

TD80™

DUAL ROD / COAX PROBE INSTALLATION MANUAL



TD80 INSTALL MANUAL

Radar Liquid Level Measurement for
Transport Tankers / Vessels
Titan Logix Corp.

This manual provides a summary of the basic procedures to follow when installing the TD80 level gauging system in a tanker truck application using a dual rod or a coax probe. Modification of these steps will be required for installations involving trailers, multiple compartments, alarms, etc. Other manuals will be provided when using configurations involving the 4-20mA transmitters.

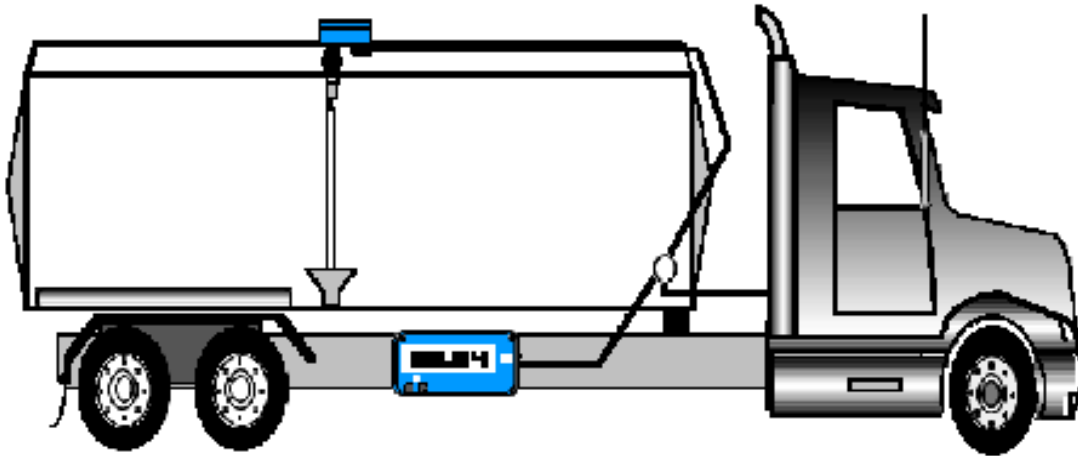
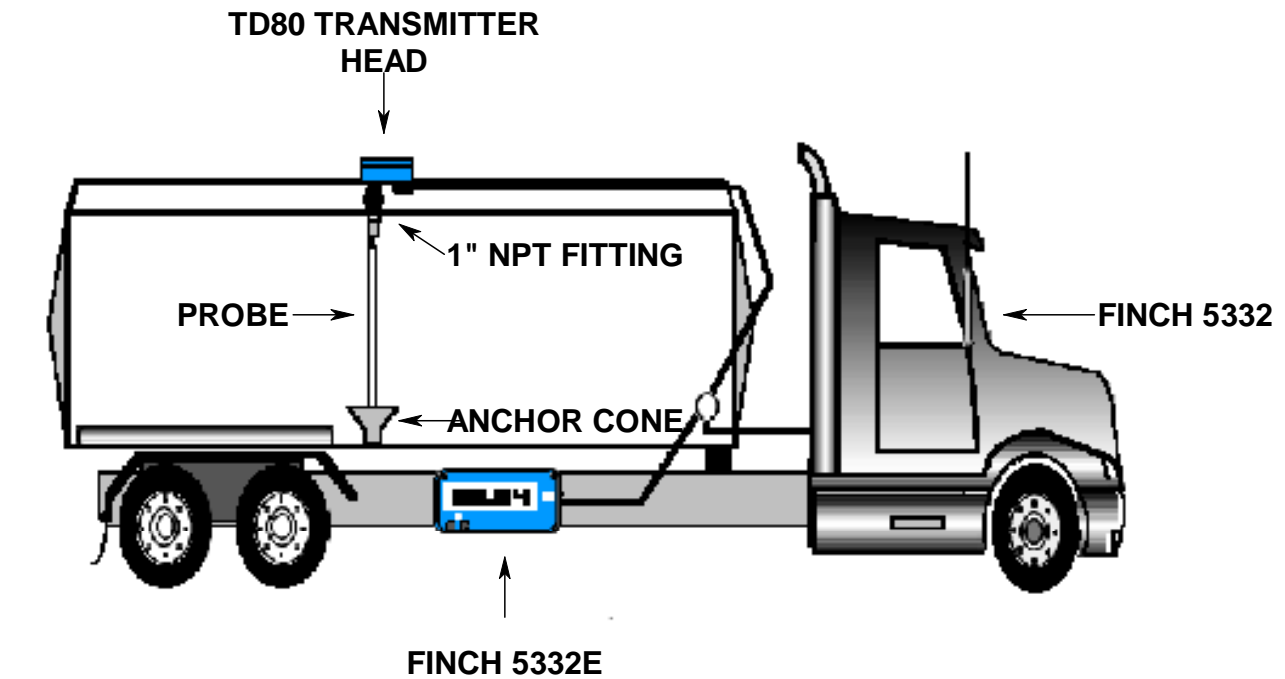


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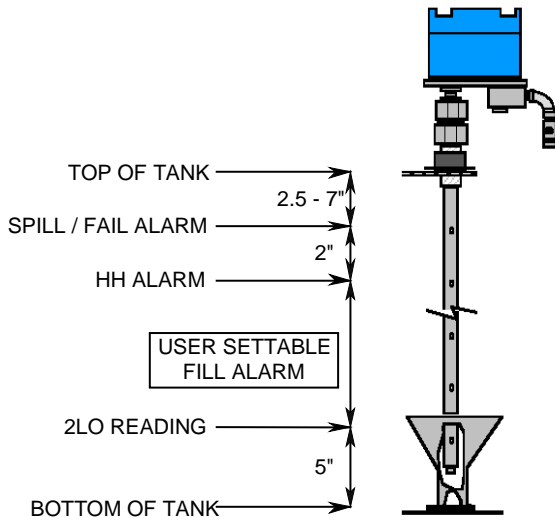
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Graphical Glossary of Terms

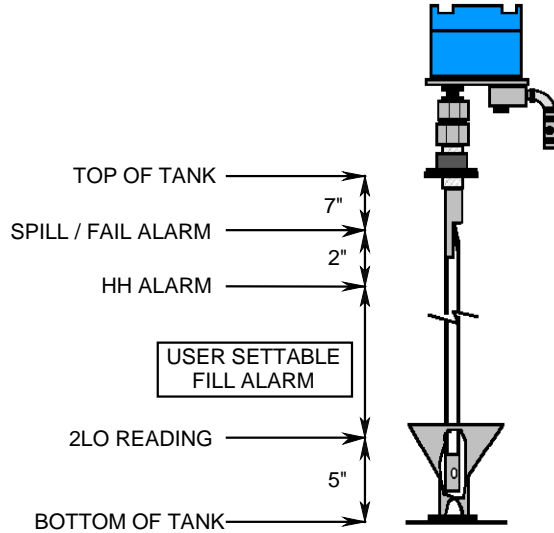
To ensure a common understanding of terms used in this manual, the following is provided.



COAX PROBE



DUAL ROD PROBE



Preparing and Installing the Probe

The probe is to be threaded into a 1" NPT fitting at the top of the tank and sits in an anchor cone in the bottom of the tank. It is not bolted in place in the bottom of the tank, but rather sits approximately ½" off the bottom of the tank floor, loosely in the cone, to allow for expansion and contraction of the tank / probe. Since it is not bolted in the bottom, the probe can be easily removed and reinstalled if required.

Aligning and Welding the Mounting Fittings (Top collar and anchor cone)

Selecting a Location

1. Ensure a minimum 2 inch radial distance between the probe and any metal (pipes, fittings) in the tank
2. Choose a location for the probe, which will allow for minimal turbulence in the liquid being measured. Do not mount the probe too close to in-feeds, drains or agitators.
3. Ensure sufficient distance from man-ways or other obstructions on top of the tank and the TD80 transmitter head.

Mounting the Top Fitting

1. If possible, use the Titan supplied 1" NPT fitting. This or a fitting that is no higher than 1-½" must be welded in the top of the tank.
2. Ensure that the fitting will allow the probe to be vertical in the tank. If the tank has a curved top a leveling piece may be required. This will prevent the probe from bending and giving false or inaccurate readings.

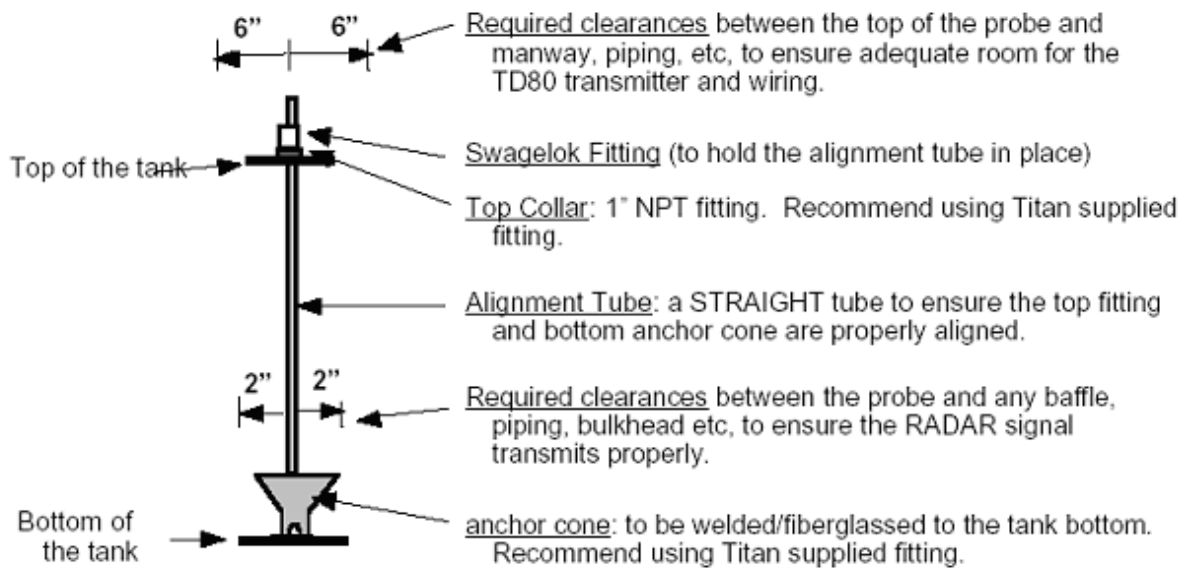
Mounting the Bottom Anchor

1. If possible use the Titan supplied anchor cone.
2. The anchor in the bottom of the tank is required to prevent excessive flexing which could bend the probe rods and damage the body. The anchor must be mounted directly in line with the NPT fitting to prevent the probe from bending when installed. This is not necessarily vertical or plumb but should not exceed 3 degrees of vertical. The anchor must have a minimum inside diameter of 1-½" and should be approximately 2" high.

Aligning

The preferred method for aligning the anchor is to use a suitable length of straight, rigid 1" tube and have a bored through 1" NPT swage fitting, as shown in Fig 1.0

Fig 1.0



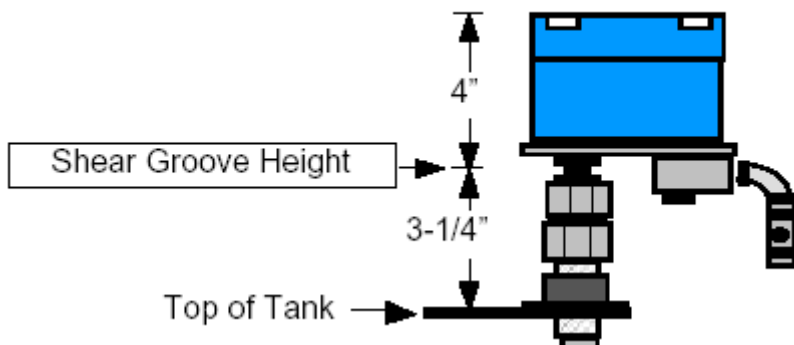
NOTE: If a riser or an extension is required to reduce the effect of the top dead band, then the following applies.

The riser or extension must have an internal diameter of 4 inches minimum through the entire height of the riser.

The top collar is to be welded to the top of the riser or extension.

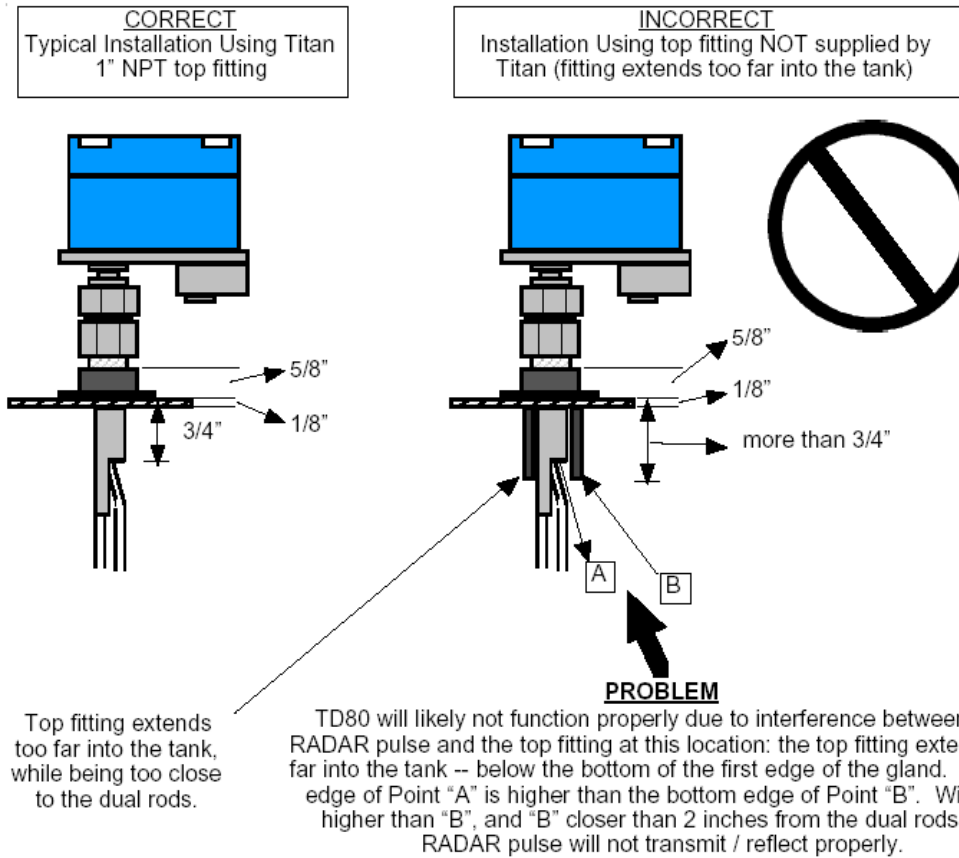
Ensure that the shear groove is not above the height of the overturn rails. Refer to Fig. 1.1 for Shear Groove height.

