TITAN TRUEFILL

HARDWARE INSTALLATION MANUAL

Document Version: 1.4

Date Updated: December 1, 2025

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1 INTRODUCTION

1.1 About this Manual

This manual provides information specific to the Titan Logix Corp. TrueFill Solution (hereafter referred to as the Titan TrueFill) only.

A Titan Logix system must be installed, operated, and maintained in accordance with the details described ONLY in Titan Logix manuals, application notes and all other relevant publications. Any installations or operations outside the scope of this information MUST contact Titan Logix technical support for more information.

Installation and operational information pertaining to optional equipment or peripheral systems will not be included in this manual. Refer to the vendor supplied documents for more information.

It is essential that this manual be read and understood for proper installation and operation of your new Titan TrueFill system.

Please visit Titan's Help Center (help.titanlogix.com) for additional information on Titan Logix's solutions.

1.2 Disclaimer

The information in this document is subject to change without notice. Titan Logix Corp. makes no representations or warranties with respect to the contents hereof.

- Only qualified personnel familiar with the installation and operation of this equipment should install, adjust, operate, or service this equipment. Failure to observe these instructions and applicable safety and electrical regulations could result in bodily injury or loss of life.
- Unintended use, including but not limited to using the product in a way not described in the product documentation or for purposes other than those intended, may impair protection provided by this equipment.
- To maintain a Class 1, Division 2 rating, each relay must only be supplied with 8-30VDC / 3.3A max transient protected power.
- Only replace with sand filled fuses of same type and rating.
- The Titan FINCH III system requires High temperature cable. Cable diameter shall be within .260" (6.6mm) to .545" (13.8mm) to maintain the strain relief integrity.
- Connections that could introduce additional transients into the circuit supplied by the power system are not permitted.
- The non-metallic enclosure parts of this equipment may become a spark ignition hazard in the presence of static electricity. The enclosure shall be cleaned only with a damp cloth, and the equipment shall be mounted to avoid building static electric charge from nonconductive process flow, strong air currents, or other potential charging through friction.

	**WARNING EXPLOSION HAZARD** THE SUBSTITUTIION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS 1, DIVISION 1. DO NOT DISCONNECT EQUIPMENT OR REPLACE FUSE UNLESS POWER HAS BEEN SWITCHED OFF AND THE AREA IS KNOWN TO BE NON-HAZARDOUS. INSTALL PER DRAWING 1001516_DME. MAXIMUM NON-HAZARDOUS VOLTAGE NOT TO EXCEED 30V.

1.3 Repair

FINCH III is an intrinsically safe associated apparatus and has no serviceable parts. Field repair of the Titan system is not recommended. Return to Titan Logix for repair. Temporary or emergency field repair of damaged or cut cables/wiring is acceptable. Replace the cable/wire at the earliest opportunity.

1.4 Warranty

Use of unauthorized parts, improper wiring, or any non-sanctioned modifications will void the manufacturer's warranty.

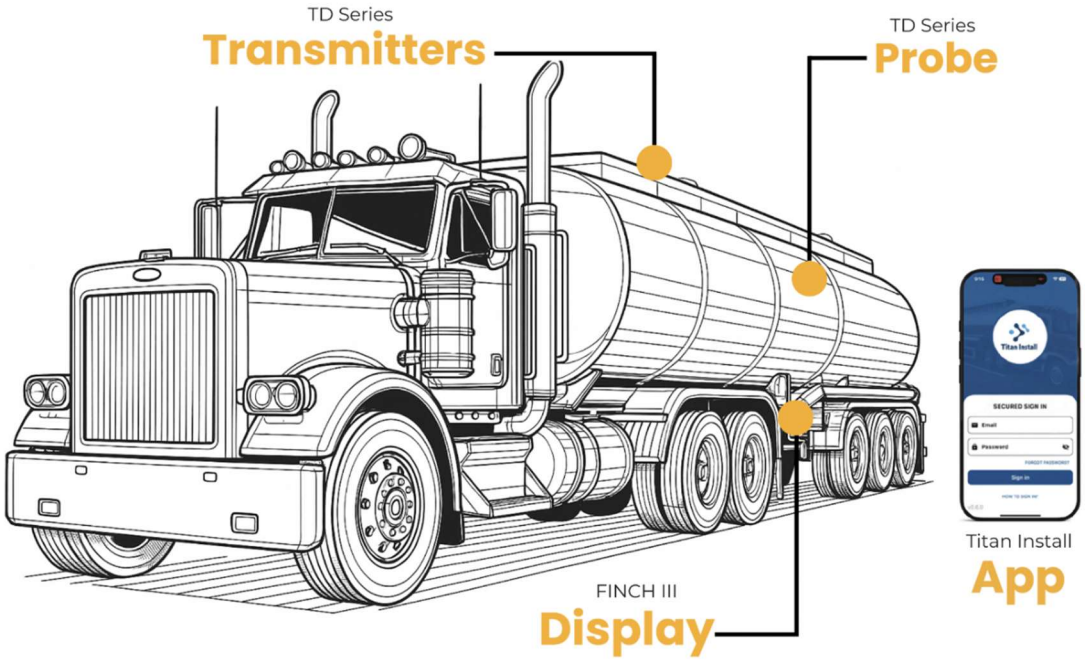
Always follow approved specifications and installation guidelines provided by Titan Logix Corp to maintain full warranty coverage.

1.5 System Overview

The FINCH III display is our newest part of the Titan Logix mobile liquid measurement solution.

The Titan Logix system provides best in class overfill provention and continous Tank Level Monitoring. Using Guided Wave RADAR (GWR) technology, the system continuously measures liquid level in the tank and transmits volume information to a display. The probe guides the RADAR pulse and reflection from the surface of the liquid. The transmitter translates this information into volume and displays it on the FINCH III. No moving parts are involved in level measurement.

The Titan TrueFill System consists of either a Red or Blue lid TD100 Transmitter, a TD Probe, a FINCH III display (with Titan Junction Box with more than 1 compartment), and our latest Titan Install and Titan Portal software platform.



2 Hardware Components

2.1 FINCH III Display

FINCH III is Titan Logix's latest version of our display in our mobile liquid level measurement system. The FINCH III is an intrinsically safe associated apparatus and has been designed to withstand harsh environments and is certified for use in hazardous locations.

The FINCH III Display shows volume, active alarms, error codes and indications. A single FINCH III display can support up to six compartments/TD transmitters on a single tanker.

Three high powered relays can be customized to indicate SPILL, High-High and Error alarms using external devices such as overfill prevention valves, lights, horns, and pump controls. These relays can also be programmed to indicate a pre-set Fill or Fall level to warn of an approaching event.

The FINCH III supports rack loading and can be connected directly to standard API sockets.

2.2 Titan Junction Box

FINCH III integrates with Titan's Junction Box, which features built-in indicator lights for confirmation that the TD100s are connected and functioning properly. Titan's Junction Box also eliminates the need to run cables from each transmitter to the FINCH Display, simplifying installation.

2.3 TD100 Transmitters

The TD100 transmitter generates and processes the RADAR signals to determine liquid level in each compartment within your tank. The TD100 is mounted on the tank top and connected to the probe, is weatherproof and rated for use in hazardous locations where explosive fumes may be present. TD100 transmitter connects with a probe and supports level measurement of a wide range of liquids. The transmitter can be configured in two detection modes (Standard and Performance), used for variations in fluid handling.

Our TD100 transmitter can only be used with our Titan supplied probes and our FINCH display. The hardware is wired together to allow the transmitter to send the display both level information and alarm states.

We have two different versions of our TD100 transmitters that are a part of the Titan TrueFill Solution: TD100 (Blue Lid) Transmitter and TD100 (Red Lid) Transmitter.

TD100 Transmitter

TD100R Transmitter

The standard blue lidded TD100 transmitter is for our core market.

The TD100 (Blue Lid) is only compatible with the two Dual Rod Probes and our standard Coaxial Probe. This transmitter is **NOT** compatible with our latest ClearView probe.

The red lidded TD100R transmitter is specifically tuned for gasoline, diesel, home heating oil, lubricants and used oil.

The TD100 (Red Lid) is only compatible with the ClearView probe.

2.4 Probes

Titan Logix's probes are mounted on the tank top through the NPT Top Fitting welded on the tank. The transmitter is then connected to the top threads of the probe. Each type of probe is installed with a 1" NPT top fitting and anchor cone.

Dual Rod Probe

The Dual Rod probe is most suitable for viscous liquids such as crude oil but can be used with most refined petroleum products.

The Dual Rod probe is available in Stainless Steel or a Hastelloy® option for corrosive environments.

The Dual Rod probe SPILL alarm is NOT changeable.

The use of an anchor cone is **mandatory**.

ClearView Probe

The stainless-steel ClearView probe is specifically designed for gas, diesel, home heating, lubricants and used oil.

The ClearView probe eliminates the bottom deadband, providing measurement at the end of the probe.

The ClearView probe has a variable SPILL alarm which allows for special requirements in applications such as Aviation Fuelers.

The use of an anchor cone is **optional**.

2.5 Fitting Kits

1" NPT Collar

Titan's NPT collar is welded to the top of the tank. The probe is threaded into the collar.

