



Operation Manual

Thank you for purchasing Analytical Sales and Services' Sentinel™ Level Indicator. This manual will guide you through setup and operation.



Safety Warnings:

All systems are designed for use by properly trained individuals following Good Laboratory Practices (GMP) who have read and understand this entire manual.

CAUTION: The Sentinel must be operated away from liquids so as not to accidentally spill solvents on the top cover. Do not immerse or operate any part of the Sentinel in liquids. In the event of solvent leakage, wipe parts clean before further use.

Manual Contents

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What's in the box?

Please verify that your Sentinel package contains the following parts:

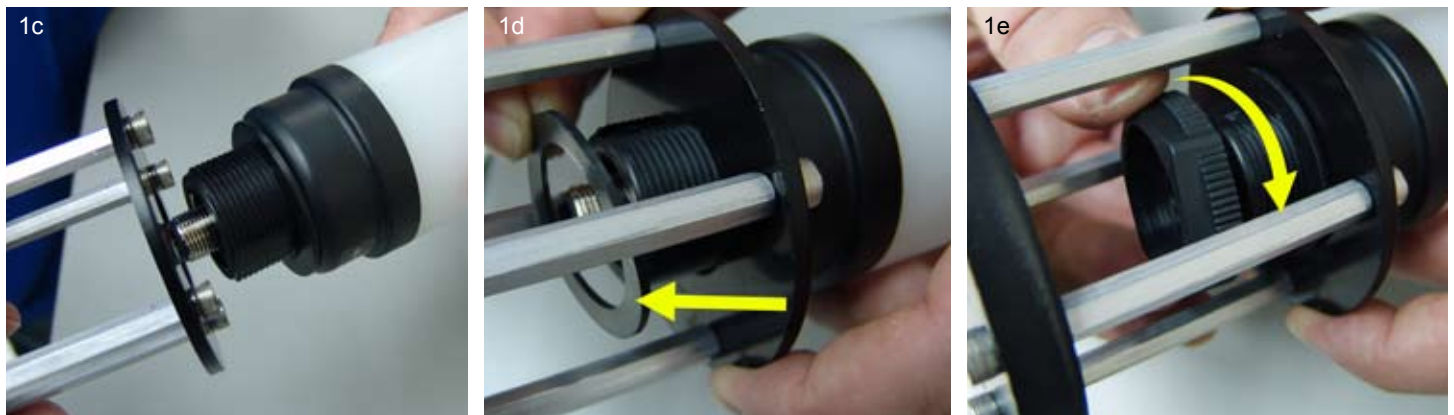
- Sentinel Control Box
- LED Alert Beacon
- Beacon Cord
- 3 Sensors (cords and straps attached)
- External Control Cord
- Beacon Free-standing Mount
- Beacon Ceiling Mount
- Beacon Mounting Nut
- 2 Rubber Mounting Washers
- 24 VDC Power Supply
- User Manual

Please notify Technical Service if the SENTINEL has any missing or damaged parts. Contact numbers: 973-616-0700, Fax 973-616-0133.



Assembly

Before starting assembly, plan out your system area. The Sentinel control box should be placed on a level surface in an area that will allow enough space behind it to accommodate the plugs and cords. It should be placed in close proximity to an AC outlet and within a workable distance to your mobile phase or waste containers. Use a sensor cord to help map out the distance you will need before assembling your system. Each sensor cord and beacon cord measures 5 meters (16.4 feet) in length.



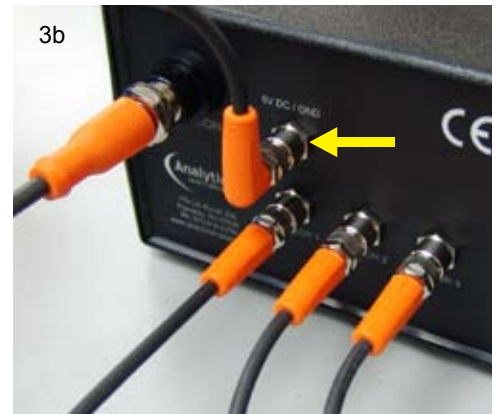
1. Attach the beacon to the beacon stand/ceiling mount

