

LS2000 LEVEL SWITCH
OWNERS MANUAL

- ◆ INSTALLATION
- ◆ CALIBRATION
- ◆ TROUBLESHOOTING
- ◆ WARRANTY

NOTICE

This manual contains important information necessary for the proper operation of this product. Before installing the unit, please read these instructions and familiarize yourself with the requirements and functions of this device.

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If any questions or problems arise during installation, please contact:

Customer Service: 1-800-835-8012 or 713-467-4438 (8:00 a.m. to 5:00 p.m. CST US)

 **WARNING**

Failure to follow safe installation and servicing guidelines could result in death or serious injury.

- Make sure only qualified personnel perform the installation.
- Use the equipment only as specified in this manual. Failure to do so may impair the protection provided by the equipment.
- Do not perform any services other than those contained in this manual unless you are qualified.
- Verify the operating environment of the Babbitt LS2000 is consistent with the appropriate area classification.

Improper use or installation of this device may cause the following:

- Personal injury or harm
- Application hazards such as overflow or overflows
- Damage to the device or system

High voltage that may be present on leads could cause electrical shock.

- Make sure the main power to the Babbitt LS2000 level switch is off and the lines to any other external power source are disconnected or not powered while wiring the instrument.



Table of Contents

1. DESCRIPTION	4
1.1 General Description.....	4
1.2 Specifications.....	4
1.3 Ordering Information	5
1.4 GA Drawing.....	5
2. THEORY OF OPERATION	6
3. INSTALLATION	6
3.1 Inspection	6
3.2 Bench Test	6
3.3 Physical Installation	7
3.4 Removing Electronics	7
3.4 Typical Applications and Wiring Diagrams	8
1.) Terminal Layout.....	8
2.) Wiring Diagrams	8
4. CALIBRATION	11
4.1 Fail Safe Selection.....	11
4.2 Sensitivity Calibration.....	11
5. MAINTENANCE AND TROUBLESHOOTING	12
6. WARRANTY	13

LS2000 LEVEL SWITCH

1. DESCRIPTION

1.1 General Description

The LS2000 is a point level switch that detects the presence or absence of material in a bin, silo, tank or other container. The basic unit is made up of a solid stainless steel probe attached to an explosion proof housing. Inside the explosion proof housing are all the calibration adjustments and sensing electronics. The unit is calibrated in the absence of material touching the probe and an internal relay changes state when material is detected.

1.2 Specifications

Electrical

Power:	115 VAC ($\pm 15\%$) 50/60 Hz. 2 watts, standard. (24VDC Optional)
Output:	1 Form C Contact SPDT relay, 10 amp resistive at 125 VAC, 8A250VAC, 5A30VDC
Fail Safe:	Selectable high or low level
RF Frequency:	Approximately 1.3 MHz

Environmental

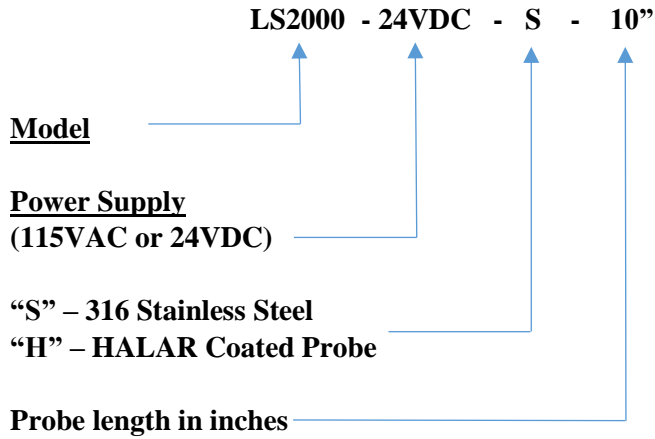
Temperature:	Probe: -30° F to 180° F * Electronics: -30° F to 170° F
Pressure:	Probe: 250 psi @ 75° F (Note: at 180° F pressure should not exceed atmosphere)
Enclosure:	Cast aluminum, Class I, Groups C & D; Class II, Groups E, F & G
Construction:	Probe: All wetted parts, 316 SS, UHMWPE and Viton. Electronics: Housed in cast aluminum explosion proof enclosure.

*Higher temperatures available upon request.

