

# Instruction Sheet

## **Rugged Interface Meter and Rugged Mini Interface Meter**

### **Instrument Use**

This instrument is designed to measure the thickness of floating Light Nonaqueous Phase Liquid (LNAPL). It will also detect and measure sinking layers of Dense Nonaqueous Phase Liquid (DNAPL).

Switch the unit on by pushing the button in the center of the electronic panel.

The unit shuts off automatically after 5 minutes. The small green light indicates that the unit is ready for use. If the green light turns off while the meter is in use, push the button again and restart the unit.

### **Use the Following Method to Take Measurements**

Lower the unit down the well until the top of the water/LNAPL is reached.

(Intermittent Signal = Water. Continuous Signal = LNAPL). Take note of the depth.

Do not try to measure the LNAPL/water interface at this stage. Allow the probe to pass through the LNAPL into the water below (indicated by the intermittent signal).

Now slowly withdraw the probe until the signal changes from the intermittent to continuous. This point indicates the base of the product layer. Take note of the depth.

This method prevents pushing the LNAPL into the water and helps avoid false interface readings.

### **General Hints**

#### **Cold Weather**

In cold weather, condensation will form on the lens as it enters the well and contacts the warmer moist air in

the well. This causes the unit to produce a continuous sound as having detected LNAPL. To overcome this, allow the probe to acclimatize in the well or lower the probe into the water, then take readings.

A dirty or scratched probe lens can also cause the instrument to produce a continuous signal.

### **Removing the Probe**

Removing the probe requires two wrenches, a 1/2" AF and 9/16" AF. When the knurled nut has been loosened, the link may be still tight in the probe. Gently separate the link from the probe by hand. Care must be taken to avoid breaking the wires while removing the probe or crimping the wires while replacing the probe.

#### **Do**

- Avoid sharp-edged well casings.
- Avoid entanglement with other equipment in boreholes and wells.
- Clean and dry the probe after use.
- Rewind tape onto reel after use.

### **Warranty is conditional upon adherence to these guidelines.**

#### **Do Not**

- Use the instrument to plumb borehole depths.
- Use the instrument as a guide to backfilling with sand, because the instrument might get stuck.

### **Remember to...**

- Clean the unit after use.
- Avoid scratching the lens.
- Hang the unit on the well casing where possible, and run the tape over the tape guide on the frame. This prevents damage to the tape.

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## **Tips for Using the Interface Meter**

### **How it Works**

In Air:

The infrared emitter sends out an I/R beam inside a 45 degree prism. The I/R beam reflects off the internal face of the prism to the opposite face, which then reflects the beam to the detector. In this state the instrument is silent.

In Fluid:

Fluids are denser than air, so Snell's law applies. The I/R beam is not reflected internally, but exits the prism. The detector does not detect the I/R beam. In this state, the instrument emits a tone and the red light is on.

At the same time, the two capacitance probes are testing for conductance. If the fluid does not conduct electricity, the sound tone and light are continuous and indicate the probe has detected LNAPL.

If the fluid does conduct electricity, the tone is intermittent and indicates the probe has detected water.

### **Care of the Reel**

Remove the electronic front panel before washing the reel. Please consider using biodegradable household dish washing liquid.

The reel may be cleaned with the following:

Soap solution, Fantastic®, Windex®, Joy®, Top Job®, Mr. Clean®, Formula 409®, GOO-GONE®, or Green Clean®.

### **Care of the Tape and Probe**

The tape and probe may be cleaned and degreased with the following:

Soap solution, Fantastic®, Windex®, Joy®, Top Job®, Mr. Clean®, Formula 409®, GOO-GONE®, or Green Clean®.

Do not clean with abrasives

The probe lens is made from an amorphous thermoplastic, highly resistant to many chemicals, but it can be scratched by abrasive cleaners.

## **Troubleshooting**

### **Question**

Why do I hear a continuous sound when the probe is out of liquid?

### **Answer**

The panel may have been removed and replaced upside-down. The battery box must be at the top, and the winding handle at the bottom.

### **Problem**

I switch the instrument on, try it in water and oil, but nothing happens.

### **Solution**

Check the battery. If the green light is off, replace the battery. Check polarity of the battery. Ensure that it is installed properly.

### **Problem**

The battery is OK, the green light is on, but the instrument still does not work.

### **Solution**

You are testing the unit in daylight or incandescent light. Test the unit away from these infrared light sources. The infrared light is interfering with the electronics of the probe.

### **Problem**

The battery is OK, the green light is on, and I am not in an infrared light area, but the instrument does not work.

### **Solution**

Check the polarity and connections of the removable electronic panel. When the handle is at the bottom, the black wire in the hub should be on the right-hand screw as you face the unit. Check for broken or loose wires. Check for corrosion or dirt on the contact strips on the back of the panel, and if they are dirty, clean them.

### **Problem**

The battery is OK, the green light is on, and I am not in an infrared light area. I am testing the unit in water, and I hear a continuous tone that indicates LNAPL, not water.

### **Solution**

Make sure you are not using distilled or deionized water.

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**Problem**

The unit makes a continuous sound when the probe enters the well while not in water or LNAPL.

**Solution**

Check to make sure that the lens is clean. Remember the unit is silent in daylight. Check for scratches on the lens. A badly scratched lens may cause the instrument to malfunction. See also **Cold Weather** under **General Hints** on Page 1.

**Problem**

In heavy LNAPL, it is difficult to discern the oil/water interface.