Anchor Cone

Titan's anchor cone is required to prevent excessive probe flexing and resulting damage to the probe or tank.

The anchor cone must be mounted directly in line with the top fitting to prevent bending the probe when installed. A bent or bowed probe produces inaccurate or false level measurements.

2.6 Wire Kit

The power, ground, and SV Bus wiring cable that connects to each TD100 Transmitter and is wired down the tank and connected inside your Titan Junction Box or directly into the FINCH III display.

High temperature cable is recommended be used with the FINCH III system. Cable diameter should be within 0.260” (6.6mm) to 0.545” (13.8mm) to maintain strain relief integrity.

2.3 Detection Modes

The transmitter and probe have two sensing options described as Standard Detection Mode and Performance Detection Mode. These choices in operating modes are offered for variations in fluid handling. If the operator is unsure which detection mode to choose, contact Titan Logix for guidance in choosing the correct detection mode.

Standard Detection Mode

Standard mode is suitable where the operator will be collecting more than one fluid in the tank.

Performance Detection Mode

In Performance Detection Mode, the transmitter continually learns from each new load and can sense differences in fluids, calibrating volume data accordingly.

When Performance Mode is enabled the TD100 learns from each load, sensing differences in the fluid, self-calibrates and measures the volume data accordingly.

To ensure correct data readings, the operator must allow for a minimum fill depth of 12” to accurately calibrate for changes in fluid type. This must be done when first using the system (commissioning), changing the fluid type, or when installing a new transmitter.

Performance Detection Mode requires a minimum probe length of 47.2” (120cm).

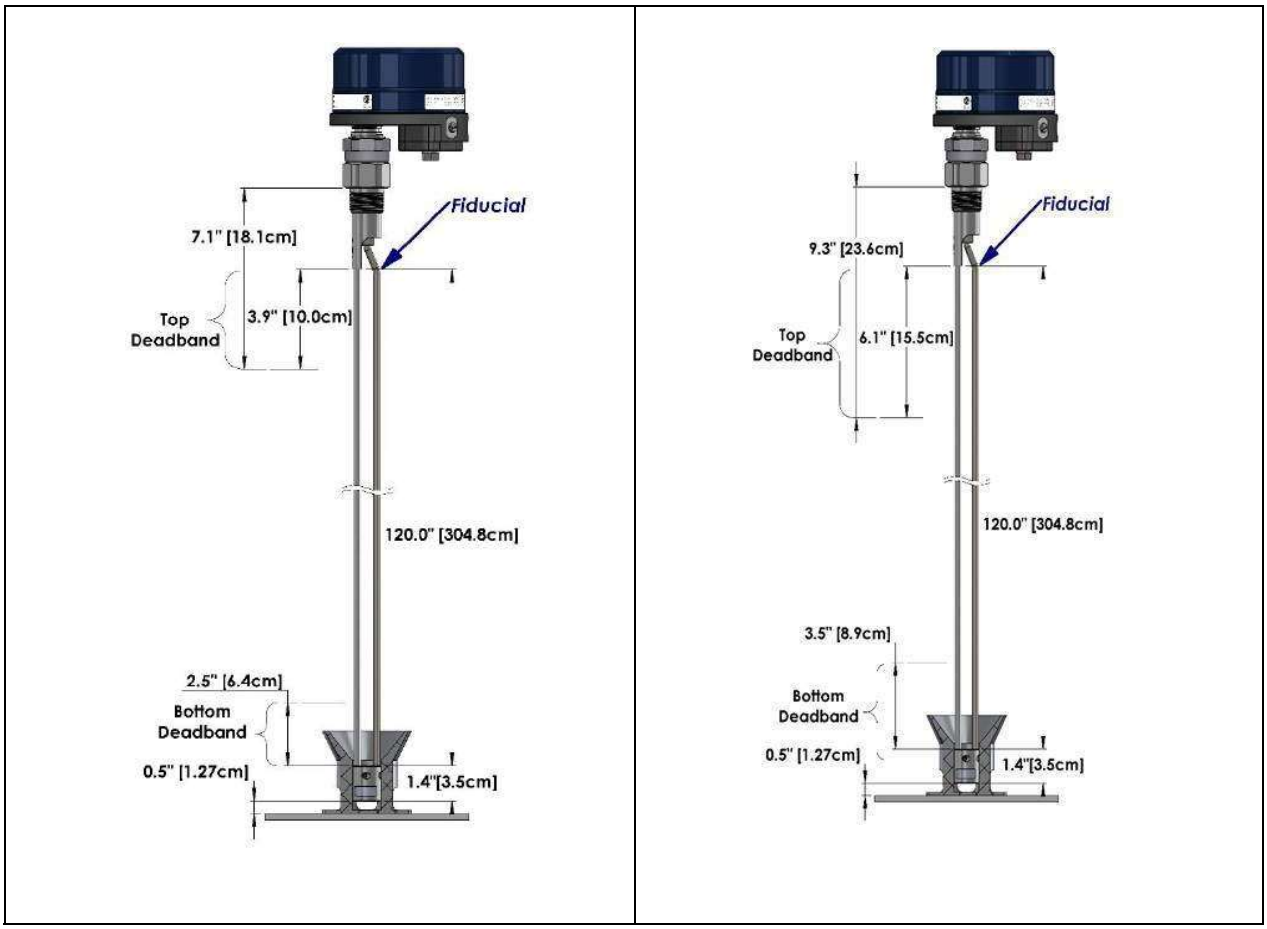
Deadband Regions

Physical limitations of the Guided Wave RADAR (GWR) create deadbands at the top and bottom of the probes where the transmitted pulses interfere with the reflected echo and inaccurate readings can occur.

Level measurements within the deadband regions are unreliable.

Dual Rod Probe Detection Modes & Deadband Regions

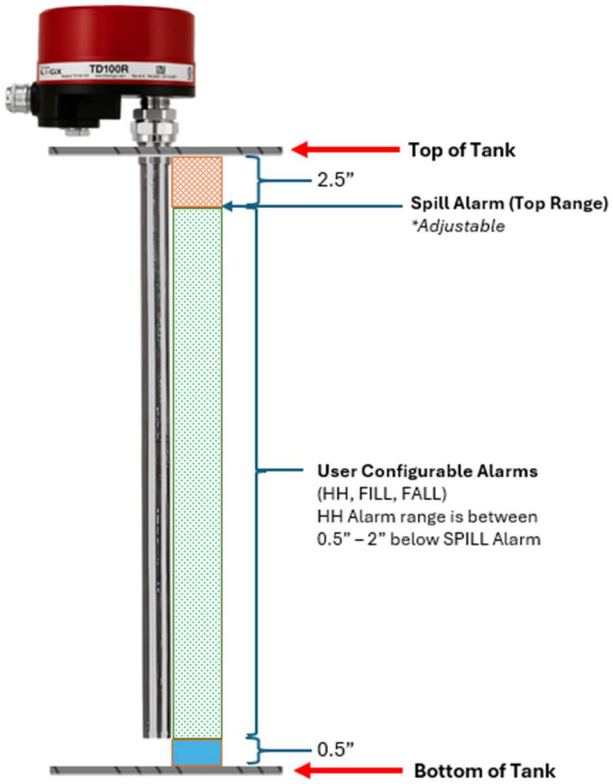
Performance Detection Mode	Standard Detection Mode
The bottom deadband region is 4.5” from the bottom of the tank.	The bottom deadband region is 5.5” from the bottom of the tank.
The top deadband region is 7.1” from the bottom of the probe nut.	The top deadband region is 9.3” from the bottom of the probe nut.



ClearView Probe Detection Mode & Deadband Regions

The ClearView Probe is only available in Performance Detection Mode.

Measurement is detected from the bottom of the probe. The top deadband region is 2.5” from the bottom of the probe nut.



	Top Deadband
	+/- 5 mm (0.197 in) of accuracy* *based on the strapping chart programmed into the transmitter
	Bottom Deadband *(required gap for installation)*

2.4 Relays

The FINCH III contains three independently controlled relays that can be controlled by alarms. When the alarm occurs then the corresponding assigned relays will respond.

Relays are fuse protected to limit short-circuit current. The relays have all contacts, Normally Open (NO), Normally Closed (NC) and Common (COM) contacts for power or signal control.

FINCH III sleep mode causes all relays to be de-energized (inactive). This must be considered when planning relay assignments and external alarm device operation.

Maximum Relay Capacity

Each individual relay can draw a maximum of 3.3A. (HORN, LIGHT, PUMP/AUX)

Fuse Rating is 5A for non-hazardous locations). All 3 relays can draw a maximum of 6.6A, with no individual relay drawing more than 3.3A.

RELAY MAIN Fuse Rating is 5A for non-hazardous locations.

