BINDICATOR®
LEVEL INSTRUMENTATION

RAD280003 Rev. B

pulse tracker™

INSTALLATION, OPERATION & MAINTENANCE MANUAL

SAFETY INFORMATION

Before installing the Pulse Tracker model, please read these instructions and familiarize yourself with the requirements and functions. If any questions or problems arise during the installation, please contact Bindicator Applications at 1-800-778-9242.

The Pulse Tracker model must only be installed and operated as described in this operating instruction. Please note that other action can cause damage for which Bindicator does not take responsibility.

If the model is not installed correctly or used in approved applications, dangers may arise such as product overflow.

Ensure that all personnel installing, wiring, and calibrating this device are suitably qualified.

Observe all local and national electrical codes for the wiring of this device.

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1.0 PRODUCT DESCRIPTION

1.1 Function

The Pulse Tracker is a 4 wire, line powered (AC or DC), level transmitter that produces a 4-20 mA output signal. One model consists of a cast aluminum housing with integral electronics and a flexible twinaxial probe with an integral display and programming keypad. A second model allows the display/keypad to be remotely wired from the tanktop electronics. The unit is typically mounted on the top of the silo or tank with the twinaxial probe suspended down into the material to be measured. The probe can extend to the bottom of the vessel.

All units manufactured after July 2001 and designated as Revision B also have the capability to be networked together on a digital communications bus. Consult operations manual # RAD280009 for information on this networking feature.

Operation of the Pulse Tracker is based upon Bindicator's Twinaxial Guided Radar (TGR) technology. A pulse of high frequency electromagnetic energy traveling at the speed of light is transmitted from the electronics down the twinaxial probe. When this pulse reaches a surface with a higher dielectric constant than air, the pulse is reflected back to the electronics. A microprocessor based timing circuit measures the travel time of the pulse and calculates the distance to the material.

Bindicator's TGR technology differs significantly from other manufacturer's TDR (Time Domain Reflectometry) and MIR (Micropower Impulse Radar) measurement methods. These differences include the following:

- The transmitted pulse is separated and shifted before being guided down the twinaxial probe. Both conductors of the twinaxial probe carry a signal 180 degrees out of phase with each other.
- A variable gain amplifier is used to amplify the echo more for signals reflected from the bottom of the probe than from the top of the probe.

These operating features result in superior sensitivity, and allow reliable measurement of materials with low dielectric constants (such as plastics) at distances as long as 60 feet (18.3 m).

1.2 Applications

- Level measurement in granulars, powders, and liquids
- Measurement of materials with a dielectric constant as low as 1.5
- Measuring ranges up to 60 ft (18.3m)
- 4 wire, line powered, with 4-20 mA opto isolated output signal
- Polyester coated, cast aluminum enclosure, rated NEMA 4X
- Unaffected by vapors, vacuum, dusts, and varying moisture content or product density.
- Measurement of materials with a temperature up to 300 degrees F (149 C)
- Measurement accuracy of $\pm$ 1 inch (25.4 mm)
- Integral or remote LCD display and keypad for setup and output calibration.

1.3 Versions and Models

The following options and models are available, and are reflected in the "Model Code" shown in section 1.4. The model code of your unit is stamped on its nameplate which is located on the housing opposite the conduit/cable openings.

Sensor Series:
RAD1- This series of electronics are line powered units (4 wire) with 4-20 mA output. It is a stand alone transmitter with integral electronics and local display and keypad for programming.
RAD2 - This series of electronics is the same as RAD1 except the display/programming and the keypad is remotely wired.

Software Version:
A- This standard software version is the original release, and is for operation in dry materials with dielectric constants $\geq$1.5 at heights up to 60 ft.

Voltage: Two options are available,
1- Input power to be either 120 VAC or 24 VDC on separate terminals, or
2- Input power to be either 240 VAC or 24 VDC on separate terminals.

Output:
A- An analog opto isolated 4-20 mA sinking signal. 24 VDC external power is required

Enclosure Material:
1- A polyester coated cast aluminum enclosure houses the electronics and display. The display is visible through a glass window on the top of the threaded screw on cover.

Housing Protection:
G- A general purpose enclosure rated NEMA 4X watertight/ dustight/ corrosion resistant is the only available option. Ratings for hazardous areas are pending.

Wiring Entry:
1- Two ¾ inch female NPT openings with removable plastic cable grips supplied as T&B # 2930-NM are standard.

Process Connection:
A- Flange mounted to 4 inch 150 lb. FF ANSI (see section 1.6 for detail)
B- Flange mounted to 3 inch 150 lb. FF ANSI (see section 1.6 for detail)

Probe End:
1- None, This option will only be factory assigned for particular applications.
2- Termination block only. (see section 1.6 for dimension and details)
3- 5 lb. Weight connected to end. (see section 1.6 for dimensions)
4- Cable loop tether connected to end (see section 1.6 for dimensions)
5- Cable pigtail connected to end (see section 1.6 for dimensions)

