SEVEN SENSOR SOLUTIONS

3S-SLS-CA

Capacitive Silo Level Sensor

USER MANUAL

USER MANUAL TABLE OF CONTENTS

Pınarçay OSB Mahallesi Organize Sanayi Tesisleri Teknokent İdare Binası No: 7, D:1, 19100 Merkez / Çorum / Türkiye
• **Telefon:** +90 364 230 1233 • **Website:** www.sevensensor.com • **Email:** sales@sevensensor.com

Revision 0.0 **/ Date** 17.02.2025

1. Introduction

SEVEN Capacitive Silo Level Sensor is used for detecting the level of solid materials, such as powders or granules, in silos, tanks, and bunkers.

Figure 1 - Capacitive Silo Level Sensor

The Capacitive Silo Sensor is used to detect the presence of material in a silo, tank, or bunker. When no material is present, the sensor does not detect any capacitance change and sends a low signal. Once the material reaches the trigger level, the sensor detects the capacitance change and generates a signal to indicate the status. In this status, the warning light remains on continuously. If the material falls below the sensor's trigger level, the signal is cut off, and the warning light blinks to indicate a material shortage.

The Warning Light operates in 3 different modes:

- **Flashing Mode:** The sensor is operating. The material level is below the trigger level.
- **Continuous On:** The sensor is operating. The material level has reached the trigger level.
- **Continuous Off:** The sensor is not operating. The power connection is disconnected.

The Capacitive Silo Level Sensor is used with a single power supply. It can be controlled by an automation system that can receive information about the completion of the silo's filling or emptying process.

The Capacitive Silo Level Sensor must be powered from an external power source. The power supply input is nominally designed for 24 V but can also operate within a voltage range of 18 to 26 V DC.

Note: *Voltages above 26V may damage the electronic board, while voltages below 18V may cause the system to operate unstably. Therefore, the sensor's power supply should be within the range of 18V to 26V.*

Note: *SEVEN reserves the right to make changes in this entire document without prior notice.*

The Capacitive Silo Sensor offers an optional rope lengths to accommodate different level requirements and silo sizes. This feature allows the sensor to be used in various types of silos and at different detection points.

Note: *The standard rope length is 100 cm, but it can be customized to be longer or shorter upon request.*

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2. Capacitive Silo Level Sensor Installation

It is suggested that the system be operated at ground level to make sure that all components are working properly prior to installation. A general diagram of the progress of the installation steps is given below

The “Relay” output from the SEVEN Capacitive Silo Level Sensor can be configured for seamless system integration. Configuration is required for this process.

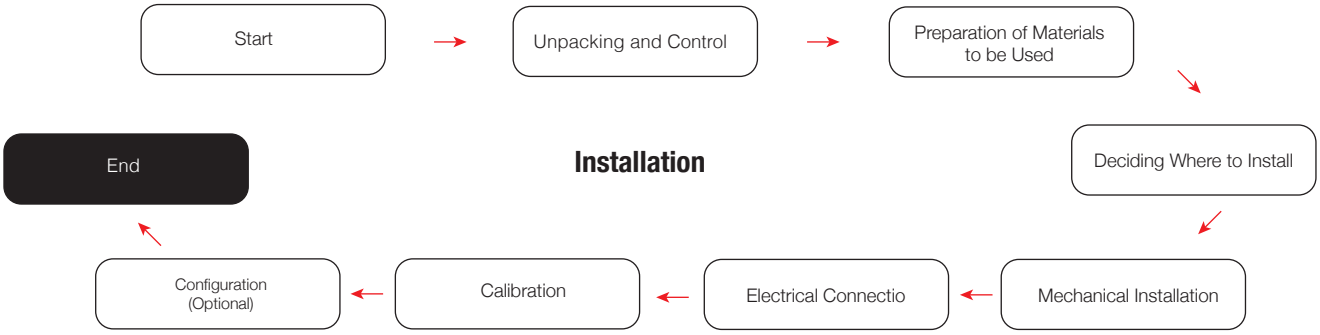

Figure 2 – Installation Process

2.1. Unpacking and Control

Upon receipt of the product, it must be carefully checked whether the package content is complete. SEVEN Sensor Solutions must be contacted if any of the components are missing, damaged or defective.

