

SiloTect

Non-Contact Radar Level Transmitter

S80S • Standard Range | S80L • Long Range

Installation & Programming Manual

80 GHz FMCW Technology • Millimeter-Accurate Measurement • Up to 98 ft Range

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1 Introduction

The SiloTect Non-Contact Radar Level Transmitter ensures precise, reliable level measurement in both dry-bulk and liquid applications. Utilizing advanced 80 GHz FMCW technology, it delivers millimeter accuracy in even the most challenging environments. Designed for materials like grains, cement, powders, granules, plastics, and coal, SiloTect is ideal for industries such as building materials, feed mills, food production, and energy. Its versatility extends to liquid applications, handling emulsions, chemicals, and other substances found in water treatment, pharmaceuticals, and chemical processing. Whether measuring fine powders in silos or viscous liquids in tanks, SiloTect adapts seamlessly, providing accurate, dependable measurements across a wide range of industries.

SiloTect utilizes 80 GHz Frequency Modulated Continuous Wave (FMCW) radar technology to achieve millimeter-accurate level measurement. Its compact antenna, narrow beam angle, and superior focus enhance precision while minimizing sensitivity to polarization and clutter. By emitting millimeter-wave energy and analyzing the frequency shift of reflected signals, SiloTect calculates distance, level, or volume based on programmed vessel height. Setup is effortless, whether remotely via EView2 software or from the silo using Bluetooth® and the Bindicator app.

1.1 Applications

Solids Measurement

The SiloTect Non-Contact Level Sensor is designed for precise level measurement in dry-bulk applications, delivering millimeter accuracy even in harsh, dusty environments. Its 80 GHz radar technology provides a focused signal with a narrow beam angle, minimizing interference from vessel structures, filling streams, and internal obstructions. Unlike other sensors, it remains unaffected by temperature changes, pressure fluctuations, humidity, or dust, making it ideal for materials like grains, cement, powders, granules, plastics, feed, and coal in industries such as food production, energy, building materials, and feed mills.

Liquid Measurement

SiloTect ensures reliable performance in liquid applications, unaffected by condensation, turbulence, foam, or vapors—challenges that impact ultrasonic and pressure-based sensors. Its narrow radar beam allows for precise operation in confined spaces, standpipes, and vessels with agitators or internal structures. With totalizer and flume calculation capabilities, it also supports flow rate measurement. Whether monitoring storage tanks, open pits, or vacuum applications, SiloTect delivers accurate, uninterrupted measurements for water treatment, pharmaceuticals, and chemical processing.

1.2 Features and Benefits

Feature	Benefit
80 GHz Technology	Ensures millimeter-accurate level measurement, improving efficiency and reducing material waste.
Bluetooth® Compatibility	Simplifies programming, configuration, and monitoring via the Bindicator app.
Flexible Communication	Supports Analog, HART®, Bluetooth®, and Relay for seamless system integration.
Customizable Design	Choose from two housing types (stainless steel, painted aluminum) and four antenna materials (stainless steel, PTFE, PVDF, polypropylene) for diverse applications.
Standard & Aiming Flanges	Available in multiple sizes (3", 4", 5", and 6") with aiming flange options for precise targeting.

Feature	Benefit
Air Purge	Designed to protect the radar face from material buildup and moisture, ensuring consistent measurement accuracy while maximizing uptime in harsh silo environments. Available on Long Range (S80L) models.
Quickstart Configuration	Enables fast, hassle-free setup and minimal downtime.
5-Year Warranty	Ensures long-term reliability and lower total cost of ownership.
High-Temperature Version*	Designed for extreme heat, ensuring performance in demanding environments.
Plug-In Graphic Display	Provides real-time data visualization and diagnostics for efficient operation.
Up to 98 ft Measurement Range	Long Range (S80L) model handles large silos and tanks with measurement ranges up to 98 ft (30 m).
ATEX Approved* / FM Approved*	Certified for safe operation in hazardous and explosive environments.

*ATEX and FM Approvals Coming Soon

1.3 Configuration Matrix / Order Code

S80S — Short Range Model

SiloTect Non-Contact Level Transmitter — S80S Short Range	Order Code
Model Prefix	S80S
Version	DS = Transmitter with Display & Window Cover
Antenna / Housing (Liquid Applications)	1A = Polypropylene (PP) / Painted Aluminum 1S = Polypropylene (PP) / Stainless Steel 2A = Stainless Steel / Painted Aluminum 2S = Stainless Steel / Stainless Steel 3A = PVDF / Painted Aluminum 3S = PVDF / Stainless Steel
Antenna / Housing (Solid Applications)	4A = PTFE / Painted Aluminum 4S = PTFE / Stainless Steel
Horn	1 = Standard Horn Antenna
Range	S = 33 ft (10 m) M = 66 ft (20 m) — max 28 ft on powders
Process Connection	A = 1½" BSP B = 1½" NPT
Outputs	1HS = 4–20 mA + HART® 1RS = 4–20 mA + HART® + Relay 1BS = 4–20 mA + HART® + Bluetooth® 1AS = 4–20 mA + HART® + Relay + Bluetooth®
Flanges†	00 = No Flange S3 = 3" Stainless Steel Flange S4 = 4" Stainless Steel Flange S5 = 5" Stainless Steel Flange

† Stainless steel flanges (S3, S4, S5) are only available when ordered with the 1½" NPT process connection (B). Flanges are not compatible with the 1½" BSP process connection (A).