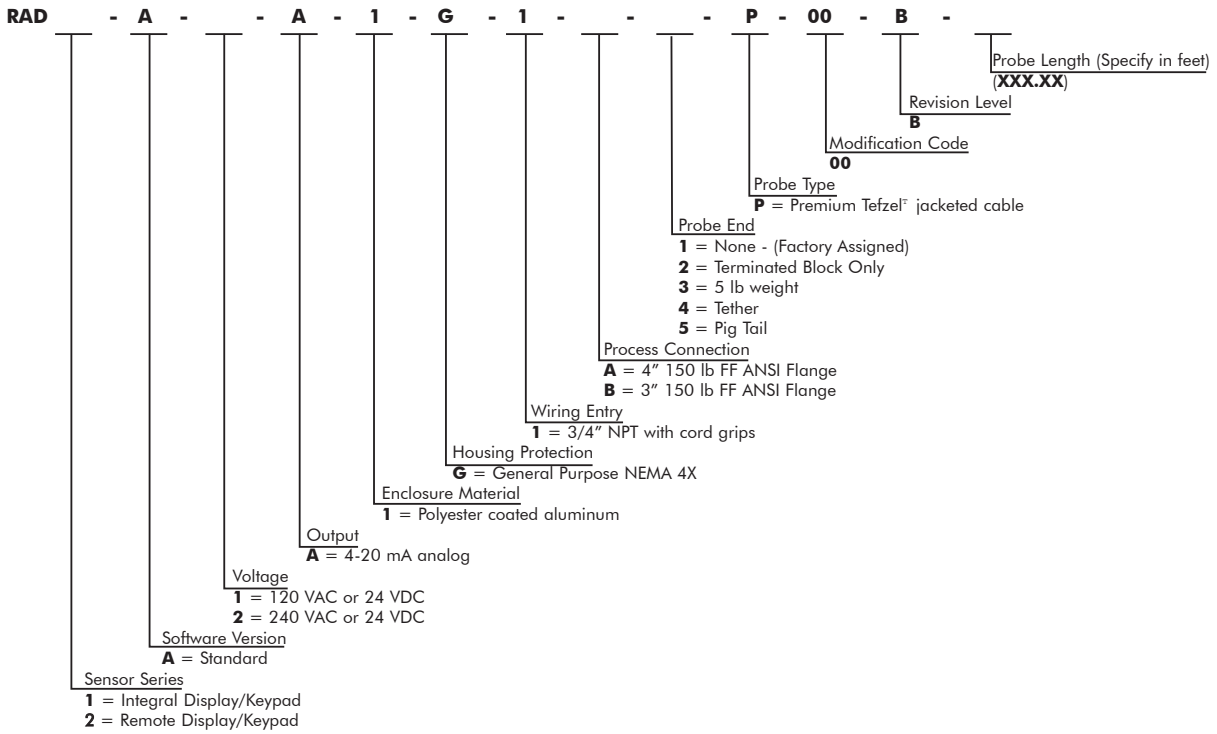
Probe Type:
P- The premium Tefzel jacked flexible twinaxial cable is used in most dry material applications.

Modification Code:
00- Special customer requested modifications will be reflected in this digit. Please consult the factory for definitions if other than the standard 00 appears on your unit's nameplate.

Revision Level:
This digit will be factory assigned to identify your unit in the event that any future changes are made in the manufacture which would affect the form, fit, function, or future replacement parts. Present level is "B".

Probe Length:
XX.X-Lengths up to 60 feet (18.3 m) are available.

1.4 Model Code Identification



1.5 Technical Specifications/Approvals

Performance

Measurement Range	$\leq$ 60 feet (18.3 m)
Accuracy	$\pm$ 1 inch (25.4 mm)
Repeatability	$\pm$ 1 inch (25.4 mm)
Resolution	0.5 inch (12.7 mm)
Scan Time	< 1 second
Linearity	$\pm$ 1% of span
Sensitivity	Adjustable
Dielectric Constant	$\geq$ 1.5
Dead Zone (Top)	2 feet (0.61 m)

Functional

Design	4 wire device
Power Supply	10 to 35 VDC or 1 phase 50/60 Hz 120/240 VAC ± 10%
Power Consumption	2.4 VA
Outputs	4-20 mA - opto isolated
Output Dampening	Factory adjustable
Max. Load Resistance	600 ohm
Communications	RS 485 - to display/keypad. Remote up to 4,000 ft.
Electronics Temperature Range	-40° to 158°F (-40°to 70°C)
Sensor Temperature Range	300° F (149° C) maximum
Operating Pressure Range	Atmospheric

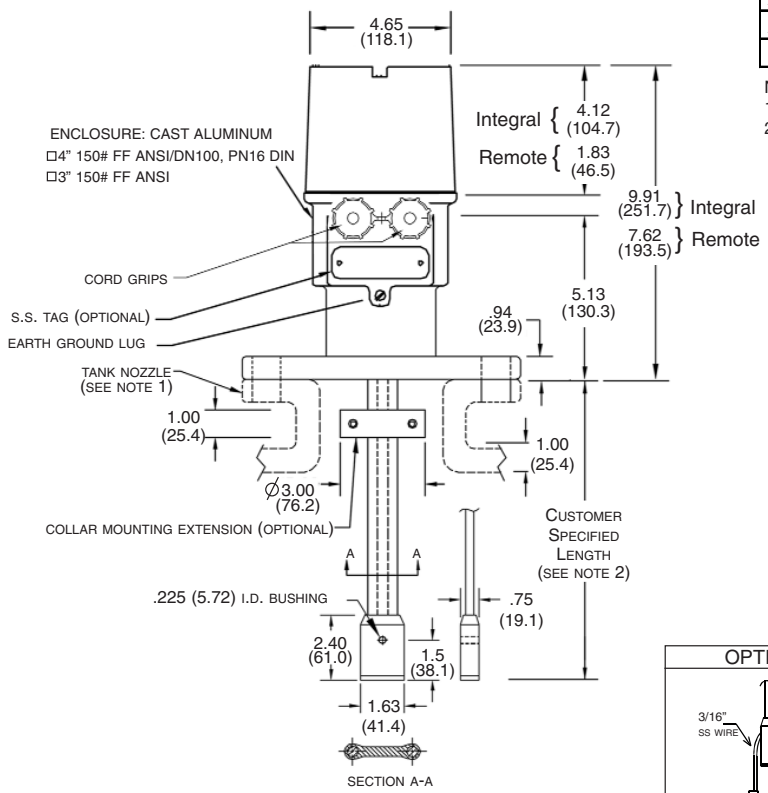
Physical

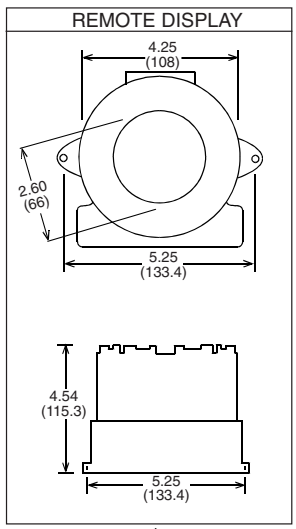
Electronics Enclosure Rating	NEMA 4X/IP66
Sensor Mounting	3" or 4" Flat Faced 150# flange
Sensor Enclosure Material	Polyester coated aluminum
Sensor Element Material	Tefzel coated stainless steel cable
Display	Integral: 2 lines by 16 character Remote: 2 lines by 16 character/NEMA 4X enclosure