Your Sentinel unit comes with both a bench-top stand and a ceiling mount bracket for the LED alert beacon (*figure 1a*). Assembly is the same for both (see page 7 for instructions on how to attach the ceiling mount bracket to the ceiling). First, slide one of the two black rubber washers onto the threads of the beacon (*figure 1b*). Next, insert the threads of the beacon into the hole on the bracket (*figure 1c*). Slide the second rubber washer onto the threads of the beacon (*figure 1d*). Now, screw the black nut onto the beacon threads and tighten (*figure 1e*).



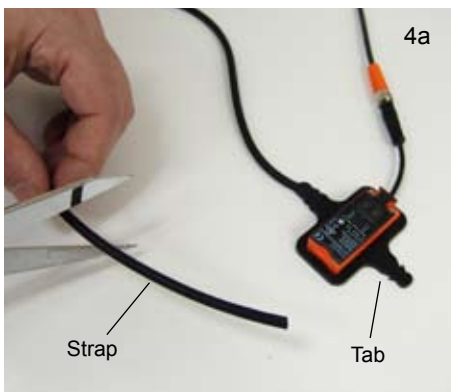
2. Attach beacon cord

Attach the orange right-angled plug of the beacon cord to the beacon. Make sure to align the slot in the plug with the nub in the socket (*figure 2a*). Turn the silver ring/nut on the plug clockwise to tighten until you hear a “clicking” sound (*figure 2b*). Next, attach the other end of the beacon cord to the control box. Make sure to align the nub in the plug to the slot in the socket marked “BEACON” on the rear panel of the control box. Again, turn the silver nut clockwise to tighten until you hear a “clicking” sound (*figure 2c*).



3. Attach sensor(s)

Attach a sensor to the control box by inserting the orange plug of the sensor cord into the socket labeled “Sensor 1” (figures 3a & 3b). Make sure to align the pins inside the plug to the holes inside the socket. Tighten by turning the silver nut clockwise until you hear a “clicking” sound. Your unit comes with three sensors. You can connect and use one, two or all three. If you are using a contact closure (optional), you can plug in the external control cord at this time (figure 3c).

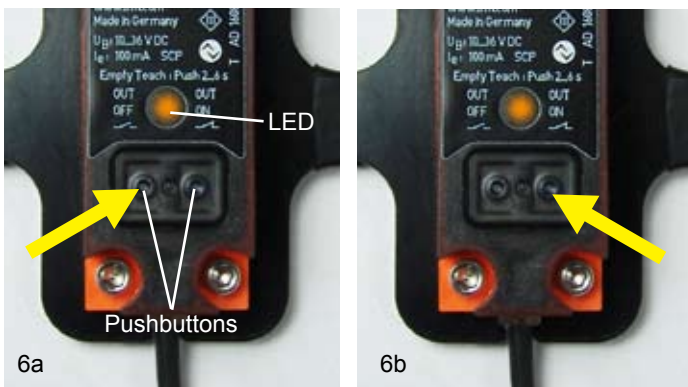


4. Attach sensor(s) to container(s)

Each sensor comes with an elastic tube strap that secures the sensor to your mobile phase or waste container. Trim the length of the strap with scissors to accommodate the size of the container you are using (figure 4a). The elastic strap should fit snug around the container but not overly tight causing it to snap. Lubricate the end of the strap with isopropyl alcohol and slide over the tab on the sensor. Now fit the sensor/strap around your container, with the **orange** side of the sensor **flush against the side of your container**. Position the sensor to the height at which the fluid is to be monitored for the alert (figure 4b).

5. Power up

Insert the silver plug of the power cord into the port labeled “24V DC 1A” on the rear panel of the control unit (figure 5). Plug the other end of the cord into wall socket.



6. Test/Tune Sensors

IMPORTANT: The sensors come pre-balanced and tuned to activate when a “container full” state has been reached. They are factory tested using a HDPE waste container. The sensors may need to be re-tuned depending on the type of container you use, or if you need to switch the sensor to monitor a “container empty” state. Test your sensors before operation.