S80L — Long Range Model

SiloTect Thru-Air Radar Level Sensor — S80L Long Range	Order Code
Model Prefix	S80L
Version	TA = Transmitter with Air Purge DA = Transmitter with Display & Window Cover with Air Purge
Housing	1A = Painted Aluminum 1S = Stainless Steel
Lens	2 = 3" Lens Antenna
Nominal Range	L = 98 ft (30 m)
Process Connection (Flange Size / Material)	1S = DN100 PN25 / Stainless Steel 2S = DN125 PN25 / Stainless Steel 3S = DN150 PN25 / Stainless Steel 4S = 4" RF 150PSI / Stainless Steel 5S = 5" RF 150PSI / Stainless Steel 6S = 6" RF 150PSI / Stainless Steel 1P = DN100 Drilled as PN25 / Polypropylene (PP) 2P = DN125 Drilled as PN25 / Polypropylene (PP) 3P = DN150 Drilled as PN25 / Polypropylene (PP) 4P = 4" RF Drilled as 150PSI / Polypropylene (PP) 5P = 5" RF Drilled as 150PSI / Polypropylene (PP) 6P = 6" RF Drilled as 150PSI / Polypropylene (PP) 1N = 3" NPT
Outputs	1HS = 4–20 mA + HART® 1RS = 4–20 mA + HART® + Relay 1BS = 4–20 mA + HART® + Bluetooth® 1AS = 4–20 mA + HART® + Relay + Bluetooth®

Note: 1N (3" NPT) is a Long Range (S80L) option only — not offered on S80S. BSP thread is not available in the 3" size.

Order Code Structure — S80L Example

S80L - [Version] - [Housing] - [Lens] - [Nominal Range] - [Process Connection] - [Outputs]

Example: S80L-TA-1A-1-L-3S-1BS = Long Range, Air Purge, Aluminum Housing, 3" Lens, 98 ft, DN150 SS Flange, HART + Bluetooth®

2 Technical Specifications

2.1 General Specifications

Parameter	Value
Signal Frequency	77–81 GHz
Measuring Frequency	~1/s
Max Range Options	Up to 33 ft (10 m) Up to 66 ft (20 m) Up to 98 ft (30 m) — S80L Long Range model

Parameter	Value
Supply Voltage	12–36 V DC
Output	4–20 mA, HART®, Bluetooth®, Relay (optional)
Accuracy	±0.078" (±2 mm) – ±0.157" (±4 mm)
Dead Zone	0 ft (0 m)
Lowest ϵ_r of Medium	S80S (Short Range): 1.9 S80L (Long Range): 1.4
Process Pressure	PP, PVDF, PTFE antenna: –1...3 bar (–0.1...0.3 MPa; –14.5...43.5 psi) Stainless steel antenna: –1...40 bar (–0.1...4.0 MPa; –14.5...580 psi)
Ratings / Approvals	IP66 / IP67 (NEMA 4X / 6), ATEX*, FM*
Process Temperature	Standard Version: –40...+158 °F (–40...+80 °C) High-Temp Version: –40...+400 °F (–40...+200 °C)*
Ambient Temperature	Standard Transmitter Only: –40...+158 °F (–40...+70 °C) Standard Transmitter with Display: –4...+158 °F (–20...+70 °C) High-Temp Transmitter Only: –40...+140 °F (–40...+60 °C)* High-Temp Transmitter with Display: –4...+140 °F (–20...+60 °C)*
Process Connections	1½" NPT, 1½" BSP S80L: DN100–DN150 PN25 flanges, 4"–6" RF 150PSI flanges, 3" NPT 3"–5" Stainless Steel Flange, 3"–5" Aiming Flange
Tilt Angle	±15°
Flange Options	Stainless Steel: 3", 4", 5", 6"* Aiming Flange: 4", 5", 6"
Antenna Materials	Polypropylene (PP), PVDF, PTFE, Stainless Steel
Housing Materials	Painted Aluminum, Stainless Steel
Ingress Protection	IP66 / IP67 (NEMA 4X / 6)
Vacuum Operation	Suitable — millimeter-wave signals propagate in vacuum
Electrical Connection	2× M20×1.5 cable glands + 2× internally threaded ½" NPT connection Cable outer diameter: Ø6–12 mm (shielded cable recommended) Wire cross section: 0.5–1.5 mm² (20–15 AWG)
Weight — S80S (Short Range)	Painted Aluminum: 2.4–4.4 lb (1.1–2 kg) Stainless Steel: 5.3–6.4 lb (2.4–2.9 kg)
Weight — S80L (Long Range)	Painted Aluminum: 3.3–5.5 lb (1.5–2.5 kg) Stainless Steel: 5.5–7.7 lb (2.5–3.5 kg)

*ATEX and FM Approvals Coming Soon

Type-Dependent Data

Short Range (S80S)

1½" process connection

Max Measuring Range	33 ft (10 m) or 66 ft (20 m)
Beam Angle (–3 dB)	7° (1½" connection)

Dead Zone	0 m (measured from antenna tip)
Antenna Insertion Length	3.62" (~92 mm) for 1½" connection
Air Purge	Not available