FINCH III Relay Alarming States

Recommended Relay Connections	Relay 1 (PUMP)	Relay 2 (LIGHT)	Relay 3 (HORN)	Can ACK?
SPILL/Error	✓			NO
HH	✓	✓	✓	✓
FILL			✓	✓
FALL				✓
Status	De-Energize	Energize	Energize	

2.5 FINCH III Fuses

The FINCH III includes the correct rating and type of ceramic, sand filled fuses to ensure your system works to the most optimal capacity. Below are the FUSE information:

- **HORN, LIGHT, PUMP/AUX Fuses:** 5A
- **RELAY MAIN Fuse:** 5A
- **IS Board Fuse:** 630mA

To ensure system safety, fuses should **only** be replaced with the supplied by Titan Logix. You can order these fuses directly from Titan Logix Sales or replace a fuse with the spare fuse supplied on your PCB board.

3 Hardware Installation

When choosing a location to install the Titan Logix system, the following guidelines must be followed:

- Follow appropriate industry, national, state / provincial, and local codes.
- Vehicle manufacturers usually have specific locations for electrical power access. These locations are fuse protected to limit short-circuit current. Contact the manufacturer for the recommended locations prior to the electrical installation.
- As best practice and to prevent potential damage, ensure that equipment has warmed to room temperature and is powered down prior to opening the enclosure and servicing the equipment.
- Ensure that the tank is completely drained of liquid and vapour free.
- Do not install or repair the system where flammable gases and/or fumes may be present.
- When making connections to vehicle electrical ground, ensure that the wiring is terminated at a battery ground terminal.
- Ensure that fuses, cables and other components are appropriate for the area classification.
- **High temperature cable** must be used with the FINCH III system. Cable diameter should be within 0.260" (6.6mm) to 0.545" (13.8mm) to maintain strain relief integrity.
- Ensure electrical components are properly connected. Some metal components may be electrically insulated from the battery ground or bolted with painted surfaces causing a poor connection.
- Wire splices should be made inside a weatherproof enclosure.

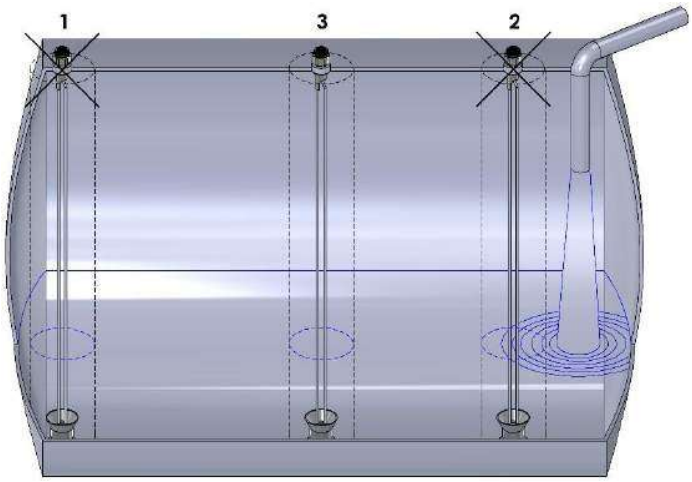
All hardware must be mounted and all cables connected before the system can be programmed using the Titan Install App to configure your system.

3.1 Pre-Installation Requirements

The nature of Guided Wave RADAR requires a 4" minimum diameter or 2" on each side clearance around the probe to be free of metal. The probe must be mounted at least 2" away from any internal pipes, fittings, and structural members. In-feeds, weirs, drains, and agitators may cause mechanical damage to the probe and could create turbulence that causes incorrect level measurements. The probe must be mounted as far as possible from turbulent areas of the tank.

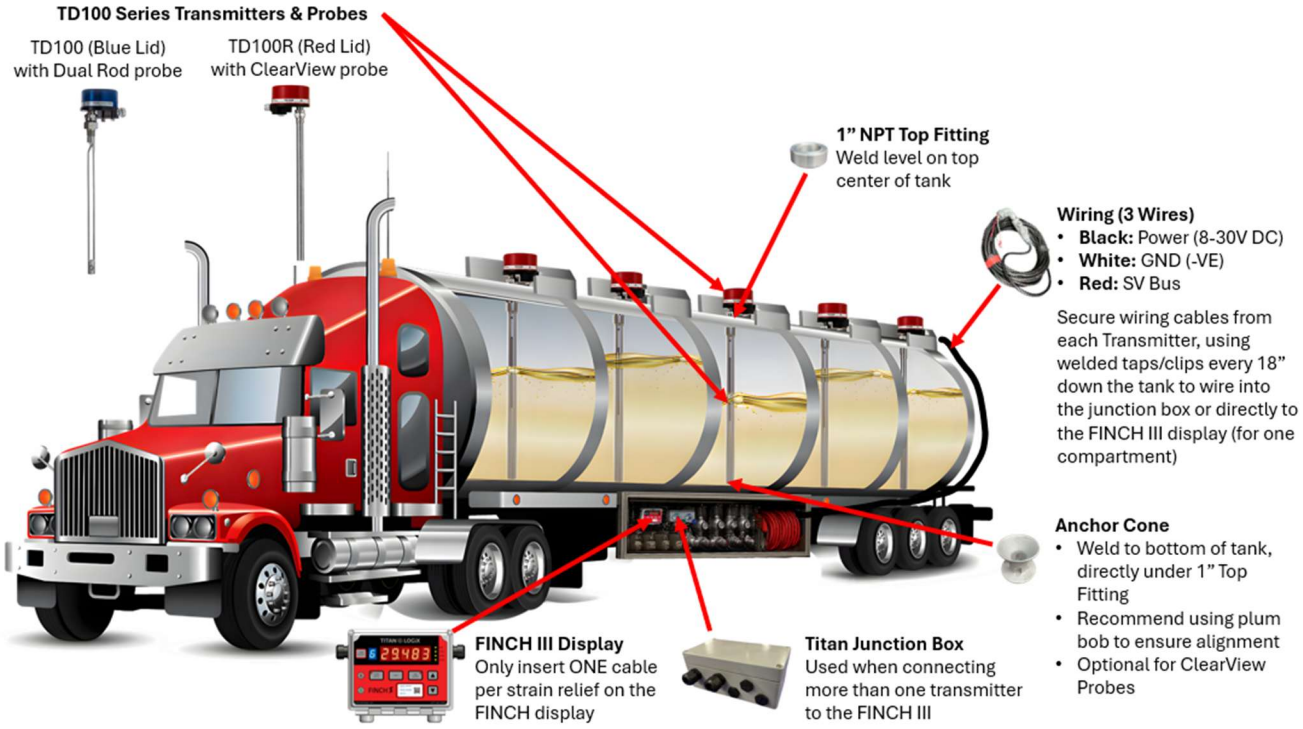
The diagram below shows what to look for when getting ready to install your probe inside your tank.

1. The probe is too close to the side of the tank (or other fittings).
2. The probe is too close to the tank infeed.
3. The probe is placed correctly. There is no interference within 2" of the probe.



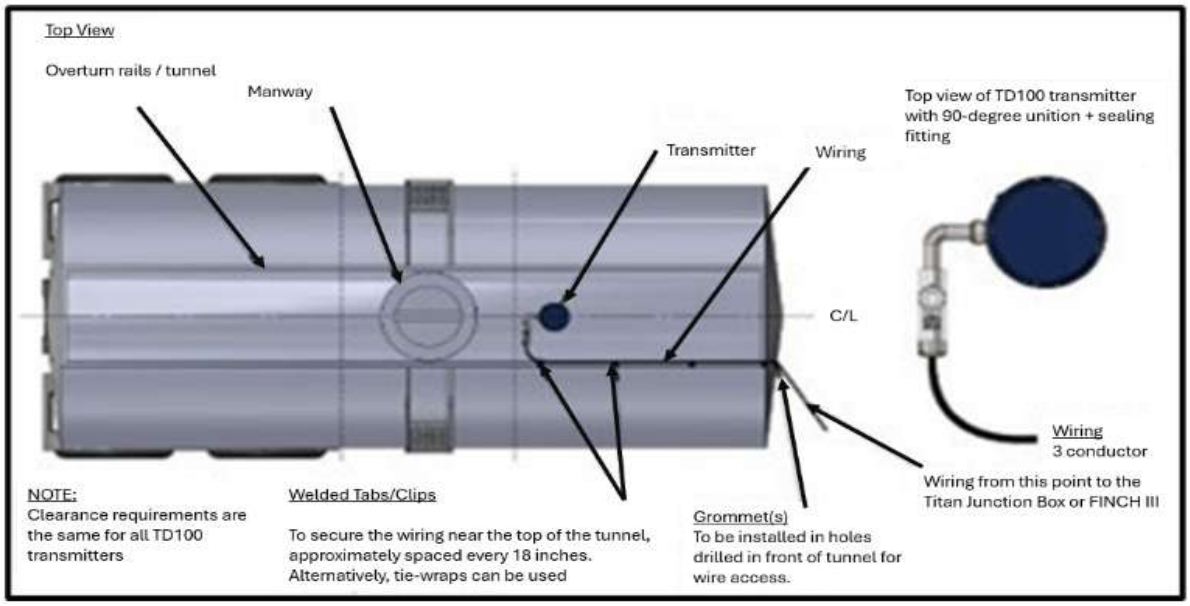
Titan System Side View Mounting

Below is an image that shows where the hardware is installed on a truck or trailer from the side view of the tank.



