TITAN TRUEFILL PRO SYSTEM

HARDWARE INSTALLATION GUIDE

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CONTENTS

1 INTRODUCTION

1.1 About this Manual

This manual provides installation and operational information for the Titan Logix TrueFill PRO system, designed specifically for the refined petroleum market.

Titan Logix equipment **must** be installed, operated, and maintained only in accordance with the instructions provided in Titan Logix manuals, application notes, and other related documentation from Titan Logix. If installation or operation falls outside the scope of this documentation, contact **Titan Logix Technical Support** before proceeding.

Documentation for optional equipment or third-party peripheral systems is not included in this manual. Refer to the documentation supplied by the respective equipment manufacturer for installation and operating instructions.

Additional documentation and product resources are available from the **Titan Logix Help Center:** (***help.titanlogix.com***).

1.2 Safety Information

WARNING

Installation, operation and service of this equipment must be performed only by qualified personnel familiar with the equipment and applicable safety and electrical regulations.

Failure to follow the instructions provided in this manual may result in equipment damage, personal injury, or loss of life.

CAUTION

Improper or unintended use of this product, including operation outside the conditions described in any Titan Logix's product documentation, may impair the protection provided by the equipment as well as void the warranty.

Installation, operation and service of this equipment must be performed only by qualified personnel familiar with the equipment and applicable safety and electrical regulations.

Failure to follow the instructions provided in this manual may result in equipment damage, personal injury, or loss of life.

1.3 Hazardous Location Requirements

WARNING EXPLOSION HAZARD

- Substitution of components may impair suitability for **Class I, Division 1** locations.
- Do **not** disconnect equipment or replace fuses unless power has been switched off and the area is known to be non-hazardous.
- Install equipment in accordance with **Drawing 1001516_DME**.
- Maximum non-hazardous voltage must **not** exceed **30V**.

Certification Requirements

To maintain certification and safe operation:

- Each relay must be supplied with **8–30 VDC, 3.3A maximum transient-protected power** to maintain the **Class I, Division 2 rating**.
- Replace fuses only with Titan Logix's sand-filled fuses of the same type and rating.
- The FINCH III system requires high-temperature cable.
- Cable diameter must be within 0.260 in (6.6 mm) to 0.545 in (13.8 mm) to maintain proper strain relief integrity.

- Connections that introduce additional electrical transients into the power supply circuit are not permitted.

	**CAUTION – STATIC IGNITION HAZARD** Non-metallic enclosure components may present a static ignition hazard. Clean the enclosure only with a damp cloth and install the equipment in a manner that prevents static charge buildup caused by airflow, non-conductive process flow, or friction.

1.4 Service and Repair

	**CAUTION** FINCH III is an intrinsically safe associated apparatus and contains **no user-serviceable internal components**.

Field repair of Titan Logix equipment is **not** recommended. If service is required, contact **Titan Logix Technical Support** for guidance and to determine if service is required.

Temporary or emergency field repair of damaged cables or wiring may be performed if necessary; however, the affected cable or wiring must be replaced at the earliest opportunity.

1.5 Warranty

Use of unauthorized parts, improper wiring, or any modifications not approved by Titan Logix Corp. will **void** the manufacturer's warranty.

All installations must follow Titan Logix specifications and installation guidelines to maintain warranty coverage.

1.6 System Overview

The **FINCH III display** is the latest part of the Titan Logix mobile liquid measurement system designed for continuous tank level monitoring and overfill protection in mobile tank applications.

The system uses **Guided Wave Radar (GWR)** technology to continuously measure liquid level inside the tank. A radar pulse is transmitted along the probe toward the liquid surface. The reflected signal is returned to the transmitter, which calculates the liquid level and corresponding volume. This information is then transmitted to the FINCH III display.

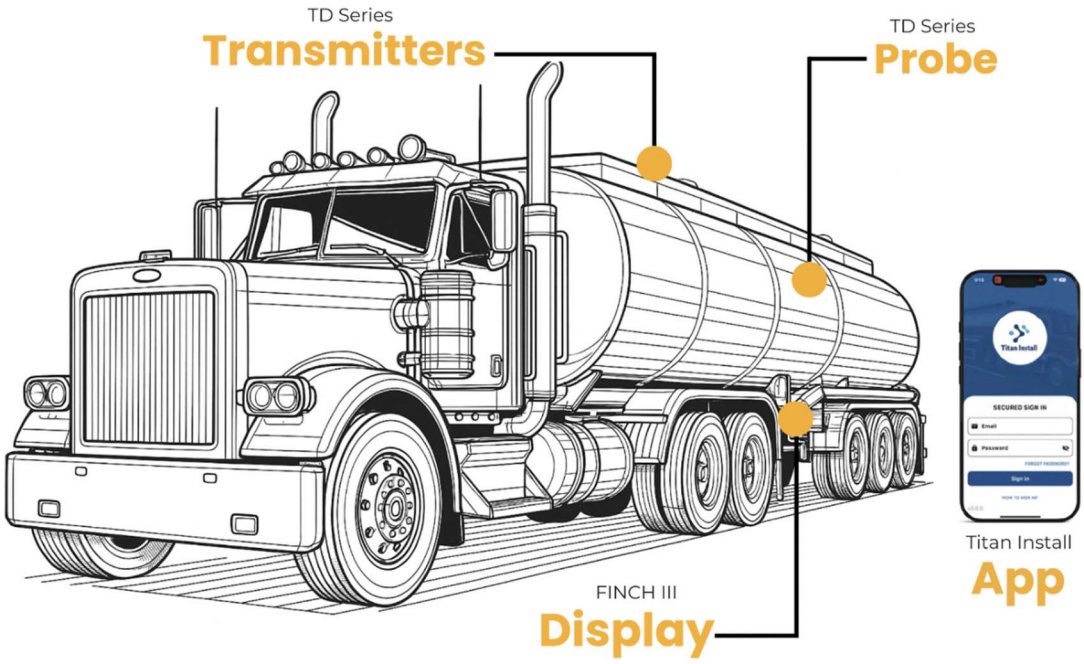
The Titan Logix system operates without any moving parts, reducing mechanical wear and maintenance requirements.

System Components

A **Titan TrueFill PRO system** consists of the following components:

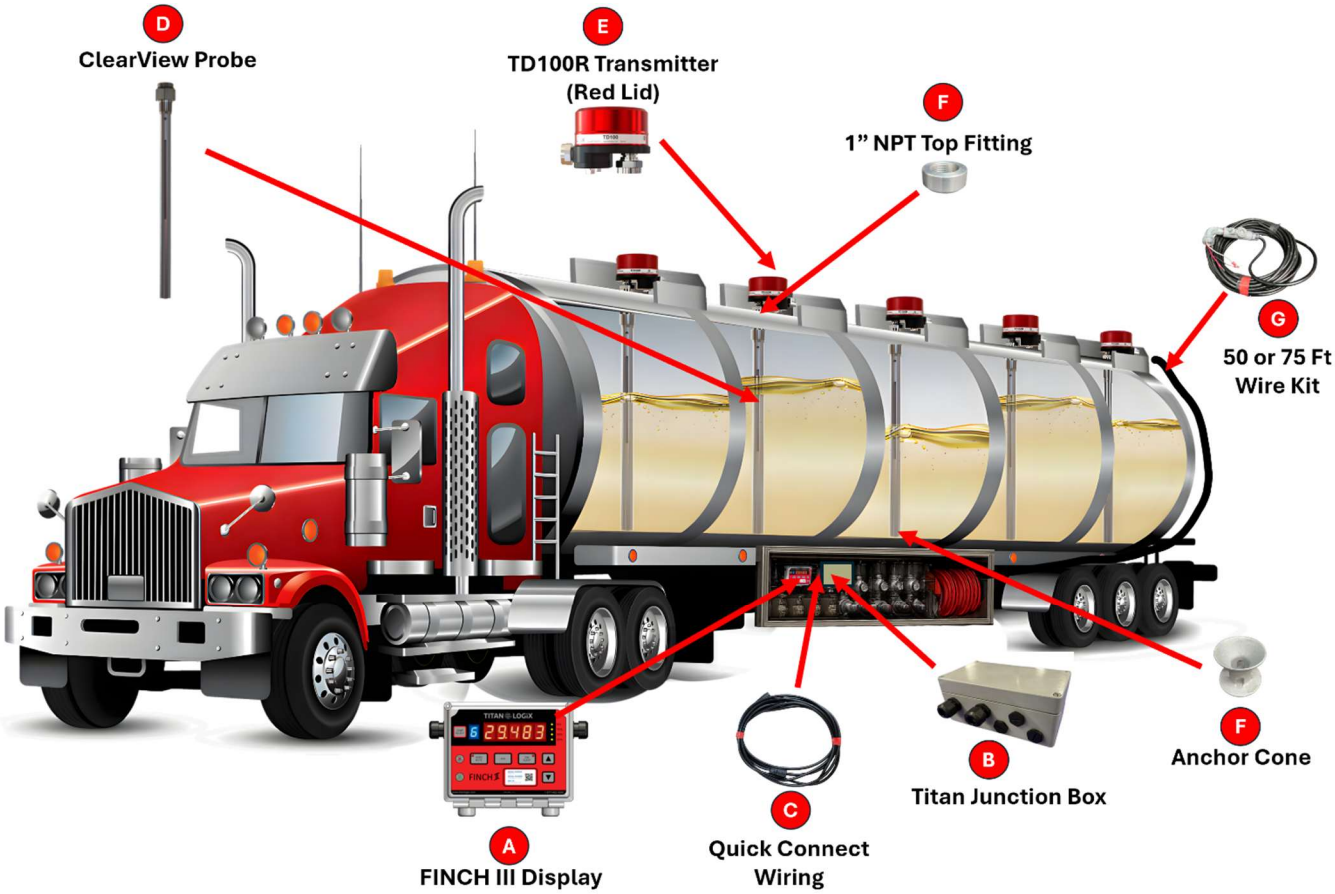
- **TD100R Transmitter** (Red lid) for each tank compartment
- **ClearView Probe** for each tank compartment
- **FINCH III Display** for level and volume indication
- **Titan Junction Box** (required for 2+ compartment tank installations)

	**IMPORTANT** System configuration and programming are performed using the Titan Install App and Titan Portal platform.


TD Series
Transmitters
TD Series
Probe
FINCH III
Display
Titan Install
App

2 HARDWARE COMPONENTS

The following components make up the **Titan TrueFill PRO system**.