2.2 Dimensions

S80S Short Range — Dimensional Reference

BSP version (1½" BSP): Overall height ~8.00" (203 mm), flange-to-tip ~3.94" (100 mm)

NPT version (1½" NPT): Overall height ~8.07" (205 mm), flange-to-tip ~3.94" (100 mm)

Housing width: ~5.86" (149 mm) (BSP) / ~5.63" (143 mm) (NPT)

Antenna diameter: Ø1.65" (Ø42 mm) (PTFE) / Ø2.91" (Ø74 mm) (PP/PVDF)

Cable glands: 2× M20×1.5 + 2× ½" NPT

S80L Long Range — Dimensional Reference

Overall height: ~5.98" (152 mm) (housing) + flange thickness

Housing width: ~3.54" (90 mm)

Lens diameter: Ø2.91" (Ø74 mm)

Flange size: per process connection selection (DN100–DN150 / 4"–6" RF)

1N (3" NPT) version: overall height ~6.73" (171 mm); antenna/lens body diameter Ø3.14" (Ø80 mm); connection collar height ~3.14" (80 mm); thread engagement length ~0.98" (25 mm).

Cable gland: 2× M20×1.5 + 2× ½" NPT

Note: Detailed certified dimensional drawings available upon request.

PTFE Antenna Design Update

Effective mid-March, the PTFE encapsulated antenna on the 1½" antenna size family has been upgraded to a higher-performance design.

The new antenna features a shorter lens body with a spherical (curved) tip replacing the previous pointed tip.

The antenna is approximately 1 inch shorter overall. All electrical and performance specifications remain unchanged.

This change does not affect part numbering.

3 Mechanical Installation

WARNING: REMOVE POWER FROM THE UNIT BEFORE INSTALLING, REMOVING, OR MAKING ADJUSTMENTS.

WARNING: INSTALLATION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONNEL AND IN ACCORDANCE WITH LOCAL GOVERNING REGULATIONS.

WARNING: TO BE USED ONLY IN THE MANNER OUTLINED IN THIS MANUAL, OTHERWISE PROTECTION PROVIDED BY THE DEVICE MAY BE IMPAIRED.

WARNING: NEVER ATTEMPT TO LOOSEN, REMOVE, OR DISASSEMBLE PROCESS CONNECTION OR INSTRUMENT HOUSING WHILE VESSEL CONTENTS ARE UNDER PRESSURE.

WARNING: THE USER IS RESPONSIBLE FOR THE SELECTION OF BOLTING AND GASKET MATERIALS WHICH WILL FALL WITHIN THE LIMITS OF THE FLANGE AND ITS INTENDED USE AND WHICH ARE SUITABLE FOR THE SERVICE CONDITIONS.

WARNING: IMPROPER INSTALLATION MAY RESULT IN LOSS OF PROCESS PRESSURE.

3.1 Guidelines and Considerations

The following precautions should be observed when installing the unit:

- Correct location is key to a successful application.
- Keep the emission cone free of interference from ladders, pipes, I-beams, or filling streams.
- The antenna cover must be parallel to the measured surface within $\pm 2-3^\circ$ for best accuracy.
- Aiming flanges are available for S80S and S80L models and will assist in directing the beam toward the material surface. Aiming is generally not required for signal optimization but can improve performance in challenging geometries.
- There is signal energy transmitted outside the primary beam angle, so false targets may be detected. Beam angle (-3 dB): 7° for 1½" and flanged models.
- The peak energy density is directly in front of and in line with the antenna.
- For outdoor installations, a painted aluminum housing is recommended. In regions with extremely hot climates, protect the device from direct sunlight to avoid exceeding the ambient temperature limits of the housing.
- SiloTect supports vacuum applications; millimeter-wave signals propagate in vacuum without signal loss.
- The S80L Long Range model includes an integrated Air Purge system to protect the radar face from material buildup and moisture in harsh silo environments.

3.2 Installation Instructions

3.2.1 Position

- Always consider the radiation cone angle. The material surface must be perpendicular to the axis of the device, and the antenna cover must be parallel to the measured surface within $\pm 2-3^\circ$.
- Under no circumstances place the device near the inlet opening. Improper placement may lead to malfunctions.
- Mount the device as far as possible from interfering objects inside the tank and from sources of interference such as waves, vortices, or strong vibrations.
- In the case of enclosed antenna designs, the possibility of antenna front surface humidity should be minimized. The Air Purge feature on S80L models provides additional protection in these environments.

3.2.2 Obstacles

- It is essential to avoid objects (pipes, ladders, structural elements, thermometers, heating coils, etc.) entering the radiation cone.
- Use the threshold mapping (echo diagram) function to mask multiple interfering echoes if obstacles cannot be avoided.
- For applications involving gas blankets or vaporizing media, consider adjusting the threshold mapping settings to optimize measurement.

NOTICE: Multiple interfering echoes can be blocked by programming threshold settings in the EView2 software. Contact Bindicator technical support at 1-800-778-9242 if threshold configuration assistance is needed.