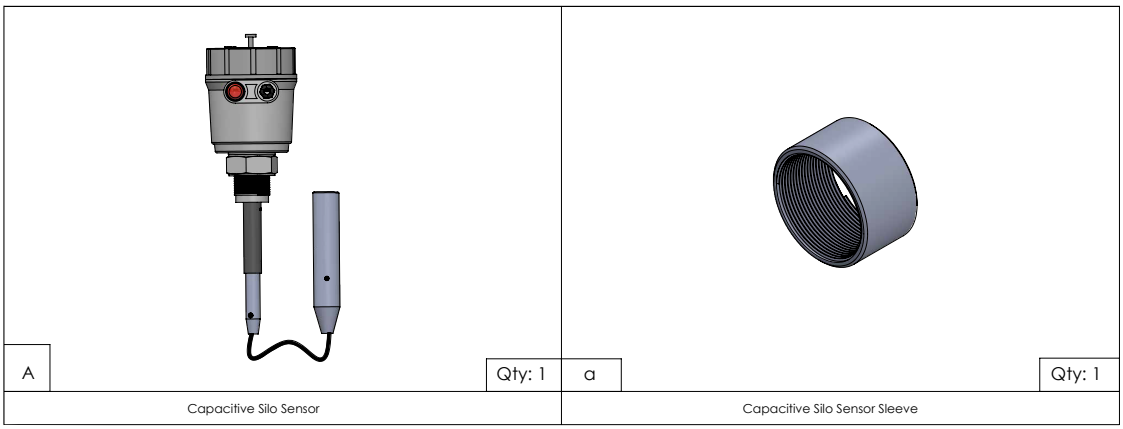

Figure 3 – Packing List

Note: *The quantity and content of the received material may differ according to the customer’s approved order.*

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2.2. Preparation of Materials to be Used in Installation

The materials needed during installation are provided by SEVEN. The user should prepare only the following hand tools and personal protective equipment.

Materials	
	
Gloves	Screwdriver - Flat

Figure 4 – Materials to be Used in Installation

2.3. Site Requirements and Considerations

Each site is different and has its own unique challenges. Therefore, the installation of the capacitive silo sensor may also differ at each site.
First of all, it should be decided where the product will be installed.
The sensor's detection surface should be protected from direct contact with areas where material may accumulate in the silo, tank, or bunker and should not be positioned close to the filling section.
Water must be prevented from entering the sensor.

