases. As the dial is turned to the left, to „70“, the sensitivity decreases. A low-level ultrasound emission produces low amplitude. To detect low-level ultrasounds, the instrument should be in a high sensitivity position. 0 is the highest sensitivity position. For higher amplitude signals, move the sensitivity to the left towards „70“.
  The dial dB indications, along with the LED indications in the bar graph may be used to establish dB levels. To do this, just add 3 dB for each LED bar graph indication to the dB level set in the sensitivity dial. EX: 0 dB on the sensitivity dial, plus 3 LED bar graph levels = 9dB (0+9). 40 dB on the sensitivity dial plus 4 bar graphs = 52 dB (40+12)
- “Phone” Jack: This is where you plug in the headphones. Be sure to plug it in firmly until it clicks. Should a recording device be utilized, this is where the cable is inserted. (Use a miniphone plug).

Headphones

The standard headphone plugs into the “phone” jack. NOTE: **Always use the headphones** when operating the Ultraprobe 201 Grease Caddy. There may be times where stray signals influence the LED indicator. Using the headset will assure that the sounds being received are coming from the subject test bearing.

a. Should inspections be performed in areas where either hard hat or hearing protection is required, there are optional headphones available for both hard hat use and for use in high noise areas. These heavy duty headphones are designed to block out intense sounds often found in industrial environments so that the user may easily hear the sounds received by the ULTRAPROBE 201.
b. For those situations in which it is not possible or difficult to wear the standard headphones described above, UE Systems has two other options available: 1. the DHC 1991 Earpiece which loops around the ear, and 2. the SA-2000 Speaker Amplifier which is a loud speaker that is compatible with the Ultraprobe headphone output jack.

Front:

A Guide Light
When the unit is on, the guide light automatically is on to help users see in dark locations.
B Wave Guide Connection
C Recharge Jack

Using the Ultraprobe 201 Grease Caddy

You may use your Ultraprobe 201 Grease Caddy to know when to lubricate by setting a baseline level. You may choose to lubricate whenever a bearing exceeds a pre-set baseline by 8 dB-12 dB accompanied by a uniform white noise or rushing sound. If a bearing is below this level, it does not need lubrication, therefore do not lubricate bearings with low level readings when compared to a baseline.

A. When lubricating:

I. Listening while adding lubrication

a. Be sure the grease coupler is securely connected to the zerk fitting and that the magnetic sensor is in full contact with the bearing housing.
b. Wear your headphones and be sure the head phones are plugged into the headphone jack.
c. Turn the Ultraprobe 201 ON.
d. If the sound is too loud, reduce the sensitivity: turn the Sensitivity Dial LEFT until the LED's are at approximately 50% of scale.
e. Apply the lubrication and listen.

II. When to STOP lubricating:

While applying the lubrication the sound level will begin to drop. You may stop:

a. when the sound level drops off and suddenly rises or
b. when the sound level approaches a pre determined baseline level which (usually a drop of 2-3 LED bars on the meter).

Specifications Ultraprobe 201 (Grease Caddy)

Housing	Attaches directly to the grease gun, gives visual and audible indication for proper lubrication
Construction	Aluminum housing
Dimensions	13.3 x 6.7 x 4.5 cm (LWH)
Operating Temperature	0 °C to 60 °C
Relative	10-95% non-condensing at up to 30 °C
Circuity Humidity	SMD/Solid State heterodyne receiver
Transducer	Magnetically mounted piezoelectric transducer
Frequency Response	Peak response: centered around 38 kHz
Indicator	10 Segment LED Bar Graph (red) Bright white LED for illumination of test area
Sensitivity Selection	8 position precision attenuation
Power	Rechargeable nickel metal hydride
Power off	Time delay after five (5) minutes
Low Battery indicator	LED
Headset	Deluxe noise isolating headset for hard hat use Over 23 dB of noise attenuation Meets or exceeds ANSI Specifications and OSHA standards
Attachment	Universal: fits most commercially used cartridge grease guns
Weight	0.45 kg
Warranty	1-year parts/labor standard, 5 years with completed warranty registration card.

Need further support?

Want information regarding products or training?

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