3.2.3 Temperature

- The transmitter must be protected from direct sunlight to avoid exceeding the highest permitted ambient temperature.
- For outdoor installations in hot climates, a painted aluminum housing is recommended to better manage heat dissipation.
- Refer to the Ambient Temperature specifications in Section 2.1 to confirm the installation environment is within the rated range.

3.2.4 Gas / Vapor

- SiloTect is suitable for applications involving a gas blanket above the liquid surface or for free-flowing solids with vaporizing properties.

- In a closed tank (especially one exposed to direct sunlight), vapors or gases above the liquid may reduce millimeter-wave signal transmission. In such cases, adjust the threshold mapping settings in EView2 to optimize echo detection.
- The device performs reliably with vaporizing media; however, dense vapor layers may attenuate the signal and should be accounted for during commissioning.

4 Electrical Installation

WARNING: REMOVE POWER FROM THE UNIT BEFORE INSTALLING, REMOVING, OR MAKING ADJUSTMENTS.

WARNING: INSTALLATION SHALL BE PERFORMED ONLY BY QUALIFIED PERSONNEL AND IN ACCORDANCE WITH LOCAL GOVERNING REGULATIONS.

WARNING: TO BE USED ONLY IN THE MANNER OUTLINED IN THIS MANUAL, OTHERWISE PROTECTION PROVIDED BY THE DEVICE MAY BE IMPAIRED.

WARNING: NEVER ATTEMPT TO LOOSEN, REMOVE, OR DISASSEMBLE PROCESS CONNECTION OR INSTRUMENT HOUSING WHILE VESSEL CONTENTS ARE UNDER PRESSURE.

WARNING: IMPROPER INSTALLATION MAY RESULT IN LOSS OF PROCESS PRESSURE.

4.1 General Safety

When using electrical equipment, you should always follow basic safety precautions, including the following:

- The installation and wiring of this product must comply with all national, federal, state, municipal, and local codes that apply.
- Properly ground the enclosure to an adequate earth ground.
- Do not modify any factory wiring. Connections should only be made to the terminals described in this section.
- All connections to the unit must use conductors with an insulation rating of 300 V minimum, rated for 105°C, a minimum flammability rating of VW-1, and be of appropriate gauge for the voltage and current required.
- Do not allow moisture to enter the electronics enclosure. Conduit should slope downward from the unit housing. Install drip loops and seal conduit with silicone rubber product.

4.2 Disconnect Requirements for Permanently Installed Equipment

A dedicated disconnecting device (circuit breaker) must be provided for the proper installation of the unit. If independent circuits are used for power input and main relay outputs, individual disconnects are required. Disconnects must meet the following requirements:

- Located in close proximity to the device
- Easily accessible to the operator
- Appropriately marked as the disconnect for the device and associated circuit
- Sized appropriately to the requirements of the protected circuit

4.3 Wiring Instructions

Refer to the wiring diagram label inside the housing cover for terminal identification.

1. Turn off all power to the device.
2. Remove the cover of the device housing.
3. Insert the cable through the cable gland into the housing.
4. Remove approximately 0.2" (4 mm) of the insulation from the wires. Cut the shielding of the signal cable.
5. Connect to points 2 and 3 of the terminal block according to the marked polarity. The loop current measuring connector is between terminals 1 and 2; the 4–20 mA current output and power supply (HART®) connects to terminals 2 (+) and 3 (–).

6. Pull the cable back with about 0.4" (10 mm) of the cable insulation remaining in the cable gland.
7. Tighten the locking nuts with a wrench. Check the connection of wires and the tightness of the cable gland.
8. Properly ground the unit. The shielding of the signal cable should be grounded at the control room. Avoid coupling of electromagnetic noise and place the signal cable away from power-current cables.
9. Replace the housing cover.
10. Return power to the unit. The unit has been programmed at the factory and is ready to begin taking readings. If reprogramming is required, proceed to Section 5.

WARNING: IN NON-EXPLOSIVE ATMOSPHERES, THE DEVICE MUST BE OPERATED ONLY FROM A GALVANICALLY ISOLATED POWER SUPPLY.

WARNING: THE INSULATION TEST WITH A TEST VOLTAGE OF 500 VAC IS PROHIBITED DUE TO THE INTERNAL ELECTRONIC OVERVOLTAGE PROTECTION.

4.4 Connecting (Grounding) to Equipotential Network (EPH)

WARNING: UNIT HOUSING MUST BE GROUNDED FOR PROPER FUNCTION.

- Earthing connector (EP) on the side of the device housing; maximum conductor cross-section: 4 mm² (AWG12).
- The instrument housing must be earthed to $R < 1 \Omega$ resistive earth.
- The shield of the measuring cable must be grounded in the instrument room.
- The measuring cable should not be routed near high-power cables, as shielding does not protect against switching harmonics.

WARNING: THE DEVICE IS PROTECTED AGAINST 4 KV E.S.D.

WARNING: THE INTERNAL PROTECTION OF THE DEVICE AGAINST E.S.D. CANNOT PROTECT THE ENTIRE MEASURING SYSTEM AGAINST ELECTROSTATIC DISCHARGE. IN ALL CASES, IT IS THE USER'S RESPONSIBILITY TO ENSURE THE GROUNDING OF THE TANK AND THE MEASURED MATERIAL.