A. 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 the liquid level volume within the compartment in real-time, any active alarms, as well as error codes that apply for that specific compartment. A single FINCH III display can support up to six compartments on a single tanker.

Three high powered relays can be customized to indicate SPILL, High-High, FILL/FALL alarms and Error codes using external devices such as overfill prevention valves, lights, horns, and pump controls.

B. 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.

The Titan Junction Box is **required** for 2 or more compartment systems.

C. Quick Connect Wiring

Titan Logix's 15ft wire kit that includes a Quick Connect connection to the Titan Junction Box and the FINCH III display.

This is required wiring if using a Titan Junction Box.

D. ClearView Probe

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 1in NPT top fitting and anchor cone.

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** when using the ClearView probe.

E. TD100R Transmitter

Titan Logix has 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.

The TD100 (Red Lid) is only compatible with the ClearView probe and is specifically tuned for gasoline, diesel, home heating oil, lubricants and used oil.

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 a Titan supplied probe and supports level measurement of a wide range of liquids. The hardware is wired together to allow the transmitter to send the FINCH III display both level information and alarm states.

TD100 is rated for use in hazardous locations where explosive fumes may be present.

F. Fitting Kit

1in NPT Top Fitting

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.

G. 50 or 75 Ft Wire Kit

The power, ground, and SV Bus wiring cable connects to each TD100 Transmitter and is wired down the tank and connected inside your Titan Junction Box (2-6 compartments) or directly into the FINCH III display (1 compartment) installations.

High temperature cable is recommended to be used with the FINCH III system.

3 PRE-INSTALLATION CHECKLIST

Before installing the **Titan TrueFill PRO system**, verify the following:

- ✓ All applicable **industry and local regulations** are followed.
- ✓ All **fuses, cables, and electrical components** meet the required **hazardous area classification**.
- ✓ The **tank is fully drained and vapor-free**. Do not install or service equipment in the presence of **flammable gases or vapors**.
- ✓ Electrical connection points are verified with the **vehicle manufacturer**. This will limit short-circuit current when powering the Titan TrueFill system.
- ✓ Wiring connections can be terminated at the **battery ground terminal**.

!	**NOTE** All hardware must be installed and wired before the system can be configured using the **Titan Install App**.

3.1 ClearView Probe Placement

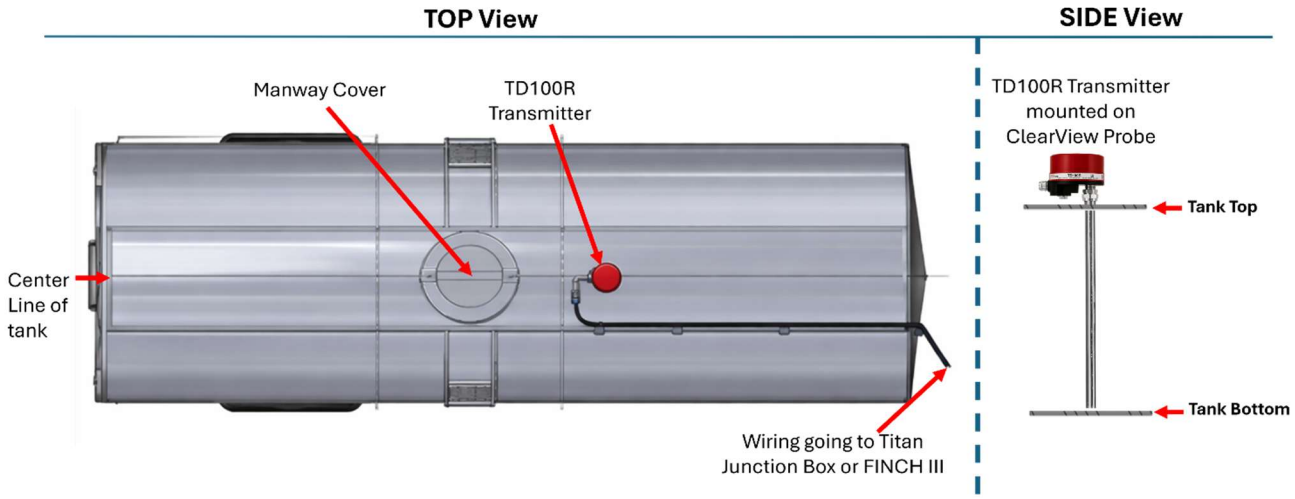
Proper probe placement is essential for accurate **Guided Wave Radar (GWR)** measurement. The specific clearance varies based on the specific probe being installed.

ClearView Probes have a thick outer tube protection, which allows more leeway with the amount of clearance it requires within the tank.

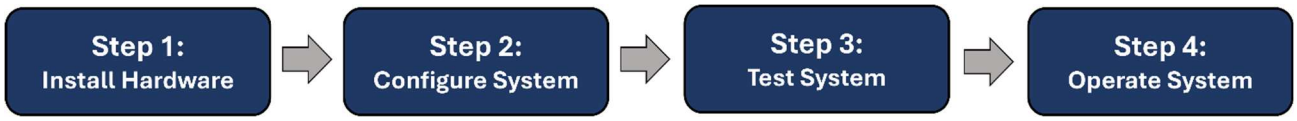
	**CAUTION** If you are using the Titan TrueFill PRO system for overfill protection at a Refinary, it is **critical** to ensure the ClearView Probes are placed closest to the manway as possible so you can easilly access the probe for “wet test” inspections. The ClearView Probe should be installed in the same pocket as the manway. It is also critical to ensure you install your transmitter as close to the center line of the tank as possible. Otherwise, alterations may be required to your strapping tables to adjust for this.

Mounting Placement Views

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



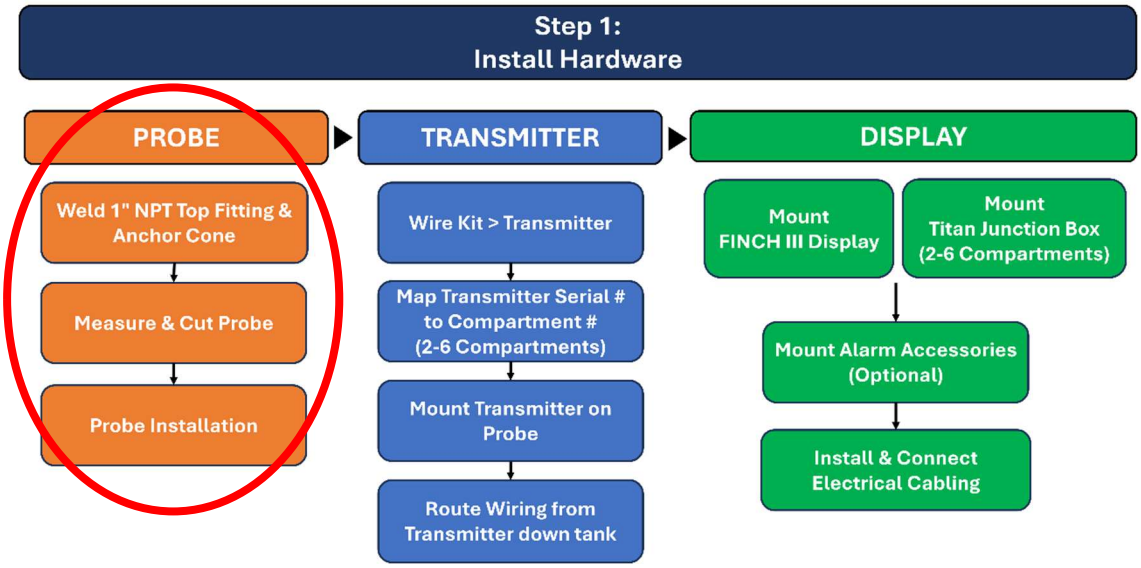
3.2 Installation Summary



Step 1: Install Hardware	Follow the instalation procedures in the following sections: • Install Probe (Page 13) • Install Transmitter (Page 18) • Install FINCH III Display and Titan Junction Box (Page 21) • Install Electrical Wiring in FINCH III (Page 23) • Install Electrical Wiring in Titan Junction Box (Page 27)
Step 2: Configure System	System configuration instructions are provided in the **Titan Install and Titan Portal Configuration Guide,** available from the **Titan Logix Help Center:** (***help.titanlogix.com***).
Step 3: Test System	Refer to System Testing (Page 31) for more information.
Step 4: Operate System	Operating instructions are provided in the **Titan TrueFill Operator Guide,** available from the **Titan Logix Help Center:** (***help.titanlogix.com***).