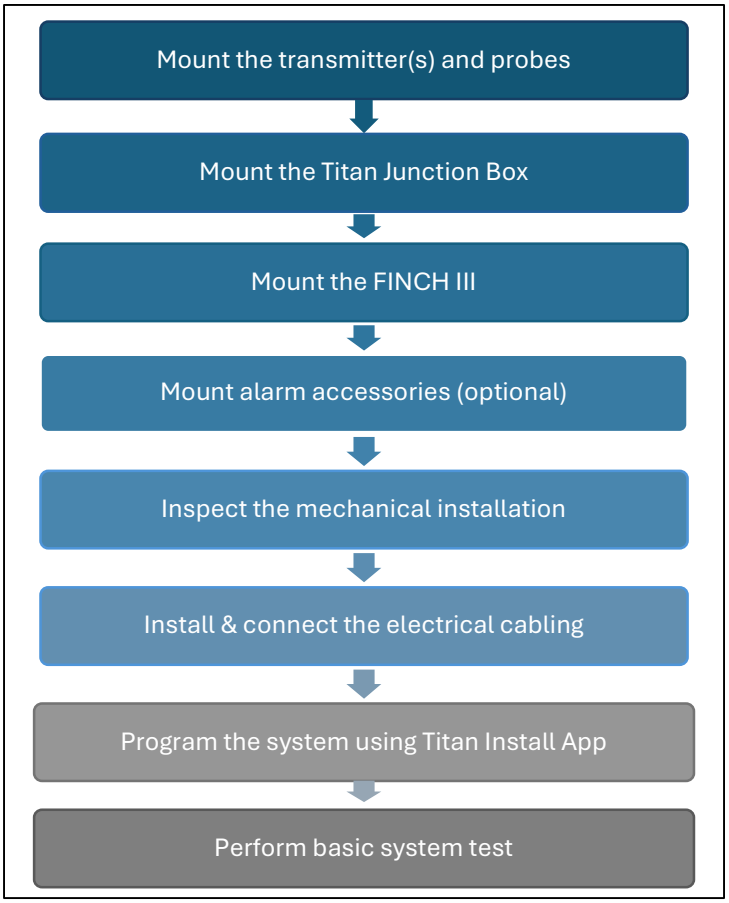
Titan System Top View Mounting

Below is an image that shows where the hardware is installed on a truck or trailer from the top view of the tank.



3.2 Installation Workflow

Below is a workflow to represent each step to take when installing your Titan System.



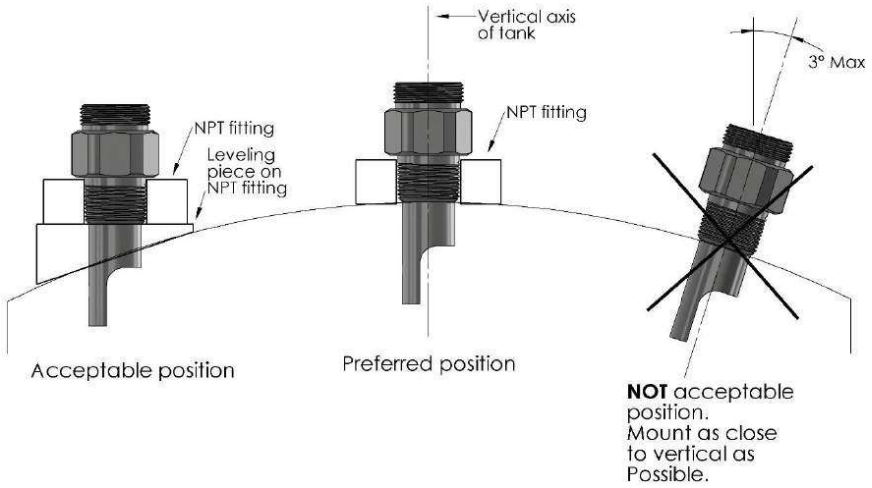
3.3 Weld Top Fitting

	**WARNING** It is recommended to use the Titan Logix supplied 1" NPT top fitting. Alternative fittings must **not** be longer than 1 ½". Fittings exceeding 1 ½" in length with an internal diameter of less than 4" interfere with the RADAR signal and prevent the TD100 transmitter from measuring the tank level or cause false level alarms.

1. Make a hole on the top of the tank where indicated by the manufacturing or installation drawings.
2. Ensure that the top fitting will allow the probe to hang vertically in the tank. If the tank has a curved top, a leveling piece may be required. This will prevent the probe from bending.

	**NOTE** Ensure the probe can hang vertically in the tank, within 3 degrees vertical to where the anchor cone is welded on the bottom of the tank. Tanks with curved tops may require a leveling piece to meet the required vertical position.

Refer to the diagram below that shows the acceptable position for welding the NTP Top fitting to the top of your tank when the tank is curved at the top. Your strapping table may require adjustments if your probe is not mounted in the center of the tank.



3. Weld the top fitting to the tank top, using a leveling piece if required.
4. Clean all debris from the threads of the top collar. This will prevent the probe from jamming during installation.
5. Ensure mounting hardware should not extend beyond 1.5” below the nut on the probe.

3.4 Weld Anchor Cone

It is recommended to use the Titan supplied anchor cone. The anchor cone is required to prevent excessive probe flexing which could damage the probe or tank. It must be mounted directly in line with the top fitting to prevent bending the probe when installed. A bent or bowed probe produces inaccurate or false level measurements. Alternative anchors must have an internal diameter of 1 ½” and be approximately 2” high.

The following steps describe the correct alignment of the top fitting and anchor cone for retrofit installations or where the positions are not accurately shown in a drawing.

1. From the 1” NPT Top Fitting, drop a plum bob down the tank to the bottom of the tank, to ensure the position of the anchor cone.
2. Mark the anchor cone position at the bottom of the tank, ensure that the anchor cone is aligned within 3 degrees vertical above where the top fitting is welded.
3. Weld the anchor cone in place.

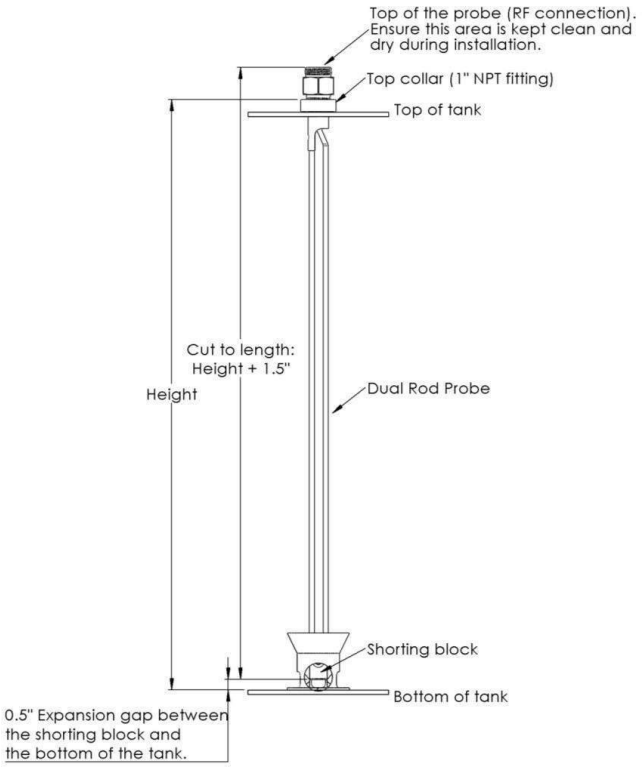
3.5A Probe Installation: Dual Rod

!	**NOTE** When using Performance Mode, the probe must be 47.2” (120cm) long.

The probe ships with a protective cap. Ensure the top of the probe is covered by the plastic cap it is shipped with. This cap must remain in place until the transmitter is mounted to protect from dirt, oil, and physical damage.

The probe is shipped longer than required to fit all installations. The installer must cut it to the desired length once the height of the tank is known.

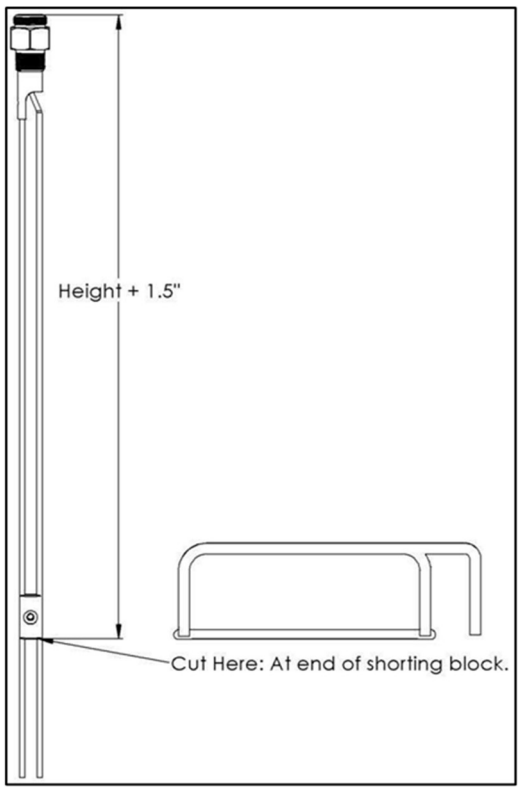
1. Measure the height from the bottom of the tank, inside the anchor cone to the top edge of the 1” NPT top fitting. Add 1 ½” to this height. This is the overall length of the probe. Temporarily remove the protective cap. Transfer the measurement to the probe, starting at the very top of the probe. Replace the cap before proceeding.