To tune your sensor, follow these steps:

Start with an empty container, and make sure the sensor is **flush against the side of the container**.

To alert when fluid level is “Full”:

Press and hold the “OUT OFF” (left) button for at least 2 seconds but not more than 6 seconds. The LED flashes slowly but will go out after releasing the button (figure 6a). If the LED does not flash, try pushing the button firmly with your fingernail. Make sure to position the sensor near the top of the container when in use.

To alert when fluid level is “Empty”:

Press and hold the “OUT ON” (right) button for at least 2 seconds but not more than 6 seconds. The LED flashes slowly and will stay lit after releasing the button (figure 6b). If the LED does not flash, try pushing the button firmly with your fingernail. Make sure to position the sensor near the bottom of the container when in use.

No further action is required.

For advanced troubleshooting, see “Sensor Tuning Guide” on page 7.

YOU ARE NOW READY TO OPERATE YOUR SENTINEL!

Operation



The sensor monitors the fluid level in your container. The Beacon illuminates **green** under safe level conditions. Up to three containers can be monitored at once.



The Beacon illuminates **red** and an audio alert sounds when a level has been reached (full or empty, depending on setup). Alert volume can be adjusted by rotating the top of the beacon. Additional volume adjustment can be obtained by turning the nut on top of the beacon with a flat head screwdriver.



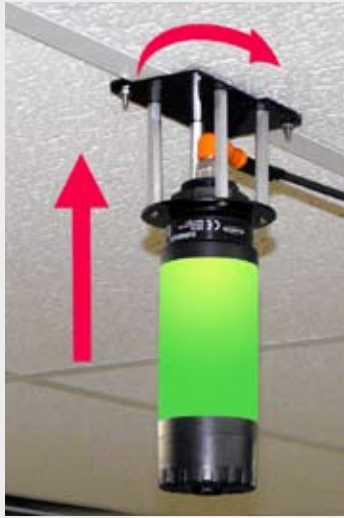
Front panel LEDs indicate which sensor has been activated.



The **Pause** button feature suspends the audio alert and changes the Beacon color to **orange**, reminding the user that attention is needed.

Installation of ceiling mount bracket to ceiling:

Hold up the ceiling mount bracket (with beacon attached) and position it perpendicular to a crossbar of a dropped ceiling. Apply upward pressure to bracket as to lift ceiling tiles. Rotate the bracket clockwise 90° so that the tabs of the bracket slide over the top side of the cross bar.



Sensor Tuning Guide (Advanced)

Basic Teach Empty State

Using the basic teach empty state the unit suppresses the installation environment. The basic teach empty state resets the unit, an adjustment teach already carried out is deleted.

| | |
|--|--|
| <ul style="list-style-type: none"> ▶ Empty the tank until the level is at least 20 mm below the sensor. | |
| <p>Set the unit as normally open (output closes when the tank is full):</p> <ul style="list-style-type: none"> ▶ Press [OUT OFF] for min. 2 s (max. 6 s). > While pressing the pushbutton the LED flashes slowly. After releasing the pushbutton, the LED goes out. | |
| <p>Set the unit as normally closed (output opens when the tank is full):</p> <ul style="list-style-type: none"> ▶ Press [OUT ON] for min. 2 s (max. 6 s). > While pressing the pushbutton the LED flashes slowly. After releasing the pushbutton, the LED lights continuously. | |

The unit is now ready for operation. For the detection of media with a low dielectric constant (e.g. plastic granulates or oils) no further setting is required.

Locking / Unlocking

The unit can be electronically locked to protect it against unintentional setting. If the unit does not react, it may be locked.

| | |
|--|--|
| <ul style="list-style-type: none"> ▶ To lock press [OUT ON] and [OUT OFF] simultaneously for 10 s. > Acknowledgement: LED state (yellow) changes for a short time (the lit LED goes out briefly or the LED which is not lit lights briefly). ▶ To unlock repeat this step. | |
|--|--|

Adjustment Teach Full State

Necessary for aqueous media. The sensitivity of the unit is optimized. Later on, the **Adjustment Teach Full State** can be repeated at any time, an adjustment teach empty state already carried out is not affected.