4 PROBE INSTALLATION

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



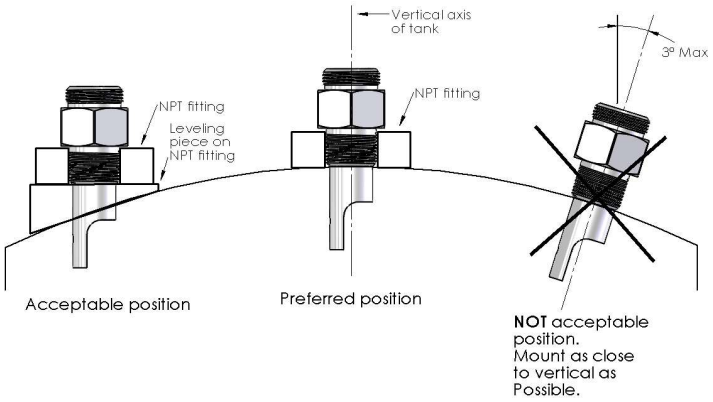
4.1 Weld 1in NPT Top Fitting & Anchor Cone

⚠	**WARNING** It is recommended to use the Titan Logix supplied 1in NPT top fitting. Alternative fittings must **not** be longer than 1 ½in. Fittings exceeding 1 ½in in length with an internal diameter of less than 4in 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 vertically 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.



	WARNING 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 1.5in below the nut on the probe.

Anchor Cone

	NOTE It is optional to use the Titan supplied anchor cone with a ClearView probe.

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 ½in and be approximately 2in high.

1. From the 1in 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.

4.2 Measure & Cut ClearView Probe

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.

Probe length for accurate sensing in this mode must be a minimum of 47.2in (120cm).

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

Measure the height from the bottom of the tank, inside the anchor cone to the top edge of the 1in NPT top fitting.

4. Add 1 ½in to this height. This is the overall length of the probe.
5. Temporarily remove the protective cap.
6. 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.
    - The overall probe length should be cut half an inch 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.
7. Use a tube cutter to cut the outer tube – apply light pressure when using a tube cutter to minimize tube deformation.
8. Debur the cut edge of the outer tube, as shown in Figure 1, to ensure minimal material is removed when installing the spacer.

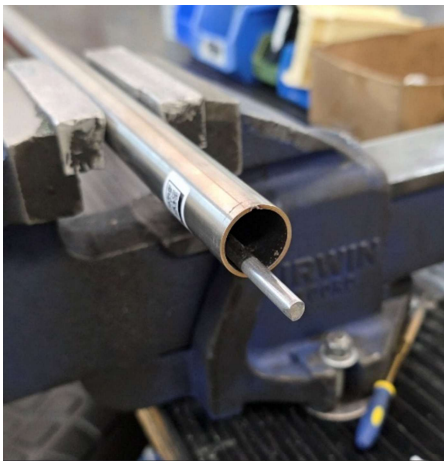


Figure 1 Debur cut end of tube

	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

9. Slide the Teflon spacer onto the center rod.

10. 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

11. Cut center signal rod flush with end of tube, as shown in Figure 3.

12. 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

13. 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.

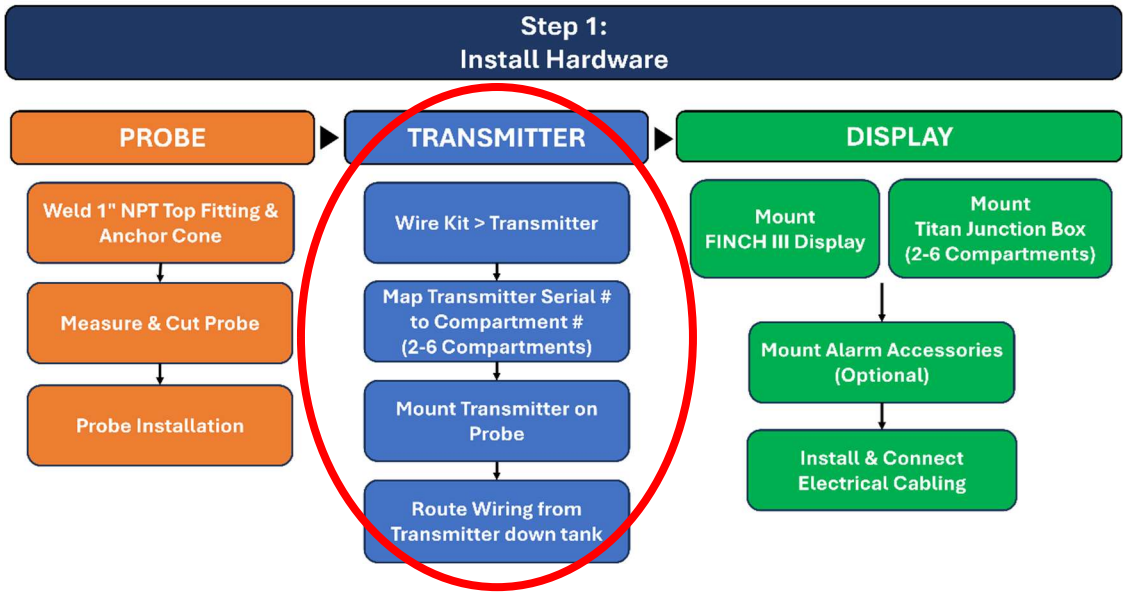
When properly installed, the crown of the end cap will extend slightly beyond the end of the tube and the spacer will be positioned approximately 4.5mm inside the tube.

Figure 5 End cap installed on center rod

The ClearView probe is now ready for compartment installation.

4.3 Probe Installation

5 TRANSMITTER INSTALLATION



5.1 Wire Kit > Transmitter

- **Black:** Power (8-30V DC)
- **White:** GND (-VE)
- **Red:** SV Bus

5.2 Map Transmitter Serial # to Compartment

!	**NOTE** Be sure to note the serial numbers and the order of each transmitter being installed. This information is required for programming the system using Titan Install.

5.3 Mount Transmitter on Probe

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

⚠	**WARNING** To maintain the explosion proof rating a seal needs to be installed within 2i**n** (50 mm) of the enclosure for hazardous locations. This only applies if installed in a C1D1 area and not using our provided wiring harness that includes a poured seal. Not including the Acidic Atmospheres – Ketones and Halogenated Hydrocarbons.

Titan Logix's wiring harness
with the Explosion Proof Elbow

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

- 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.

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

3. Continue to support the transmitter while hand tightening the transmitter nut until it is resting on the probe O-ring seal.
4. 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.
5. Continue tightening the transmitter nut with a 1 ¾in 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

- All electrical grounding is to the vehicle or trailer electrical ground connection and not to the chassis.
- To maintain the explosion proof rating a seal needs to be installed within 2in (50mm) of the enclosure for hazardous locations. This only applies if installed in a C1D1 area and not using our provided wiring harness that includes a poured seal. Not including the Acidic Atmospheres – Ketones and Halogenated Hydrocarbons.

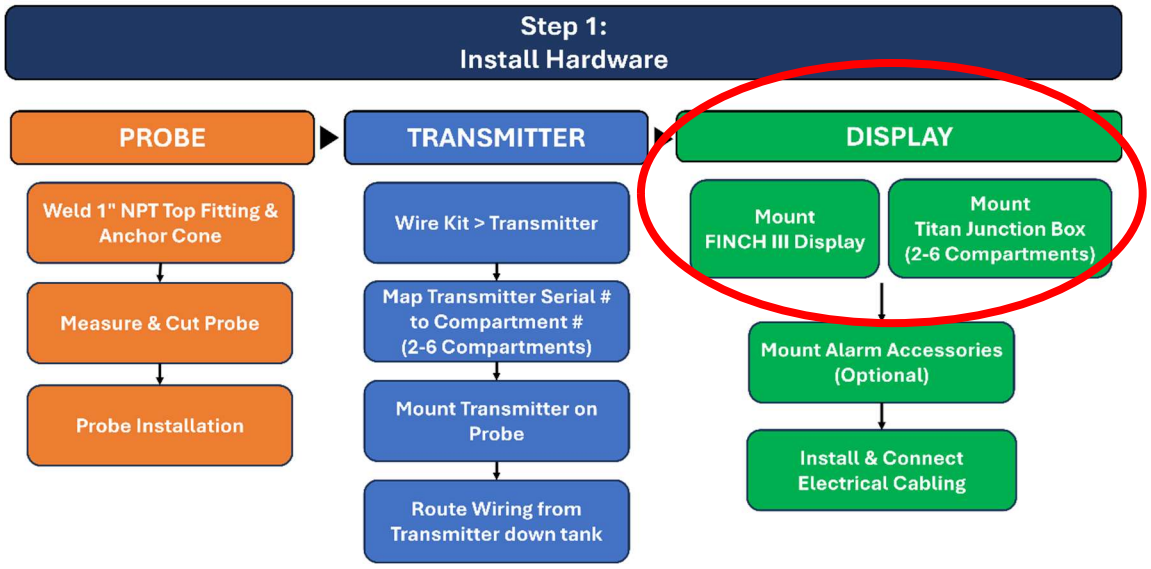
CAUTION

- 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.