2. Loosen the screws, retaining the shorting block on the rods of the probe. Do not completely remove the screws.
3. Slide the shorting block up the probe until the bottom of the block is at the overall length of the probe when it is installed.
4. Tighten the screws (2) on the shorting block. Ensure that the rods are not twisted and then completely tighten the screws.

Cutting Probe

5. Use a hacksaw to cut off the rods at the bottom of the shorting block. For the Hastelloy® probe rods, a pipe cutter or die grinder is recommended.



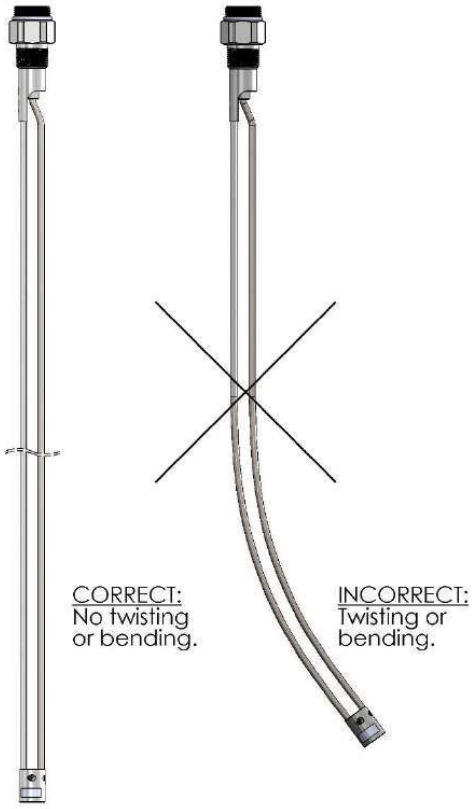
6. Use a flat file to remove any burs after cutting the rods. The ends should be smooth and flush with the shorting block.
7. Inspect the probe for any bends or twists. Loosen the shorting block to readjust the rods and then retighten once the rods are straight and parallel.
8. Inspect the threads on the probe and top fitting for damage or debris. Do not install the probe with damaged threads.
9. Apply Teflon tape or anti-seize compound to the 1” NPT threads that mate with the top fitting.
10. Carefully insert the probe through the top fitting, resting the shorting block inside the anchor cone.
11. Hand tighten the probe into the top fitting, then finish tightening with a 1 ¾” wrench.

Probe Inspection

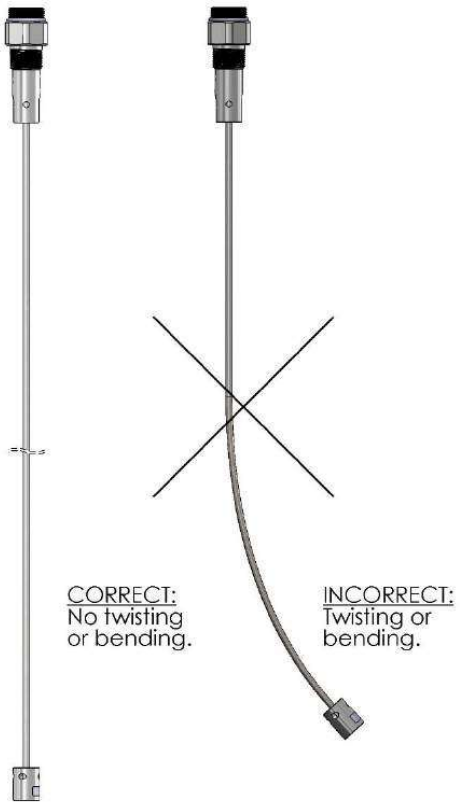
Once the probe is installed inside the tank, it is critical you inspect it before moving forward to ensure everything is installed correctly.

- Ensure that the probe is not bent or twisted after installation.
- Ensure that there is approximately a ½” gap between the shorting block and the bottom of the tank.

The probe has been cut to the proper length when it is fully threaded into the top fitting with a ½” gap between the bottom of the tank and end of the probe at the shorting block, inside the anchor cone.



Side view: Both rods visible.



Side view: One rod visible.

3.5B Probe Installation: ClearView

The probe ships with a protective cap. Ensure that the top of the probe is covered by the plastic cap it is shipped with. This cap must remain in place until the transmitter is mounted to protect from dirt, oil, and physical damage.

The probe is shipped longer than required to fit all installations. The installer must cut it to the desired length once the height of the tank is known.

The following parts are shipped with the ClearView probe:

1. ClearView Probe
2. Teflon Spacer
3. End Cap

Contact Titan Logix if any parts are missing or have been damaged during shipment.

⚠	**WARNING** • The Teflon spacer is required to stabilize the center rod and must be installed prior to applying the end cap • The end cap is required for the probe to accurately measure fluid to the bottom of the probe and must be in place prior to the probe being installed in the tank.

Probe Installation

The ClearView probe installation steps are as follows:

- Determine length of the probe
- Cut the outer probe tube
- Install spacer

- Cut the center signal rod
- Install end cap

Cut Tube

1. Measure the height from the bottom of the tank, inside the anchor cone to the top edge of the 1” NPT top fitting.
2. Add 1 ½” to this height. This is the overall length of the probe.
3. Temporarily remove the protective cap.
4. Transfer the measurement to the probe, starting at the very top of the probe. Replace the cap before proceeding.
    a. The probe length is measured from the bottom of the probe nut to the end of the ClearView probe tube. Ensure the bottom of the ClearView probe nut to the top of the mounting collar is considered when determining the probe length.

    b. The overall probe length should be cut ½" shorter than the distance from the bottom of the ClearView probe nut (top of the mounting collar) to the bottom of the tank or the bottom of the stabilizing cone, if installed.
5. Use a tube cutter to cut the outer tube – apply light pressure when using a tube cutter to minimize tube deformation.
6. Debur the cut edge of the outer tube, as shown in Figure 1, to ensure minimal material is removed when installing the spacer.

Figure 1 Debur cut end of tube

!	**NOTE** The ClearView probe will measure volume as soon as the fluid touches the bottom of the probe. If the fluid is below the probe the FINCH will display 2LO. It is important that the probe is cut to the correct length to get an accurate measurement of retained fluid.

Install Spacer

7. Slide the Teflon spacer onto the center rod.
8. Push spacer inside the outer tube flush with the tube end, as shown in Figure 2.

Figure 2 Install Teflon spacer flush with end of tube

Cut Center Signal Rod

9. Cut center signal rod flush with end of tube, as shown in Figure 3.
10. Debur center signal rod, as shown in Figure 4.

Figure 3 Cut center signal rod flush with end of tube

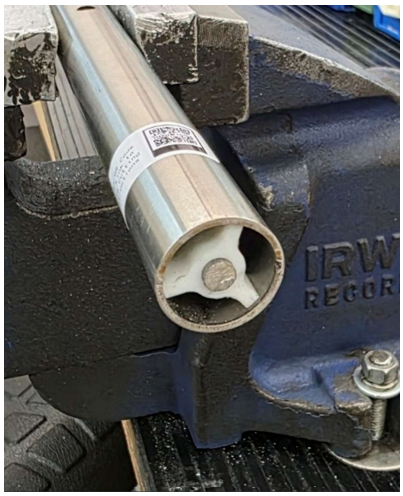


Figure 4 Center signal rod cut flush with end of tube

Install End Cap

11. Push the end cap onto the center rod until it is firmly seated against the end of the center rod, as shown in Figure 5. When properly installed, the crown of the end cap will extend slightly beyond the end of the tube and the spacer will be positioned approximately 4.5mm inside the tube.

Figure 5 End cap installed on center rod

The ClearView probe is now ready for compartment installation.

3.6 Transmitter Installation

Guided Wave RADAR requires a 4" minimum diameter around the probe to be free of metal. The probe must be mounted at least 2" away from any internal pipes, fittings, and structural members. In-feeds, weirs, drains, and agitators may cause mechanical damage to the probe. They will also create turbulence that causes incorrect level measurements. The probe must be mounted as far as possible from turbulent areas of the tank.

Ensure sufficient clearance between the transmitter and tank top mounted fittings, obstructions, or manway. Provide at least 4" of clearance around the transmitter. Consider the installation location for clearance of the large 1 ¾" wrench required to install the probe and transmitter. These components must be sufficiently tightened for safe and reliable operation.

When preparing to install the transmitter, carefully remove the orange protective cape. Ensure that the threads are not damaged. Inspect the transmitter and probe for dirt, oil, moisture, or debris.

Place the transmitter on top of the probe, supporting it with one hand while hand engaging the transmitter nut with the probe. Hand-tighten the transmitter nut and then use a wrench to secure the connection.

Continue to support the transmitter while hand tightening the transmitter nut until it is resting on the probe O-ring seal. Position the transmitter for the required cable routing. The angled sealing fitting and cable must not interfere with the tank top mounted fittings and manway.