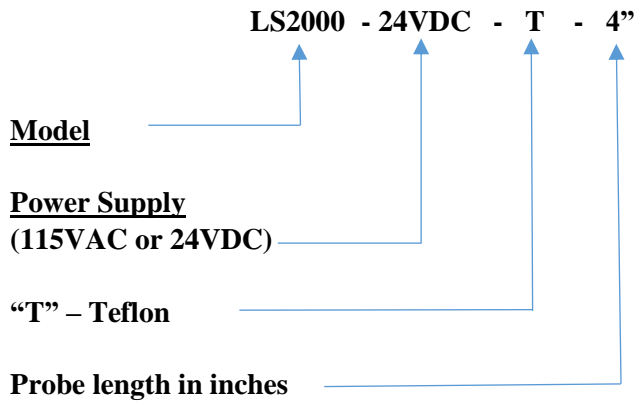
Specifications subject to change without notice

1.3 Ordering Information

Standard Probe Style

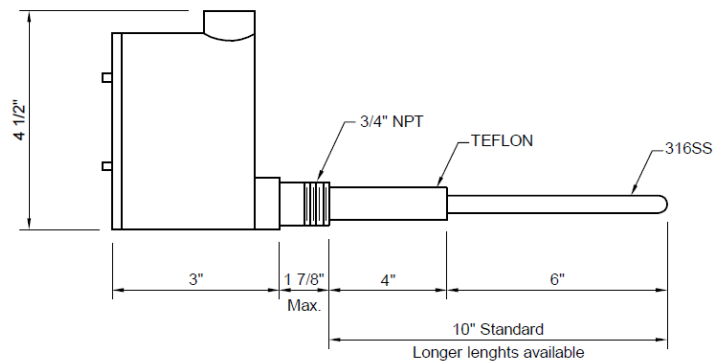


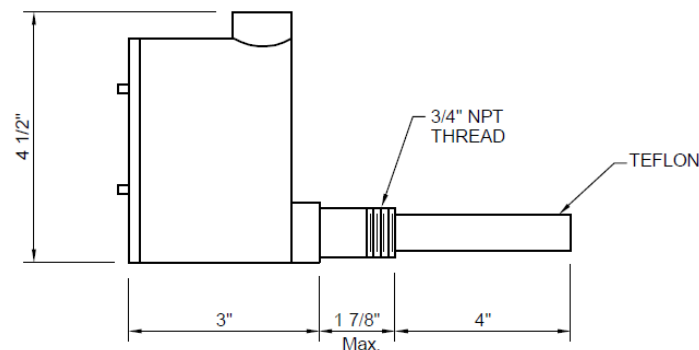
Blind End Probe Style



1.4 GA Drawing

Standard Probe



Blind End Probe**2. THEORY OF OPERATION**

The LS2000 employs a radio frequency (RF) balanced impedance bridge circuit to detect if the probe is in contact with the material that is to be sensed. When material is not in contact with the probe, the bridge is balanced by turning the adjustment pot to find the threshold where the red LED goes out. When material is in contact with the probe, the bridge becomes unbalanced and the comparing circuit realizes the change. This causes the relay to change state.

3. INSTALLATION

CAUTION: ALL INSTALLATION AND WIRING MUST CONFORM TO NEC AND ALL OTHER LOCAL ELECTRICAL CODES. TAKE SPECIAL CARE IN OBSERVING HAZARDOUS AREA SAFETY PROCEDURES. WE ASSUME NO LIABILITY FOR IMPROPERLY INSTALLED OR WIRED UNITS.

3.1 Inspection

Carefully unpack the LS2000 from the shipping box and check each item against the packing list before destroying any packing material. Visually inspect for any damage that may have occurred during shipping. Please advise the factory or your local distributor of any damage.

3.2 Bench Test

Before installing the unit, a simple operational check can be performed. On the bench, hook up the appropriate power to L1 and L2. The operating voltage of the LS2000 is marked on the power supply board. Hold the unit so that the probe is not in contact with any surface and touch the probe. When the probe is touched, the red LED should come on. This simulates product touching the probe.