5.4 Route Wiring from Transmitter down tank

Secure wiring cables from each Transmitter, using welded taps/clips every 18in down the tank to wire into the junction box or directly to the FINCH III display (for one compartment).

6 Display Installation

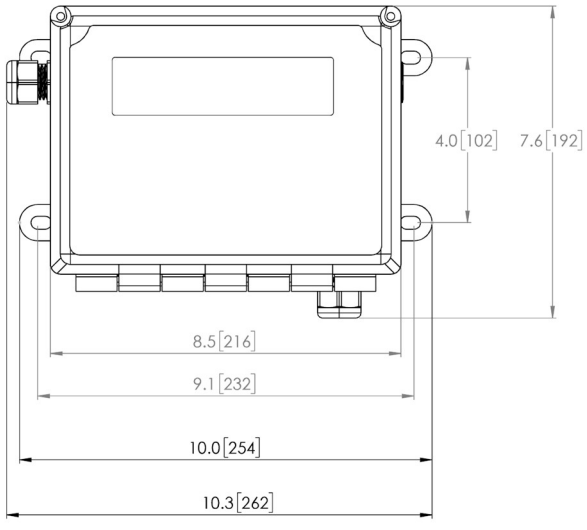
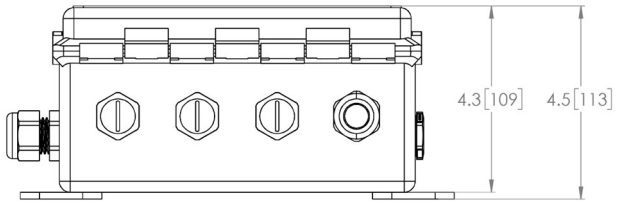


6.1 Mount FINCH III Display

WARNING

If used in a hazardous area then the installer should be familiar with and follow the proper area classifications and hazardous area wiring requirements for the AHJ (authority having jurisdiction).

Below is the front and bottom view of the FINCH III display where only the left side strain relief is being used.

Front View of FINCH III	Bottom View of FINCH III
	

1. Attach the mounting tabs to the back of the FINCH III display.
2. Mount the display, ensuring 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.

FINCH III Strain Reliefs

The FINCH III ships out from factory with three additional strain reliefs in each FINCH III display. The black strain reliefs and black plugs are for the Intrinsically Safe (IS) wiring connection and the gray strain reliefs and gray plugs are for the non-Intrinsically Safe wiring to the Main PCB Board.

Extra Strain Reliefs:
- (3) Non-IS Wiring
- (1) IS Wiring

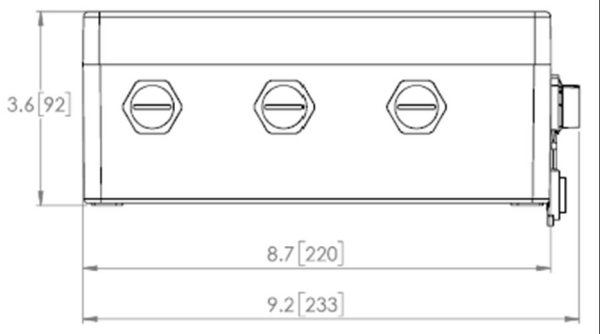
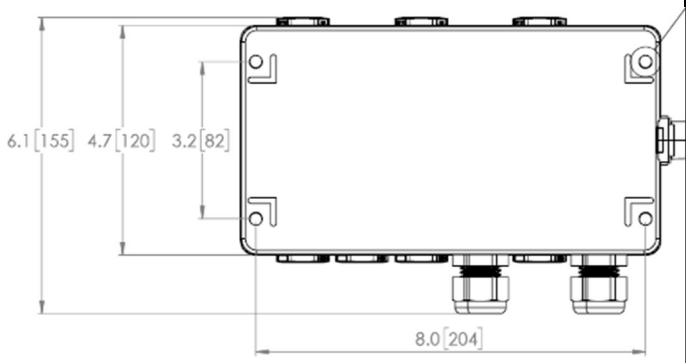
6.2 Mount Titan Junction Box

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 Junction Box is installed in a location that can be accessed at ground level.

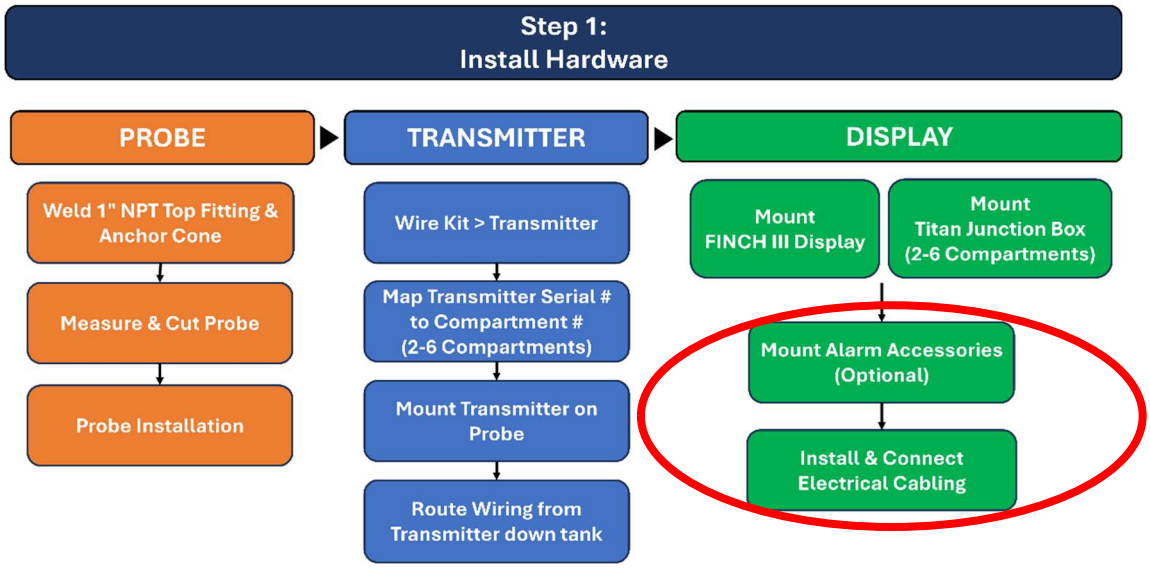
Below is the side and back view of the Titan Junction Box.

Side View of Titan Junction Box	Back View of Titan Junction Box
	

Titan Junction Box Strain Reliefs

The Titan Junction Box ships with a total of 9 holes but 2 have strain reliefs installed and the other 7 holes are plugged. It is the installers responsibility to replace any plug with a strain relief if the TJB channel will be connected to a transmitter.

7 ELECTRICAL WIRING

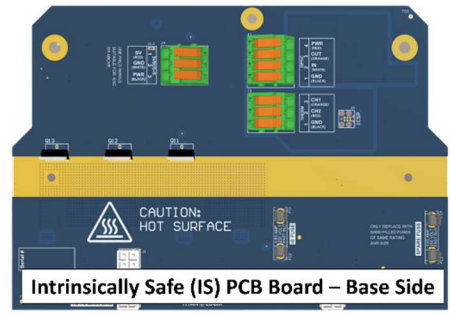


7.1 FINCH III PCB Boards

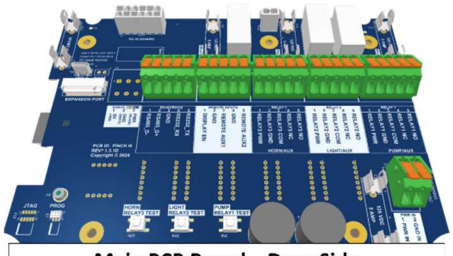
The FINCH III display is made up of two PCB boards, the main PCB board which is located on the door, and a Intrinsically Safe (IS) PCB board within the base of the FINCH display box.

FINCH III Display (Outside View)

FINCH III Display (Inside View)



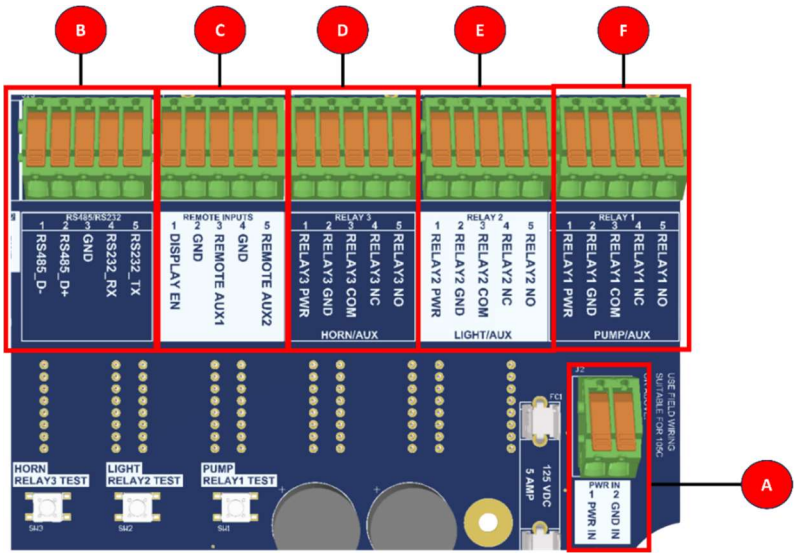
Intrinsically Safe (IS) PCB Board – Base Side



Main PCB Board – Door Side

Main PCB Board – Door Side

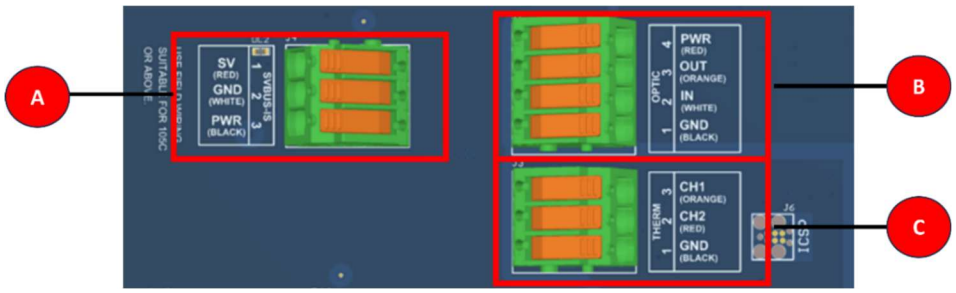
The Main PCB Board (on the door of the FINCH III) will connect to Relays, Remote Input, RS485/RS232, and Power and Ground connections.