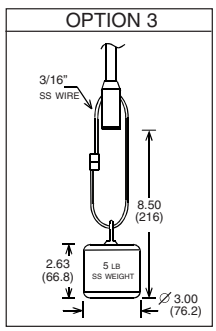
1.6. Dimensions

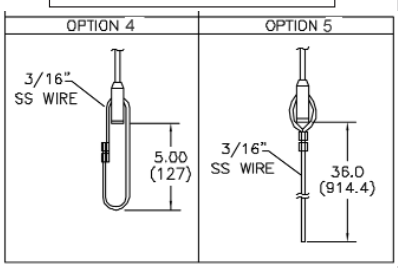
DIN 100 PN 16	9.00"	8	7.08"	.75"
ANSI 4" -150# MACH.	9.00"	8	7.50"	.75"
ANSI 3" -150# MACH.	9.00"	4	6.00"	.75"
FLANGE SIZE	O.D.	# OF HOLES	B.C.	HOLE SIZE

Notes
1. For nozzle heights in excess of 6", consult factory.
2. Sensor cable must never come closer than 6 inches (152.4mm) to the vessel wall or other obstructions. End of cable must not contact bottom of vessel.









inch (mm)

2.0 HANDLING & STORAGE

2.1 Inspection and Handling

The Pulse Tracker level transmitter is individually packed to provide adequate protection during shipping, and has been tested and calibrated at the factory. When the instrument is received, it should be inspected for damage that may have occurred due to mishandling during shipping. If the unit is received damaged, do not dispose of the carton or packing material and notify the shipping carrier immediately. If you have any problems or questions, consult Bindicator Customer Service at 1-800-778-9242.

2.2 Storage

After receiving the Pulse Tracker level transmitter care should be taken to avoid damage. If the unit is not scheduled to be installed soon after delivery, the following steps should be observed:

1. After inspection, repackage the unit into it's original packaging.
2. Select a clean dry site, free of vibration, shock, and impact hazards.

If the level transmitter will be in storage for more than 30 days, it must be stored in a non-condensing atmosphere less than 100% relative humidity. DO NOT STORE THE UNPOWERED UNIT OUTDOORS FOR A PROLONGED PERIOD.

3.0 MECHANICAL INSTALLATION

3.1 Guidelines

The Pulse Tracker sensor is to be mounted on the top of the vessel, with the flexible twinaxial probe hung fully extended along the distance to be measured. Location of the mounting is important. Please follow these guidelines for locating the unit.

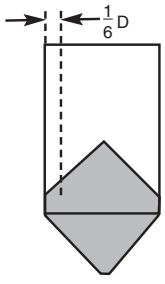
WARNING!

The vessel roof must be able to withstand the pull-down forces of the material on the probe. The pull-down force is dependent on the bulk density and coefficient of friction of the material, the diameter and height of the vessel, the position of the probe in the vessel, and the discharge flow characteristics on the vessel; i.e., mass flow vs. funnel flow. Generally, these forces do not exceed 2,000 lb. (8.9kN) in a typical dry bulk material silo. Consult Bindicator Applications Department for assistance if your application has:

- Material density greater than 50 lb./cu ft and height exceeding 45 ft.
- Vessel diameter exceeding 25 ft.
- Mass flow discharge vessel
- Sensor located near the discharge of the vessel.

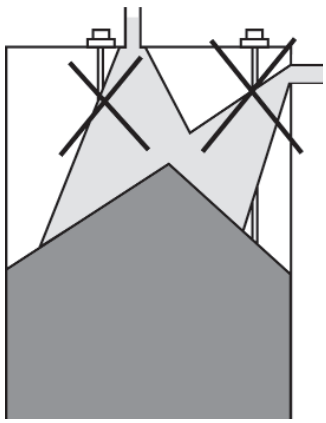
Average Volume

Locate the sensor at a point 1/6th the diameter of the vessel from the vessel wall, if it is a center fill, center discharge vessel. This will allow an averaged reading of the material volume in the cone portion at the top of the material.



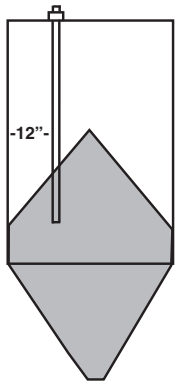
Fill Stream

Locate the sensor out of contact with the stream of incoming material. Failure to avoid contact with the stream of incoming material may result in erroneous measurement readings while filling, and increase the pull forces on the probe.



Clearances

Hang the probe at least 12 inches (300mm) from the vessel wall or any obstructions in the vessel.

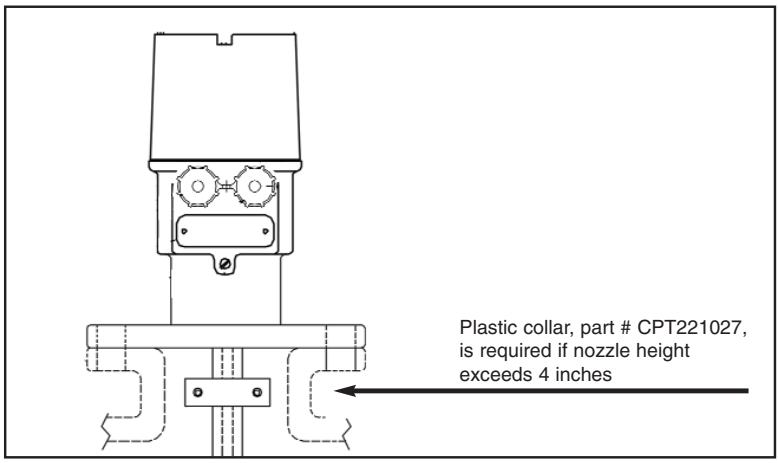


3.2 Mounting

The Pulse Tracker mounts to the vessel with the housing's integral aluminum flange. This flange is sized to mate to either a 3 inch or 4 inch 150 lb. ANSI flange. See section 1.4 to determine the size furnished on your model. Figure 3.1 illustrates a typical mounting to a tank top nozzle. The height of this nozzle should be kept to a minimum. Consult Bindicator Applications Department if the nozzle height exceeds 6 inches.

If the height exceeds 4 inches, an optional plastic collar, part # CPT221027, must be installed onto the twinaxial probe to prevent it from contacting the nozzle. This contact can be caused from any lateral probe movement, and will cause false measurement readings and probe damage unless the collar is installed.

FIGURE 3.1



4.0 ELECTRICAL WIRING

4.1 Guidelines

The Pulse Tracker is a line powered, level transmitter that produces a 4-20 mA output signal. Wiring will consist of:

- Grounding
- Input supply line power
- Output 4-20 mA
- RS485 & power on remote RAD2 series units
- RS485 & power on networked sensors.