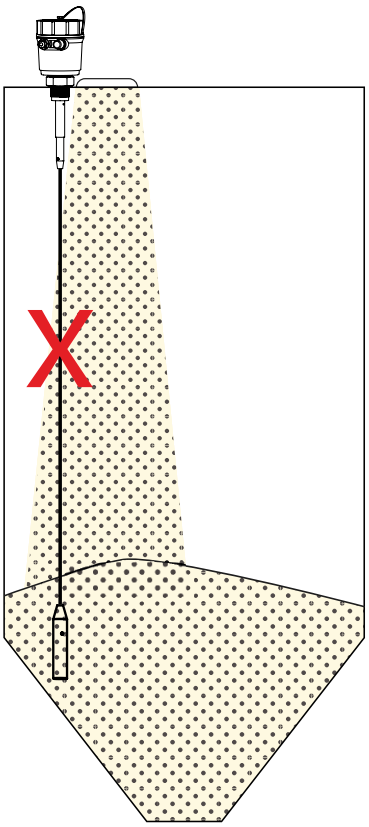

Figure 5 - Incorrect Installation

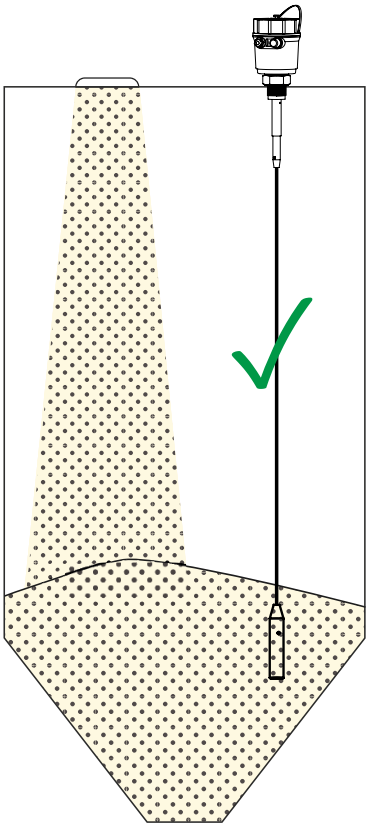

Figure 6 - Correct Installation

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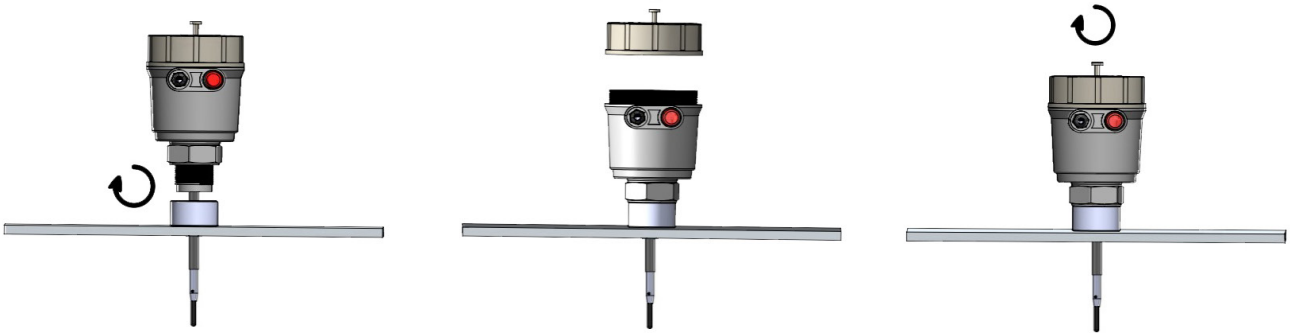
2.4. Installation

Upon receipt of the product, it must be carefully checked whether the package content is complete. SEVEN Sensor Solutions must be contacted if any of the components are missing, damaged or defective.



Step - 1

Install the sleeve by turning it in the direction of the arrow.

Step- 2

Open the cap by turning it in the direction of the arrow and make the connections for the cables passed through the cable gland

Step - 3

Close the cap by turning it back in place.

Note: *During installation, make sure the sensor is protected from dust.*

3. Connections

The sensor junction box is waterproof and UV-resistant. The power supply voltage for the Capacitive Silo Level Sensor is 18 – 26 V DC@1 Amp. It is recommended that the supply voltage be 24 V.

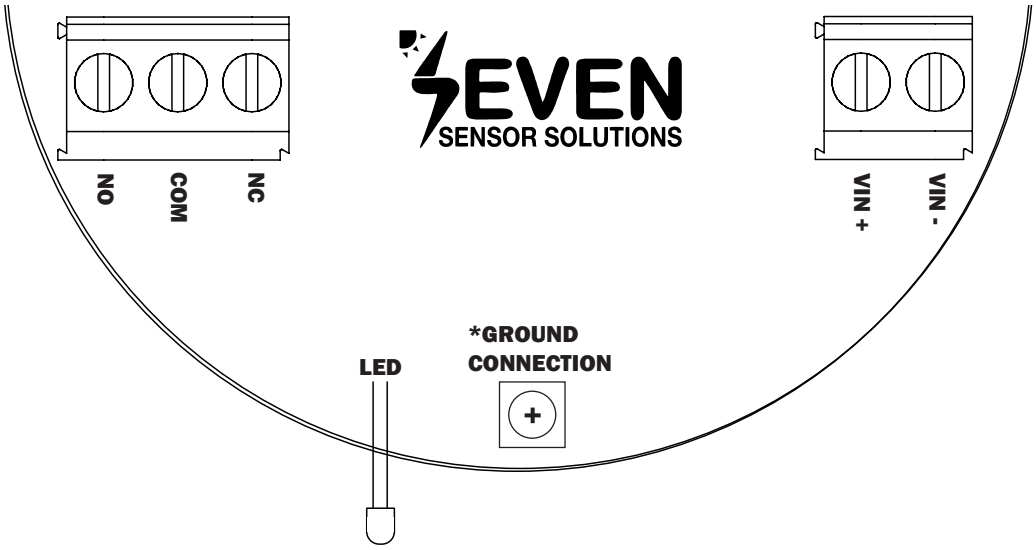


Figure 7- Electronic Board Connection

The Capacitive Silo Level Sensor has one connector for power and one for the relay output. The cables used for these connections should be passed through the gland on the sensor. Additionally, make sure that the sensor's cap and gland are fully tightened. Otherwise, the sensor may be exposed to water and dust.