5 Programming Methods

5.1 Programming With Bluetooth® / Bindicator App

Bluetooth® connectivity is available on SiloTect models ordered with the Bluetooth option (output codes 1BS or 1AS). Programming, configuration, and monitoring can be performed wirelessly using the Bindicator app for Android or iOS, or with the EView2 software on a laptop or desktop computer via a compatible USB/Bluetooth HART modem.

- Enable or configure Bluetooth via parameter P36 (see Section 5.3).
- The Bluetooth transmission range depends on environmental conditions and the Bluetooth power settings on the user's smartphone or tablet.
- Bluetooth is available for both S80S and S80L models when ordered with the Bluetooth output option.

On-Site and Remote Access: Use the Bindicator app for on-the-go adjustments or the free EView2 software on your laptop or desktop.

5.2 Programming With Display

The most important parameters can be set with the optional plug-in graphic display module. By default, the display shows the primary measurement result from which the output current is calculated.

Programming is done using a text menu system. Measured values are displayed as numbers and bar graphs on the dot-matrix screen. Use the E / ▲ / ▼ / ► buttons to navigate the menu.

If you do not exit the menu, the device will automatically return to the measurement display state after 30 minutes. Any changes made in the menu but not saved will be ignored.

The echo map helps detect false reflections and optimizes measurement configuration.

WARNING: DISPLAY USES AN LCD. DO NOT EXPOSE TO PROLONGED STRONG HEAT OR SUNLIGHT AS THE DISPLAY MAY BE DAMAGED.

5.3 Programming With EView2

The EView2 software provides access to all device parameters. Some parameters cannot be set directly from the graphical interface and must be changed by navigating the paths indicated in the EView2 callout boxes below.

Code	Description
P00: d c b a	Unit system, default units, regional parameter
P00a Mode	0 = Normal; 1 = High-sensitivity
P00b Unit (by P00c)	0 = m (Metric) / ft (Imperial); 1 = cm (Metric) / inch (Imperial); 2 = mm (Metric) / inch (Imperial)
P00c Region / Unit System	0 = EU / Metric 1 = US / Imperial 2 = Region 2 / Metric (Brazil, Japan, South Korea, Taiwan, Thailand) 3 = Region 2 / Imperial 4 = Region 3 / Metric (India, Malaysia, South Africa) 5 = Region 4 / Metric (Russia, Kazakhstan)
P00d Temperature Unit	0 = °C; 1 = °F

EView2 Path: Advanced mode → Parameters

P01: d c b a — Output source

P01ba defines the source of the primary output value (HART – PV), which also determines the value transmitted on the analog current output. The device automatically selects the measurement mode based on the selected output source.

P01ba = 10	Distance — no additional parameters required
P01ba = 11	Level — requires P04
P01ba = 12	Volume — requires P04, P40–45
P01ba = 13	Weight — requires P04, P32, P40–45
P01ba = 14	Flow — requires P04, P40–45, P46
P01ba = 15	Empty Volume — requires P04, P40–45, P47
P01ba = 16	Level % — requires P04
P01ba = 17	Volume % — requires P04, P40–45
P01ba = 40	Temperature
P01ba = 41	TOT1 Totalizer
P01ba = 42	TOT2 Totalizer

EView2 Path: Application → Operating mode / Measurement configuration → Measurement mode

P03: Maximum sensing distance

The maximum sensing distance measured from the process connection. The device evaluates level signals only within the specified distance. This is type-specific based on the purchased range option (33 ft, 66 ft, or 98 ft).

EView2 Path: Measurement configuration → Sensing Distance

P04: Zero-level distance (tank height – H)

This parameter must always be set, except for distance measurement. The zero-level distance is the distance between the sealing plane of the process connection and the designated zero level of the measurement (e.g., bottom of the tank). The device calculates the level value by subtracting the measured distance from this value. Maximum: 60 m (200 ft).

EView2 Path: Measurement configuration → Zero-level distance

P05: Close-end blocking (dead zone extension)

The dead zone starting from the process connection is the range within which the device cannot measure due to its physical limitations. Close-end blocking is a user-defined extension of the dead zone within which the device ignores any echoes. Useful for excluding objects close to the sensor.

EView2 Path: Measurement configuration → Minimum (P05)

P06: Far-end blocking

Specifies a level value below which the output will no longer follow further level decreases. Used when objects at the tank bottom cause measurement uncertainty. Far-end blocking can be deactivated by setting P06 = 0.

EView2 Path: Measurement configuration → Far end (P06)

P08: Manual output current value

If the analog current loop output mode (P12b) is set to Manual, the output current takes the value specified here (3.8–20.5 mA). Setting P08 = 0 returns the device to Automatic current transmission mode.

EView2 Path: Outputs → Fix output current (P08)

P10 / P11: Values assigned to 4 mA and 20 mA output

P10: The PV value assigned to 4 mA output (usually the lower limit of the measuring range). P11: The PV value assigned to 20 mA output (usually the upper limit). Values can be assigned inversely for reverse-acting outputs.