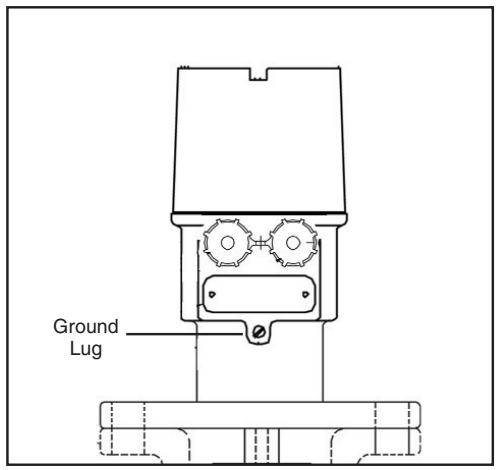
Grounding

IMPORTANT!

Probes installed in dry bulk products are exposed to static electricity. Static protection is provided on this unit. This is effective only when the enclosure safety ground is connected as shown. This ground must be connected at all times and connected before material contacts the probe.

A ground lug is located on the outside of the enclosure, just below the electrical openings. Connect a 14 gauge or larger wire from this lug to electrical earth ground.

FIGURE 4.1



Conduit- Cable Connection
Two threaded conduit openings are provided in the housing for input and output wiring. These ¾ inch NPT female openings have compression type cord grip connectors (T&B # 2930-NM) installed by Bindicator. If rigid or flexible conduit is being run to the Pulse Tracker unit, remove the two cord grip connectors, and thread directly into the ¾ inch female NPT openings. If jacketed cables are being used instead of conduit, the cable diameter must be at least .125 inches (3.2 mm) and not greater than .375 inches to (9.5 mm) allow an effective weather tight seal at this entry.

Access to Wiring Terminals (Integral RAD1 Series)
Remove the threaded enclosure cover by unscrewing counterclockwise (CCW). Remove the compression fitted LCD display assembly out away from the sensor housing by gently pulling outward.

IMPORTANT NOTE! Do not remove the 4 flat socket head screws from the display face!

The display assembly is connected via a 4 conductor cable to the signal board. Be careful not to damage these wires after removing the display assembly. All wiring terminals are removable plug-in style. The display assembly wiring can be unplugged from the signal board during wiring if desired.

Access to Wiring Terminals (Remote RAD2 Series)
Remove the threaded sensor enclosure cover by unscrewing counterclockwise (CCW). The wiring terminals are now accessible. Remove the threaded enclosure cover of the remote display/keypad by unscrewing counterclockwise (CCW). Remove the one round head slotted screw from the face of the display. Pull out the display assembly from the enclosure. Wiring terminals are on the back of the display assembly.

IMPORTANT NOTE! Do not remove the 3 flat socket head screws from the display face. Remove only the one round head slotted screw.

Input Supply Line Power
Input power to the Pulse Tracker can be either 120 VAC (50/60 Hz ± 10%), 240 VAC (50/60 Hz ± 10 %), or 24 VDC (10 - 35 VDC). Please note: Only one of these voltage choices are to be connected to power the unit.

AC Wiring:
Connection of AC input power wiring is to a three terminal removable plug-in style screw terminal block located on the "signal board" (see figure 7.1). See section 4.2 for location of "Hot", "Neutral", and "Ground" wires.

IMPORTANT NOTE! A two position blue jumper J3 selects either 120 or 240 volt inputs. See Figure 4.2. Verify that the jumper is in the correct voltage position before applying power to the unit. (See section 4.3.1).

DC Wiring:
Connection of DC input power wiring is to a two terminal removable plug-in style screw terminal block located on the "signal board" (see figure 7.1). See Figure 4.2 for location of "Plus", and "Minus" wires.

Output 4-20 mA
The 4-20 mA output signal is an optic isolated design. It requires an external 24 VDC source to power the current loop. Wiring should be shielded twisted pair cable 18 gauge or larger.

Connection of 4-20 mA output wiring is to a two terminal removable plug-in style screw terminal block located on the "signal board" (see figure 7.1). See Figure 4.2 for location of "positive", and "negative" output wires.

Power & Communication to optional remote display RAD2 Series units only
A 4 conductor shielded cable similar to Belden #9842 or #8132 is required to connect the power wiring (24VDC) and RS485 communications from the sensor's signal board electronics to the optional remote display/keypad of the RAD2 series units. See Figures 4.2 and 4.3 for location of the display board wiring terminals. The Belden #9842 and #8132 are two pair cables. Use one pair for the 24 VDC and the other pair for the RS485 connections. The 28AWG Belden #8132 should not be used for lengths greater than 500 ft.

Networking Connections (optional)
All units manufactured after July 2001 and designated as Revision B have the capability to be networked together on a digital communications bus. Consult operations manual # RAD280009 for information on this networking feature.

4.2 Connection Information/Wiring Diagram

Consult Figure 4.2 for the correct location and placement of input and output wiring.

IMPORTANT! Either 24 VDC or 120/240 VAC is to be connected to the Power Input. Never both.

Consult Figure 4.3 for location and placement of wiring on remote display/keypad.

4.3 Electrical Jumper Settings

4.3.1 Signal Board Electronics

There are two separate user adjustable electrical jumpers on the Signal Board (see figure 4.2). One jumper is for configuring the AC input voltage range, and the other is for configuring the unit for a possible network connection.

AC Input Voltage Range

The two position blue jumper located next to the power input terminals selects between either 120 VAC or 240 VAC input (see figure 4.2). This jumper is factory set to the voltage specified in the model number. It can be changed in the field if a different input voltage is desired.

Network Termination Jumper

The two position blue jumper located near the 4-20 ma output terminal (see figure 4.2) is used to configure a possible communications network between multiple Pulse Tracker units. The jumper should be left in the position shown in figure 4.2 when the Pulse Tracker is used as a stand-alone non-networked unit. If the Pulse Tracker is to be networked, consult operations manual #RAD280009 for information on this feature.

4.3.2 Display Board Electronics

There are two separate user adjustable electrical jumpers on the Display Board electronics (see figure 4.3). Both jumpers are for configuring the unit for a possible network connection. The jumpers should be left in the positions shown in figure 4.3 when the Pulse Tracker is used as a stand-alone non-networked unit. If the Pulse Tracker is to be networked, consult operations manual #RAD280009 for information on this feature.