3.3 Physical Installation

- 1) The LS2000 is installed into the vessel wall using a 3/4" NPT process connection. This can be either a threaded coupling or a tapped entry such as a flange.
- 2) The insulator should always extend at least 2" through the vessel wall.
- 3) Always check for physical room around the location you have chosen to allow for installation. Allow 3.75" turning radius to screw the probe in and clearance above for the length of the probe.
- 4)

CAUTION: Always take the necessary safety precautions when cutting or welding in the coupling for the LS2000.

- a) Tag and lock out the electrical power to the equipment that services the vessels.
 - b) Check liquid or dry powders that create a gas in the vessel for oxygen as well as the explosion factor. (All dust will explode.)
 - c) Vessels that are cross vented have to be isolated.
- 5) Screw the LS2000 into the connection provided. In dry material applications, no sealant on the threads is required. On liquid applications, Teflon or a good pipe thread sealant may be used.
 - 6) The LS2000 has a 3/4" conduit entry. When wiring these units, conform to the National Electrical Code and any other city or company codes.
 - 7) Always install the electrical connection into the 3/4" conduit entry on the LS2000 so water will not follow the connection routing into the threads of the conduit hub. To guarantee that condensation and water will stay outside the unit, install an EYSM unilet before each LS2000 and fill with explosion proof sealing cement.

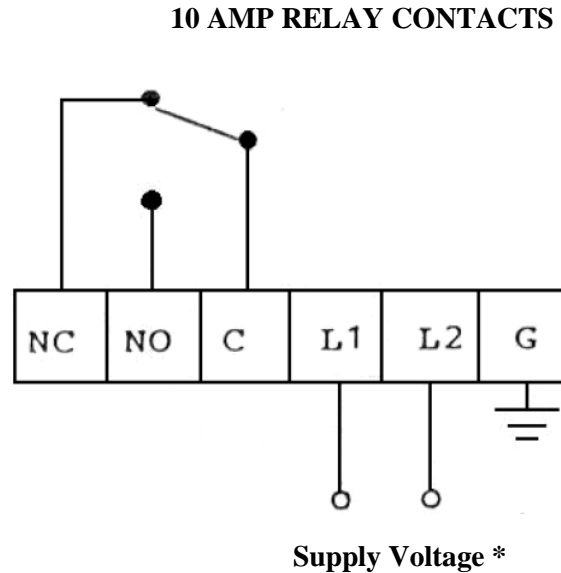
3.4 Removing Electronics

- 1) Disconnect supply power at main power source.
- 2) Disconnect wires from terminal strip.
- 3) Unplug blue antenna lead.
- 4) Remove green grounding screw.

To reinstall, reverse the above procedure.

3.4 Typical Applications and Wiring Diagrams

1.) Terminal Layout



***NOTE: EACH LS2000 POWER SUPPLY IS INTENDED FOR ONLY ONE SUPPLY VOLTAGE. THIS VOLTAGE IS PRINTED ON THE POWER SUPPLY BOARD**

FOR 115VAC UNITS HOOK UP THE HOT LEAD TO L1 AND THE NEUTRAL TO L2, WITH APPROPRIATE GROUND.

24VDC UNITS HOOK THE POSITIVE VOLTAGE TO L1 AND THE COMMON OR GROUND TO L2.