FIG 1.1



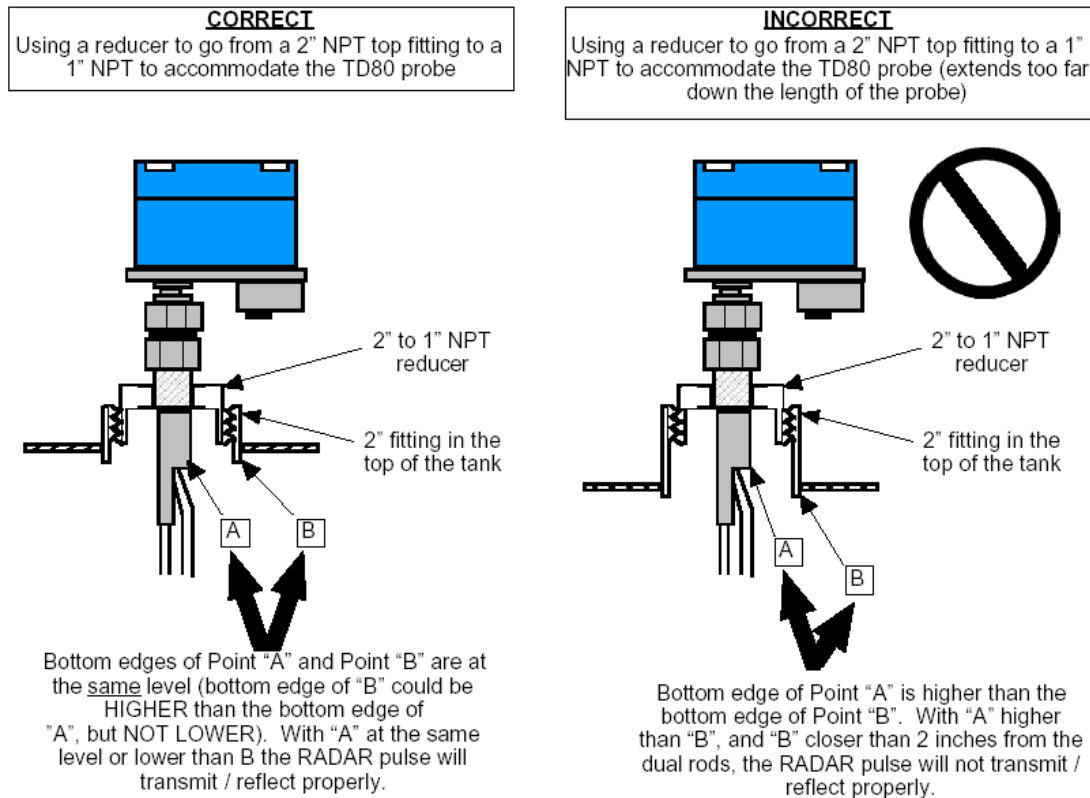
NOTE: Refer to FIG 1.2 and 1.3 if using a top fitting other than the one supplied by Titan Logix Corp. Typically a fitting with a total height of more than 1-1/2" will NOT work with the TD80, as the radar signal can be affected by the surrounding metal of the fitting.

FIG 1.2



The same principle applies if the tank uses a top fitting larger than 1" NPT (eg: 2" NPT): it may NOT be possible to use a reducer to go from 2" down to 1", depending upon the height of the reducer and the 2" fitting. Refer to the following diagram:

FIG1.3



Cutting Probe to the Proper Length

The probe is shipped longer than required so it may be cut to the proper length during installation. To determine the overall length of the probe, measure from the bottom of the tank, inside the anchor cone, to the top of the 1" NPT fitting in the top of the tank and add 1-½". This will provide the probe with a ½" expansion gap between the bottom of the probe and the bottom of the tank.

Dual Rod

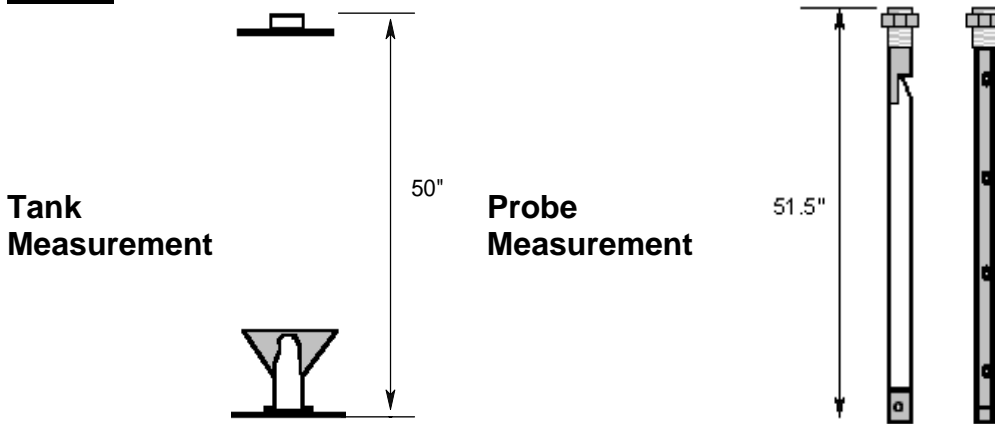
1. Loosen the screw on the clamping block and slide it up to the desired length.
2. Tighten the clamping block at this length and cut off the excess ¼" rod with a hacksaw.
3. File the ends of the cut off rod to prevent possible scratching or puncturing of the tank.

NOTE: When installing the dual rod probe in an acidic environment, the probes clamping block must be welded on each side to prevent the block from falling off. If installed under non-acidic conditions, be sure that when the clamping block has been tightened into place, the probe rods are straight and are not touching.

Coax

1. Remove the shorting block from the bottom of the probe by loosening the setscrew and holding in a vise to remove.
2. With a tube cutter, cut the 1" tube to ½" shorter than the desired probe length to allow for the shorting block.
3. Re-install the shorting block ensuring that the ¼" rod is kept centered and tighten the setscrew.
4. Cut off the excess ¼" rod with a hacksaw and file the end to prevent possible scratching or puncturing of the tank.

FIG 1.4



Installing the FINCH 5332E display (If applicable)

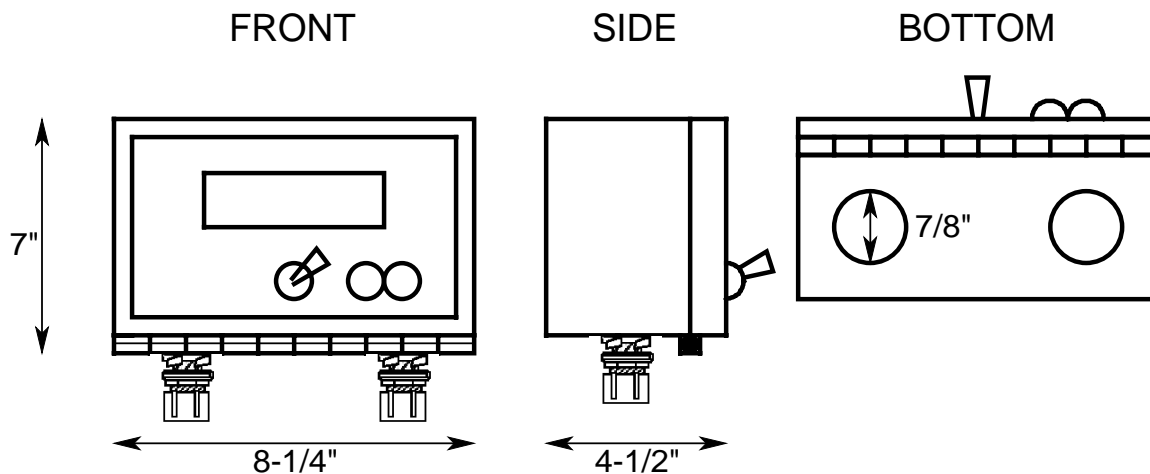
Selecting a Location

The FINCH 5332E display is to be mounted in a protective enclosure to keep the display from being damaged by road debris as well as to prevent water and dust from entering the display enclosure. The FINCH 5332E display is a fiberglass weatherproof enclosure and CSA approved for Class 1, Div 2 applications. The following should be considered when choosing a location for the display. Mounting tabs are provided with the Hoffman enclosures and should be used in all installations for ease of future service and re-installations.

1. Ensure sufficient clearance to open the front panel door and have access to the mounting tabs as well as wiring coming into and out of the display.
2. The display should be kept as much out of direct sunlight as possible, as it could make the display LED digits hard to read.
3. Display should be in a highly visible area for the operator to see.
4. Ambient temperature kept within -40C and $+80\text{C}$ (-40F and $+176\text{F}$).
5. Avoid locations where the 5332E display is close to high voltage or current.
6. Displays should be mounted on the side of the truck or trailer that loading and unloading will take place.
7. Refer to wiring diagram #64 for wiring.

Wiring should always enter the display from the bottom of the enclosure to prevent water or fluid from entering the display.

FIG 2.0



Installing the FINCH 5332 (In Cab) display (If applicable)

Selecting a Location

The most common places for mounting the FINCH 5332 display are;

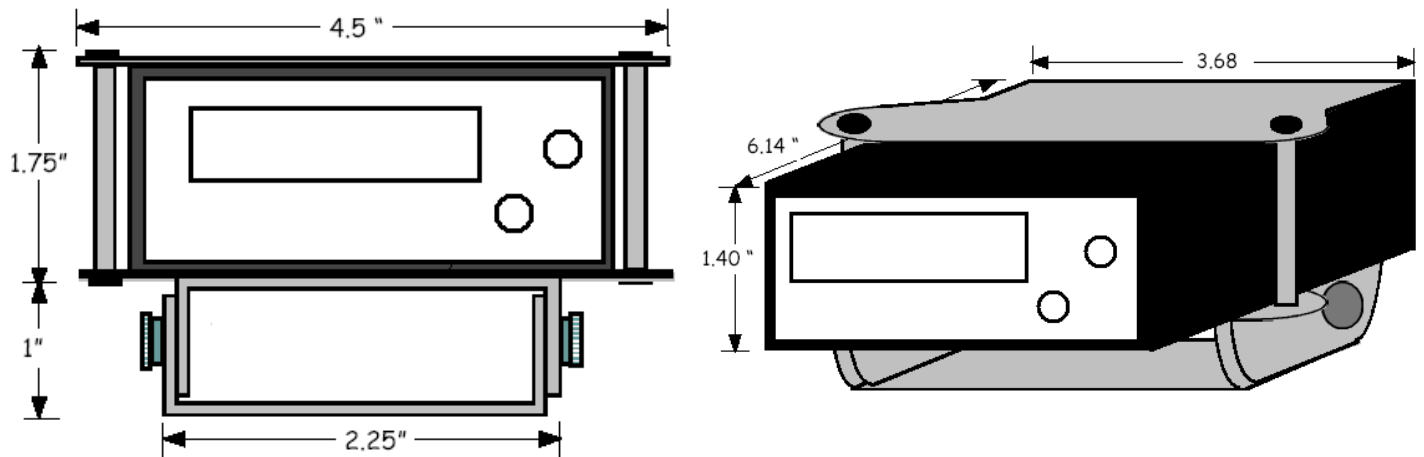
- Under the dash
- In the overhead compartment
- On the floor of the cab, to the left of the drivers seat

The 5332 display is not to be mounted in direct, such as on the dash. Warping of the case and possible malfunction of the display could result.

The FINCH 5332 display is not weather proof and sufficient space must be left behind the display for the wiring harness to be installed and removed.

1. Attach the display to the mounting bracket (if supplied) or mount in the dash or console.
2. Refer to FIG 2.2 for installing the optional mounting bracket.
3. Refer to wiring diagram #60 for wiring.

FIG 2.1

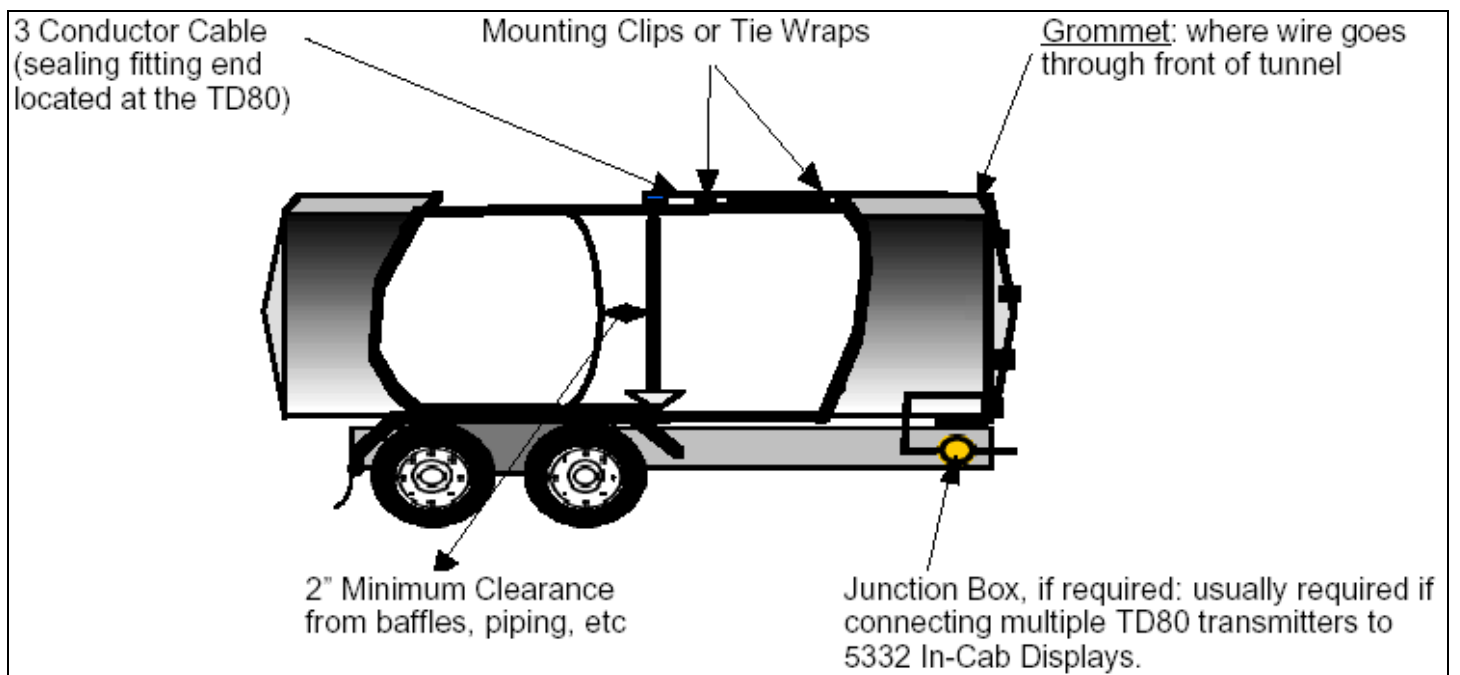
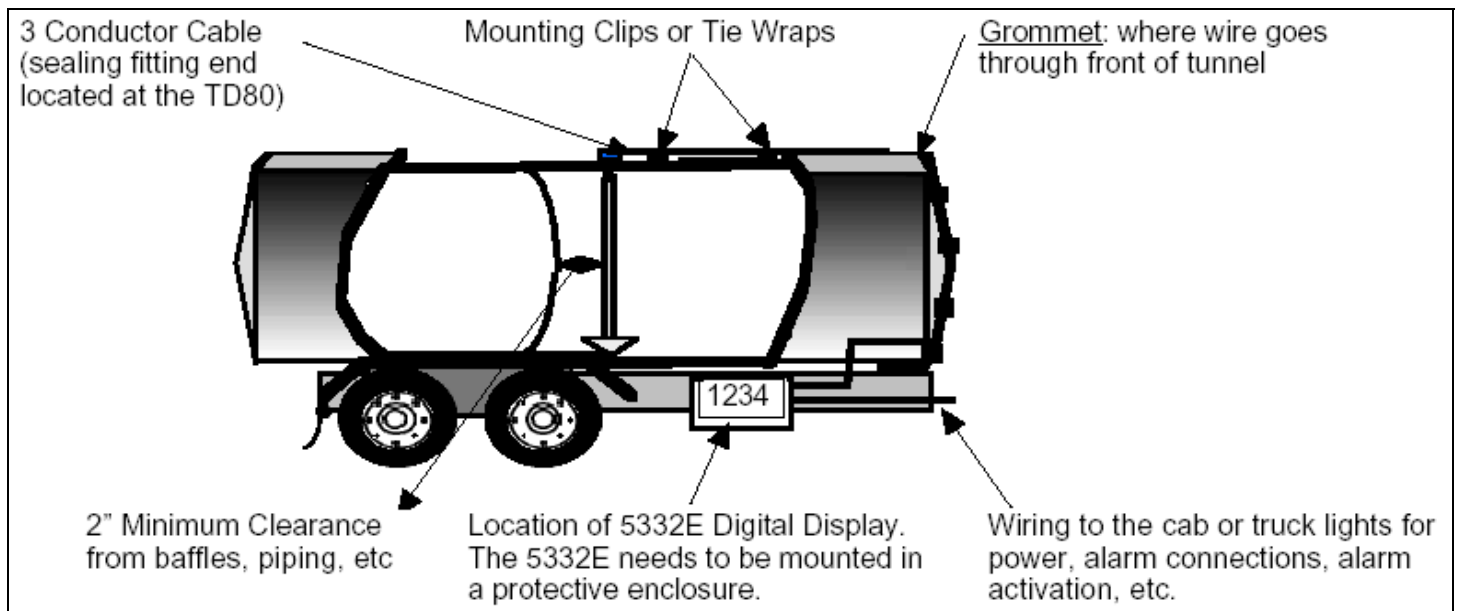


Wiring from the TD80 Transmitter to the Display

There are two types of cable for the TD80 Transmitter and are ordered in two different lengths. These are an **ACID** cable and a **REGULAR** cable (Both of which are 3 conductor cables) and are supplied in lengths of 50' for body job trucks and 75' for trailers.

