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LP-2000 Pulse Point™
Installation & Operation Manual

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SAFETY SYMBOLS

WARNING:

IDENTIFIES CONDITIONS OR PROCEDURES, WHICH IF NOT FOLLOWED, COULD RESULT IN SERIOUS INJURY.

CAUTION:

IDENTIFIES CONDITIONS OR PROCEDURES, WHICH IF NOT FOLLOWED, COULD RESULT IN SERIOUS DAMAGE OR FAILURE OF THE EQUIPMENT.

LP-2000 Pulse Point™

I. HANDLING AND STORAGE

SAVE THESE INSTRUCTIONS

INSPECTION AND HANDLING

Do not dispose of the carton or packing materials.

Each package should be inspected upon receipt for damage that may have occurred due to mishandling during shipping. If the unit is received damaged, notify the carrier or the factory for instructions. Failure to do so may void your warranty. If you have any problems or questions, consult the manufacturer Customer Support at 800-778-9242.

DISPOSAL AND RECYCLING

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

STORAGE

If the Pulse Point™ is not scheduled for immediate installation following delivery, the following steps should be observed:

1. Following inspection, repackage the unit into its original packaging.
2. Select a clean dry site, free of vibration, shock and impact hazards.
3. If storage will be extended longer than 30 days, the unit must be stored at temperatures between -40° and 70° C in non-condensing atmosphere with humidity less than 85%.

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

II. GENERAL SAFETY

AUTHORIZED PERSONNEL

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

USE

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

WARNING: VERY HIGH VOLTAGE IS PRESENT ON THE FORK TERMINALS. ALWAYS REMOVE POWER BEFORE SERVICING.

MISUSE

Improper use or installation of this device may cause the following:

- Personal injury or harm
- Application specific hazards such as vessel overfill
- Damage to the device or system

If any questions or problems arise during installation of this equipment, please contact the manufacturer Customer Support at 800-778-9242.

III. PRODUCT DESCRIPTION

FUNCTION

The Pulse Point™ is an electronic, vibratory level control designed for use in powders and granular solids. The Pulse Point™ uses a vibrating “tuning fork” to sense the presence of material.

The tuning fork contains two piezoelectric crystal assemblies: one “transmit” and one “receive”. Piezo crystals convert electrical signals to mechanical movement, and vice versa. High-voltage pulses applied to the transmit crystal cause the tines of the fork vibrate. This vibration is mechanically coupled to the receive crystal which produces a small electrical signal (one-volt pulses). The receive crystal will produce low voltage pulses as long as the fork is vibrating.

If the fork stops vibrating, as it does when in contact with material in the vessel, the receive pulses stop. The electronics recognize this loss of signal and cause the main relay to change state.

APPLICATIONS

Unlike radio frequency and capacitance technology sensors, the Pulse Point™ senses material using a mechanical principle and is therefore not affected by the dielectric constant of the material. This makes it an ideal sensor in plastics, dust, shavings, and low-density powders and food. The Pulse Point™ can sense material as light as 0.5 lbs/ft^3 (8 kg/m^3). It can be applied in any free flowing dry material up to $^3/_8$” (9.525 mm) in particle size.

FEATURES

Multiple mounting configurations, forks, and coatings available to suit almost any application
Universal input power; AC or DC (see specifications for input ranges)
No calibration required
Adjustable time delay
Selectable fail-safe operation (high or low level)
Adjustable Sensitivity
Build-up Detection