Continue tightening the transmitter nut with a 1 ¾" wrench until the nut compresses the O-ring on the probe and the transmitter does not rotate on the probe when twisted by hand. The transmitter to probe connection must not have any movement to operate properly.

WARNING

- Do NOT apply Teflon tape or anti-seize compound to the transmitter threads.
- Do NOT apply dielectric grease to the transmitter and probe connection. This must be a clean and bare metal-to-metal connection.
- All electrical grounding is to the vehicle or trailer electrical ground connection and not to the chassis.
- Seal shall be installed within 2" (50 mm) of enclosure for unmodified Titan wire kit for hazardous locations. Not including the Acidic Atmospheres – Ketones and Halogenated Hydrocarbons.

	**CAUTION** • To maintain explosion-proof protection, replace the transmitter if the terminal cover or terminal cover area on the transmitter base becomes dented or scratched. • Replace the transmitter if the threads for the transmitter lid become damaged, to maintain explosion-proof protection.

	**NOTE** Be sure to note the serial numbers and the order of each transmitter being installed. This information is required for programming the system in later steps.

3.7 Mounting the FINCH III

Attach the mounting tabs to the back of the FINCH III display.

Ensure that the unit is:

- Installed in a location that does not exceed Class 1, Div. 2 hazardous area classification.
- Mounted in a cabinet or protected area, shielded from wheel spray and stones.
- Not operated at temperatures less than -40°C and greater than +55°C.

3.8 Mount the Titan Junction Box

The Titan junction box is **required** for installations with **2 or more** compartments. The Titan Logix junction box is designed to support up to 6 compartments with one FINCH III. The junction box can also aid in troubleshooting the system if required. Mount the junction box in a location that is recommended by the tank manufacturer and according to company procedures. For ease of configuration and troubleshooting, it is recommended that the Titan Logix junction box is installed in a location that can be accessed at ground level.

To ensure reliable and secure connections, it's recommended that ferrules be attached to the wires that terminate into the junction box.

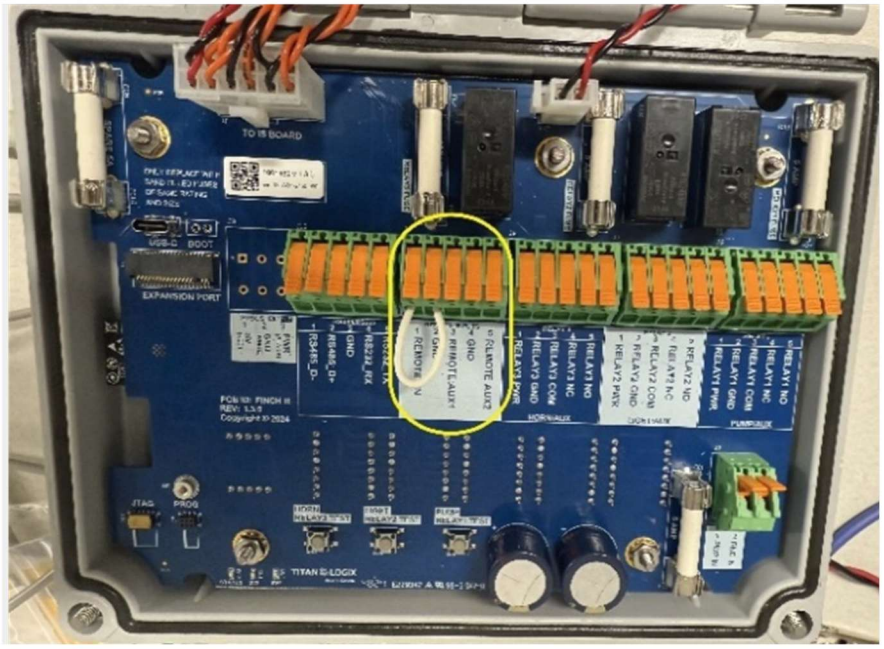
4 Electrical Installation

4.1 FINCH III Display Overview

The FINCH III display is made up of two PCB boards, the main PCB which is located on the door, and a Lower Intrinsically Safe (IS) PCB board within the box.

Terminals on FINCH III are identified by the name of the connector group.

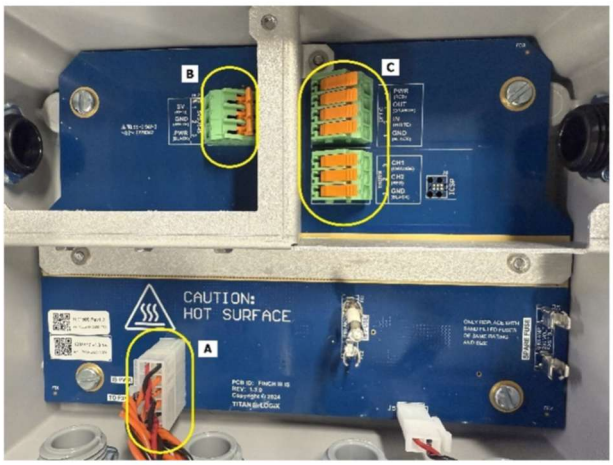
Main PCB



The Main PCB Board (on the door of the FINCH III) will connect to Relays, Remote Input, RS485/RS232, and Power and Ground connection.

FINCH III is preinstalled with a jumper wire between DISPLAY EN and GND to allow the FINCH III display to stay on while in use. This jumper can be removed and connected directly to a PTO as well, depending on the configuration you would like.

Lower (IS) PCB

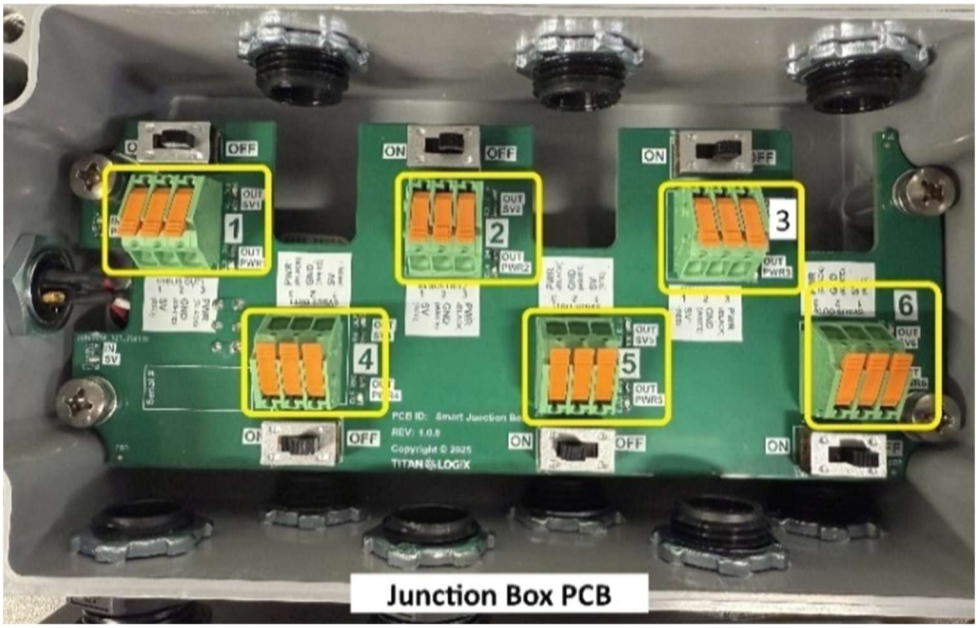


The lower PCB Board (on the base of the FINCH III) connects to the Junction box or directly to a transmitter (for 1 compartment installations). The other terminal blocks connect to either the thermistor or optic sockets. FINCH III provides intrinsically safe (IS) power to the transmitters.

- Connect A to the FINCH III main (upper) board with the ribbon cable.
- Connect B to Junction Box (for 2-6 compartments) or directly to the transmitter for a single compartment setup.
- Connect C to any industry standard Optic and Thermistor API sockets. This is only used with rack loading trucks and trailers. If you do not require rack loading, Connect C will be left blank.

4.2 Wiring to the Junction Box

For installations with more than 1 transmitter, the Titan Junction Box is required to be installed. The Terminal blocks on the junction box are numbered to represent the transmitter it will be connected to.



Junction Box PCB

The Titan Junction Box was designed to allow you to either run cables all from one side of the junction box, or you can use both sides of the junction box to run the wires.

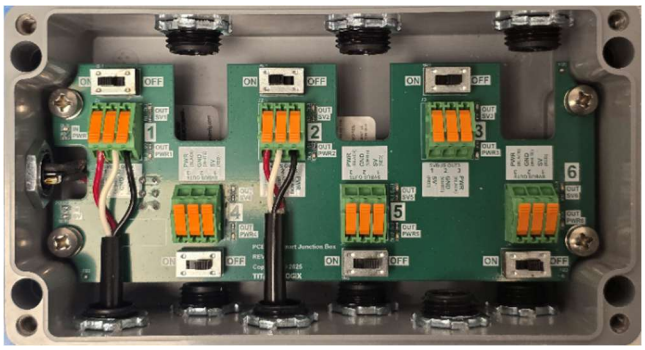
Ensure that there is only one cable per gland. One side of the Titan Junction Box includes three strain reliefs, and the other side includes 6 strain reliefs, providing you with the option to have the wire cables all going into one side of the Titan Junction Box or having the wire cables going through strain reliefs from both sides of the box.