FIGURE 4.2

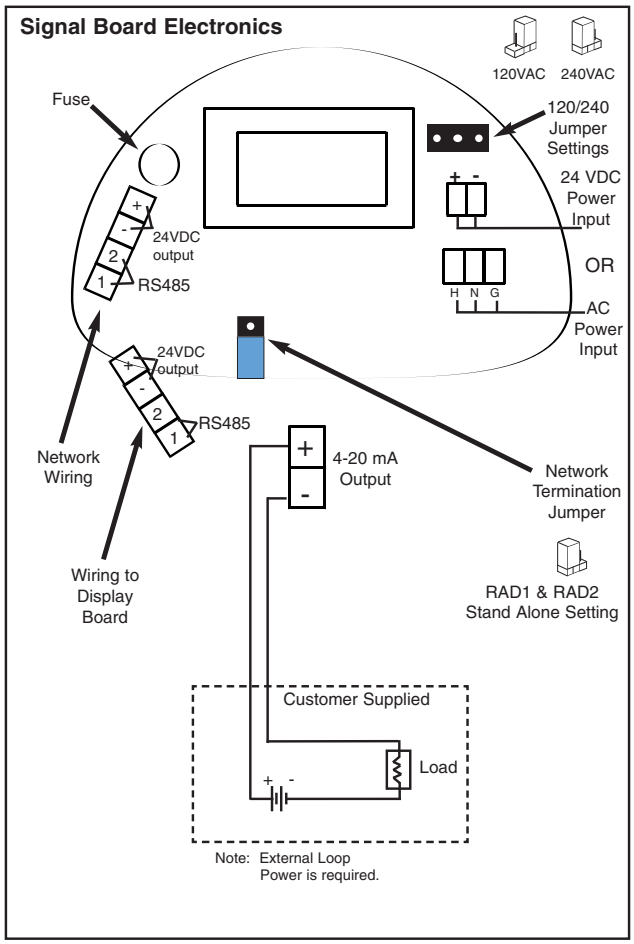
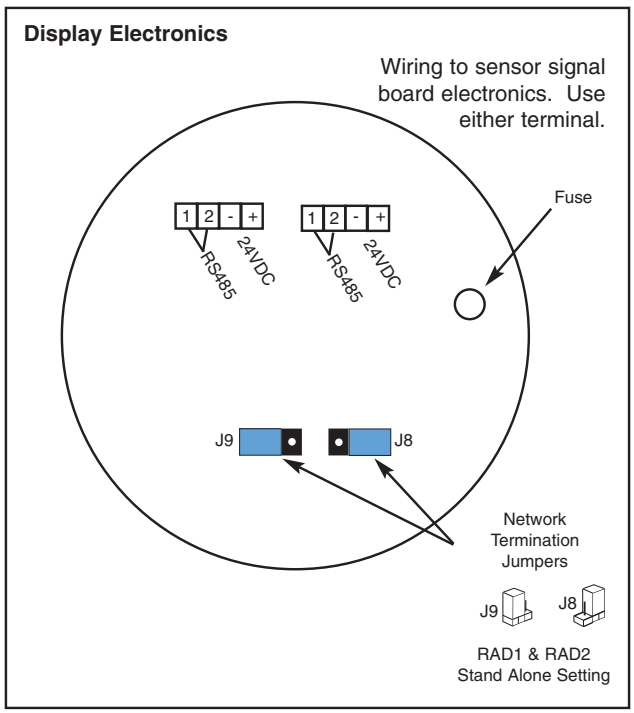


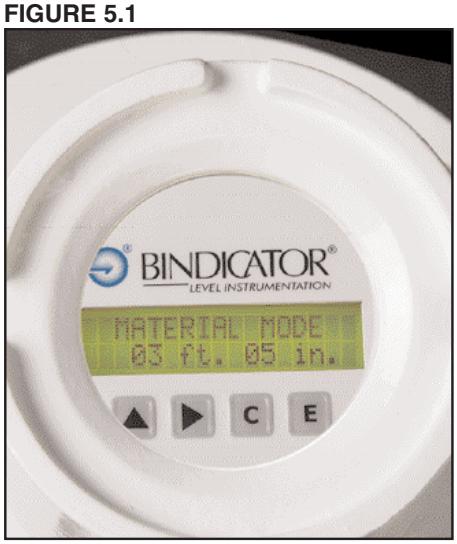
FIGURE 4.3



5.1 Operation

The Pulse Tracker will automatically begin operating when powered up. The display will show the distance measurement, and a 4-20 mA signal will be produced on the output dependent on the measurement. If the material level is below the end of the probe (empty vessel), the Pulse Tracker measurement reading will be the end of the probe, and the output will be 4 mA.

FIGURE 5.1



The back-lit LCD display will indicate the measurement reading on the lower line (See Figure 5.1). This reading will be in one of two possible modes, either "Air" mode or "Material" mode. The reading mode will be displayed on the top line of the LCD display.

Air Mode: Is the measurement of the amount of the Pulse Tracker's probe that is in air above the material. It is the measurement from the top sensor flange down to the material. The display reading is the distance from the top down to the material.

Material Mode: Is the measurement of the amount of the Pulse Tracker's probe that is covered by the material. It is the measurement from the bottom of the probe up to the material surface. The display reading is the amount of material covering the probe.

The measurement reading displayed will be in one of three units of measure. It can be in either feet and inches ("ft." & "in.") or meters ("Meters") or percent ("%") and is always based on the full length of the probe. Changing the displayed unit of measure and the mode is described in section 5.2.

The 4-20 mA output can be adjusted to be spanned along various heights of the probe. See section 5.2 for this adjustment. The 4 mA setting must always be at the lower end of the probe, and the 20 mA setting must always be at the top portion of the probe. The Pulse Tracker cannot read levels in the top 2 ft. of the probe. The 20 mA setting should always be 2 ft. or greater from the top. The minimum distance over which the 4-20 mA span can be set is 20% of the overall probe length. The output will not exceed 20 mA, even if the level reading is above the spanned setting, and the output will not fall below 4 mA even if the level reading is below the spanned setting. The LCD display will however, show the correct actual reading if the measurement level is outside the parameters set for the 4-20 mA span.