EView2 Path: Outputs → Assignment of 4 mA – PV / Assignment of 20 mA – PV

P12: - c b a — Analog current loop output mode

P12a Error Current Mode	0 = HOLD (holding last valid value); 1 = 3.8 mA; 2 = 22 mA
P12b Analog Output Mode	0 = Automatic (current transmission from measured value via P10/P11); 1 = Manual (fixed output current from P08)
P12c Startup Mode	0 = Normal (≤ 3.8 mA startup; resume 12–16 s); 1 = Fast (> 22 mA startup; resume 3–4 s)

EView2 Path: Outputs → Error indication / Current generator mode / Startup mode

P13: - c b a — Relay function (optional)

P13a = 0	By PV (P14–P15–P16) — relay switches based on trigger/release setpoints
P13a = 1	“No ECHO” (echo loss): C1 = On (release)
P13a = 2	“No ECHO” (echo loss): C2 = On (energize)
P13a = 3	FLOW impulse (P17)
P13a = 4	C1 error (release)
P13a = 9	OFF
P13b Operating Mode	0 = Hysteresis (P14 > P15 normal; P14 < P15 inverted); 1 = Window comparator

P13c Flow Impulse Unit	0 = m ³ (Metric) / ft ³ (US); 1 = liter / US gallon; 2 = liter / GB gallon
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EView2 Path: Outputs → Relay mode / Relay Function / Relay parameters → Pulse constant unit

P14, P15, P16, P17: Relay parameters

P14 Relay On Value	PV value at which the relay energizes. Minimum 0.787" (20 mm) hysteresis between P14 and P15.
P15 Relay Off Value	PV value at which the relay de-energizes.
P16 Relay Delay	Delay (0–999 s) between reaching the setpoint and actual relay operation.
P17 Flow Pulse Constant	Volume per relay pulse in FLOW mode. Unit set in P13c. Max pulse density: ≤3 seconds.

EView2 Path: Outputs → Relay parameters → Energized / De-Energized value / Relay delay time / Pulse constant

P19: HART short address (device address)

P19 = 0: Analog current loop active (standard 4–20 mA transmission). P19 = 1–15: Analog current loop inactive (fixed 4 mA); multi-drop mode.

EView2 Path: Device Identification → HART Device Short Address

P20: Damping Time

Reduces unwanted fluctuations in the transmitted value. Unit: seconds (0–999 s). Recommended: 8 s for barely volatile media; >40 s for strongly waving liquids.

EView2 Path: Measurement optimization → Damping time

P22: User slope correction factor (actual / measured)

Multiplier to refine the output value if the device reading differs from real conditions. Default: 1.0 (no correction). Value range: 0.7–10.

EView2 Path: Measurement optimization → Velocity user correction factor

P25: - - - a — Echo selection

P25a = 0	Automatic (recommended for most applications)
P25a = 1	First echo
P25a = 2	Second echo
P25a = 3	Largest echo
P25a = 4	Last echo

EView2 Path: Measurement optimization → Echo selection

P26 / P27: Level tracking speed

Sets the maximum level change speed the device will track. Changes faster than this are considered measurement errors and held. P26 = Level rising rate (filling speed). P27 = Level descent rate (emptying speed). Unit: m/h (Metric) or ft/h (Imperial).

EView2 Path: Measurement optimization → Level elevation rate (filling speed) / Level descent rate (emptying speed)

P28: - - b a — Measurement loss handling

P28a = 0	Hold for period set in P28b
P28a = 1	Hold indefinitely

P28a = 2	Filling simulation (at detected speed)
P28a = 3	Filling simulation (at P26/P27 max speed)
P28a = 4	Tank empty (DIST = max / LEV = 0)
P28a = 5	Tank full (DIST = min / LEV = max)
P28b Error Delay	0 = No delay; 1 = 10 s; 2 = 20 s; 3 = 30 s; 4 = 1 min; 5 = 2 min; 6 = 5 min; 7 = 15 min

EView2 Path: Measurement optimization → Echo loss handling / Error delay

P29: Tank Full Limit

Echo is tracked below the specified distance, but the output holds and a “Tank Full” flag is displayed. Set P29 < P05 to disable. Value range: 0 – (P04 – 5 cm [2"]).

P32: Specific density of measured medium

Required when weight transmission is selected. Enter the specific density relative to water (1 g/cm³). Value range: 0.01–10.

EView2 Path: Measurement optimization → Specific gravity

P34: Threshold offset

Adjusts the acceptance threshold curve. Range: –4000...+4000. Positive values increase noise suppression; negative values decrease it. 0 = no change from default.

EView2 Path: Measurement optimization → Threshold offset

P36: - - b a — Bluetooth settings

P36a = 0	Bluetooth ON
P36a = 1	Bluetooth ON for 5 minutes after startup if no connection, then OFF
P36a = 9	Bluetooth OFF
P36b = 0	Lowest signal strength
P36b = 1–4	Increasing signal strength: +2 / +4 / +6 / +8 dB above minimum

EView2 Path: Communication → Bluetooth

P40: 0 - b a — Output value calculation method (tank/silo shape)

Selects the tank shape for volume/weight calculation, or enables the Output Conversion Table (OCT). Tank dimensions are set in parameters P41–P45. See EView2 for full shape catalog including vertical cylindrical, rectangular, horizontal cylindrical, spherical, and custom shapes.

EView2 Path: Tank/Silo parameters → Tank shape / Bottom shape

P47: Total tank volume (for empty/ullage volume calculation)

Required when output is set to transmit Ullage (Empty) Volume. Transmitted value = Total Volume – Actual Volume. Unit: as set in P02b. Value range: 0–999,999.