TECHNICAL SPECIFICATIONS

FUNCTIONAL	
Power Requirements	Universal, (+/- 10%) 100-240 VAC 50/60 Hz or 22-65 VDC
Power Consumption	11 W AC; 4 W DC
Fuse	Slow Blow, 2A 300V (Not User Serviceable)
Operating Temperature	
Electronics	-40° to 158° F (-40° to 70° C)
Tuning Fork	-55° to 302° F (-48° to 150° C)
Outputs	
Main Relay	8A DPDT @ 277 VAC or 30 VDC (resistive)
Tuning Fork	0.46 @ 150 VAC or 1A SPDT @ 30 VDC
PERFORMANCE	
Pressure Rating	150 psi (10.5 kg/cm^2) with 1½" NPT; 5 psi (0.35 kg/cm^2) with mounting plate
Time Delay	Field Adjustable; 1-150 seconds
Fail Safe	Field Selectable high/low level
Sensitivity	Minimum 0.5 lbs/ft^3 (8 kg/m^3); Field Adjustable
Maximum Particle Size	⅜" (9.5 mm)
PHYSICAL	
Enclosure Material	Polyester or epoxy coated aluminum or 304 SS
Tuning Fork	316 SS (standard); 316 SS with Teflon® coating
Dual Conduit Entry	¾" NPT
Process Connections	1¼" or 1½" NPT; Extended forks can be mounted directly through 1¼" or 1½" NPT half coupling
Mounting Plate Material	Mild Steel; 304 SS
Extended Pipe Material	Galvanized; 316 SS
Maximum Insertion Length	15 ft (4.6m)
Shipping Weight	Integral, non-extended 10 lb (4.5 kg)

APPROVALS

CE:
- Electromagnetic Compatibility Directive 2004/108/EC
- Low Voltage Directive 2006/95/EC

Hazardous Location Approvals Pending:
UL (US and Canada)
ATEX
IEC and IECEX

IV. MECHANICAL INSTALLATION

WARNING: VERY HIGH VOLTAGE IS PRESENT ON THE FORK TERMINALS.
REMOVE POWER FROM THE UNIT BEFORE INSTALLING, REMOVING, OR MAKING ADJUSTMENTS

GUIDELINES

The following precautions should be observed when installing and operating the Pulse Point™:

- The installation and wiring of this product must comply with all national, federal, state, municipal and local codes that apply.
- The Pulse Point™ is a precision device - handle it carefully to prevent damage to the forks.
- Do not allow moisture to enter the electronics enclosure. Conduit should slope downward from the Pulse Point™ housing. Install drip loops (or drain fitting) and seal conduit with silicone rubber product.
- The resonant frequency of the forks is 85 Hz (+/-10%); locations subject to this vibration frequency should be avoided.
- The Pulse Point™ is available with 1¼" NPT or 1½" NPT mounting.

CAUTION: WHETHER MOUNTING DIRECTLY THROUGH A SIDE WALL, OR PIPE EXTENDED AND MOUNTED VERTICALLY THROUGH THE TOP OF A VESSEL, NEVER ATTEMPT TO MOUNT THROUGH A FULL COUPLING.

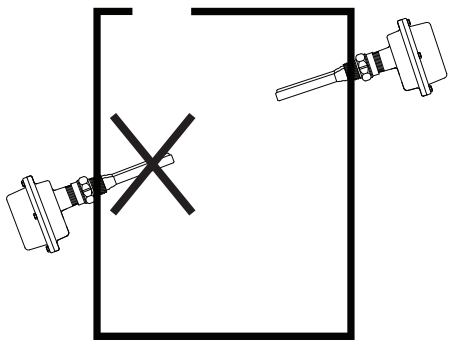
CAUTION: ATTEMPTING TO TIGHTEN THE PULSE POINT™ BY ROTATING THE HOUSING OR FORKS MAY DAMAGE THE UNIT AND VOID THE WARRANTY.

MOUNTING CONSIDERATIONS

The Pulse Point™ must be located at the position where level indication is desired. The forks may be mounted through the top or side wall of the vessel. To ensure reliable operation, observe the following guidelines when choosing the mounting location.

- DO NOT mount the forks in an area where they can contact the vessel.
- The forks assembly must be horizontal or pointing downward. DO NOT mount the forks pointing upward.
- If the unit is to be used with powders, it should be installed vertically, or at a downward angle that exceeds the angle of repose to reduce material build-up on the forks.

Figure 1: Mounting Orientation



CAUTION: THE MAXIMUM ALLOWABLE DOWNWARD FORCE ON THE FORKS IS 88 LBS (40 KG).