A	Power and Ground connections from 12 clean volts from your vehicle.
B	RS485/RS232 to connect to 3rd party devices, such as LCR.iQ. Refer to our LCR.iQ Integration Application Note on our Help Center (*help.titanlogix.com)*
C	Remote Inputs 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.
D	Horn Relay
E	Light Relay
F	Pump Relay

Intrinsically Safe (IS) PCB Board – Base Side

The Intrinsically Safe (IS) PCB Board (on the base of the FINCH III) is protected by a metal casing and includes three terminal blocks. There is a wiring harness installed at factory to connect the two PCB Boards and should never be disconnected.



A	**SVBUS-IS** terminal block connects to either the Quick Connect wiring from the Titan Junction Box (2-6 compartment systems) or to the three wire harness directly from a transmitter (1 compartment system). FINCH III provides intrinsically safe (IS) power to the transmitter or Titan Junction Box.
B/C	The right side of the IS area is to connect to industry standard Optic and Thermistor API sockets. This is only used with rack loading trucks and trailers. If you do not require rack loading, this will be left blank. The strain relief on the optic/therm terminal block side is plugged by default. You will need to

	replace the plug with a black strain relief (we are using black for IS wiring and grey for non-IS wiring). **B. OPTIC:** thermistor or optic sockets. **C. THERM:** Right side terminal block that FINCH III provides Intrinsically Safe (IS) power to both the Optic and Thermistor API Sockets it is connected to.

Any cable used to connect into the FINCH III display should be within 0.260in (6.6mm) to 0.545in (13.8mm) in diameter. This ensures the strain relief holes on the FINCH III display can be securely tightened to prevent water from getting inside the enclosure.

- The FINCH III requires **high-temperature cables**.
- Cable diameter must be between **0.260in (6.6 mm) and 0.545in (13.8mm)** to maintain proper strain relief integrity.
- Confirm all electrical connections are secure and free of paint or insulation that could prevent proper grounding.
- Wire splices should be installed within a **weatherproof enclosure**.

	**WARNING** Ensure adequate slack is in the cables and then tighten all strain reliefs after everything is wired properly. It is critical that only ONE cable goes through ONE strain relief. This ensures the proper seal required for no water to get inside the unit.

7.2 Connecting Power

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

- **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.

2. Locate a switched and fuse protected source of electrical power that is 12 volts.
3. Pass the power cable from vehicle through a strain relief and connect it to power and ground as on the FINCH III.
4. Tighten the strain relief until the cable cannot be pulled, leaving enough cable inside to open the door.

7.3 Remote Inputs

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 our Help Center *(help.titanlogix.com)*.

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.

7.4 Relay Wiring

1. When installing an external **HORN as a relay on your FINCH III System, wire your connection** : Connections on RELAY 3 terminal block

FINCH III Terminal Connection	Wire
RELAY3 PWR > RELAY3 COM	Jumper Wire

RELAY3 NO	HORN (+)
RELAY3 GND	HORN (–)

2. Optional **LIGHT**: Connections on RELAY 2 terminal

FINCH III Terminal Connection	**Wire**
RELAY2 PWR > RELAY2 COM	Jumper Wire
RELAY2 NO	LIGHT (+)
RELAY2 GND	LIGHT (–)

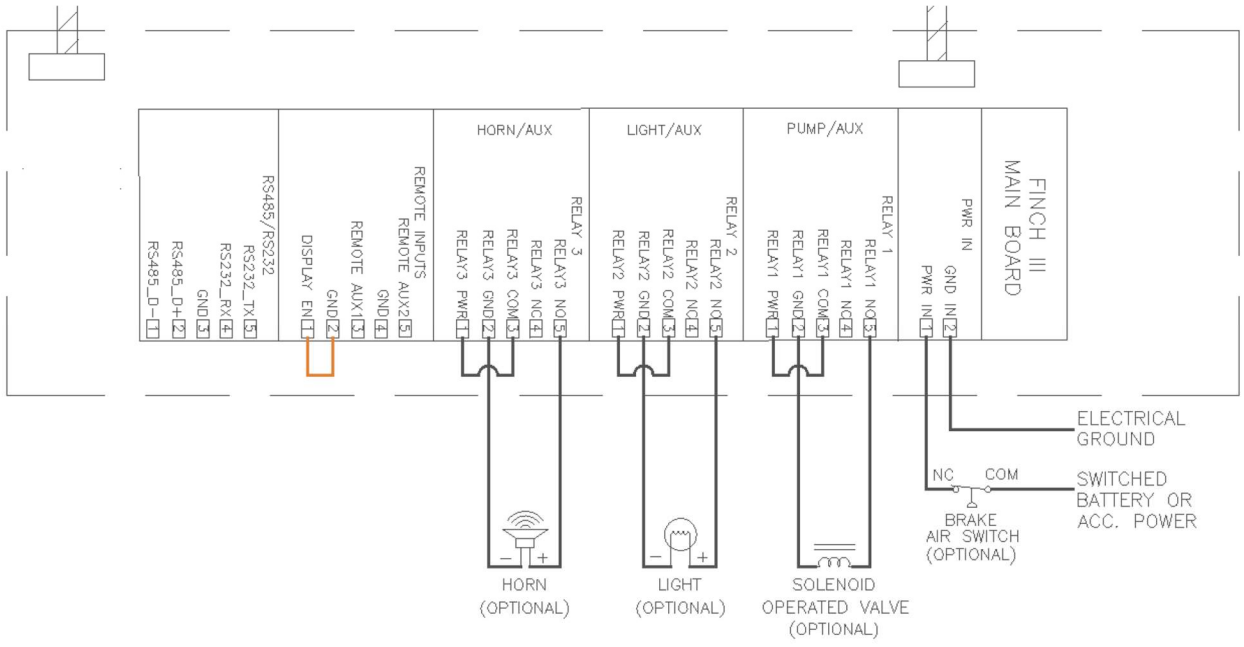
3. Optional **Soloinoid Operated Valve**: Connections on RELAY 1 terminal block

FINCH III Terminal Connection	**Wire**
RELAY1 PWR > RELAY1 COM	Jumper Wire
RELAY1 NO	PUMP (+)
RELAY1 GND	PUMP (–)

Wiring Schematic

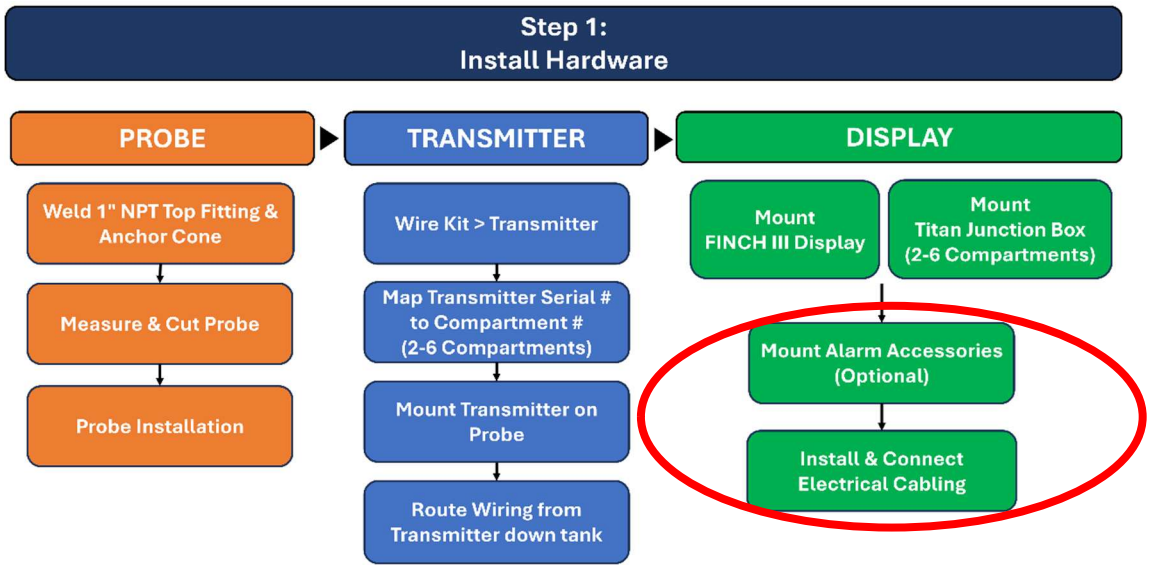
The wiring schematic below shows the wiring for an option Horn, Light, and Solenoid operated valve.