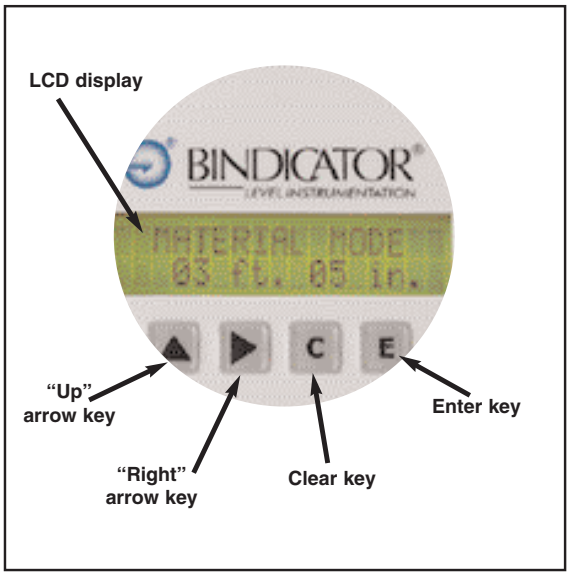
5.2 Settings and Adjustments

There are 4 types of settings for the Pulse Tracker transmitter and its display.

· The display's "Mode" of measurement
· The "Span" of the 4-20 mA output
· The display's "Units" of measure
· The setting of the electronics' "Sensitivity"

Changes to all of these settings are made from the membrane keypad located below the LCD display. To access the keypad, remove the housing cover by screwing counter-clockwise (CCW).

FIGURE 5.2



There are four keys on the keypad below the display, the up arrow key, the right arrow key, the "clear" key, and the "enter" key. See Figure 5.2. The operation of these keys are:

Up arrow key ▲
Depressing this key during the program mode will step from one type of setting to the next, and also increase values when setting the span and sensitivity.

Right arrow key ▶
Depressing this key during the program mode moves the programming into the adjustment of a type of setting, and also decrease values when setting the span and sensitivity.

Clear or "C" key
Depressing this key during the program mode will clear the settings of the sensitivity and span to default values. When used in conjunction with the "enter" key, it will move the operation into and out of the program mode.

Enter or "E" key
Depressing this key during the program mode will enter the values of each of the four types of settings. When used in conjunction with the "clear" key, it will move the operation into and out of the program mode.

Programming
To enter the programming mode and adjust the settings and display of the Pulse Tracker, momentarily depress both the "C" and "E" keys at the same time. This procedure will also exit the unit from the program mode back into the normal operation mode. The display will then read "Set mode?", and changing the settings can begin.

Momentarily depressing the up arrow key will step the program from one type of setting to the next. There are four types of settings. The "Mode" of display, The "Span" of the 4-20 mA output, the display's "Units" of measure, and the setting of the electronics' "Sensitivity". Reference figure 5.3 for a matrix of the programming steps.

Set Mode?
To change the "Mode" of the display's readings, momentarily depress the right arrow key when "Set Mode?" is the displayed programming step. See section 5.1 for a description of the display modes. The display will read "Set Mode = Air". If the air mode is desired, press the "enter" key. If the material mode is desired, press the right arrow key. The display will read "Set Mode = Material". Press enter if this mode is desired. Pressing the right arrow key (if enter was not chosen) will allow the choice of air mode again. To exit this step without selecting either of the two choices and leave the setting to the last one programmed, press both the "C" and "E" keys.

Set Span?
To change the span settings of the 4-20 mA output, momentarily depress the right arrow key when "Set Span?" is the displayed programming step. See section 5.1 for limitations and description of the 4-20 mA output . The display will read "Set 20 mA = " and the present 20 mA setting will be shown. The setting is displayed as both a % of the probe length (0%= bottom, 100% =top) and the distance down from the top of the probe in feet and inches. Depress the up arrow key to increase the value, and the right arrow key to decrease the value. Note: The 20 mA setting can be no lower than 20% higher than the 4 mA setting. It may be necessary to adjust the 4 mA setting lower before the desired 20 mA setting can be selected. When the desired value is displayed, depress the "E" enter key.

The display will then read "Set 4 mA = " and the present 4 mA setting will be shown. The setting is displayed as both a % of the probe length (0%= bottom, 100% =top) and the distance down from the top of the probe in feet and inches. Depress the up arrow key to increase the value, and the right arrow key to decrease the value, when the desired value is displayed, depress the "E" enter key. Note: The 4 mA setting can be no higher than 20% below the 20 mA setting. It may be necessary to adjust the 20 mA setting higher before the desired 4 mA setting can be selected.

To exit this step and leave the settings to the last ones programmed, press the "E" enter key at both the 20 mA and 4 mA steps.

Set Units?
To change the "units" of the display's readings, momentarily depress the right arrow key when "Set Units?" is the displayed programming step. See section 5.1 for a description of the display modes. The display will read "Set Feet?". If this unit of measure is desired for the display, press the "enter" key. If another unit of measure is desired, press the right arrow key.

The display will read "Set Meters?". If this unit of measure is desired for the display, press the "enter" key. If another unit of measure is desired, press the right arrow key.

The display will read "Set Percent?". If this unit of measure is desired for the display, press the "enter" key. If another unit of measure is desired, press the right arrow key.

To exit this step without selecting either of the three choices and leave the setting to the last one programmed, press both the "C" and "E" keys.

Set Sensitivity?