Junction Box Wiring

Connect the terminals on the lower board to Junction Box / Transmitter (for single compartment).
On the lower PCB, locate the SVBUS-IS terminal

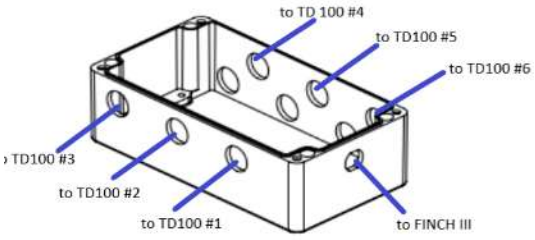
- Connect SV (RED) to 1 - SVBUS on the junction box
- Connect GND (WHITE) to 2 - GND on the junction box
- Connect PWR (BLACK) to 3 – PWR

Wiring 2 to 3 Compartments



The cables can be pushed through the cable glands as indicated and attached to terminal blocks labeled 1, 2, 3.

Wiring 4 – 6 Compartments (Using Both Sides of Junction Box)



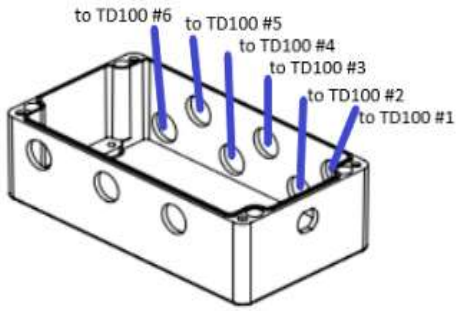
When using both sides of the Titan Junction Box to connect more than 3 transmitters, you are able to only use the upper strain reliefs to connect to the PWR, GND, and SV terminal blocks. This way doesn't require you to push wires from underneath the PCB board and loop them through. See steps below for those instrctions.

Wire compartments 1, 2 and 3 from one side of the Titan Juntion Box that has the 6 available strain reliefs available. Only use the UPPER three strian reliefs to connect directly to the respective Comp 1 – 3 PWR, GND, and SV terminal blocks.

For the remaining compartments, use the upper strain reon the opposite side of the Titan Junction Box.

Thread each cable through the strain reliefs as per the diagram (TD100 #4, #5, #6).

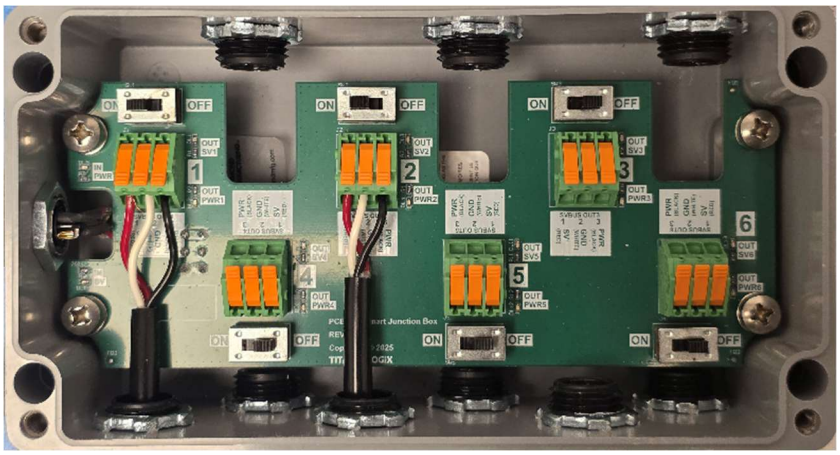
Wiring 4 – 6 Compartments (Using ONE Sides of Junction Box)



Wire compartments 1, 2 and 3 as in (a) above.

To connect compartment 4, 5 and 6, push the cable through the cable glands, under the PCB, and pull it up gently through the cutout. Attach cable to the appropriate terminal block.(4, 5, 6)

Push under the PCB, and pull it up gently through the cutout. Attach cable to the appropriate terminal blocks (4, 5, 6).

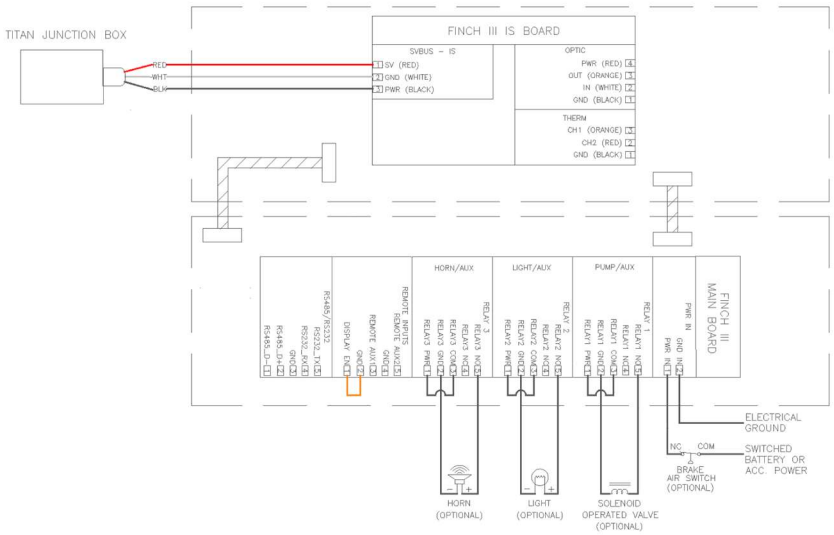


!	**NOTE** The wiring order for the top row of terminal connectors (1, 2 and 3) is SV (red), GND (white) and PWR (black). The bottom row of terminal connectors (4, 5 and 6) is reversed PWR (black), GND (white) and SV (red). If the FINCH display is showing dashes (------) review the wiring to ensure that the wires are in the correct order

!	**NOTE** Make note of serial numbers of the transmitters installed in each compartment. It is best practice that compartment one on the trailer (closest to the front of the trailer) is wired into the first (1) connector in the junction box.

After programming is completed in the later steps, LEDs on the connected terminals within the junction box will light up. This indicates communication is active between the junction box and the TD Transmitter.

FINCH III wiring schematic to Titan Junction Box



*Schematics for other configurations are available https://help.titanlogix.com/

STEP 1:

Connect truck **POWER** source to GND and PWR

Locate a switched and fuse protected source of electrical power.

Pass the power cable from vehicle through a strain relief (gland) and connect it to power and ground as on the FINCH III. Tighten the strain relief until the cable cannot be pulled, leaving enough cable inside to open the door.

- **TRAILERS:** connect the FINCH III power and ground to the nose box or junction box electrical connector.
- **TANK TRUCKS:** connect the FINCH III power and ground to a switched accessory power connection from battery. A switched electrical power source is needed to prevent battery drain while not in operation.

STEP 2:

Enable **DISPLAY EN:** Connections on REMOTE INPUTS terminal

- Wire REMOTE IN: (1) DISPLAY EN to (2) GND.

Note: This configuration is pre-installed on FINCH III from the factory. Other installation options are available, such as connecting to PTO, vents, etc, and can be configured using one of our Titan approved solutions available on help.titanlogix.com site.

STEP 3:

Optional REMOTE ACK push button: Connection on the REMOTE INPUTS terminal.

- Wire REMOTE IN: (1) REMOTE AUX to one terminal of the Normally Open push button switch.
- Wire REMOTE IN: (2) GND to the other terminal of the push button switch.

4.3 Relay Wiring

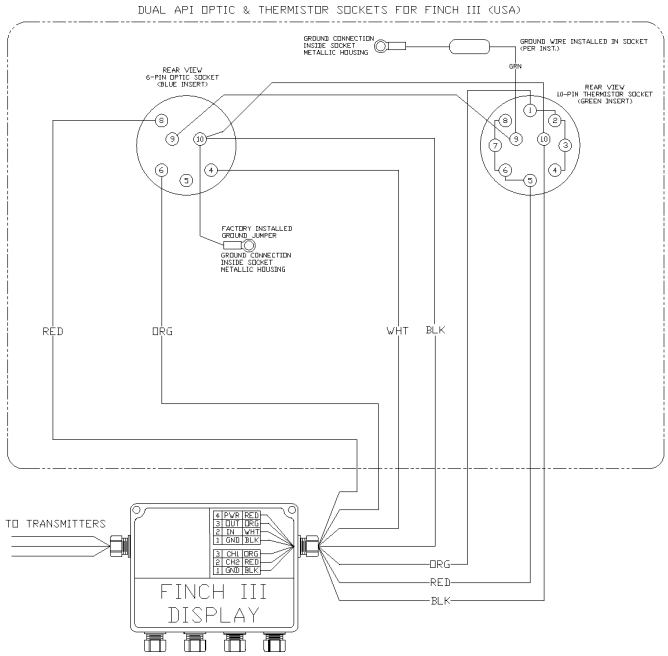
Optional **HORN**: Connections on RELAY 3 terminal

- RELAY3 PWR to RELAY3 COM
- RELAY3 NO to HORN (+)
- RELAY3 GND to HORN (–)