A **basic teach empty state** must be carried out prior to the adjustment teach full state (→ **Basic Teach Empty State**)! If it is not possible to empty the tank, a basic teach empty state can be carried out by simulating the empty state (e.g. adjustment when not installed, adjustment at a higher position). For optimum function it is necessary to carry out the "modified basic teach empty state" (→ **Modified Basic Teach Empty State**) when the tank is emptied the next time.

| | |
|--|--|
| <ul style="list-style-type: none"> ▶ Fill the tank until the sensing face of the unit is covered. > For NO the LED lights, for NC it goes out. | |
| <p>Set the unit as normally open (output closes when the tank is full):</p> <ul style="list-style-type: none"> ▶ Press [OUT ON] for min. 6 s. > While pressing the pushbutton the LED first flashes slowly, after 6 s more quickly. After releasing the pushbutton, the LED lights continuously. | |
| <p>Set the unit as normally closed (output opens when the tank is full):</p> <ul style="list-style-type: none"> ▶ Press [OUT OFF] for min. 6 s. > While pressing the pushbutton the LED first flashes slowly, after 6 s more quickly. After releasing the pushbutton, the LED goes out. | |

Modified Basic Teach Empty State

Recommended for deposits in the tank. Deposits are largely suppressed. This is also recommended if it has not been possible to carry out a **basic teach empty state** (e.g. if the sensor is set up on a full tank; details: → **Adjustment Teach Full State**). Later on, the **Modified Basic Teach Empty State** can be repeated at any time, an adjustment teach full state already carried out is not affected.

| | |
|---|--|
| <ul style="list-style-type: none"> ▶ Empty the tank until the level is below the sensing face of the unit. > For NO the LED goes out, for NC the LED lights. | |
| <p>Set the unit as normally open (output closes when the tank is full):</p> <ul style="list-style-type: none"> ▶ Press [OUT OFF] for min. 6 s. > While pressing the pushbutton the LED first flashes slowly, after 6 s more quickly. After releasing the pushbutton, the LED goes out. | |
| <p>Set the unit as normally closed (output opens when the tank is full):</p> <ul style="list-style-type: none"> ▶ Press [OUT ON] for min. 6 s. > While pressing the pushbutton the LED first flashes slowly, after 6 s more quickly. After releasing the pushbutton, the LED lights continuously. | |

DECLARATION OF CONFORMITY

Analytical Sales and Services, Inc. hereby declares that the product(s) listed below conform to the European Union directives and standards identified in this declaration.

Analytical Sales and Services, Inc. erklärt, daß die aufgeführten Produkt(e) in Übereinstimmung sind mit den Bestimmungen der angegebenen EU-Richtlinien und mit den aufgeführten normative Dokumenten.

Analytical Sales and Services, Inc. dichiara con la presente, che I prodotto(I) sottomenzionati sono in conformità con le direttive e norme Europee, specificate in questa dichiarazione.

Analytical Sales and Services, Inc. déclare par la présente, que les produit(s) sous-mentionnés, sont conformes aux directives et normes Européennes identifiées dans cette déclaration.

Analytical Sales and Services, Inc. declara por la presente que los producto(s) abajo mencionados, están conformes con las directivas y normas Europeas identificadas en esta declaración.

Products(s) / Produkt(e) / Prodotto(l) / Produit(s) / Producto(s):

SENTINEL LEVEL INDICATOR

EU Directive(s) / EU-Richtlinien / Direttiva(e) Europee / Directives Européenne(s) / Directiva(s) Europeas:

Low Voltage (73/23/EEC, 93/68/EEC)
Electromagnetic Compatibility (89/336/EEC, 92/31/EEC, 93/68/EEC)

Standard(s) / Norm(en) / Norma(e) / Norme(s) / Norma(s):

EN55011:1998 ENN61000-3:1995+A1:1998+A2:1998+A14:2000
EN61326: 1997 +A1: 1998 +A2:2000 EN61000-3-3:1995

EN61010-1:2001



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