The communication and power cables of the Capacitive Silo Level Sensor should always be laid separately from the AC/DC cables.

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Note: *It is recommended to establish a grounding connection to minimize the sensor's susceptibility to electrical noise.*

Wire Assignment for Power & Communication	
Power Supply (+)	VIN+
Power Supply(-)	VIN-
Common Terminal	COM
Normally Open	NO
Normally Closed	NC

Note: *The installation and electrical connections of SEVEN sensors should be carried out by a qualified personnel.*

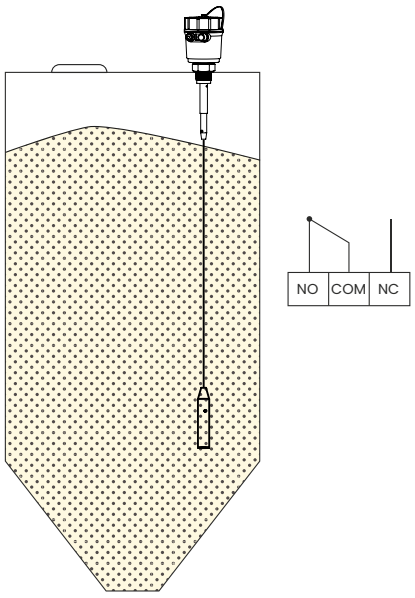

Figure 8 - Full Silo and Signal Output

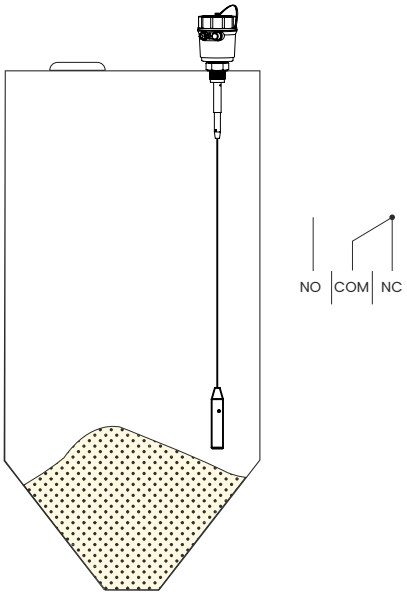

Figure 9- Empty Silo and Signal Output

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3.1. Working Principle

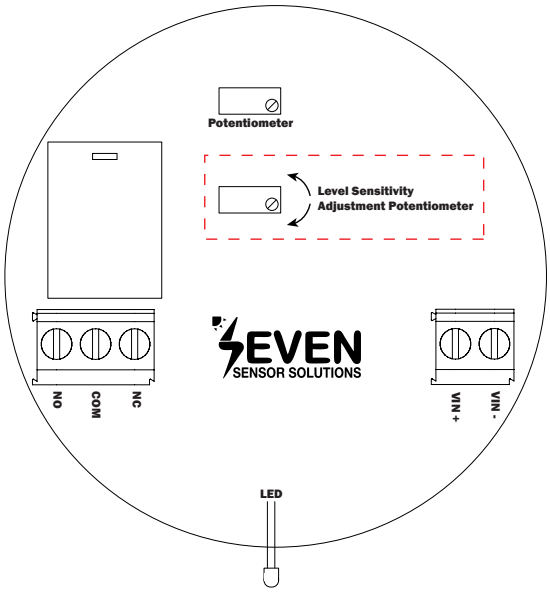

Figure 10 - Electronic Card

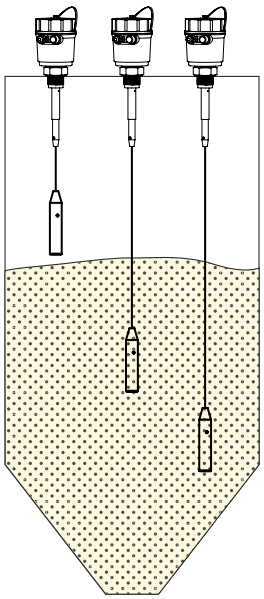

Figure 11- Sensor in Three Different Mounting

1- When the solid material in the silo, tank, or bunker is below the set level of the capacitive silo sensor or when these storage units are empty, the COM–NC connection becomes active, and the warning light starts flashing.