1. Run the 3-conductor cable from the location of the TD80 through a hole (with a grommet) cut in the front of the tunnel.
2. Run the cable down the tank following existing wiring or drain hoses and into a junction box if installing a FINCH 5332E (In Cab) display or directly into the FINCH 5332 display.

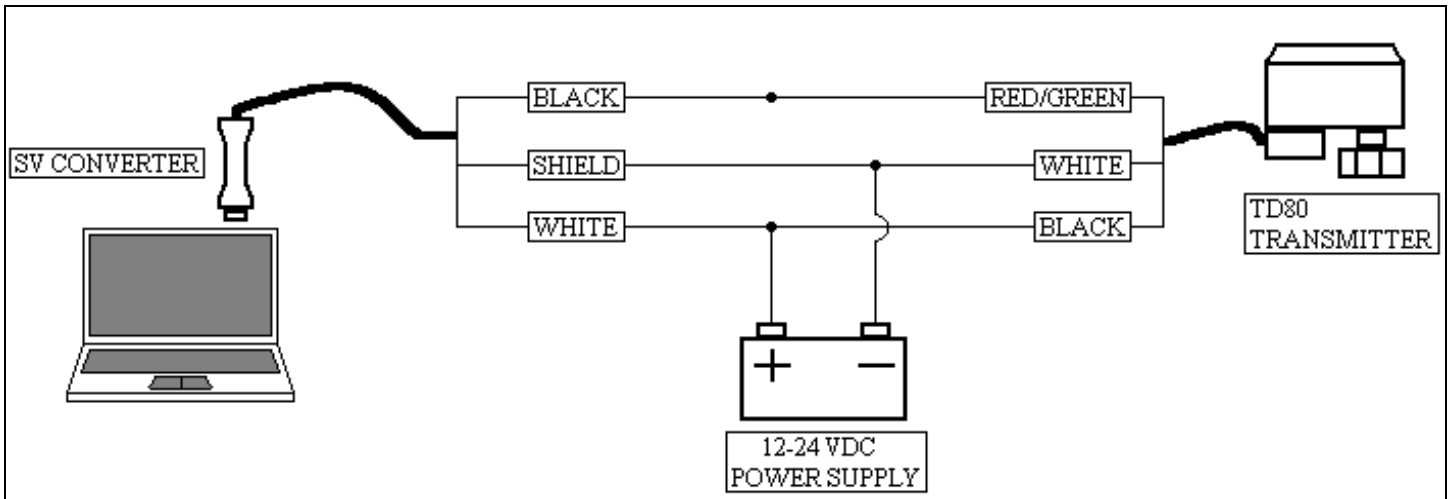
FIG 3.0



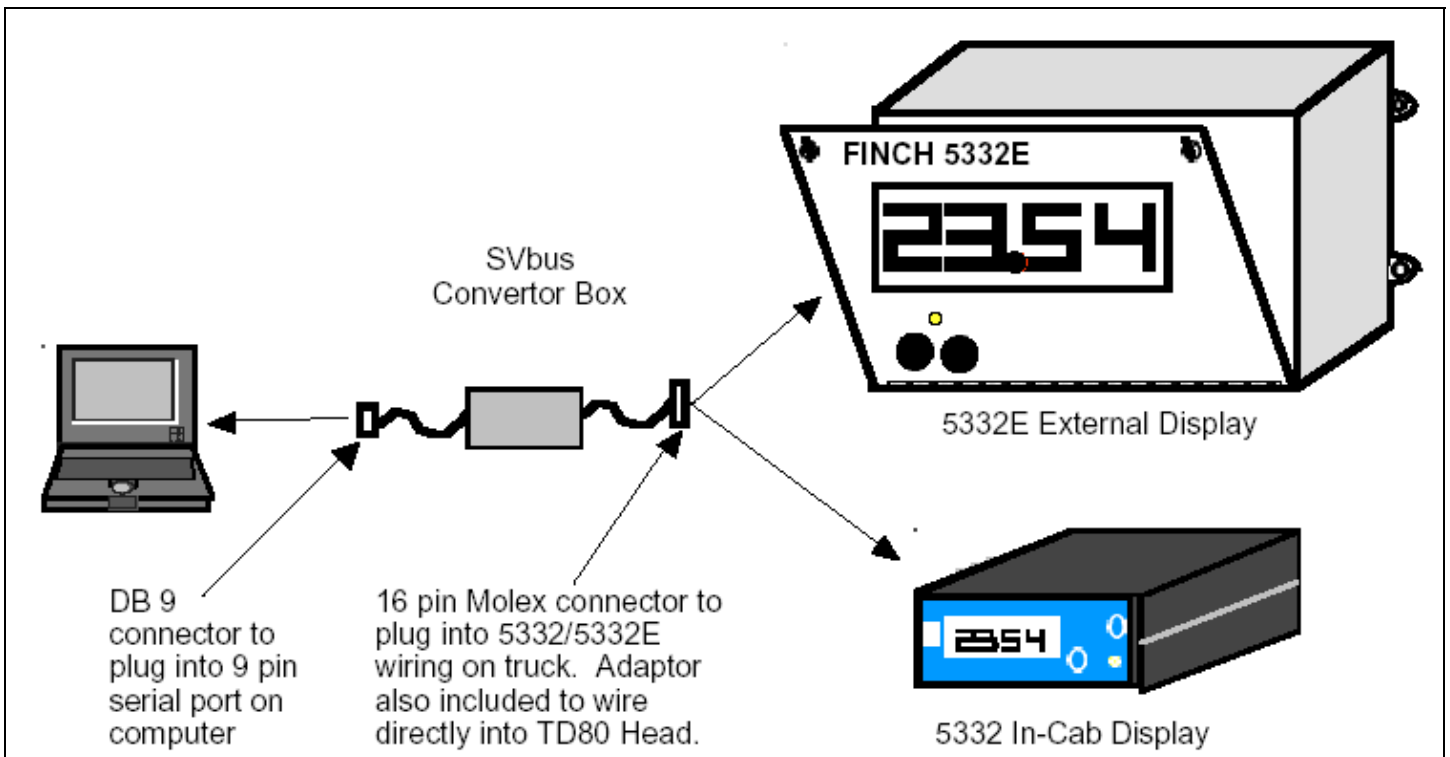
Wiring and Programming the TD80 Transmitter Head

Preparation

Before Installation



After Installation

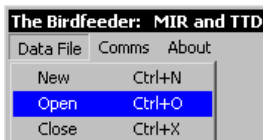


Programming

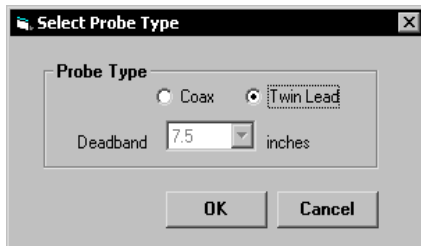
Open the MDU software program and select **N**ew from the Data **F**ile menu.

- Once selected, blank screen will appear in which the strap table can be entered. To enter the strap table, enter in the **Inch** values in the left side of the screen (always starting at 0), tab once and enter the corresponding Volume (always starting at 0.01), then press enter to continue the next values. (Strap tables must be entered in inches.)
- If a sump or a riser is installed in the tank, the height of both must be accounted for in the strap table. (eg. If there is a 3" riser in the tank, 3" must be added to the top of the strap table. If there is a 3" sump in the tank, 3" must be added to the bottom of the strap table.)
- When the strap table has been completed, save the file according to the serial number of tank or unit number and name of the customer for ease of future service and exit the program.
- Re-open the software, select **O**pen and choose the strap table just created.

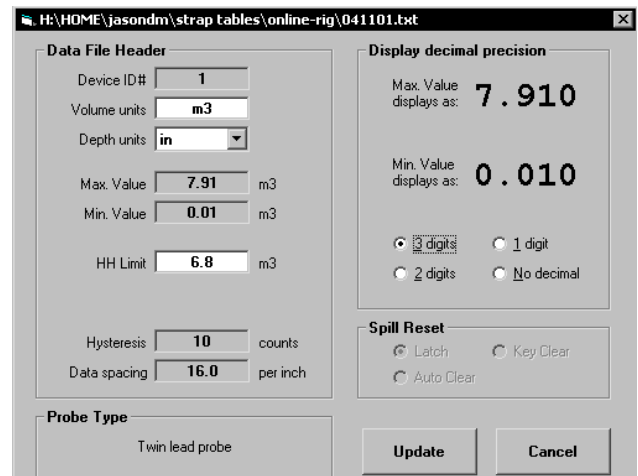
C:\SOFTWARE\MDU13\TRUCKS~1\			
Data File	Process data	Comms	About
0	0.01		
1	0.2		
2	0.4		
3	0.8		
4	1.1		
5	1.6		



- Select the type of probe being installed and press OK. If choosing a Coax probe, select the Dead band desired.

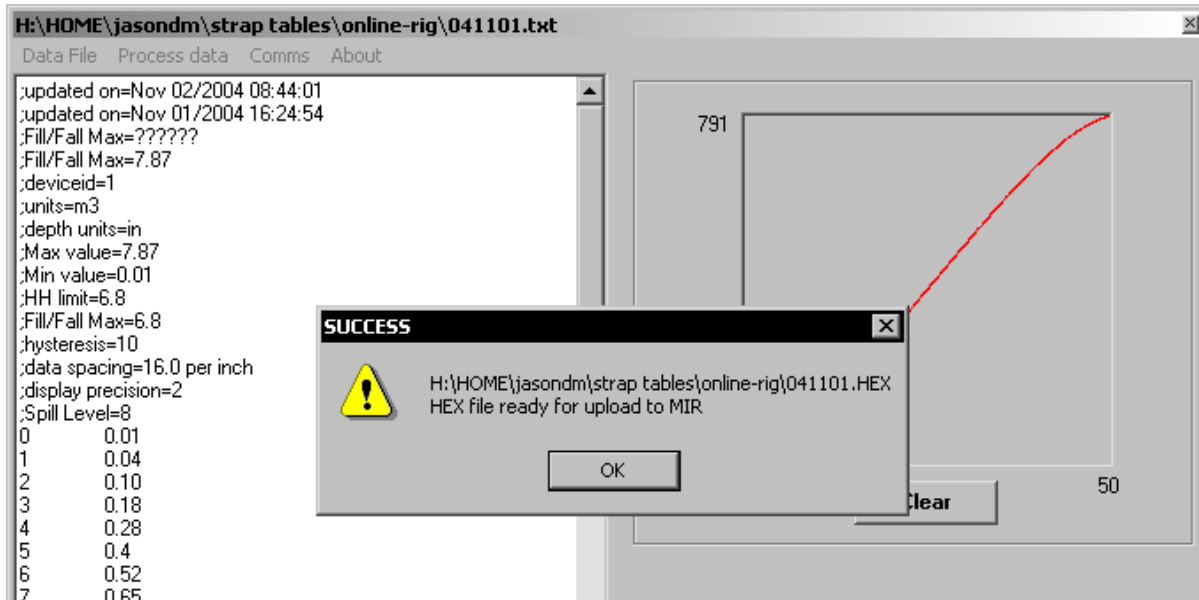


- Select **E**dit Header from the **P**rocess **D**ata menu. If the software detects any points of the strap table that are inconsistent, an error window will pop up and display the point of error to be corrected. When the strap table is correct, two warning windows will appear, one after the other, explaining the HH and H level alarms. Select OK on both of these and a screen will show up as follows.

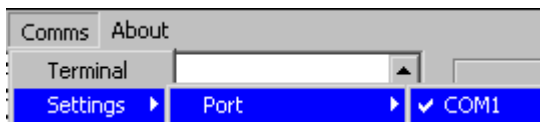


- Device ID # remains 1.
- Type in the volume units where asked.
- Select **inches** for Depth Units.
- Max Value, and Min Value remain same.
- HH Level and H Level remain same.
- Hysteresis and Data Spacing remain same.
- Select digits for decimal precision. (Choose to show 4-digits. eg. 35.00)
- Click Update.

- When the strap table re-appears with a list of information above it, select **Compile data** from the **Process data** menu. When it is finished a **SUCCESS** window should appear.



- In the Comms menu, select the correct com port for the computer. (Most computers will be COM1.)



- Select **Terminal** from the **Comms** menu. Turn power to the gauge **off**. Apply power to the gauge and click on the **Connect** button within 5 seconds of applying power. If an error message appears, turn the power supply off, check all of the wiring and COM port settings of the computer (COM 1, COM 2 etc.) and try to reconnect to the gauge applying power again. If the problem persists, a new SV Converter may be needed, or the configuration of the COM port being used on the computer may be incorrect.
- When the **MIR DETECTED** message appears click on the **Send File** button and the strap table just produced will appear in the file box highlighted. If not, choose the **Hex** file wanted and press OK. The strap table will take approximately 1 – 2 minutes to load and a Success window should appear. If this does not finish or an error occurs during download, start over from step 10 and repeat.

If at any time an error occurs that is not described in this manual or in the TD80 installation manual or if technical support is required, please contact our office during business hours for assistance. Due to Titan Logix Corp. policy, a Titan representative must make HH and SPILL alarm changes at a Titan Logix Corp. office location for testing and functionality purposes.

Blank Depth Chart Form

The following form can be used when creating a depth chart for a particular tank or vessel compartment. Simply enter the liquid volume (eg: M3, BBL's, Gallons etc.) at each inch. This can then be entered into the Birdfeeder (MDU) programming software and be downloaded to the TD80 Transmitter head.

Note: The maximum length of the TD80 probe is 92 inches.

Depth Units: **(inches)**

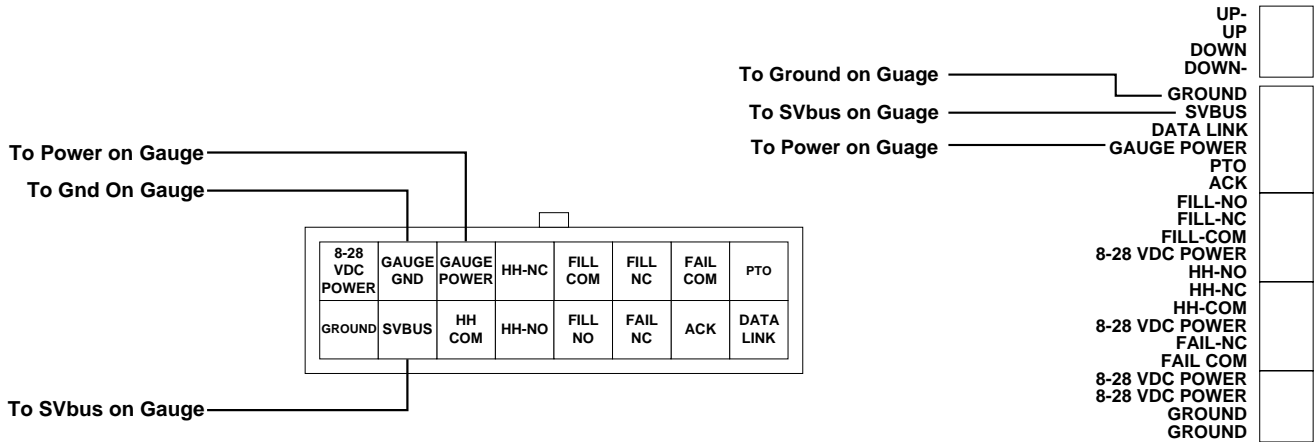
Volume Units: **(M3, Liters, BBL's)**

<u>DEPTH</u>	<u>VOLUME</u>	<u>DEPTH</u>	<u>VOLUME</u>	<u>DEPTH</u>	<u>VOLUME</u>
0		33		66	
1		34		67	
2		35		68	
3		36		69	
4		37		70	
5		38		71	
6		39		72	
7		40		73	
8		41		74	
9		42		75	
10		43		76	
11		44		77	
12		45		78	
13		46		79	
14		47		80	
15		48		81	
16		49		82	
17		50		83	
18		51		84	
19		52		85	
20		53		86	
21		54		87	
22		55		88	
23		56		89	
24		57		90	
25		58		91	
26		59		92	
27		60		93	
28		61		94	
29		62		95	
30		63		96	
31		64		97	
32		65		98	