EView2 Path: Tank/Silo parameters → Total tank volume

P84 / P85 / P86 / P87 / P88: Simulation parameters

P84a Simulation Method	0 = No simulation 1 = Triangular symbol 2 = Simulate constant level (P86 value)
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	3 = Simulate between P86/P87 with cycle time P85 (triangle wave) 4 = Simulate between P86/P87 with cycle time P85 (square wave)
P85	Simulation cycle time [s]
P86	Lower level of simulation (unit per P00b)
P87	Upper level of simulation (unit per P00b)
P88	Total simulation timeout [min]. Default: 10 min. Range: 0–9999 min.

EView2 Path: *Advanced* → *Special*

5.4 Additional EView2 Functionalities

5.4.1 Service Diagnostic Parameters (Read Only)

P60	Operating hours since manufacture [h]
P61	Operating hours since last power-on [h]
P62	Operating hours of relay (contact C2 closed time) [h]
P63	Number of relay switching cycles
P64	Current electronics temperature [°C / °F]
P65	Highest device temperature ever recorded [°C / °F]
P66	Lowest device temperature ever recorded [°C / °F]
P70	Number of detected echo peaks (current)
P71	Magnitude of selected echo (raw value)
P72	Amplitude of selected echo [dB]
P73	Distance of selected echo [m]
P74	Echo lost/shot ratio

5.4.2 Flow Measurement Control Parameters (Read Only)

P76	Measuring height for flow measurement ('h' in flow formula, see P46)
P77	TOT1 totalizer (clearable)
P78	TOT2 totalizer

5.4.3 Output Control Parameters (Read Only)

P79	Current generator re-measured output current [μA]
P80	Current generator calculated output current [mA]
P81	Relay output status

5.4.4 Hardware / Software Version (Read Only)

P94 / P95	Software code 2 / 3 (SLAVE MCUs)
P96	Software code 3 (MAIN MCU)

P97 / P98	Hardware identification code
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5.4.5 Security Codes

The unit can be protected against unauthorized reprogramming by a four-digit PIN code. If a value other than zero is entered the code is active; entering zero clears the code. When active, the device will prompt for the code upon entering the menu.

EView2 Path: Advanced → Special

5.4.6 Reset

Warm start: restarts the device and reloads all parameters from non-volatile memory without clearing stored values.

EView2 Path: Advanced → Special

6 Factory Default Parameters

6.1 Solids (Factory Setting)

Parameter	Default
P00	1101
P01	1011
P02	1110
P03	Type Specific
P04	Type Specific
P05	Type Specific
P06	0.0
P08	4.0
P10	0.0
P11	Type Specific
P12	0000
P13	0009
P14	0
P15	1
P16	0
P17	1
P19	0
P20	40
P22	1.0
P25	00
P26	1968 ft/h

Parameter	Default
P27	1968 ft/h
P28	0030
P29	0.0
P32	1.0
P34	0
P36	41
P40	0021
P41–P46	Type Specific

6.2 Liquids (Factory Setting)

Parameter	Default
P00	0000
P01	1011
P02	2021
P03	Type Specific
P04	Type Specific
P05	Type Specific
P06	0.0
P08	4.0
P10	0.0
P11	Type Specific
P12	0000
P13	0001
P14	0
P15	0
P16	0
P17	1
P19	0
P20	40
P22	1.0
P25	00
P26	1970 ft/h
P27	1970 ft/h

Parameter	Default
P28	0010
P29	0.0
P32	1.0
P34	0
P36	41
P40	0000
P41–P46	Type Specific

7 Troubleshooting

7.1 Application Errors

Error	Possible Cause	Recommended Action
Transmitted value shows a close-range reading (~7.8" [0.2 m])	Condensation or material buildup on the antenna face.	Clean the antenna carefully. Use threshold mapping in EView2 to block the interfering echo. On S80L models, verify the Air Purge is operating correctly.
Measured value does not change despite a level change	Echo loss — typically caused by: foaming of the medium; dirt or buildup on antenna; excessive surface turbulence or waves; incorrect maximum measuring distance setting; echo amplitude below the threshold curve.	Remove buildup from the antenna. Check the surface condition; take measures to reduce foaming or ripples. Review threshold settings and maximum measuring distance (P03) in EView2.
Measurement is erratic or unstable	Interfering echoes from internal structures, filling streams, or turbulence.	Increase damping time (P20). Use threshold mapping to mask interfering echoes. Reposition device if possible. Check that antenna cover is parallel to medium surface within $\pm 2-3^\circ$.
Output reads high or maximum when vessel is empty	Antenna or process connection is dirty; false echo from vessel bottom.	Clean antenna. Check P06 (far-end blocking) settings. Run threshold mapping.

8 Handling and Storage

8.1 Save These Instructions

Study this instruction manual carefully. Failure to do so can lead to serious damage, injuries, and loss of warranty. Store the instruction manual in a safe environment.

8.2 Inspection and Handling

Do not dispose of the device's packaging or packaging materials during the warranty period or if the device is being stored. Each package should be inspected upon receipt for damage that may have occurred during shipping. If the unit is received damaged, notify the carrier or Bindicator for instructions. Failure to do so may void your warranty.