**Solution**

Apply a small amount of liquid dish washing detergent onto the lens and probe body. Slowly lower the probe into the well to determine the top of the LNAPL layer. Perform this action until you achieve a steady reading. Pass the probe through the LNAPL into the water. The small amount of detergent helps the probe to quickly shed oil. Slowly raise the probe to determine the underside of the LNAPL layer.

**Problem**

At times a steady tone is emitted at the surface of the water in a well that has no LNAPL.

**Explanation**

The most accurate reading is made when the probe goes down the well and first contacts the fluid surface. When the probe is raised out of the well through the fluid, you can get a less representative reading due to hysteresis and the meniscus effect. As the probe passes from water to air, fluid draining down the outside of the tape and probe can affect readings.

**Question**

Why do I hear a signal when the probe is coming out of the well but is no longer in fluid?

**Answer**

Small amounts of fluid may be draining down the probe and over the probe and lens. This could cause a sporadic signal to be given. These stray signals should not be confused with the LNAPL and water signals.

**Problem**

I tried to measure the water level in a cascading well using the interface meter, and I heard a continuous signal both in and out of the water.

**Solution**

These units can be used as expensive water level meters, but they have not been designed for use in cascading wells. The water running over the lens can cause the unit to signal LNAPL. Using the probe shroud can help prevent this problem. You can purchase a probe shroud by special order.

**Question**

Why does the unit stay on for only 5 minutes?

**Answer**

Unlike a water level meter, the interface meter uses power continuously. The automatic shutoff is a safeguard in case the user forgets to switch off the unit after use.

**Question**

Will the instrument detect DNAPLs?

**Answer**

Yes.

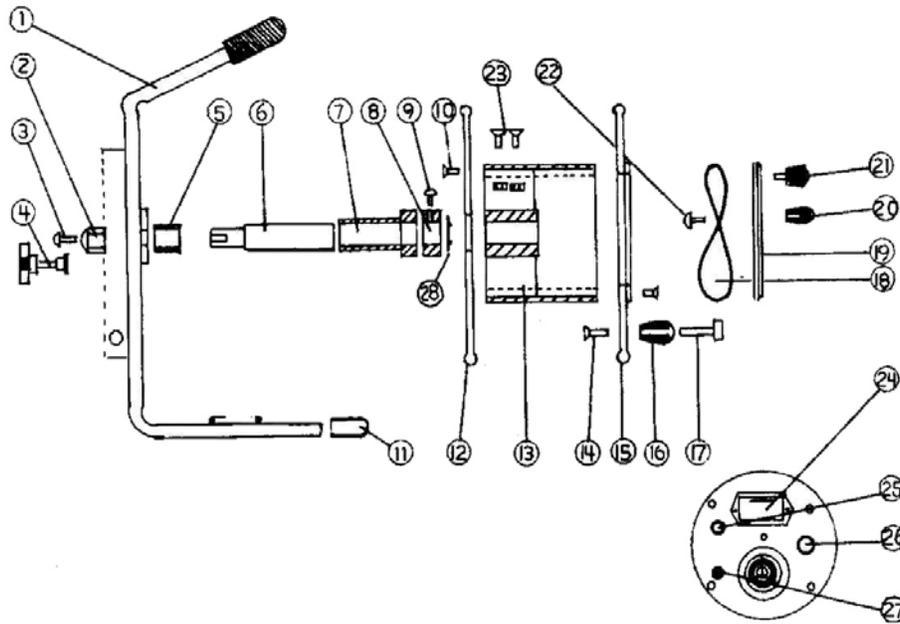
**Question**

Can the instrument be lowered to full tape depth in the well?

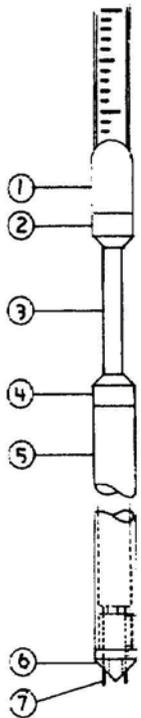
**Answer**

Yes, although we advise against this. The probe will withstand the pressure at depth, but damage to the probe or accumulations of mud may affect the operation of the unit.

## Reel Electronics

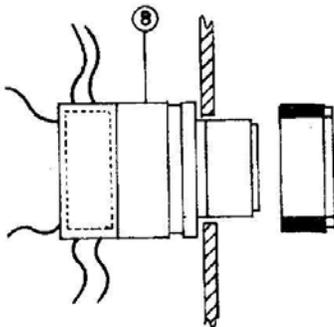


## Probe Electronics



- 1 - Tape Connector
- 2 - Link/Tape Connector
- 3 - Link
- 4 - Link/Probe Connector
- 5 - Probe Body
- 6 - 1/F Lens, WLM Tip
- 7 - Conductivity Pins
- 8 - Reel Electronics

Note: Items 1 to 8 are serviceable only by supplier.



- 1 - Frame
- 2 - Nut
- 3 - Screw
- 4 - Brake
- 5 - Spacer
- 6 - Shaft
- 7 - Bearing
- 8 - Ground Ring
- 9 - Screw
- 10 - Screw
- 11 - Frame Boot
- 12 - Rear Plate
- 13 - Hub
- 14 - Screw
- 15 - Front Plate
- 16 - Cranking Handle
- 17 - Spindle
- 18 - O-ring
- 19 - Electric Disk
- 20 - Disk Handle
- 21 - Disk Retaining Knob
- 22 - Screw
- 23 - Tape Screws
- 24 - Battery Holder
- 25 - Battery L.E.D.
- 26 - Oil/Water L.E.D.
- 27 - On/Off Button

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## Warranty

Refer to the In-Situ Inc. website for all warranty information.

## Certifications and Registrations



**For more information contact In-Situ Inc.**

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