*Schematics for other configurations are available on Titan Logix Help Center (***help.titanlogix.com***)



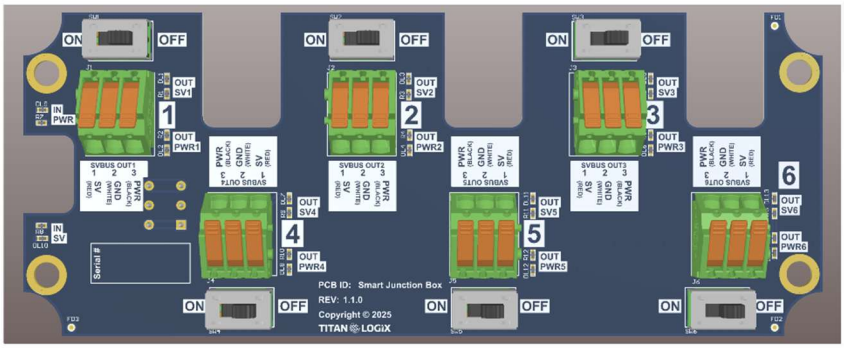
8 Titan Junction Box Wiring

For installations with 2 or more transmitters, the Titan Junction Box is required to be installed. The Terminal blocks on the junction box are numbered to represent the compartment number it will be connected to.



Titan Junction Box (Outside View)

Titan Junction Box (Inside View)



	**WARNING** Ensure adequate slack is in the cables and then tighten all strain reliefs after everything is wired properly. It is critical that only ONE cable goes through ONE strain relief. This ensures the proper seal required for no water to get inside the unit.

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.

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.

To ensure reliable and secure connections from each transmitter to the specific compartment number inside the Titan Junction Box, it's recommended that ferrules be attached to the wires that terminate into the junction box.

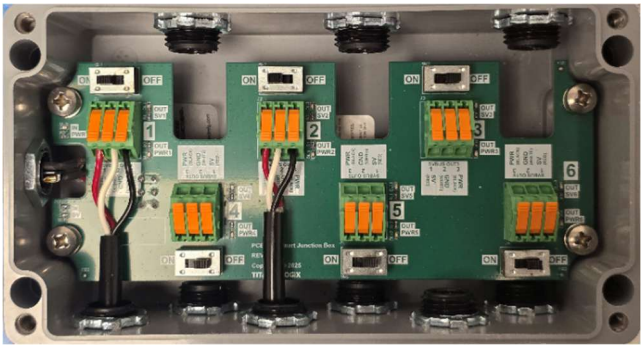
!	**NOTE** Make sure to keep in mind that the wiring order (left to right) is one direction for the top row of terminal connectors(Compartments 1, 2, 3) and the reverse direction for the bottom row (Compartments 4, 5, 6). • **Top Row Wiring Order:** SV (RED), GND (WHITE) and PWR (BLACK) • **Bottom Row Wiring Order:** PWR (BLACK), GND (WHITE) and SV (RED)

8.1 Preparing Transmitter Serial Number to Compartment Number

!	**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.

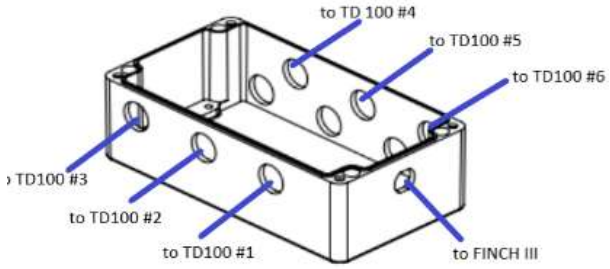
After programming is completed in the later steps, LEDs on the connected terminals within the junction box will light up. This indicates communication is active between the junction box and the TD Transmitter.

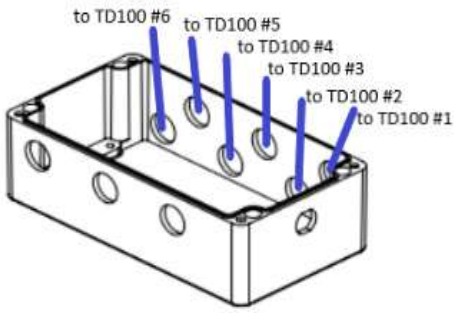
8.2 Wiring 2 to 3 Compartments



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

8.3 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 Bus 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 instructions.

1. Wire compartments 1, 2 and 3 from one side of the

Using ONE Sides of Junction Box

1. Wire compartments 1, 2 and 3 as described in above instructions.
2. To connect compartment 4, 5 and 6, push each cable through the cable glands, **UNDER** the PCB board, and pull it up gently through the cutout.
3. Attach each cable to the appropriate terminal block accordingly (4, 5, 6).

Titan Junction Box that has the 6 available strain reliefs available.

2. Only use the UPPER three strain reliefs to connect directly to the respective Comp 1 – 3 PWR, GND, and SV Bus terminal blocks.

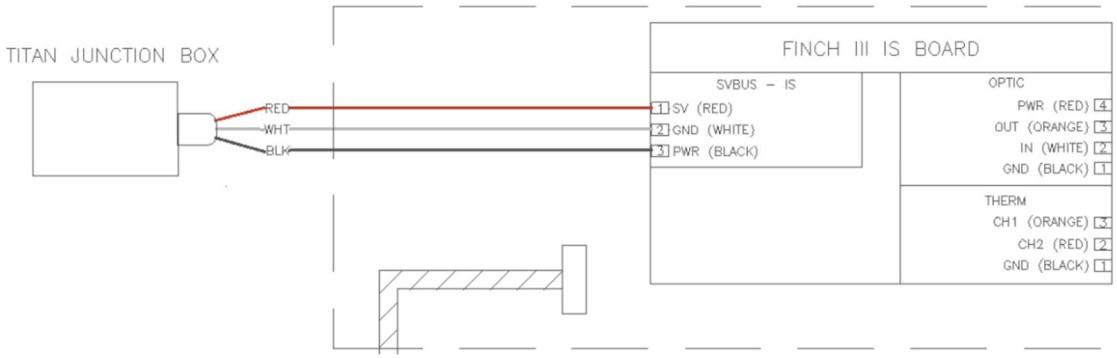
3. For the remaining compartments, use the upper strain relief region on the opposite side of the Titan Junction Box.

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

8.4 Wiring Schematics

*Schematics for other configurations are available on Titan Logix Help Center (***help.titanlogix.com***)