If you have any problems or questions, contact Bindicator Customer Support at 1-800-778-9242 or sales@bindicator.com.

8.3 Maintenance and Repair

SiloTect does not require regular maintenance, but there may be cases where the sensor head needs to be cleaned of material deposits. Clean the device carefully without scratching or pressing the surface.

All repairs, whether covered by warranty or not, must be carried out by Bindicator. The device returned for repair must be cleaned by the user before return. The user must ensure the device is free of all contamination and substances hazardous to health.

8.4 Disposal and Recycling

This product can be recycled by specialized companies and must not be disposed of at a municipal collection site. If you do not have the means to dispose of it properly, contact Bindicator for return and disposal instructions or options.

8.5 Storage

If the device is not to be installed immediately following delivery:

1. Following inspection, repackage the unit in its original packaging.
2. Select a clean, dry site free of vibration, shock, and impact hazards.
3. For storage longer than 30 days, store at temperatures between -40° and $+158^{\circ}\text{F}$ (-40° to $+70^{\circ}\text{C}$) in a non-condensing atmosphere with humidity less than 98%.

CAUTION: DO NOT STORE A NON-POWERED UNIT OUTDOORS FOR A PROLONGED PERIOD.

9 General Safety

9.1 Authorized Personnel

All instructions described in this document must be performed by authorized and qualified service personnel only. Before installing the unit, read these instructions and familiarize yourself with the requirements and functions of the device. Required personal protective equipment must always be worn when servicing this device.

9.2 Intended Use

The device is solely intended for use as described in this manual. Reliable operation is ensured only if the instrument is used according to the specifications described in this document. For safety and warranty reasons, use of accessory equipment not recommended by the manufacturer, or modification of this device, is explicitly forbidden. All servicing must be performed by qualified service personnel only. This device should be mounted in locations where it will not be subject to tampering by unauthorized personnel.

9.3 Misuse & Warranty

Bindicator is not responsible for damages resulting from misuse or negligence. Any misuse, improper handling, unauthorized modifications, or use of the product outside its intended purpose may result in damage and will void the warranty. Misuse includes but is not limited to:

- Operating the product outside specified parameters
- Using incompatible accessories or components
- Unauthorized repairs or modifications
- Exposure to extreme conditions not covered in this manual
- Failure to follow installation, maintenance, or usage instructions

Improper use or installation of this device may result in: personal injury or harm; application failures such as vessel overflow or underfill; damage to the device or system; or void of warranty.

WARNING: THE WARRANTY IS NOT VALID IF THE NON-CONFORMITY OR FAILURE IS DUE TO IMPROPER USE OF THE PRODUCT. EXAMPLES OF IMPROPER USE INCLUDE BUT ARE NOT LIMITED TO: OPERATING THE PRODUCT AT HIGHER THAN SPECIFIED TEMPERATURES; IMPROPER INSTALLATION THAT LEADS TO PRODUCT FAILURE.

10 Safety Regulations for Ex Models

This level transmitter must be operated in an intrinsically safe circuit only. The metal enclosure of the unit must be connected to the Protective Earth (PE) circuit. If the device is installed in a location subject to overvoltage, the device must be protected with at least Class II surge protection.

In the case of II 1 G Ex ia IIB T6–T4 protected equipment versions with aluminum enclosure, the aluminum content of the enclosure may exceed the limit. The equipment must therefore be protected against impact and friction effects. In the case of II 1 D Ex ia IIIC T85°C–T110°C Da protected equipment versions with a window, the equipment must be protected against effects that result in electrostatic charges.

- Intrinsically safe devices may only be operated from a circuit that complies with the technical data of the device and is marked [Ex ia IIC] or [Ex ia IIB].
- The device may contain components capable of being electrostatically charged. Electrostatic charges can cause sparks and ignition; they must be prevented entirely in potentially explosive atmospheres.
- The device must only be installed in an environment free from direct air currents and any other charging effects — except in the case of Application Group III, if the conductivity of the particulate matter is greater than $>10^{-9}$ S (at 50±5% relative humidity) or $>10^{-11}$ S (at 30±5% relative humidity).
- Extreme care must be taken during maintenance when explosive residue may be present in the process tank. The device may only be touched in an explosive (Ex) environment with a wet antistatic cloth.

If any questions or problems arise during installation, contact Bindicator Customer Support at 1-800-778-9242.

11 Essential Health and Safety Requirements

Covered by Section 9 (General Safety) and Section 10 (Safety Regulations for Ex Models).

All national, federal, state, municipal, and local codes, laws, and applicable standards must apply.

WARNING: AMONG OTHERS: ENERGIZED MACHINERY, PRESSURIZED VESSELS, LIVE VALVES, WIRES, FALLING OBJECTS, SLIPPERY OR SHARP SURFACES, HEIGHTS, HOT, COLD, ACIDIC, CAUSTIC, VOLATILE, TOXIC, AND EXPLOSIVE MATERIALS POSE A GREAT RISK OF SERIOUS INJURY, PERMANENT DISABILITY, AND DEATH.

Only trained and authorized professionals are allowed to mount, set up, alter settings, or operate the device. Personnel must be fit and able and must wear required personal protective equipment at all times.

The SiloTect level transmitter is not a plant safety device.

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