Wiring

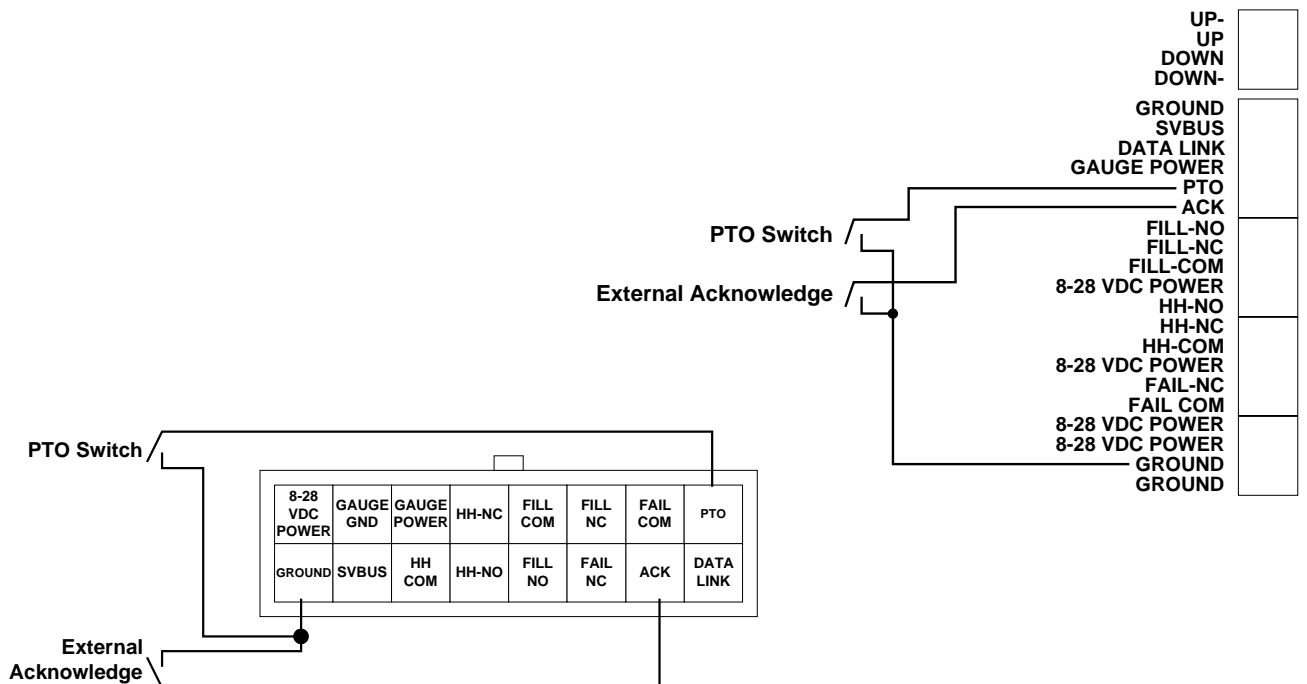
Transmitter Power and SVbus

Power for the TD80 Level Transmitter is provided through the Finch Display and the level is transmitted to the display through the SVbus.



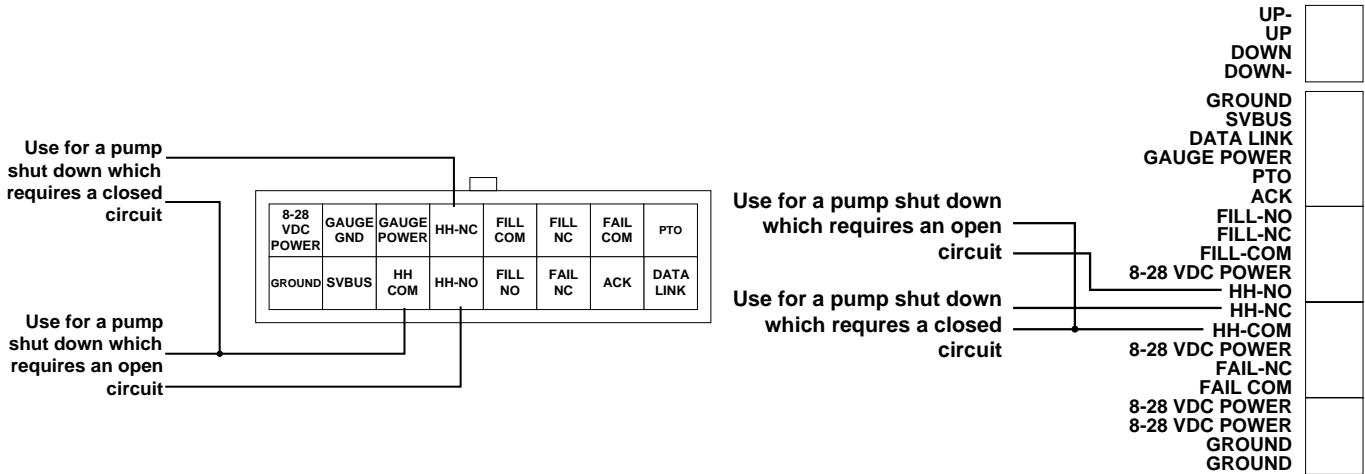
PTO and External Acknowledge (Optional)

The PTO is used for setting the Finch Display to Monitor Mode. In Monitor Mode the Finch will display and act on all alarms sent by the level transmitter. To set the display to Monitor Mode the PTO needs to be shorted to ground through a PTO switch. If the unit is being used for a stationary system where power consumption is not a large concern the PTO may be jumpered directly to ground to keep the unit in Monitor Mode at all times. The external acknowledge is used to acknowledge alarms without having to use the buttons on the Finch Display.



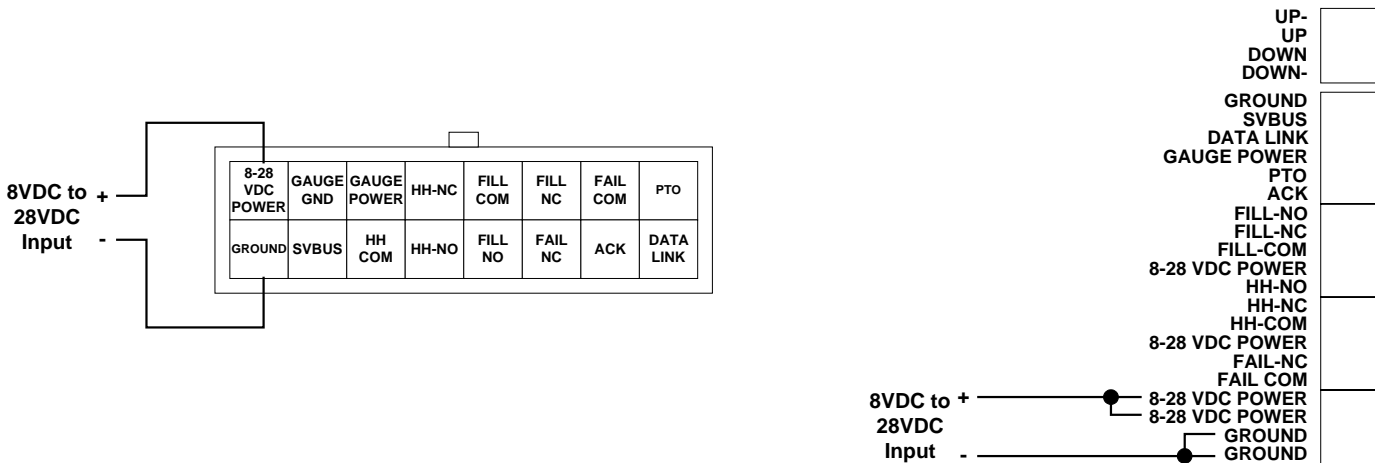
High High Alarm Relay Output (Optional)

The High High Alarm (HH) level is set in the strapping table which is loaded into the level transmitter. This level indicates a point 8" from the top of the tank. This point is important because the probe and transmitter begin to lose their linear accuracy at this point. This alarm is intended for use as a pump shutdown output to prevent the tank from being overfilled. This relay is normally on and in an alarm state it will turn off. For example: if the pump requires an open circuit to shut down the normally open contact should be used, the contact will be closed when not in an alarm state and will open in an alarm state. This alarm is set up this way for fail-safe operation (if the display loses power it will automatically shut down the pump).



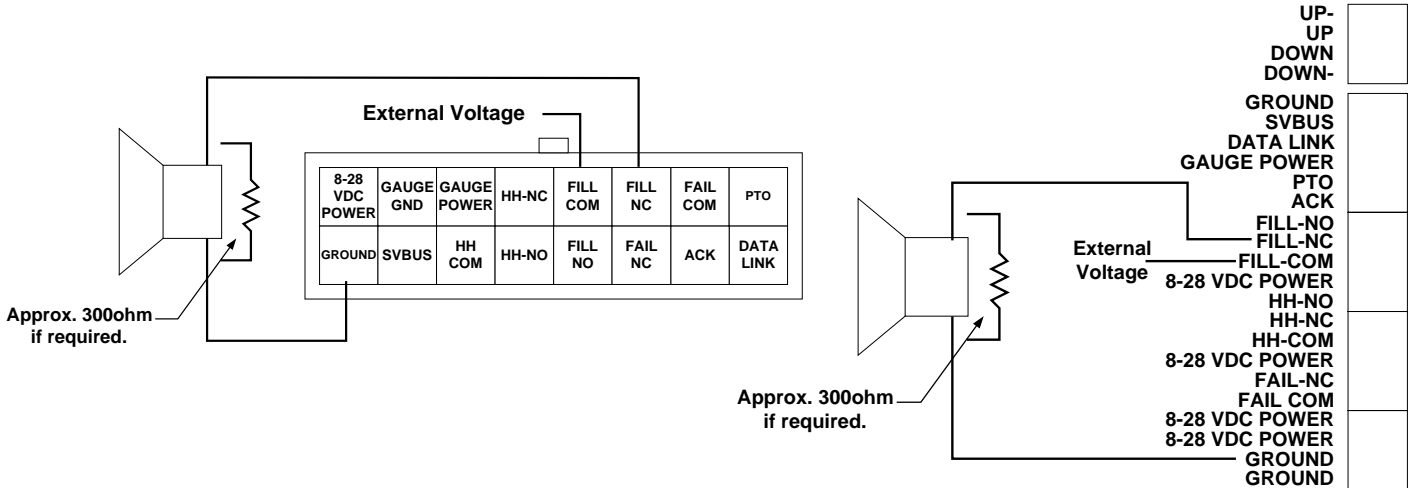
Power Input

Before applying power to the Finch Display ensure the supply is set to a voltage the unit can accept, otherwise damage to the Finch Display and Level Transmitter is very likely. Before applying power to the Finch Display for the first time, ensure any related alarm/control equipment is disabled until satisfactory system operation and performance is verified. The Finch Display is designed to operate from 8 to 28VDC. For transport applications it is recommended that the unit be powered from the vehicle's accessory power.



Fill Alarm Relay Output (Optional)

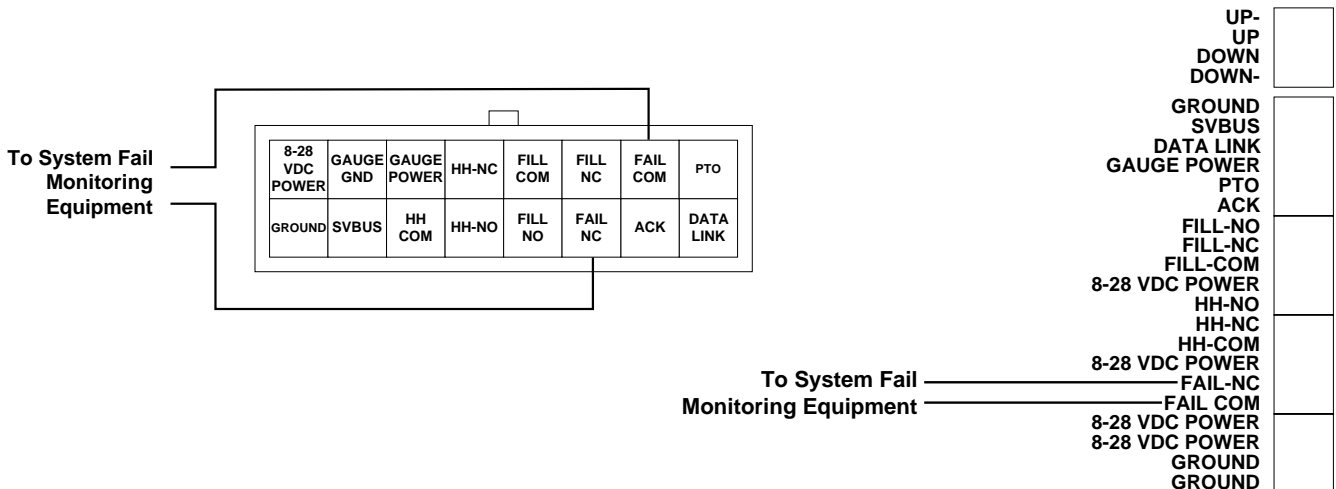
The Fill alarm is a user set level intended to let the operator know when the level in the tank reaches a desired point. It is recommended that a horn or visible indicator be used on this output. The relay is factory set for fail-safe operation (normally on, off in alarm state) but this can be changed by moving the Fill Alarm Relay Select Jumper (J1) to the other position. The Horn Circuit OK LED on the front of the display is connected to a circuit, which constantly monitors the output. As long as this sensing circuit is seeing a proper path on the output the LED will be on (if using the NC contact, for the NO contact the LED will be off when the circuit is correct). If the horn is too sensitive (makes peeping noises etc.) a resistor may need to be placed across the horn, this resistor should be approximately 300 ohms.



Fail Alarm Relay Output (Optional)

The Fail Alarm is used to inform the operator when an error state exists in the system, a spill alarm has been set, or communications between the level transmitter and display has been interrupted (see Troubleshooting and Alarms sections for more information). This relay is a dry contact and can be set by the operator to either normally open or normally closed. It is factory set to normally open but may be changed by moving the Fail Alarm Relay Select Jumper (J10) to the other position. This relay is designed for fail-safe operation (on when not in an alarm state, off when alarming). This relay is recommended for use in spill protection applications as a system fail relay and should be connected to a warning device, which can alert the operator that an error state is present.

Note: This relay is not designed to take the place of proper process supervision when filling the tank.



Operation

The finch display constantly receives level information from a level transmitter, which is attached to the probe in the tank. The level transmitter contains a strapping table, which allows it to convert the measurements it takes into useable units. The level transmitter also contains the information for the HH Alarm and the Spill Alarm levels. These levels are predetermined within the software and are not user settable. The finch display contains the information for the fill alarm, which can be changed at any time to suit the need of the user. This also allows any faulty displays to be changed out without losing any strapping table information about the tank itself.

Start Up

When power is applied to the finch display, the level transmitter will be fed power from the display itself. The level transmitter will run through a 12 second, diagnostic test to ensure the information it transmits correct. During the transmitter's diagnostic cycle the Finch Display will run its own diagnostic, during which the Finch display will show the current software revision number followed by a display test consisting of all four digits showing the values from 0 to 9 and A to F. At the same time as the display test, the unit will test the Fill and Fail relays. The unit will wait 2 seconds, pulse the Fill relay for 1 second, wait for 2 seconds, and pulse the Fail relay for 1 second.

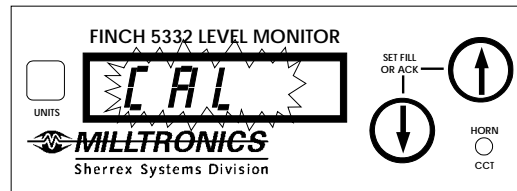
During start up, the operator may force the unit into calibration mode (see Calibration section for more information) by pressing either of the front panel buttons while turning the power on. If no button press is registered the unit will enter its normal mode of operation (either Monitor Mode or Off Mode Depending on PTO condition).

Note: If the display diagnostic is completed before the transmitter diagnostic the unit may display four dashes (----) for a few seconds while the transmitter diagnostic completes.

Calibration

In order to perform a calibration on the system a known amount of fluid must be in the tank. This level must be greater than 6 inches or the system will be unable to read the level accurately enough to perform the calibration.

To enter calibration mode, the displays PTO switch must be turned on. If the display does not have a PTO switch, it must be wired such that the PTO is grounded. Before powering up the unit, the operator must hold down one of the buttons on the front of the display. While continuing to hold down one of the buttons, the operator must apply power and continue to hold down the button throughout the displays diagnostic cycle. Once the cycle is complete and display shows "CAL", release the button.