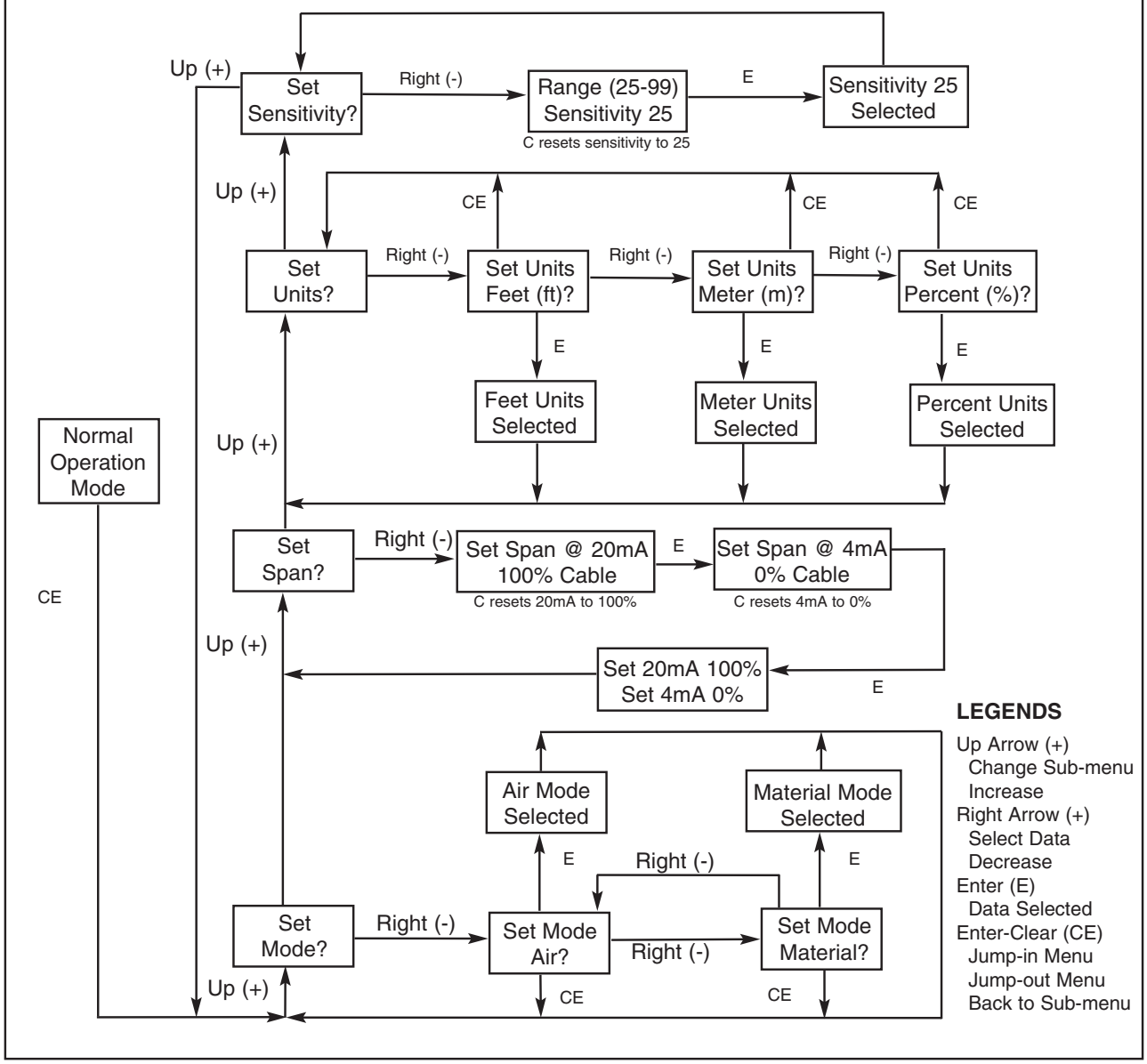
IMPORTANT NOTE! The sensitivity of the electronics has been set by Bindicator at a value determined to be best for your application. Do not change the sensitivity setting without first discussing this with Bindicator Applications Department at 1-800-778-9242.

To change the sensitivity of the electronics, momentarily depress the right arrow key when "Set Sensitivity?" is the displayed programming step. The display will show the sensitivity setting as a numerical value between 25 and 99. Depress the up arrow key to increase the value,and the right arrow key to decrease the value, when the desired value is displayed, depress the "E" enter key. To exit this step without changing the sensitivity and leave the setting to the last one programmed, press the "E" enter key.

To exit the program mode and enter normal operation mode, momentarily depress both the "C" and "E" keys at the same time.

FIGURE 5.3 Programming Matrix

(See pages 11, 12 and 13 for clarification.)



6.0 START-UP & OPERATION

The Pulse Tracker will automatically begin operation when powered up. The integral display will show the distance measurement, and the 4-20 mA signal will be produced on the output dependent on the measurement.

Before filling the vessel, verify the following:

1. That the electrical grounding wire is attached to the external ground lug of the housing. See section 5.1
2. That a 4-20 mA signal is being output. In an empty vessel a 4 mA signal should be produced.
3. That the programming of the 4-20 mA span was performed. Please be aware that the Pulse Tracker cannot measure material level in the top 2 ft. dead zone of the probe. See section 5.2 for programming.

Bring material level up on to the probe, and verify that the 4-20 mA output is tracking this level change.

IMPORTANT NOTE: In critical applications where the output of the Pulse Tracker will signal high level, it is recommended for safety reasons that a separate and redundant point level switch be used to signal a High-High full condition.

If any problems or questions arise during the start-up of your Phase Tracker, please contact:

Bindicator Applications Department at 1-800-778-9242

OR

Bindicator Service Department at 1-800-778-9249

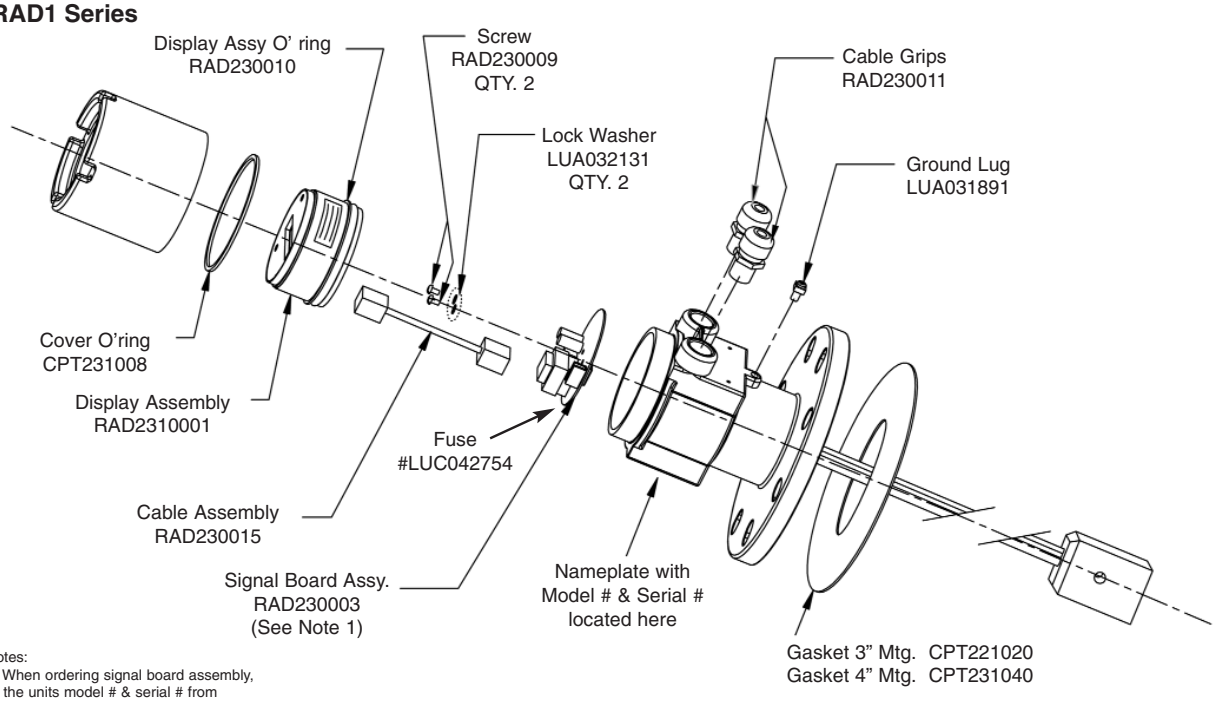
7.0 MAINTENANCE / PARTS LIST

Please reference figure 7.1 for the field replaceable service parts on the Pulse Tracker series RAD1 - integral display. Reference Figure 7.2 for series RAD2 - remote display.

If it should become necessary to replace the probe on your unit, please contact Bindicator Service Department at 1-800-778-9249 for return authorization of the Pulse Tracker. It is necessary that probe replacements be done at Bindicator.

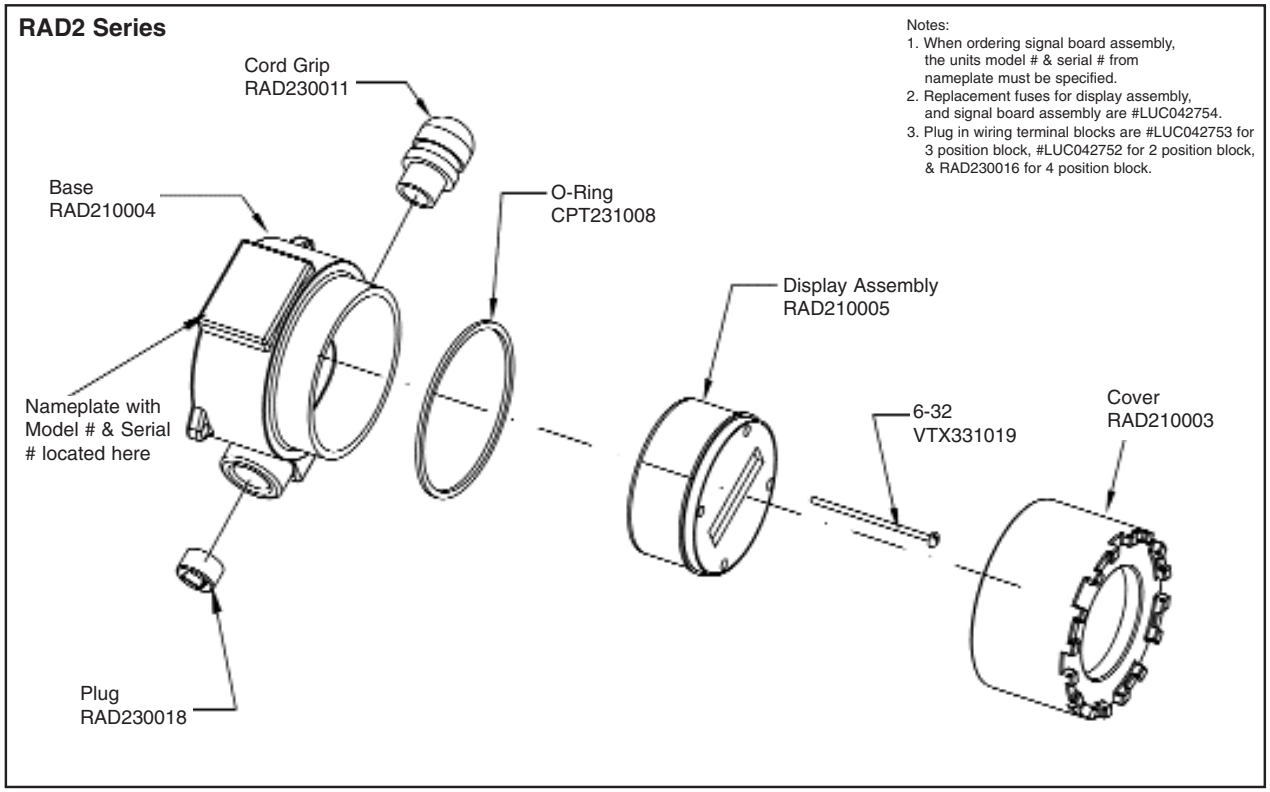
FIGURE 7.1

RAD1 Series



Notes:
1. When ordering signal board assembly, the units model # & serial # from nameplate must be specified.
2. Replacement fuses for display assembly, and signal board assembly are #LUC042754.
3. Plug in wiring terminal blocks are #LUC042753 for 3 position block, #LUC042752 for 2 position block, & RAD230016 for 4 position block.

FIGURE 7.2



8.0 TROUBLE SHOOTING

The following is a list of suggested procedures if you experience problems with the Pulse Tracker unit. Please contact Bindicator for assistance if you are experiencing any problems with your unit.

Display not illuminated and no 4-20 mA output:

- Check for input power voltage.
- Check fuses on signal board and Display assembly.
- Check that power plug-in terminal block is completely plugged into socket.

Display reading correctly and no 4-20 mA output:

- Check external power supply of current loop for proper voltage. Note: the Phase Tracker does not power (source) the current loop.
- Check that 4-20 mA output plug-in terminal block is completely plugged into socket.

Display's measurement reading is correct, but 4-20 mA output is incorrect:

- Review section 5.2 and verify that the correct 20 mA and 4 mA settings were made.

Display's measurement reading and 4-20 mA output incorrectly shows material level as empty:

- Check sensitivity setting. If the electronics does not sense the reflected signal from the material surface, it will see the reflection from the end of the probe and indicate an empty vessel.

1. Review section 5.2, and record the sensitivity setting of your unit.
2. Record the serial # from the nameplate on the exterior of the Phase Tracker housing.
3. Contact Bindicator Applications Department at 1-800-778-9242 for assistance with determining the correct sensitivity setting for your unit.

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