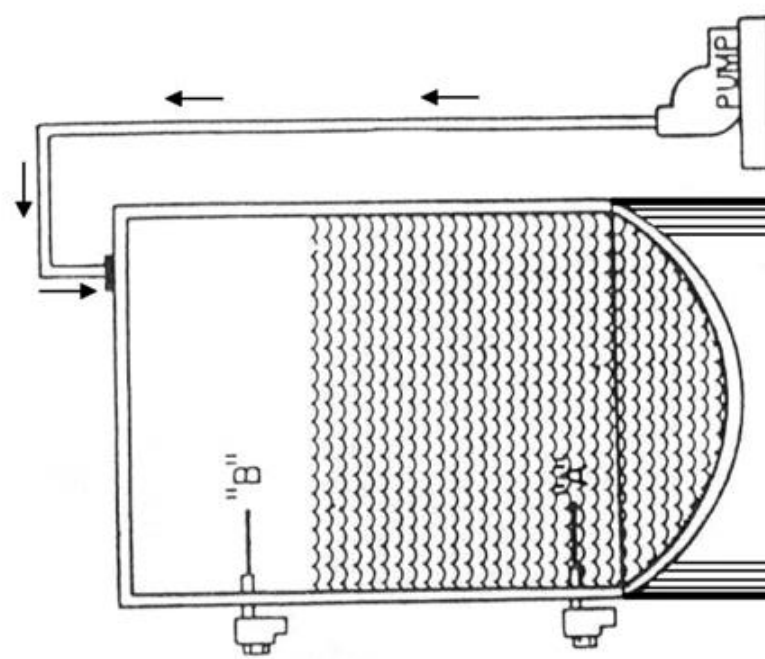
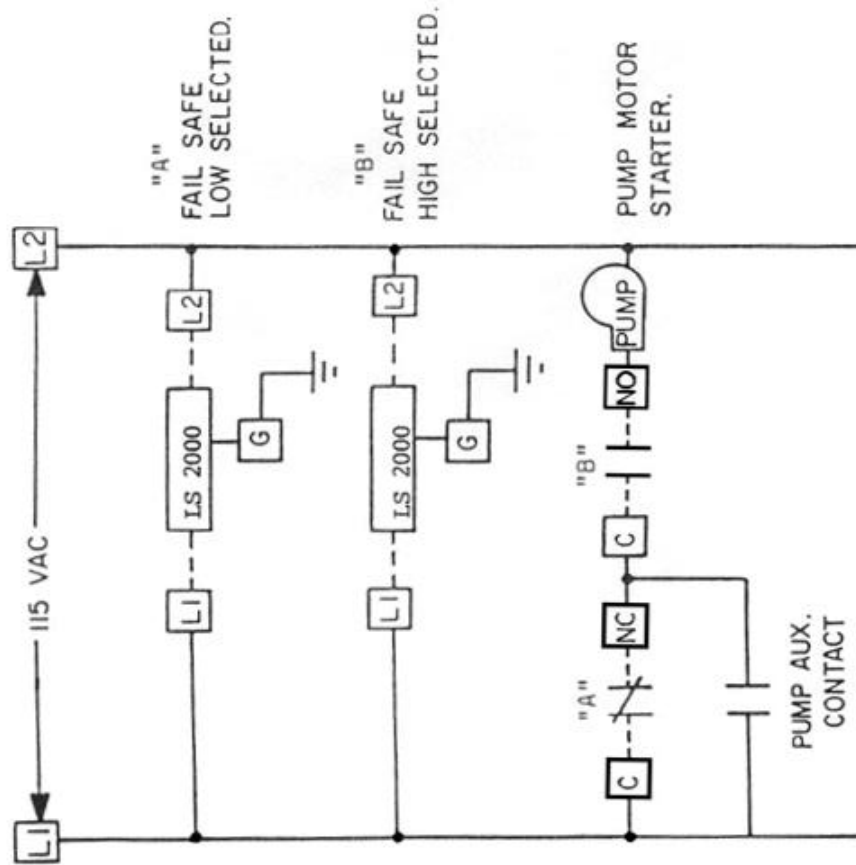
2.) Wiring Diagrams

Next 2 Pages

APPLICATION -AUTOMATIC FILLING OF TANK

WHEN LEVEL FALLS TO POINT "A",
A PUMP COMES ON TO FILL TO POINT
"B" THEN TURNS OFF.

TYPICAL WIRING



4. CALIBRATION

PLEASE READ THE ENTIRE CALIBRATION PROCEDURE BEFORE CALBRATING

4.1 Fail Safe Selection

The failsafe feature provides a “false alarm” in case of power outage or major component failures. When properly selected, the failsafe feature can protect equipment or alert you of a unit failure.

Fail Safe High (FSH) means that the relay is energized when NO PRODUCT is touching the sensing element. When product comes into contact with the sensing element, the relay is de-energized.

Fail Safe Low (FSL) means that the relay is energized when PRODUCT IS touching the sensing element.