4.4 Rack Loading Wiring

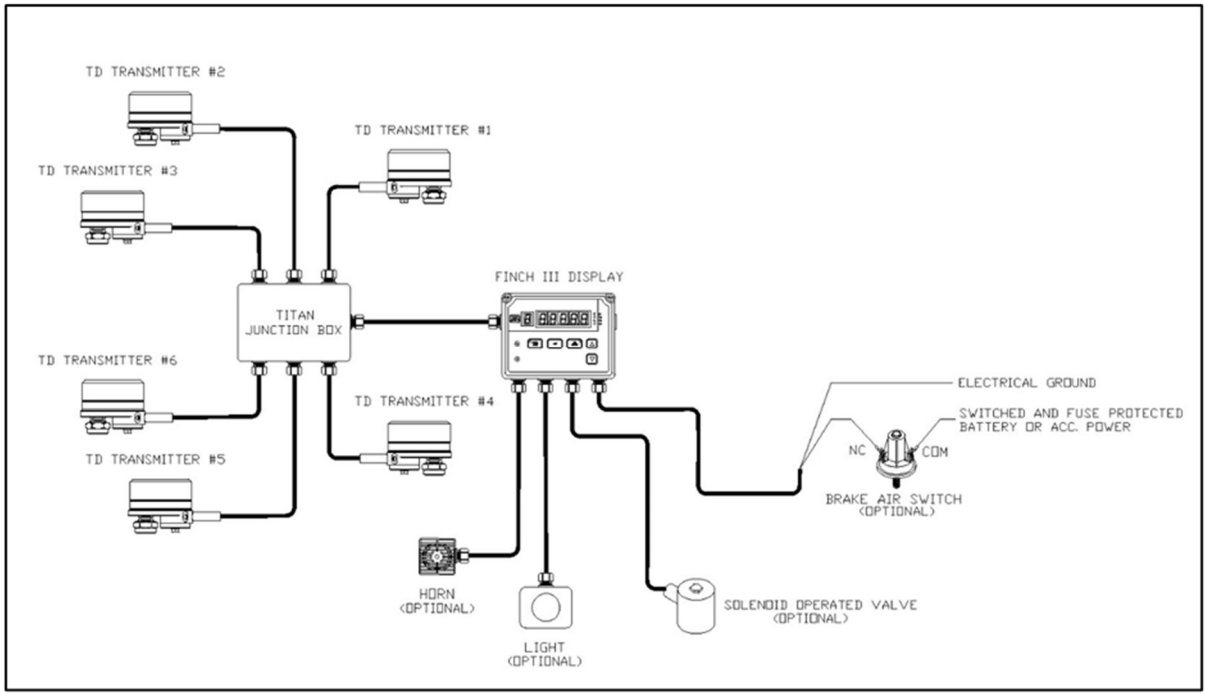
For rack loading trucks and trailers, OPTIC and THERM connections can be made directly to API sockets.

FINCH III wiring schematic to API Dual Socket



*Schematics for other configurations are available https://help.titanlogix.com/

FINCH III, Titan Junction Box, 6 Transmitters



5 System Configuration & Testing

After hardware is installed and configured using Titan Install App, the system must be tested to ensure correct functioning before being used in the field.

5.1 System Configuration

After the hardware installation is completed, the FINCH III is configured using the Titan Install app. There are NO manually adjustable settings within the FINCH III device. All configurations and adjustments must be made using the Titan Install App.

Titan Install software can be downloaded on the iOS and Google app stores.

- Before turning on system power, perform a mechanical inspection.
- When powering the Titan Logix system via a 120V outlet use a fixed power supply that can supply up to 9A at 12V.
- Ensure adequate slack in the cables and then tighten all compression fittings. ONLY ONE wire is allowed to go into each strain relief, which ensures the proper seal required for no water to get inside the unit.

5.2 Basic System Testing

If testing a system which is programmed with the performance mode, operator must allow for a **minimum fill volume of 12”** (tank) to accurately calibrate for any changes in fluid type. This must be done when first using the system or changing the product type. Probe length for accurate sensing in this mode must be a minimum of 47.2” (120cm).

Shorting the probe:

!	**NOTE** This is a basic operational test and will not produce as accurate results as a water calibration. (See below for Water Calibration steps)

For dual rod probes, run your hand along the probe to check the volume display and alarm settings. If the probe is not within reach, use a metal rod to short the two probe rods together. Volume displayed will increase as the hand or shorting rod moves toward the top of the compartment. The volume displayed will decrease as the hand or shorting rod moves toward the bottom of the compartment.

For coaxial probes, insert a small metal rod into the holes or slots along the probe. Short the center rod to the outer tube to check the volume and alarm settings. The volume displayed will increase as the shorting rod moves toward the top of the compartment. The volume displayed will decrease as the shorting rod moves toward the bottom of the compartment.

B) Water Calibration

For a more accurate volume, water calibration using a flow meter is the recommended way to test a new installation.

6 HARDWARE TECHNICAL SPECIFICATIONS

6.1 FINCH III Technical Specifications

Category	Specification
Power	8-30 VDC (recommend 12 VDC)
Current Consumption	1.4A Min, 9A Max (3A to 12A)
Fuse Ratings	5A (MAIN, HORN, LIGHT, PUMP/ENGINE) 630mA (IS fuse) The transmitters are powered from the IS barrier
Relay Ratings	• 3.3A Max on any individual relay • 6.6A Max across all 3 relays
Ambient Temperature Range	-40°C to +55°C
Humidity	RH 95% max
Altitude	2000 m above sea level
Environment/Enclosure	Flame Retardant Fiberglass, Weatherproof Type 4X
Communications	RS-232, TD100 SVBus 4-20 mA and Bluetooth
Approvals	Class I, Div. 2, Groups C & D, T4 [Ex ia] ASSOCIATED EQUIPMENT • Uo = 11.055, Io = 1.99A, Po = 9.43W, Co = 13.2uF, Lo = 35.9uH • Ui = 14.5V, Ii = 250mA, Pi = 0.7W, Ci = 2.4uF, Li = 0uH
Pollution degree	2 (micro)
Installation Category	I
Overvoltage Category	II
Use	Suitable for Indoor or Outdoor use
Dimensions	• **Width:** 8.5” (215.90 mm) • **Depth:** 4.29” (108.97 mm) • **Height:** 7.47” (189.74 mm)

6.2 TD100 Transmitter Technical Specifications

The technical specifications are for both the TD100 (Blue Lid) and TD100 (Red Lid).

Category	Specification
Power	8-30 VDC (recommend 12 VDC)
Current Consumption	125mA max @ 12V DC
Ambient Temperature Range	-40° F (-40° C) to +167° F (+55° C)
Firmware Version	TD100 Transmitters must be upgraded to at least 6.x firmware to be compatible with FINCH III displays.
Hazardous Area Approvals	Class I, Div. 1 (with explosion-proof seal) Class I, Div. 2 (without explosion-proof seal)
Communication	SV Bus 4-20mA
Weatherproof	Type 4/4X, NEMA 4/4X Paired with Titan Probes
Dimensions	• **Width:** 5.44" (138.18 mm) • **Depth:** 5.44" (138.18 mm) • **Height:** 4.43" (112.63 mm)

6.3 Dual Rod Probe Technical Specifications

Titan Logix has two different dual rod probes available, based on the liquid you are hauling.

Category	Stainless Steel Specification	Hastelloy Specification
Metal Type	316-L Stainless Steel	Hastelloy C-276 alloy
Fluid Type	High viscosity fluids, such as: • Crude Oil • Asphalt • Molten Sulfur	Corrosive fluids and acids, such as: • Corrosive Chemicals • Hydrochloric Acid
Titan Solution	Titan TrueFill Core	Titan TrueFill Guard
Length	8’ or 10’	8’
Transmitter Compatibility	TD100 (Blue Lid)	
Top Deadband	Measurement starts at the bottom of the probe nut. • Standard Detection Mode: 9.3” • Performance Detection Mode: 7.1”	
Bottom Deadband	Measurement includes the 0.5” installation gap at the bottom of the tank. • Standard Detection Mode: 5.5” • Performance Detection Mode: 4.5”	
SPILL Alarm	Not Adjustable	
HH Alarm	Adjustable Can be set to 0.5” below SPILL	
Retain Alarm	Not Available	

6.4 ClearView Probe Technical Specifications

Titan Logix has a probe for refined petroleum trucks.

Category	Stainless Steel Specification
Metal Type	316-L Stainless Steel
Fluid Type	Refined petroleum and other low viscosity fluids, such as: • Gasoline, Diesel, DEF, & Jet Fuel • Waste Oil • Lubricants • Produced, Potable, and Waste Water • Non-Corrosive Chemicals
Titan Solution	Titan TrueFill Pro
Length	8’
Transmitter Compatibility	TD100 (Red Lid)
Top Deadband	Measurement starts at the bottom of the probe nut. 2.5”
Bottom Deadband	0.5” installation gap at the bottom of the tank
SPILL Alarm	Adjustable
HH Alarm	Adjustable Can be set to 0.5” below SPILL
Retain Alarm	Configurable

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