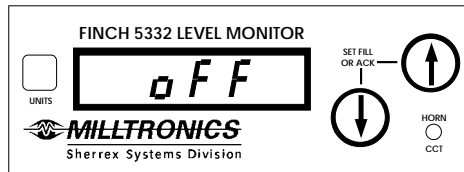


The unit will flash CAL for a few seconds to indicate that it has entered calibration mode, and it will then show the current level of liquid in the tank. If the current measurement displayed is not valid for what is in the tank, the operator may change the reading at this time by pressing the up or down arrow until the displayed value is correct. All alarms in the transmitter are cleared at this time. If there is not enough fluid in the tank the display will flash 2 LO. Calibration adjusts the strapping table offset in the transmitter. The transmitter also ensures that the level value at the highest point will not exceed the HH Alarm level. If this point is reached the unit will not allow the operator to continue adjusting in that direction. If this condition is reached the strapping table will need to be adjusted. Please contact your distributor for the adjustment. Once the display is reading as accurately as possible the unit must be turned off and restarted for normal operation.

Modes of Operation

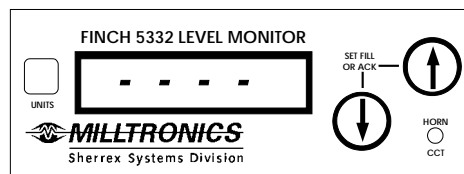
Alarm Disable Mode

The Finch display has a feature that allows the user to disable all of the alarms on the unit, while still having the unit keep active track of level. While in this mode display will show “oFF”, as to notify the operator that his alarm functions are disabled. To view the current level of fluid while in this mode, the operator may press either button on the display to enter display mode, or turn on the PTO switch to return the display to an active state.



Display Mode

In this mode the Finch display will show the current tank level as well as any errors received from the level transmitter. The unit will remain in Display Mode for 30 seconds before it returns to Off Mode. If the Finch Display does not receive any information from the transmitter for 6 seconds the unit will display four dashes (----) to indicate a communications error.



Monitor Mode

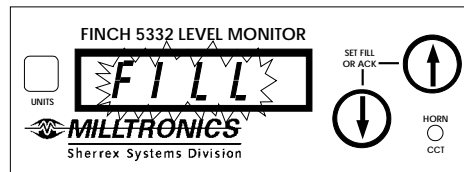
In this mode the Finch Display shows the current level, any error messages, and any alarm information sent by the level transmitter. The unit will act on any alarms it receives. To enter Monitor Mode the PTO must be on. From Monitor Mode the operator can enter either Display Mode by turning off the PTO, or Set Fill / Fall Mode by pressing either button.

As with Display Mode the Finch Display will show the current level and if the level falls below 6" the unit will display 2 LO. If the display does not receive any information from the transmitter for 6 seconds the display will show four dashes (----) and set the Fail Alarm. The Fail Alarm will also be set if the Finch Display receives an error message or a Spill Alarm. The Fill / Fall Alarm and the HH Alarm are also active in this mode and will activate if the conditions are reached. For more information on the alarms please see the Alarms section of this manual.

Set Fill / Fall Mode

Set Fill / Fall Mode can be reached from either Display Mode or Monitor Mode by pressing either of the buttons on the display. If the Fill / Fall Jumper is out the display will blink FILL.

If the Fill / Fall Jumper is in the display will blink FALL. After a few seconds the display will show the current Fill or Fall setting. The current setting can then be adjusted up or down by pressing the appropriate button on the display. Each button press changes the level by one unit while holding the button down will change the level by tens of units. The fill level is prevented from exceeding the HH Level through software. After 5 seconds of inactivity the Finch Display will revert to either Display Mode or Monitor Mode depending of the state of the PTO.



Alarms

When the Finch Display is in Monitor Mode, the unit will respond to the various alarm states. There are four alarm states associated with three relays. The Spill and HH Alarms are controlled by the level transmitter only, the Fail alarm is controlled by the level transmitter primarily but may be set by the display if communications are lost, and the Fill / Fall Alarm is controlled by the Finch Display only. All alarm levels have a built in hysteresis to prevent false tripping during the load procedure. The Finch Display has a built in alarm log which will record each occurrence of a HH or Spill alarm. The Fill / Fall and Fail alarms are designed for fail safe operation, this means that should the Finch Display lose power the Fill and Fail relays will both go into their alarm states.

Fill / Fall Alarm

The Fill / Fall Alarm level is an operator entered value for use in filling or draining the tank to a predetermined level. This alarm is associated with the Fill Alarm Relay. The Fill Alarm Relay is a powered relay intended for use with a horn or visible indicator. When the fill / fall level is reached the alarm is set and the relay is activated. The Fill / Fall Alarm will persist until it is acknowledged. To acknowledge the alarm the operator needs to press one of the buttons on the front of the display or the External Acknowledge button (if installed).

High High Alarm

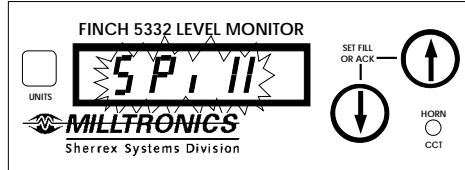
The High High Alarm (HH) level is set in the strapping table in the transmitter. This level is always set to 8" below the top of the tank and is where the probe and transmitter begin to lose their linear accuracy. This alarm is associated with the HH Alarm relay. This relay is to be used as a pump shut down. When the HH Alarm trips the HH Alarm relay is activated, the display will begin flashing, alternating between the current level and HH, and the occurrence of the alarm is recorded in the alarm log. To acknowledge this alarm the operator must either press the External Acknowledge button (if installed) or press the buttons on the front in the following order: *up - up - down - up*. If the Fill / Fall Alarm and the High High Alarm are both set at the same time they can both be acknowledged at the same time by pressing the External Acknowledge button.

Fail Alarm

The Fail Alarm lets the operator know when a system error has occurred. This alarm is associated with the Fail Alarm relay. This alarm will activate the relay if an error message is received from the level transmitter, the Finch Display does not receive any communications for 6 seconds, or a Spill Alarm is set. This alarm is self-resetting, when the cause of the alarm is gone so is the alarm. For example if the unit does not receive any communications for 6 seconds the alarm will be set, but if a communication is received 1 second later the alarm will reset itself. No acknowledgment is required for this alarm, nor is this alarm recorded in the alarm log.

Spill Alarm

The level for the Spill Alarm is set in the transmitter software. This level is set to approximately 6" from the top of the tank. This alarm has no relay associated directly with it but it is counted as a system error and therefore sets the Fail Alarm. When the Spill Alarm level is reached the display will flash Spill, and record the alarm in the alarm log.



The only way to reset the Spill alarm is to either pump out fluid until the level is below the HH Alarm level, or to put the unit into calibration mode, and cycle the power. If the Finch Display and level transmitter are not powered while the fluid is pumped out the Spill Alarm will *not* be reset.

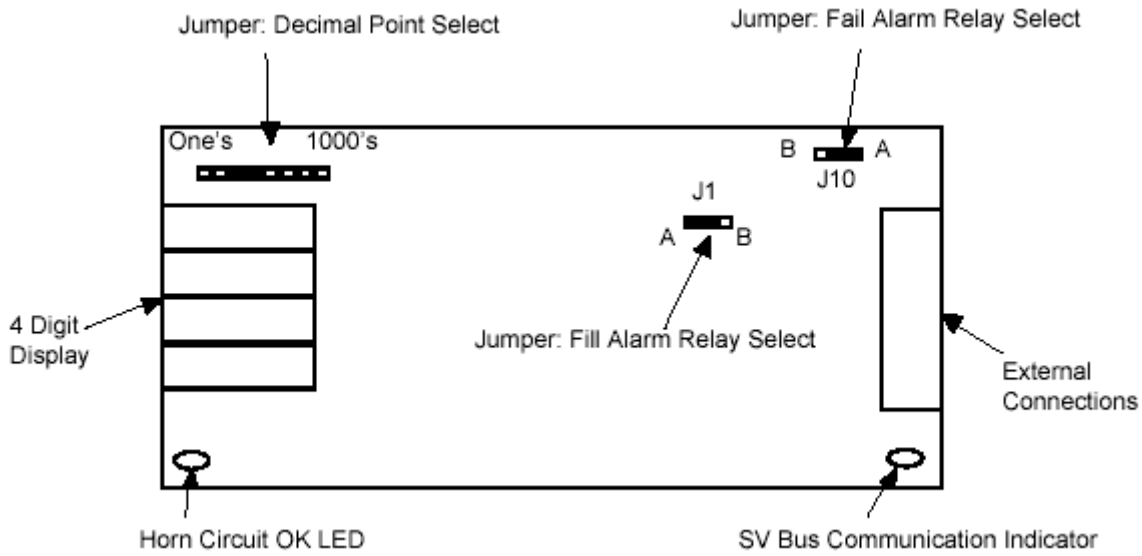
Disabling the 2 LO Message

The Finch display can be set to measure below the bottom dead band by installing the 2 LO Disable Jumper. This will prevent the 2 LO message from appearing on the display, When installed this jumper will allow the Finch Display to give readings all the way to the shorting block.

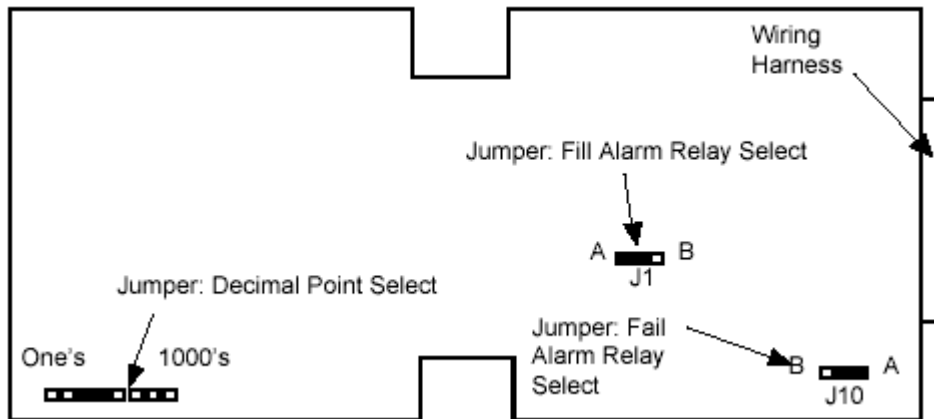
Note: It is not recommended that the unit be operated in this state. The readings below the bottom dead band are being measured in the non-linear portion of the probe. These readings cannot be counted on for accuracy.

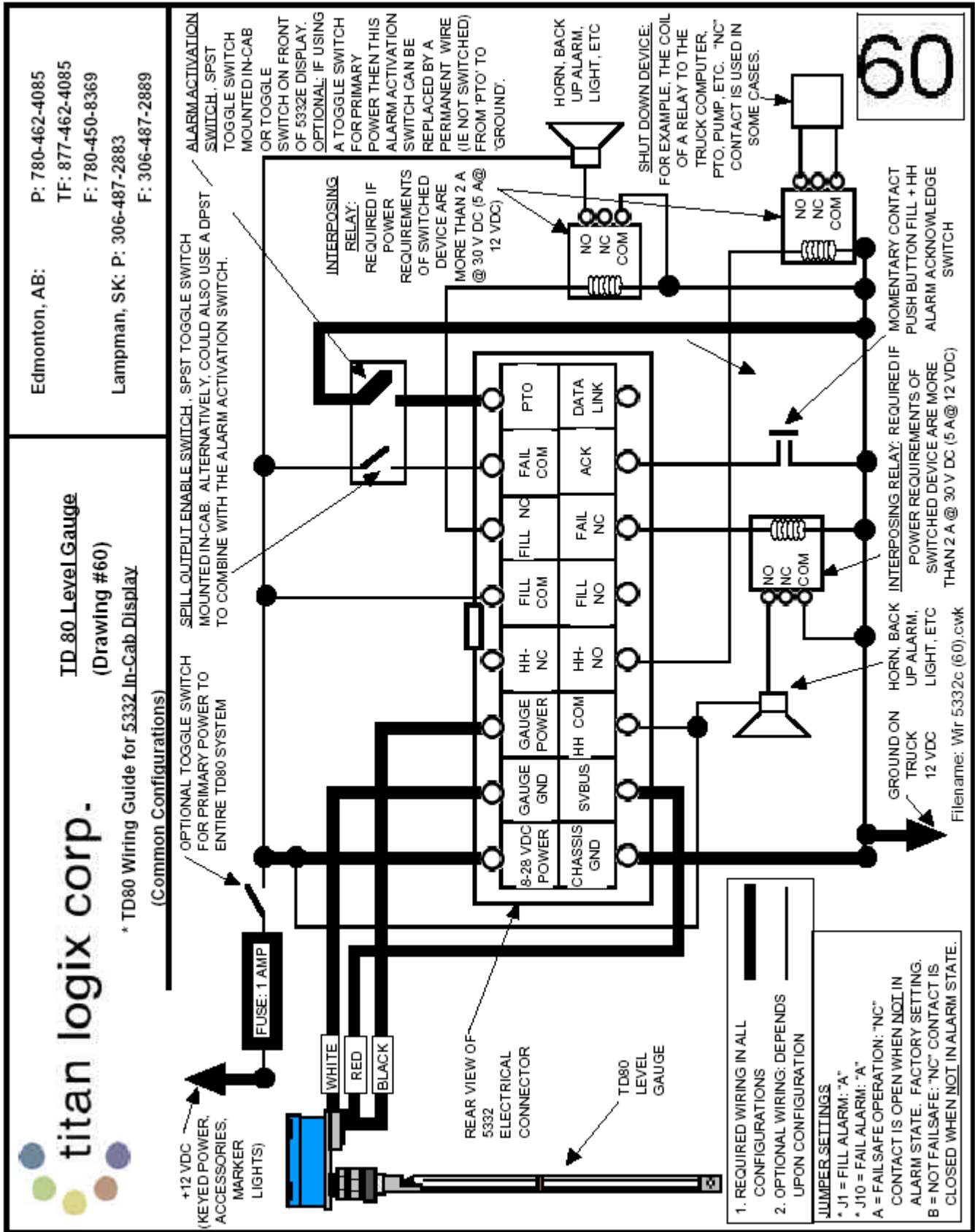
Jumper Settings

FINCH 5332



FINCH 5332E



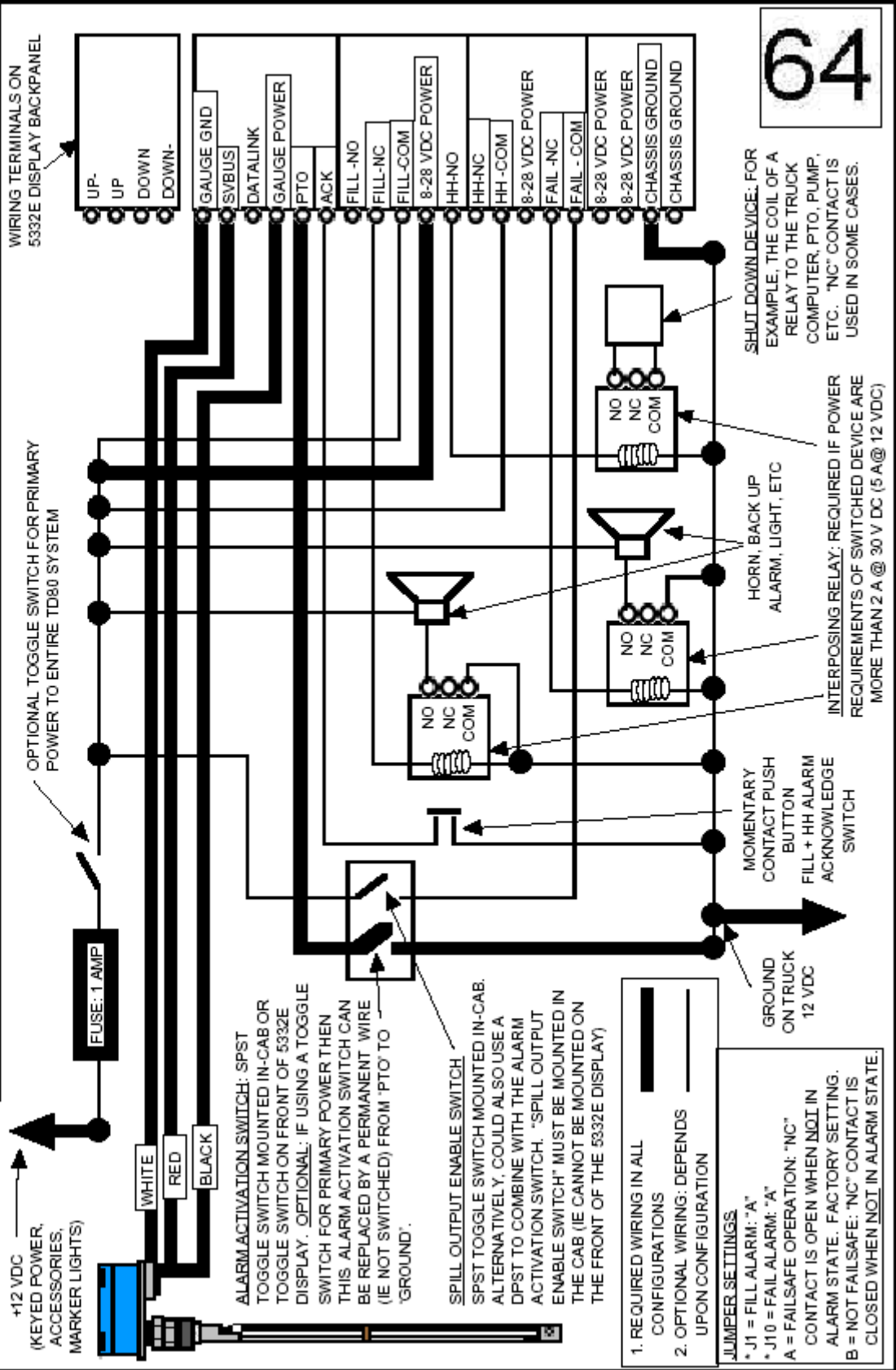


Edmonton, AB:
Lampman, SK:

P: 780-462-4085
TF: 877-462-4085
F: 780-450-8369
P: 306-487-2883
F: 306-487-2889

TD 80 Level Gauge
(Drawing #64)

* TD80 Wiring Guide for 5332E External Display
(Common Configurations)



64



**TD 80 Level Gauge
(Drawing #47)**

* TD80 Displays: Essential Instructions for the 5332 In-Cab and 5332E External Displays

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TF: 877-462-4085
F: 780-450-8369
Lampman, SK: P: 306-487-2883
F: 306-487-2889

ABOUT THE DISPLAY

DURING START UP THE DISPLAY WILL SHOW THE CURRENT SOFTWARE VERSION #, THEN GO THROUGH A COUNTING SEQUENCE FROM 0 TO 9 AND A TO F ON ALL 4 DIGITS. AFTER THE COUNTING IS COMPLETED, THE DISPLAY WILL READ "----" FOR 20 SECONDS IF THE ALARM ACTIVATION SWITCH IS ON. WHEN THIS SWITCH IS NOT ON THE DISPLAY SHOWS "OFF". THE DISPLAY AND ALARM RELAYS ARE ACTIVE ONLY WHEN THE ALARM ACTIVATION SWITCH (OR PTO AIR ASSISTED SWITCH) IS ON. THE DISPLAY CAN BE TEMPORARILY ACTIVATED (IE FOR APPROXIMATELY 35 SECONDS) BY PRESSING EITHER OF THE ARROW BUTTONS, AFTER WHICH IT WILL RETURN TO "OFF". THE ALARMS ARE NOT ACTIVE UNLESS THE ALARM ACTIVATION SWITCH IS ON.

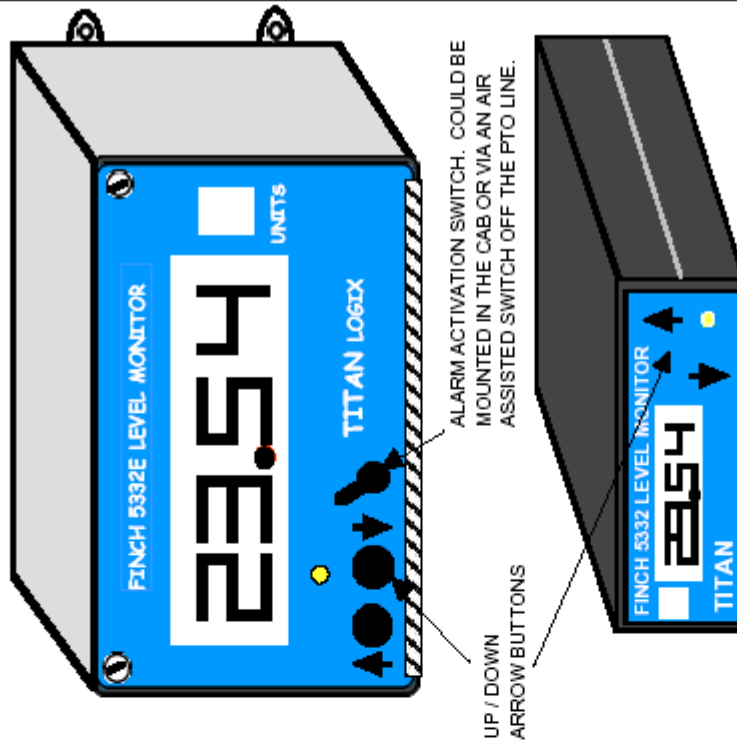
STEP 1: CALIBRATION

NOTE: THE DISPLAY IS NOT CALIBRATED BY THE INSTALLATION TECHNICIAN AND MUST BE CALIBRATED BY THE CUSTOMER USING THE FOLLOWING PROCEDURE BEFORE ACCURATE LIQUID LEVELS WILL BE AVAILABLE.

1. ENSURE THE TANK IS LEVEL / HORIZONTAL.
2. FILL THE TANK APPROXIMATELY 1/2 TO 2/3 FULL. DETERMINE THE VOLUME EITHER THROUGH A METER OR HAND DIPPING AND CORRESPONDING TO A DEPTH CHART.
3. TURN THE GAUGE OFF (IE TURN OFF THE IGNITION SWITCH)
4. TURN THE GAUGE BACK ON WHILE AT THE SAME TIME HOLDING EITHER OF THE ARROW BUTTONS FOR AT LEAST 5 SECONDS.
5. AFTER THE START UP SEQUENCE (INCLUDING 20 SECONDS OF "----") THE DISPLAY WILL READ "CAL" BRIEFLY AND THEN DISPLAY THE CURRENT LIQUID LEVEL. THIS LIQUID LEVEL SHOULD BE CLOSE TO THE ACTUAL LEVEL.
6. USE THE ARROW BUTTONS TO DIAL IN THE CORRECT LEVEL.
7. TURN THE GAUGE OFF.
8. TURN THE GAUGE BACK ON AGAIN WITHOUT PRESSING ANY BUTTONS. CALIBRATION IS COMPLETE.

STEP 2: SETTING ALARM LEVELS

1. FILL LEVEL: THE 'FILL' ALARM LEVEL CAN BE CHANGED AT ANY TIME DURING OPERATION. CAUTION: DO NOT CHANGE THE FILL LEVEL WHEN THE TANK IS FILLING. TO CHANGE THE FILL LEVEL THE DISPLAY MUST BE ACTIVATED (IE: SHOWING THE CURRENT LIQUID LEVEL) EITHER BY PRESSING ONE OF THE ARROW BUTTONS OR BY TURNING ON THE ALARM ACTIVATION SWITCH. WHEN THE DISPLAY IS ACTIVATED PRESS AND RELEASE EITHER OF THE ARROW BUTTONS. THE DISPLAY SHOULD FLASH "FILL" THEN DISPLAY A NUMBER. USING THE ARROW BUTTONS, CHANGE THE NUMBER TO THE DESIRED "FILL" LEVEL. AFTER THE LEVEL HAS BEEN ENTERED THE DISPLAY WILL FLASH THE NUMBER AND RETURN TO DISPLAYING THE CURRENT LIQUID LEVEL. THE 'FILL' ALARM HAS NOW BEEN SET.
2. HH LEVEL: THIS IS FACTORY SET, USUALLY AT 2 INCHES BELOW THE TOP DEADBAND.
3. SPILL/FAIL LEVEL: THIS IS FACTORY SET AT THE TOP DEADBAND OF 6.5 TO 7 INCHES.



NOTE: THE ALARM ACTIVATION SWITCH FOR THE 5332 IN-CAB DISPLAY COULD BE MOUNTED IN THE CAB OR VIA AN AIR ASSISTED SWITCH OFF THE PTO LINE.

STEP 3: ACKNOWLEDGING THE ALARMS

1. FILL ALARM: PRESS EITHER OF THE ARROW BUTTONS.
2. HH ALARM: ENTER THE SEQUENCE UP-UP-DOWN-UP
3. SPILL ALARM: LOWER THE LIQUID LEVEL 1 INCH BELOW THE SPILL POINT OR ENTER INTO 'CALIBRATION' MODE (SUB-STEP 2 TO 8 OF 'STEP 1: CALIBRATION')

Filename: DispPts.cwk

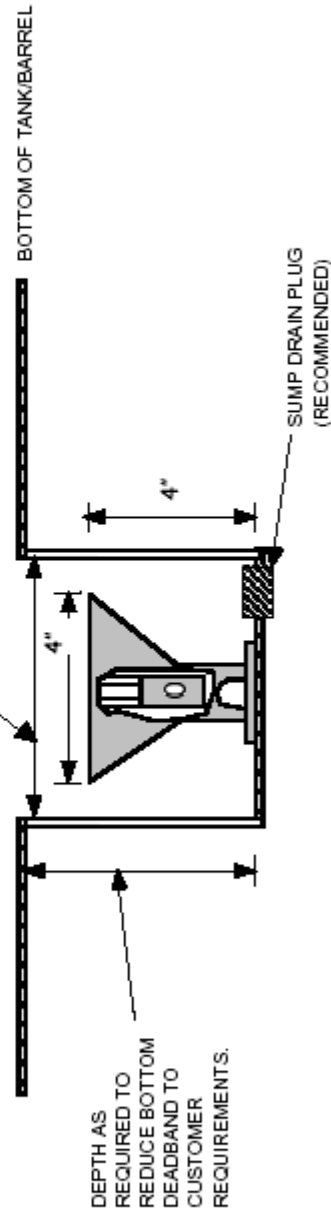
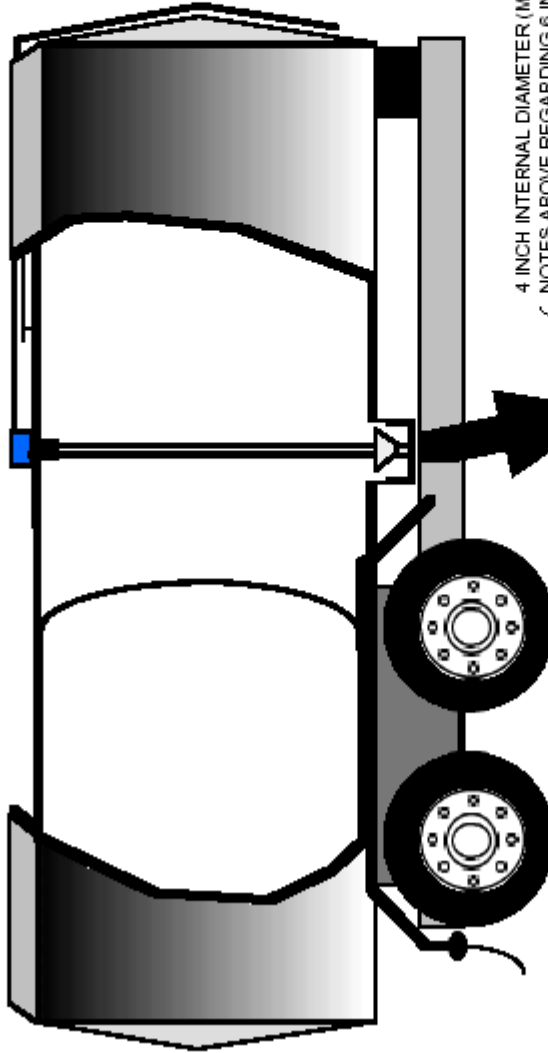


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TD 80 Level Gauge
(Drawing #18)

* Mounting the TD80 in a 6 inch Sump to
reduce the Bottom Deadband

Edmonton, AB: P: 780-462-4085
TF: 877-462-4085
F: 780-450-8369
Lampman, SK: P: 306-487-2883
F: 306-487-2889



NOTES:

1. SUMP MUST BE A MINIMUM OF 4 INCH INTERNAL DIAMETER. THIS IS NECESSARY TO ENSURE THE RADAR PULSE IS NOT AFFECTED BY THE SURROUNDING METAL OF THE SUMP PIPING.
NOTE: IF MOUNTING THE ANCHOR CONE IN THE SUMP IT IS RECOMMENDED TO USE MINIMUM 6 INCH DIAMETER SUMP PIPING TO ENSURE A 1 INCH CLEARANCE ALL AROUND THE MOUNTING CONE TO ALLOW FOR ADEQUATE DRAINAGE.
2. THE DEPTH OF THE SUMP SHOULD BE SUFFICIENT TO REDUCE THE BOTTOM DEADBAND TO THE REQUIRED LEVEL.
3. A SUMP DRAIN IS RECOMMENDED.
4. SUITABLE ACCIDENT DAMAGE PROTECTION NEEDS TO BE INSTALLED TO PROTECT THE SUMP.

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instrumentation solutions that just make sense

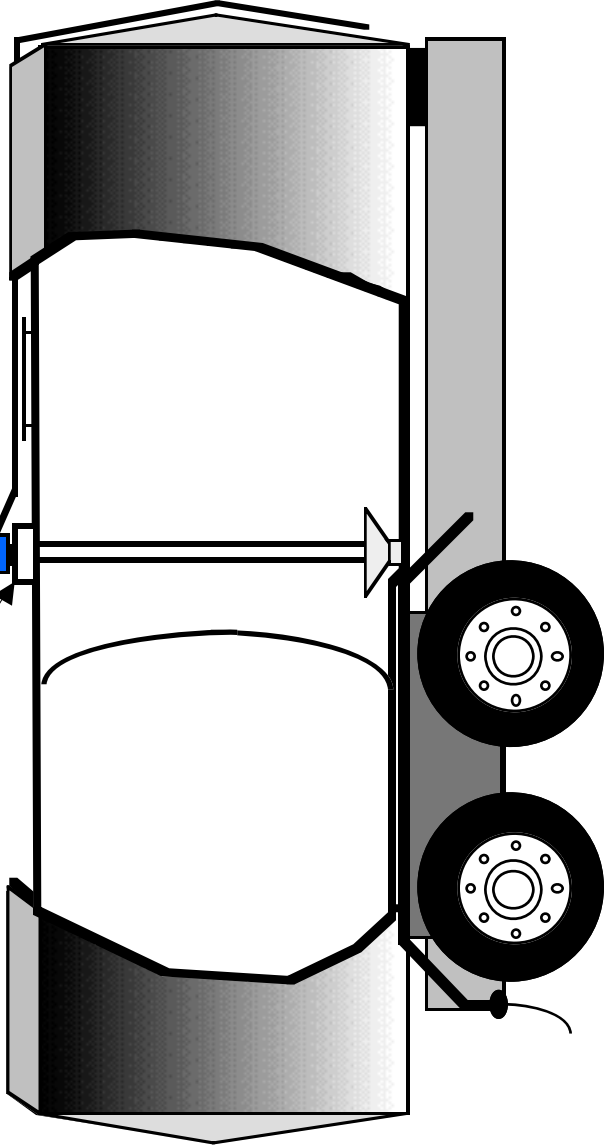
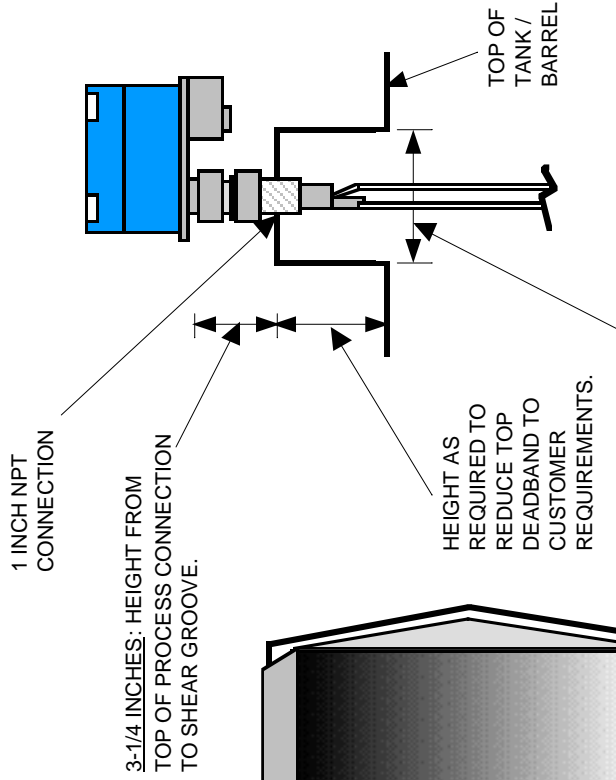
Filename: 6inSump.cwk