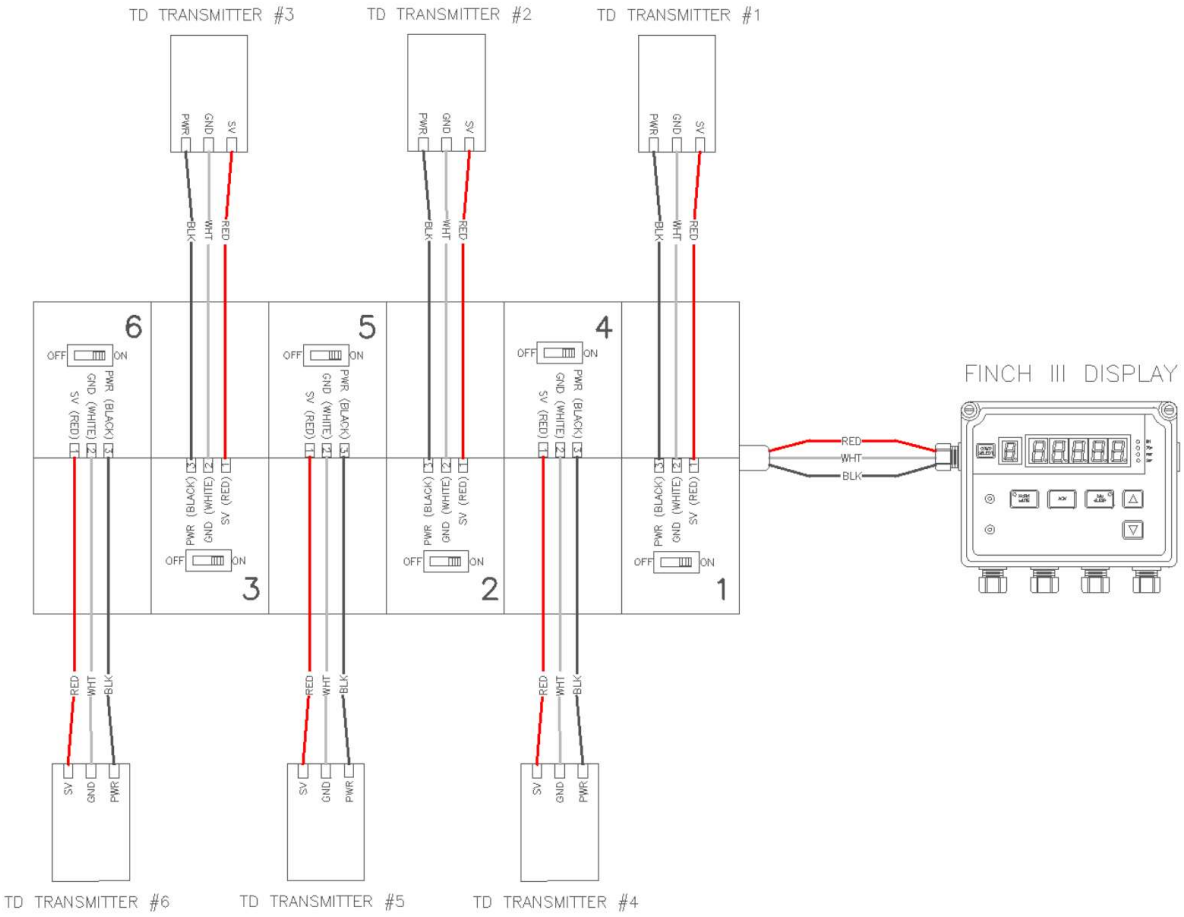
Titan Junction Box Wiring to FINCH III



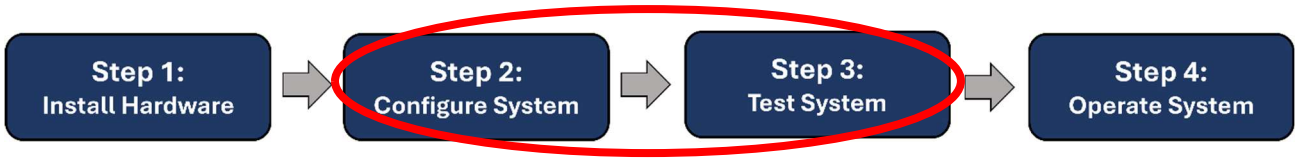
*Schematics for other configurations are available on Titan Logix Help Center (***help.titanlogix.com***)

Titan Junction Box Wiring to 6 Transmiters

The Installation Diagram highlights the connection between the Titan Junction Box and the FINCH III display.


TD TRANSMITTER #3
TD TRANSMITTER #2
TD TRANSMITTER #1
PWR
GND
SV
BLK
WHT
RED
6
5
4
3
2
1
OFF
ON
SV (RED)
GND (WHITE)
PWR (BLACK)
FINCH III DISPLAY
TD TRANSMITTER #6
TD TRANSMITTER #5
TD TRANSMITTER #4

9 CONFIGURE & TEST SYSTEM



9.1 Configuring System

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. 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.

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

!	**NOTE** System configuration instructions are provided in the **Titan Install and Titan Portal Configuration Guide,** available from the **Titan Logix Help Center:** (***help.titanlogix.com***).

9.2 Testing System

- Before turning on system power, perform a mechanical inspection.
- When powering the Titan TrueFill PRO system via a 120V outlet, use a fixed power supply that can supply up to 9A at 12V.

An operator must allow for a **minimum fill volume of 12in** (tank) to accurately calibrate for any changes in fluid type. This must be done when first using the system or changing the product type.

Shorting the probe

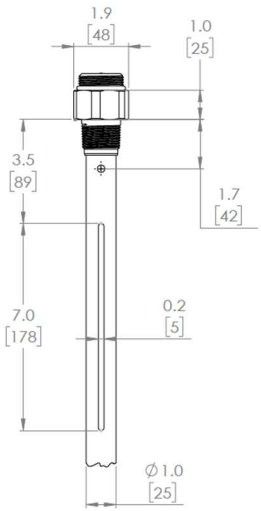
!	**NOTE** This is a basic operational test and will not produce as accurate results as a water calibration. (See below for Water Calibration steps)

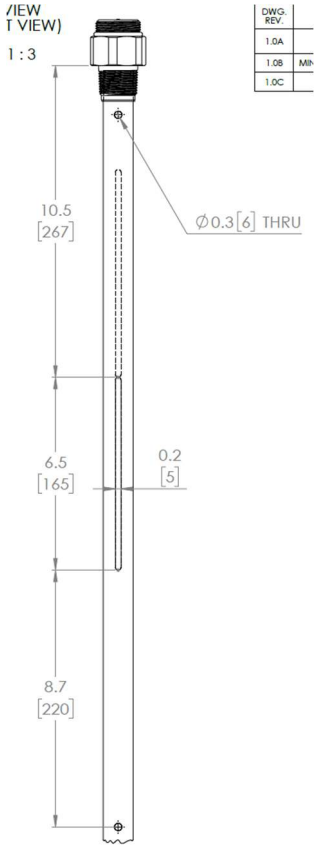
For ClearView probes, insert a small metal rod into the holes or slots along the probe. Short the center rod to the outer tube to check the volume and alarm settings. The volume displayed will increase as the shorting rod moves toward the top of the compartment. The volume displayed will decrease as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

The diagrams below show the front and back view of the ClearView Probe and where the slits are located.

Front View

Back View





Water Calibration

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

A APPENDIX: TECHNICAL SPECIFICATIONS

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 three 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 • RS-485 • TD100 SV Bus • 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:** 8.5in (215.90mm) • **Depth:** 4.29in (108.97mm) • **Height:** 7.47in (189.74mm)

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 +185° F (+75° 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)

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. 2.5in
Bottom Deadband	0.5in installation gap at the bottom of the tank
SPILL Alarm	Adjustable
HH Alarm	Adjustable Can be set to 0.5in below SPILL
Retain Alarm	Configurable

B APPENDIX: HARDWARE FEATURES

Probe Sensing

The transmitter and probe work together to measure liquid level within each tank compartment. The sensing characteristics vary depending on the probe type installed.

Titan Logix offers two probe types for the Titan TrueFill system:

- **Dual Rod Probe**
- **ClearView Probe**

Due to the nature of **Guided Wave Radar (GWR)** measurement, small regions at the top and bottom of the probe may produce unreliable readings. These areas are referred to as **deadbands**, where transmitted radar pulses can interfere with the reflected signal.

Level measurements within these deadband regions should not be used for control or monitoring purposes.

Feature	ClearView Probe
Detection Mode	Performance Detection Mode only
Retain Alarm	Configurable
Transmitter Compatibility	TD100R (Red Lid)
Top Deadband	4 in from bottom of probe nut
Bottom Deadband	Zero Deadband
Adjustable Spill Alarm	Yes
Vapor Vent Interlock Option	Configurable

Detection Mode

Detection Mode	Description
Performance	In Performance Detection Mode, the transmitter continually adapts to changes in fluid characteristics during loading operations. The system learns from each load event and self-calibrates volume calculations accordingly.

For accurate measurements:

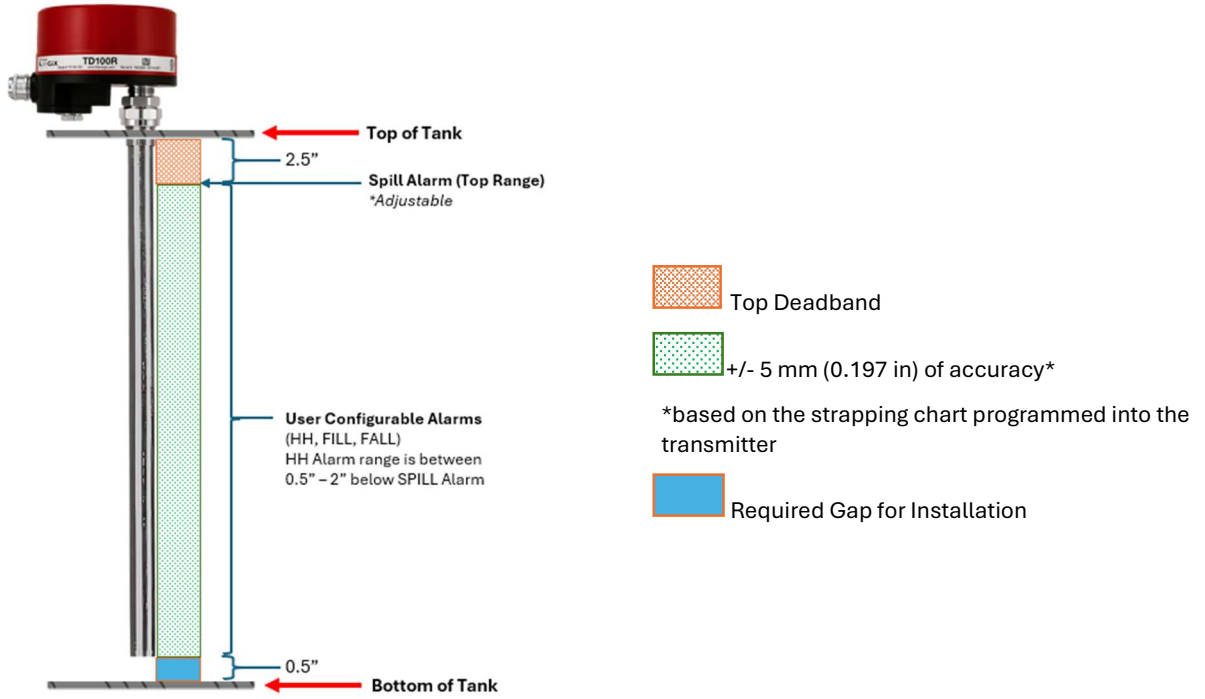
- A minimum of 12in of depth is required to calibrate your compartments.
- This calibration occurs during initial commissioning, when fluid type changes, or when a new transmitter is installed.
- Performance Detection Mode requires a minimum probe length of 47.2in (120cm).