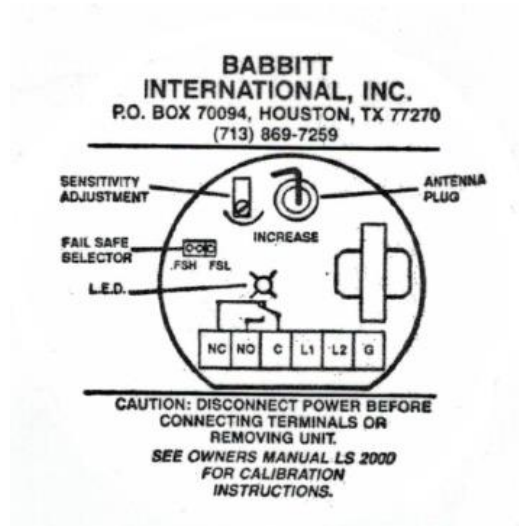
Fail Safe High or Fail Safe Low is selected by plugging the jumper next to the transformer in the appropriate position.

NOTE: Due to the wide variety of applications and possible control or alarm functions, the proper fail safe selection will depend on your circumstances. Please call your distributor or the factory if you need assistance.

4.2 Sensitivity Calibration

The LS2000 should be calibrated when no material is touching the probe, when the unit is installed where it will be used.

1. Observe the Red LED. If it is on, go to Step 3
2. If the Red LED is off, turn the sensitivity adjustment potentiometer clockwise (CW) until it comes on.
3. Turn the sensitivity adjustment pot counter-clockwise (CCW) until the Red LED just goes out. This sets the unit to its maximum sensitivity. If in your application this is too sensitive, you can turn the sensitivity adjustment pot further CCW; usually ¼ to ½ turn is sufficient to reduce the units sensitivity. Always bring the product into contact with the probe after calibration to assure proper performance.



5. MAINTENANCE AND TROUBLESHOOTING

No routine maintenance is required other than keeping the interior of the unit clean and free of dirt, dust and other contaminants. The LS2000 consists of two main sub-assemblies. These are the enclosure with the probe assembly and the power supply board. The following troubleshooting guide will assist in determining how to correct most of the problems which may occur in the field. Review the Installation and Calibration procedures in sections 3 & 4.

PROBLEM	POSSIBLE CAUSE	SOLUTION
RED LIGHT cannot be adjusted to turn on.	Antenna lead not connected. No power to unit.	Plug antenna lead into probe. Check for correct power to unit.
RED LIGHT remains on at all times.	Probe is shorted to ground.	Unplug banana plug and position it so that the bare end is not touching anything. Turn calibration pot 20 turns CCW. LED should go out. If it does, repair, replace or clean antenna probe. If LED does not go out, replace electronics.
Unit triggers when material touches probe, but will not reset when material recedes from probe or unit gives false alarm.	Improper mount of probe. Improper calibration procedure. Excessive material build-up on probe.	Contact factory or distributor. See Section 4.2 Perform “dirty probe” calibration; <u>recalibrate with buildup material</u> on probe.
Unit will not detect material.	Improper calibration. Antenna lead not plugged into probe. Unit was calibrated with material touching probe.	See calibration instructions section 4. Plug antenna lead into probe. Be sure material is not touching probe and recalibrate.
Unit will not stay in calibration.	Poor grounding of unit to vessel.	Provide secure grounding connection.
Relay operates properly, but no signal at terminals.	Burned or broken lands on the printed circuit board. Bad relay contacts.	Turn off power. Remove module from housing and inspect lands on printed circuit for damage. Replace if necessary. Replace relay or return for repair.

PLEASE CONTACT THE FACTORY OR YOUR DISTRIBUTOR IF YOU HAVE ANY QUESTIONS OR NEED ASSISTANCE.

Customer Service: 1-800-835-8012 or 713-467-4438 (8:00 a.m. to 5:00 p.m. CST US)

6. WARRANTY

All components of the LS2000 are warranted to be free from defects in material and workmanship for a period of two years from the date of purchase. This warranty applies to general purchaser and to components installed, serviced and operated according to instructions.

Babbitt International, Inc. will repair or replace, at its option, FOB at its plant or any other location designated, any part which proves to be defective in manufacture or workmanship.

All claims must be made in writing within the warranty period. No claims outside of the warranty period will be honored.

Warranties are not applied to any components which have been damaged by improper installation, use, exposure to unusual atmospheric conditions or components which have been misused, abused, damaged by neglect or accident. This warranty shall not apply to any components which have been altered or repaired without the prior written consent of Babbitt International, Inc.

Babbitt International, Inc. assumes no responsibility or liability for any labor or material back charges, without written authorization. Any products returned must be with prior written authorization.

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