TD 80 Level Gauge (Drawing #17)

*** Mounting the TD80 on a Riser / Extension to reduce the effect of the Top Deadband**

Edmonton, AB
 (780) 462-4085
 Calgary, AB
 (403) 251-5797
 Lampman, SK
 (306) 487-2883

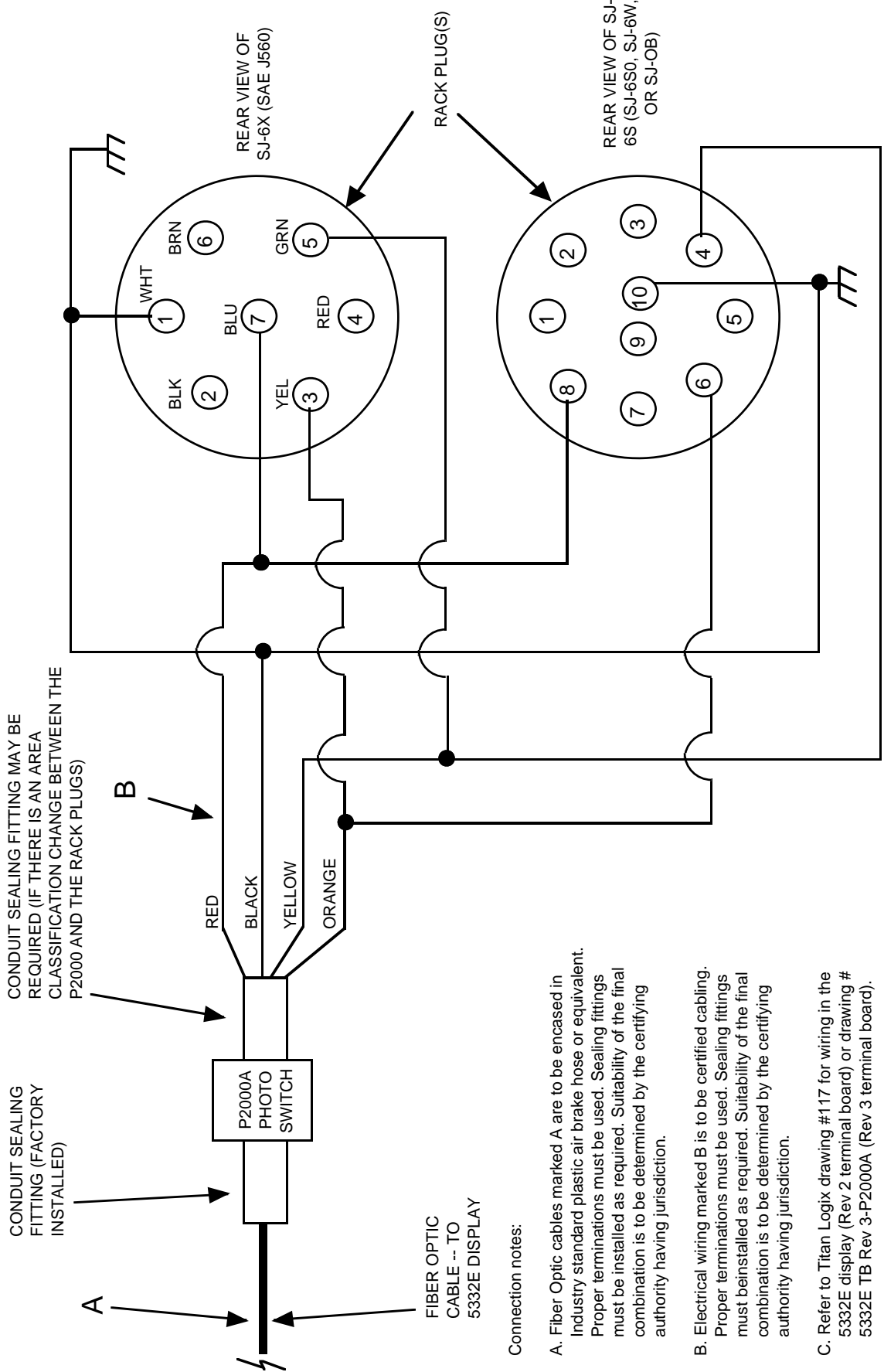
RISER TO REDUCE THE EFFECT OF THE TOP DEADBAND.



NOTES:

1. RISER MUST BE A MINIMUM OF 4 INCH INTERNAL DIAMETER (IF USING THE DUAL ROD PROBE). THIS IS NECESSARY TO ENSURE THE RADAR PULSE IS NOT AFFECTED BY THE SURROUNDING METAL OF THE RISER PIPE. IF USING A COAXIAL PROBE, THE RISER DIAMETER NEED ONLY BE LARGE ENOUGH FOR THE COAXIAL TUBE (1" DIAMETER) TO FIT THROUGH.
2. THE HEIGHT OF THE RISER SHOULD BE SUFFICIENT TO REDUCE THE TOP DEADBAND TO THE REQUIRED LEVEL.
3. THE SHEAR GROOVE IN THE TD80 TRANSMITTER HEAD IS LOCATED 3-1/4 INCHES ABOVE THE PROCESS CONNECTION (SEE THE TECHNICAL SPECIFICATION GUIDE).

1. IF USING THE DUAL ROD PROBE (SHOWN ABOVE): 4 INCH INTERNAL DIAMETER (MINIMUM) THROUGH THE ENTIRE HEIGHT OF THE RISER (SCH 40)
2. IF USING THE COAXIAL PROBE (IE FOR DIESEL, GASOLINE, JET FUEL): THE RISER DIAMETER NEED ONLY BE LARGE ENOUGH TO ACCOMMODATE THE 1" PIPE ON THE COAXIAL PROBE.



CONDUIT SEALING FITTING MAY BE REQUIRED (IF THERE IS AN AREA CLASSIFICATION CHANGE BETWEEN THE P2000 AND THE RACK PLUGS)

CONDUIT SEALING FITTING (FACTORY INSTALLED)

FIBER OPTIC CABLE -- TO 5332E DISPLAY

Connection notes:

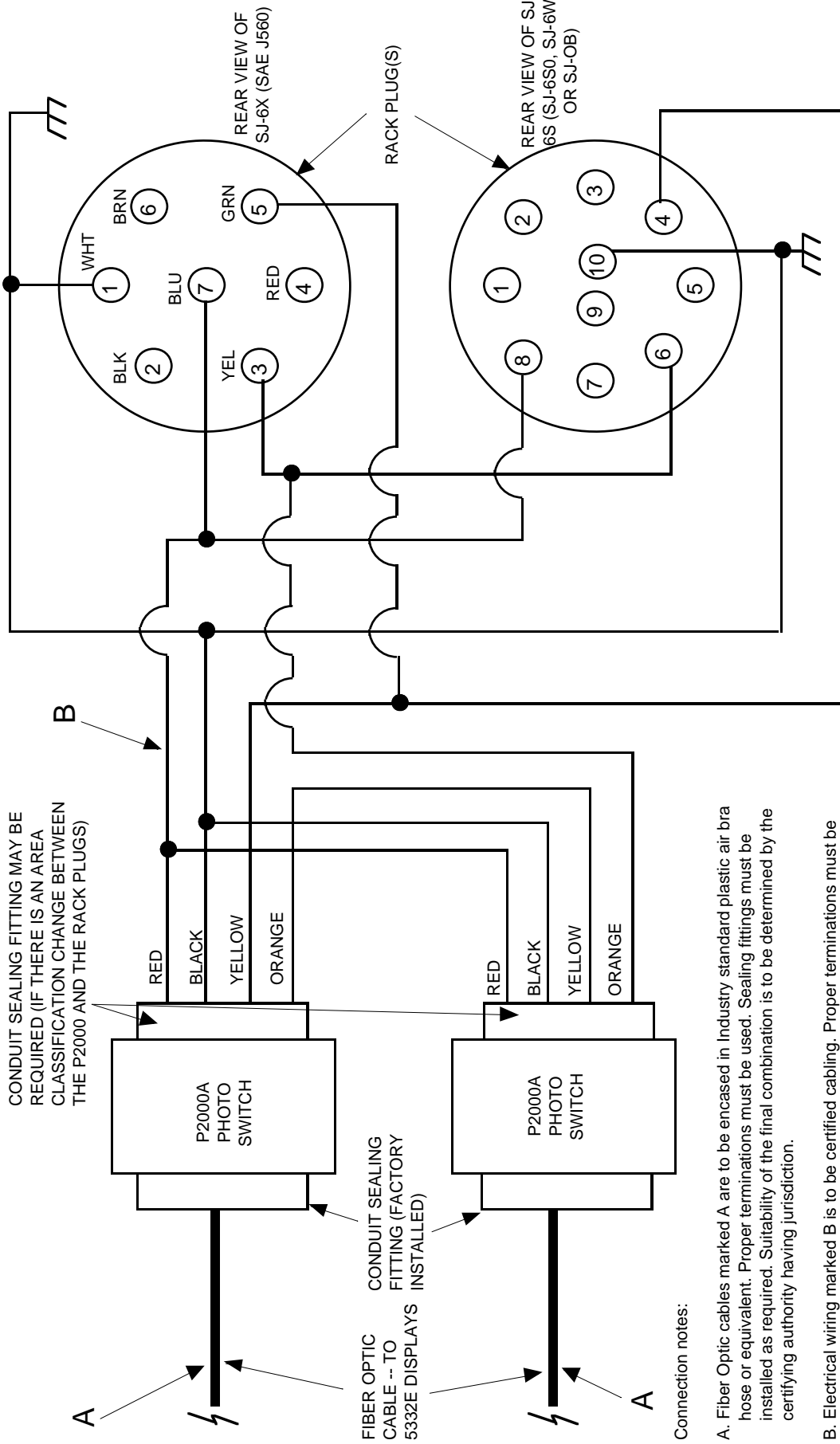
- A. Fiber Optic cables marked A are to be enclosed in industry standard plastic air brake hose or equivalent. Proper terminations must be used. Sealing fittings must be installed as required. Suitability of the final combination is to be determined by the certifying authority having jurisdiction.
- B. Electrical wiring marked B is to be certified cabling. Proper terminations must be used. Sealing fittings must be installed as required. Suitability of the final combination is to be determined by the certifying authority having jurisdiction.
- C. Refer to Titan Logix drawing #117 for wiring in the 5332E display (Rev 2 terminal board) or drawing # 5332E TB Rev 3-P2000A (Rev 3 terminal board).

ID 80 Level Gauge (Drawing #1116)

Rack Interface Module (Photoswitch): Connecting Titan 5332E display to Scully Optic Loading Rack (7 pin and 10 pin plug). NOT 'TRUE' THERMISTOR WIRING.

* Dual Compartment Tanker

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 Calgary, AB
 (403) 251-5797
 Lampman, SK
 (306) 487-2883



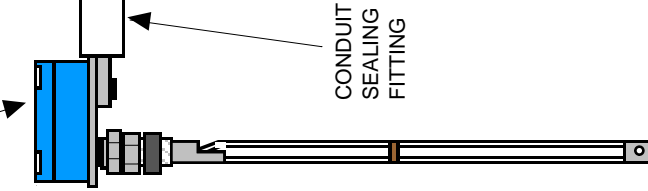
Connection notes:

- A. Fiber Optic cables marked A are to be encased in industry standard plastic air bra hose or equivalent. Proper terminations must be used. Sealing fittings must be installed as required. Suitability of the final combination is to be determined by the certifying authority having jurisdiction.
- B. Electrical wiring marked B is to be certified cabling. Proper terminations must be used. Sealing fittings must be installed as required. Suitability of the final combination is to be determined by the certifying authority having jurisdiction.
- C. Refer to Titan Logix drawing #117 for wiring in the 5332E display (Rev 2 terminal board) or drawing # 5332E TB Rev 3-P2000A (Rev 3 terminal board).

CLASS I DIV 1

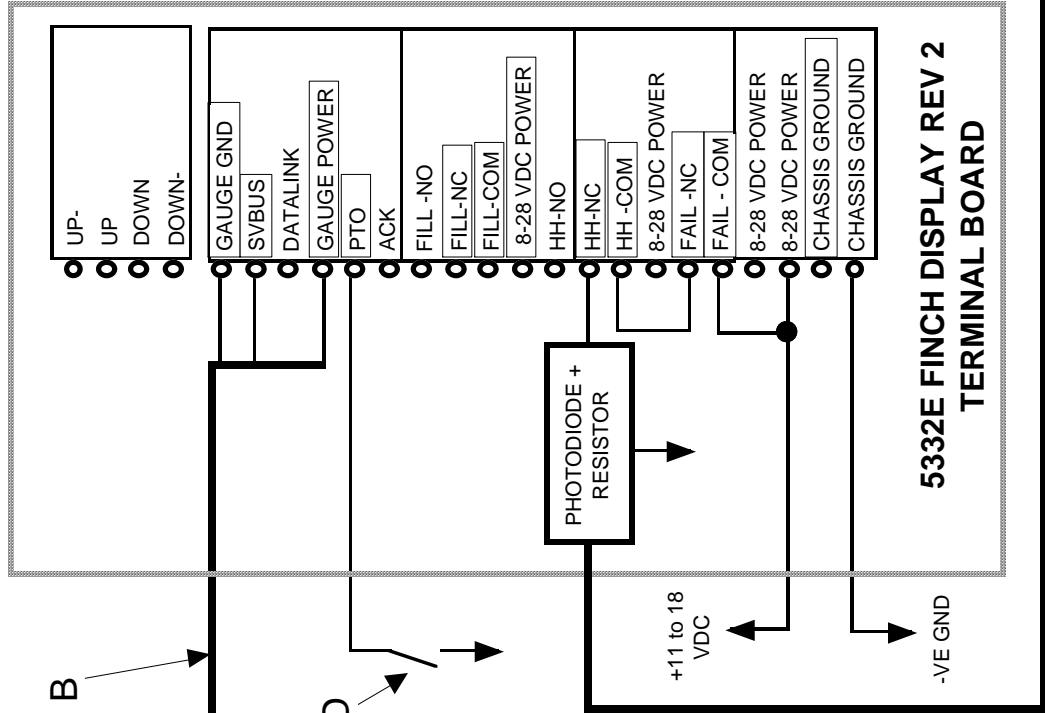
CLASS I DIV 2

TD80 MOUNTED IN TANK



Connection notes:

- A. Fiber Optic cables marked A are to be encased in Industry standard plastic air brake hose or equivalent. Proper terminations must be used. Sealing fittings must be installed as required. Suitability of the final combination is to be determined by the certifying authority having jurisdiction.
- B. Electrical wiring marked B is to be certified cabling. Proper terminations must be used. Sealing fittings must be installed as required. Suitability of the final combination is to be determined by the certifying authority having jurisdiction.
- C. Refer to Titan Logix Drawings #115 and #116 for wiring of the 'External Circuit'
- D. PTO Switch. 'PTO' must be shorted to ground for the 5332E/TD80 to be activated. The switch can alternatively be located in a non-hazardous area, or mounted on the 5332E.



TO EXTERNAL CIRCUIT BEING SWITCHED. SEE DRAWING #115 AND #116.