2- When the solid material in the silo, tank, or bunker is at or above the set level of the capacitive silo sensor, the COM–NO connection becomes active, and the warning light remains steadily on.

3.2. Calibration

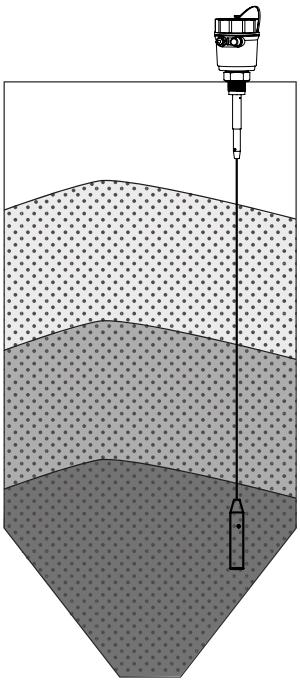

Figure 12- Desired Trigger Level
*The colors represent different levels.

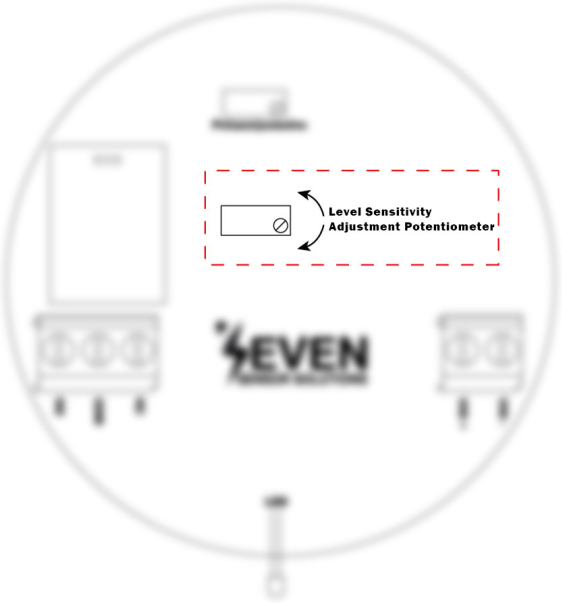

Figure 13- Calibration Adjustment Element

For product calibration, fill the silo/tank/bunker to the desired trigger level, then adjust the calibration potentiometer on the product by rotating it with a screwdriver until the LED light remains steady. The point at which the LED light remains steady is the calibration point.

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Note: *After product usage, recalibration may be necessary due to dust accumulation on the rope and metal probe.*

Note: *Periodic cleaning of the Capacitive Silo Level Sensor is recommended when used with products containing high levels of dust.*

4. Inspection and Maintenance

Fastener tightness and cable conditions, looking for damage, deterioration, or disconnection of sensors and electrical enclosures, evidence of moisture or vermin in enclosures, loose wiring connections, embrittlement of attachments and other potential problems, should be checked periodically.

If the sensor is used without a thermal protection apparatus, it may be affected by very high temperatures. The integrity of the sensor's external mechanical structure should be checked.

Note: *We recommend to use thread-locking fluid for fasteners.*

5. Additional Documents

The following documen can be downloaded from www.sevensensor.com or requested from SEVEN Sensor

Datasheet	3S-SLS-CA Datasheet

6. Contact Details

Please feel free to contact us if you face any difficulties during installation or configuration.

SEVEN Technical Services

Address	**Pınarçay OSB Mahallesi 11. Cadde, No: 35, Çorum Organize Sanayi Bölgesi 19200 Merkez / Çorum**
Phone	**+90 530 889 8019**
E-mail	**teknik@sevensensor.com**
Website	**www.sevensensor.com**