ClearView Probe Measurement

The ClearView Probe is only available in Performance Detection Mode. The Detection Mode is configured when building your strapping table in Titan Portal.

The actual tank top is installation specific, as some tanks have risers installed on the tank and then the transmitter/probe mounted on top of this. The bottom of the probe nut is a fixed point of reference on the probe and is used as the starting point for measuring the top deadband region. The top deadband range starts at 4in from the bottom of the probe nut (which is above the tank top).

There is no bottom deadband region on the ClearView probe. Measurement is detected right when liquid touches the bottom of the ClearView probe. There is a requirement of a half inch of space between the bottom of the probe and the bottom of the tank, which the probe cannot determine any measurement.



Relay Outputs

The FINCH III display contains three independently controlled relays that can be assigned to alarm conditions.

When an alarm occurs, the assigned relay activates according to its configuration.

Relay characteristics:

- Fuse protected to limit short-circuit current
- Contacts for power or signal control include:
  - Normally Open (NO)
  - Normally Closed (NC)
  - Common (COM)

These contacts can be used to control external power circuits or signaling devices.

When the FINCH III enters **Sleep Mode**, all relays are **de-energized (inactive)**. This behavior should be considered when configuring your system setup.

Default Relay Mapping

Relay alarm states are configured using the **Titan Install App** during system setup.

The table below shows the **default factory relay assignments**.

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	

FINCH III Fuses

The FINCH III display includes **ceramic, sand-filled fuses** to protect internal circuits and relay outputs.

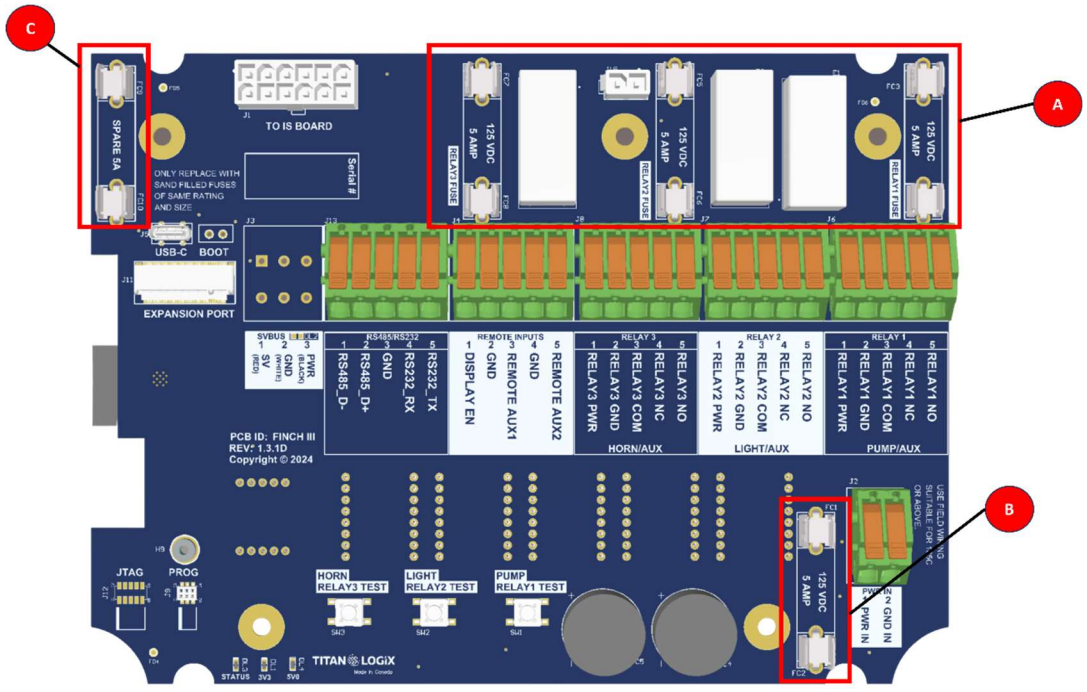
For safety and proper system operation, fuses must only be replaced with **fuses of the same type and rating supplied by Titan Logix**. Replacement fuses can be ordered through **Titan Logix Sales**, or a spare fuse can be used from the PCB board.

Fuse Rating: 5A

HORN, LIGHT, PUMP/AUX Relay Load Limits:

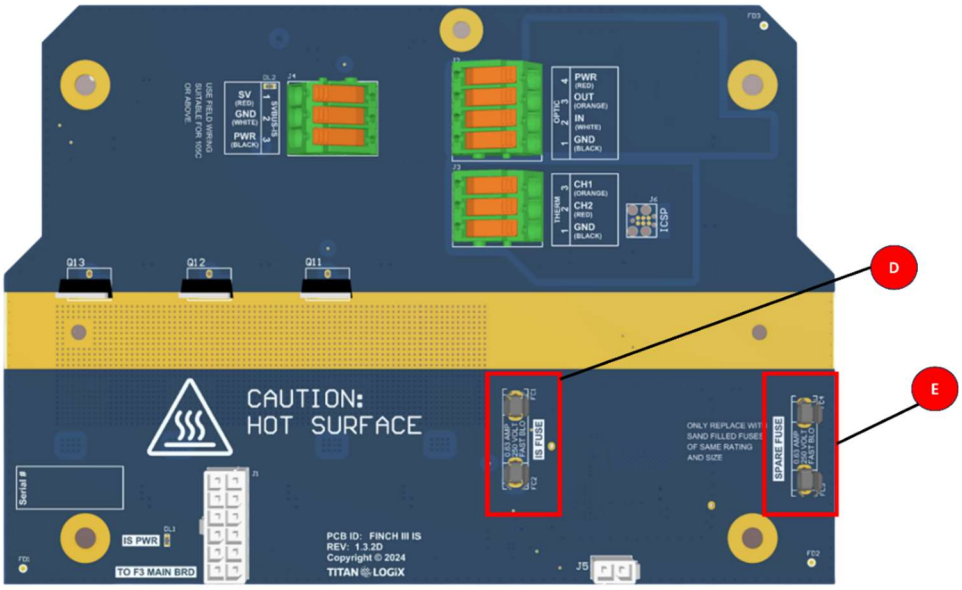
- Maximum 3.3 A per relay
- Maximum 6.6 A combined across all relays

Main PCB Board



A	HORN, LIGHT, PUMP/AUX Fuses: 5A
B	RELAY MAIN Fuse: 5A
C	Spare 5A fuse that can be swapped out with a Relay or Main Fuse

Intrinsically Safe (IS) PCB Board

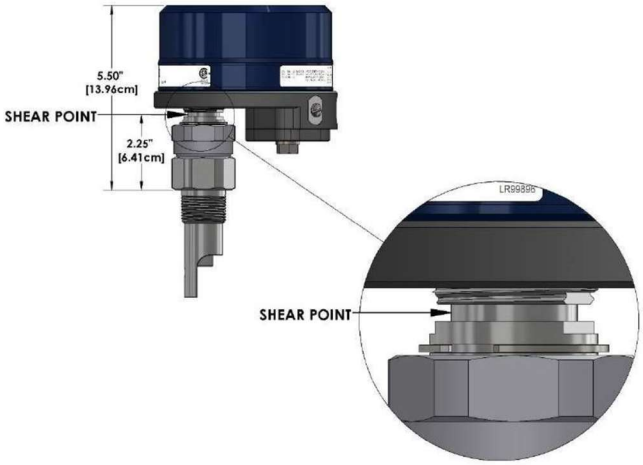


D	IS Board Fuse: 630mA
E	Spare 630mA Fuse

Transmitter Shear Point

The **TD100 transmitter** incorporates a **shear point** designed to reduce the risk of product release in the event of a vehicle rollover or external impact.

If excessive force is applied to the transmitter, the shear groove allows the transmitter to separate at a controlled point. This helps protect the tank fitting and maintains the seal to prevent leaks or spills.

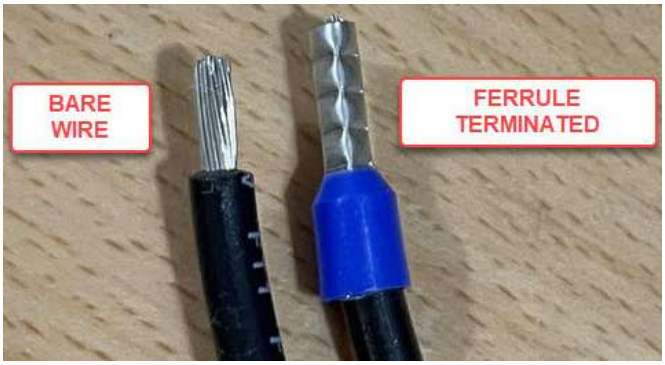


C APPENDIX: WIRING TIPS

Titan's Wiring Harness that connects from each transmitter down the tank to the Junction box uses stranded wires, the stranded ends can be an issue when terminating them in each terminal block with loose wire strands shorting to adjacent wires.

Titan Logix's wiring kit uses stranded wire in our wiring harnesses the stranded ends can be an issue when terminating them in a terminal block with loose wires strands shorting to adjacent wires.

To prevent this we recommend adding a ferrule which crimps onto the ends of a stranded wire and essentially converts it from stranded to a solid-core to prevent wire whiskers from shorting out the wiring.



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