JUMPER SETTINGS ON 5332E REV 2

* J1 = FILL ALARM: A

* J10 = FAIL ALARM: B

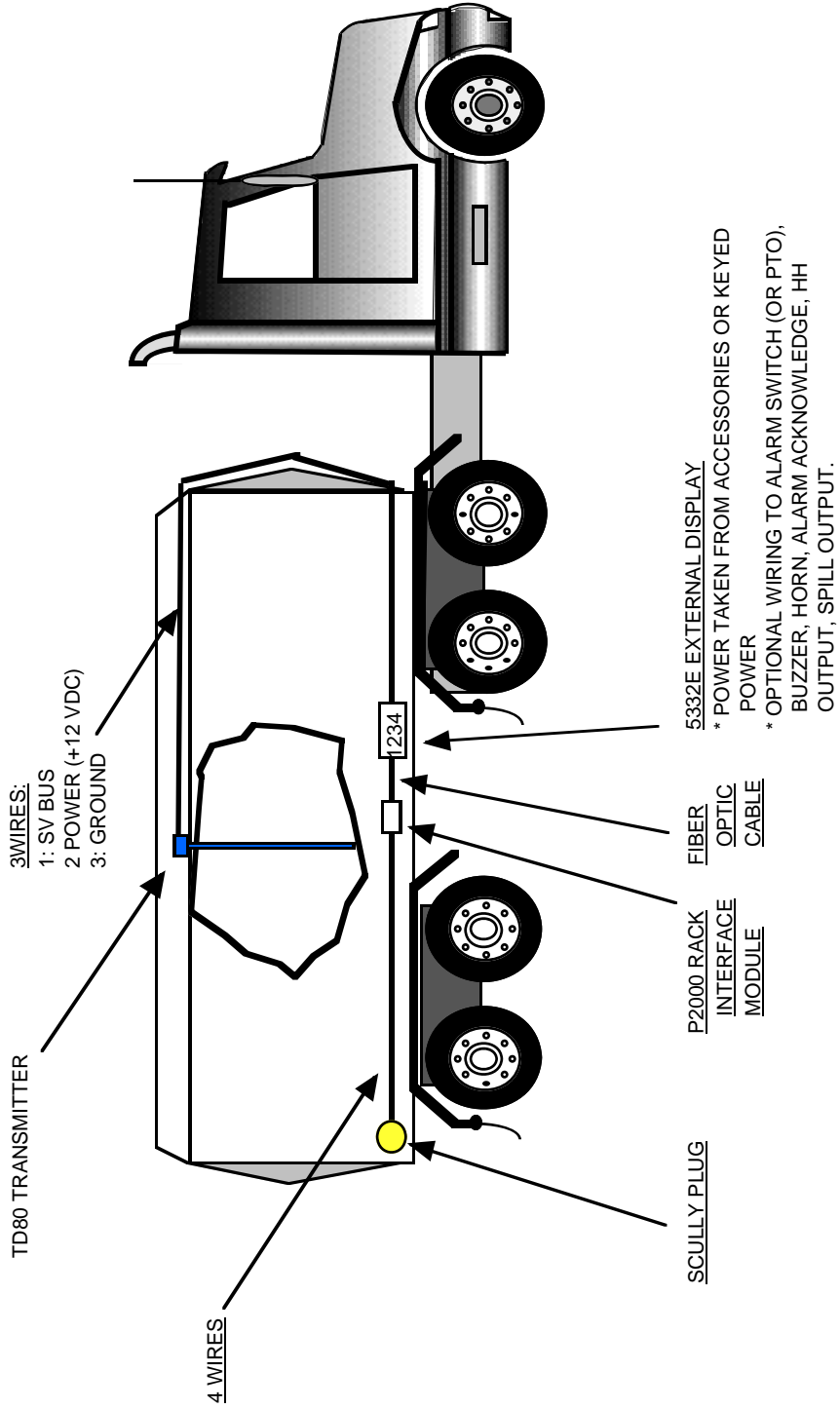


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**TD 80 Level Gauge (Drawing #118)
* Rack Interface Module on Tanker**

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Ph: 877-805-4104
Fx: 403-285-9798
Edmonton, AB: Ph: 780-447-2171
Fx: 780-451-2232

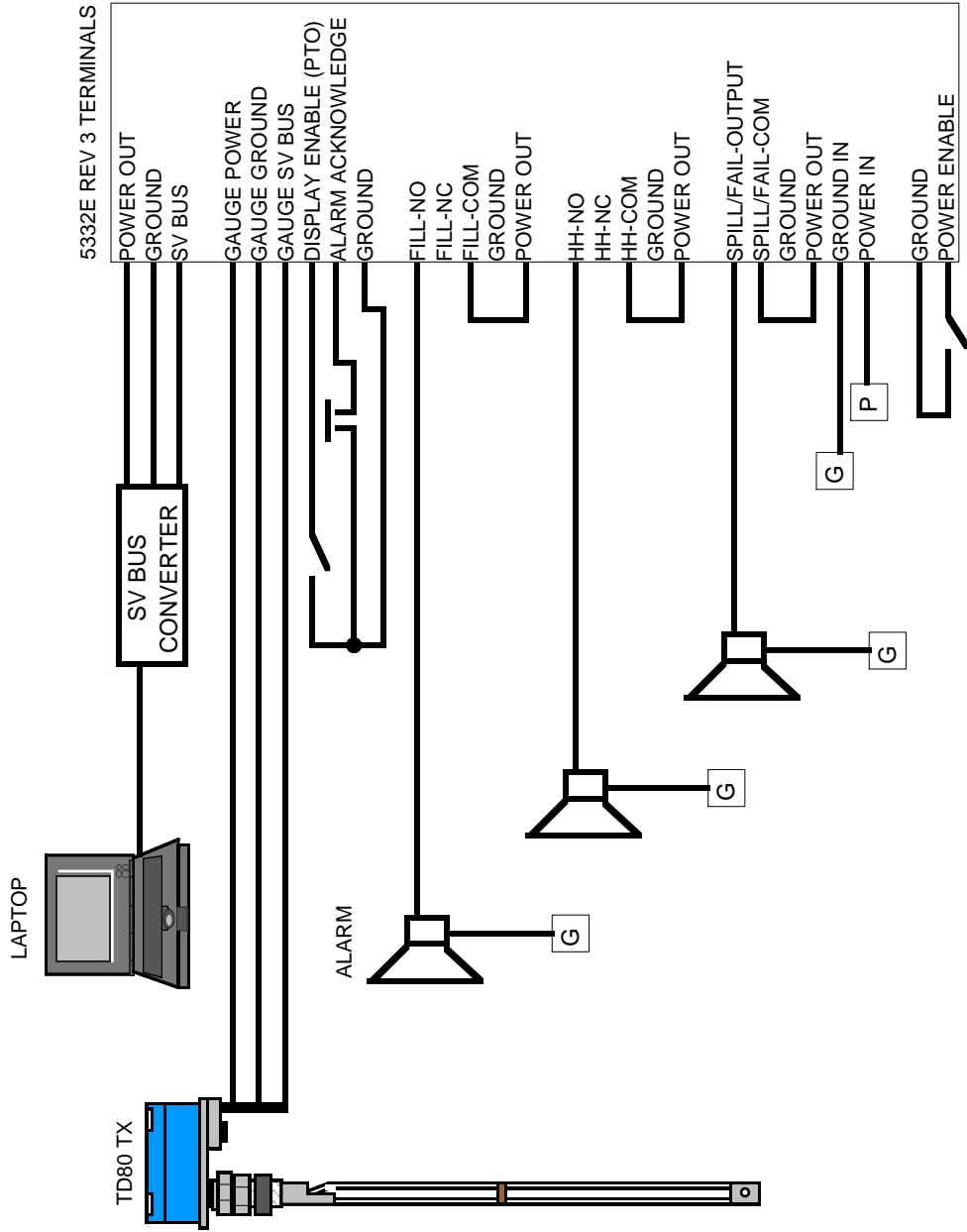


Transport Technology Solutions You Can Count On

5332E TERMINAL BOARD REV 3

Wiring Example

File Name	5332E TB REV 3
Date Created	19 SEPT 2005
Drawn by	GM
Product	TD80
Revision History	.



LEGEND

- P POWER (FROM POWER SUPPLY).
8 TO 28 VDC MAX @0.5 A MAX.
- G GROUND (FROM POWER SUPPLY)

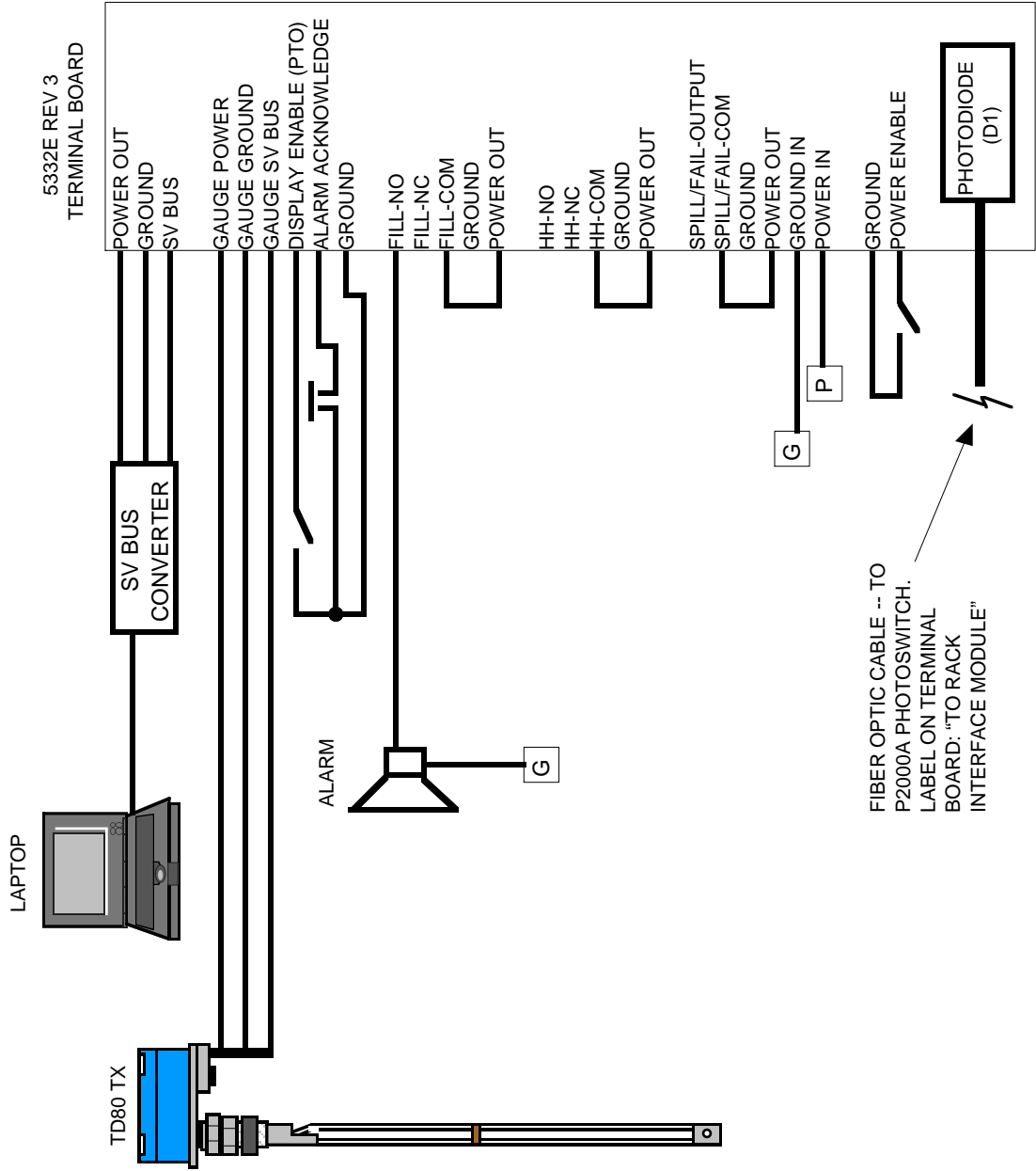
- TOGGLE SWITCH
- MOMENTARY CONTACT
PUSHBUTTON SWITCH

NOTES

1. Each control relay (FILL, HH, SPILL/FAIL) is rated for a maximum output of 2 A @ 30 VDC resistive.
2. The laptop (or PC) is running MDU software for programming the depth chart in the TD80 transmitter.
3. Typical installations will connect either the 'Display Enable' or the 'Power Enable' toggle switch.
4. FILL alarm jumper setting (J1): set according to the control method required.
5. SPILL/FAIL alarm jumper setting (J10): set according to the control method required.

5332E TERMINAL BOARD REV 3
Wiring Example: Connection to the P2000A Optic Module

File Name	5332E TB REV 3-P2000A
Date Created	2 JAN 2008
Drawn by	GM
Product	TD80
Revision History	.



FIBER OPTIC CABLE -- TO P2000A PHOTOSWITCH. LABEL ON TERMINAL BOARD: "TO RACK INTERFACE MODULE"

LEGEND

- P** POWER (FROM POWER SUPPLY). 8 TO 28 VDC MAX @0.5 A MAX.
- G** GROUND (FROM POWER SUPPLY)

- TOGGLE SWITCH
- MOMENTARY CONTACT PUSHBUTTON SWITCH

NOTES

1. Each control relay (FILL, HH, SPILL/FAIL) is rated for a maximum output of 2 A @ 30 VDC resistive.
2. The laptop (or PC) is running MDU software for programming the depth chart in the TD80 transmitter.
3. Typical installations will connect either the 'Display Enable' or the 'Power Enable' toggle switch.
4. FILL alarm jumper setting (J1): set according to the control method required.
5. SPILL/FAIL alarm jumper setting (J10): set to position A.
6. Refer to drawings #115 and #116 for wiring connections at the rack plug.

Testing and Verification

1. Turn power on to the gauge. The gauge should turn on and go through its start-up sequence (approximately 30 seconds).
2. Run your hand along the probe (If you can reach into the tank) to check the reading and alarm points. If the probe is not within reach, use a metal rod shorting the two probe rods together.
3. Confirm that the following occurs:
 - “2Lo” shows up on the display when the tank has less than 5.5 inches of fluid. A volume appears when the level is above 5.5 inches.
 - FILL alarm activates when the fluid level reaches above the set alarm point.
 - FILL alarm deactivates when either the up or the down button is pressed.
 - HH alarm activates when the fluid level reaches above the set alarm point.
 - HH alarm deactivates when UP – UP – DOWN – UP is pressed on the display.
 - SPILL / FAIL alarm activates when the fluid level reaches above the alarm set point.
 - SPILL / FAIL alarm deactivates when the fluid level decreases more than 2 inches below the SPILL alarm setting.
4. Set the FILL alarm as per customer requirements.
5. Calibrate the gauge as per drawing #47. If this is not possible, ensure that the end user knows how to perform the one-time field calibration.

Trouble Shooting

Problem	Possible Solution
Horn Circuit OK LED is not on.	Check that the horn is wired properly. Replace the fuse for the horn Replace the horn
Horn Circuit OK LED is blinking. Or Faint beeping coming from horn.	Check that the horn is wired properly. Check for loose wires. Place a 150ohm to 500ohm resistor across the horn Replace the horn with a less sensitive one.
Display does not turn on.	Check that the input power fuse is not blown. Check that the power is wired correctly. Check for loose wires.
Only the decimal point appears on the display.	The display is faulty.
Display shows only "----"	Communications between the level transmitter and the display have been interrupted. Check the wiring between the display and transmitter. Possibly a faulty level transmitter.
Display shows "8888"	Power problem If the unit is being powered by a charging unit in a machine shop, be sure that the charging unit is not plugged into the wall.
Large offset or error.	Unit may be faulty or strapping table is incorrect, contact your distributor.
Display shows "OFF"	The PTO terminal or wire is not connected to ground. Turn the PTO switch on if it is installed. Ground the PTO wire or terminal.
Display shows "2 LO" during calibration	Power down the system, add more fluid to the tank. Recalibrate. (see Calibration section of this manual)
Display shows "SPill"	Tank has been over filled, pump out excess fluid immediately. Reset the Spill bit in the transmitter. (see Spill Alarm section of this manual)
Display shows "E_20"	Error code indicating there is no fiducial. Possible problem with the probe being pitted due to acid service. Replace probe.
Display shows "E_80"	Error code indicating the HH alarm is too close to the SPILL alarm. Re-enter the strap table and ensure the alarm setting are correct.
Display shows "E_82"	Error code indicating no strap table or large strap table error. Re-enter the strap table.
Display is flashing	The fill alarm is activated. Press the up or the down button to acknowledge the alarm and set the fill alarm.



Manufactured in Canada

Manufactured by:



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