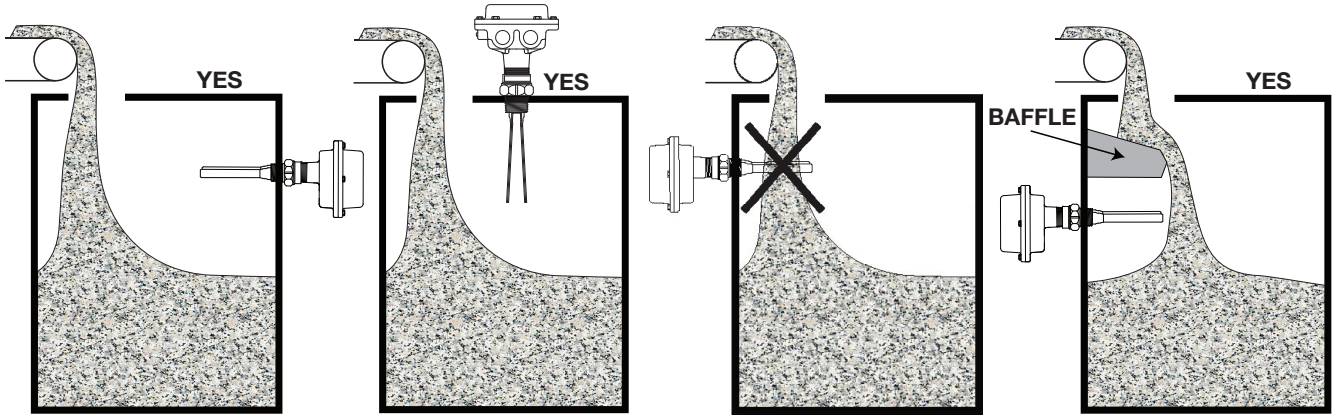
To calculate the maximum solids head height above a horizontally mounted fork, use the following equation:

Maximum height of material (ft) = 2200 / bulk density (lbs/ft^3)

Do not mount the fork directly in the flow of material. If necessary, use a baffle to protect the fork from falling material. The baffle should be placed 6 to 8 inches above the fork so that material will not become packed between the fork and the baffle.

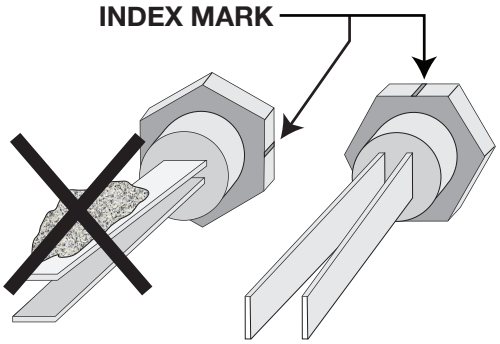
If using a remote unit, remote turtle cannot be mounted more than 100 feet away.

Figure 2: Mounting In Relation To Flow of Material



If the fork is mounted horizontally, it must be positioned so that the material will not accumulate on top of the tines. There is an index mark on the mounting nut to assist in proper positioning of the fork.

Figure 3: Index Mark Positioning



V. ELECTRICAL INSTALLATION

WARNING: VERY HIGH VOLTAGE IS PRESENT ON THE FORK TERMINALS.
REMOVE POWER FROM THE UNIT BEFORE INSTALLING, REMOVING, OR MAKING ADJUSTMENTS

GENERAL SAFETY

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

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

DISCONNECT REQUIREMENTS FOR PERMANENTLY INSTALLED EQUIPMENT

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

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

PROTECTIVE EARTH GROUND

To eliminate shock hazards in the unlikely event of an internal insulation breakdown, the unit is provided with a "protective earth" (⏚) lead which must be connected to earth ground. In addition, the input power ground lead must be connected to the "protective earth" (⏚) terminal provided. Wire sizes must be selected such that it can safely carry the sum total of all circuits' maximum amperage.

CONDUIT CABLE CONNECTION

Two threaded ¾" NPT female conduit openings are provided in the housing for input and output wiring. When only one conduit opening is used for installation, the unused opening must be sealed with a suitable type 4X/IP66 ¾"-14 NPT plug with pipe sealant in order to maintain approval requirements.

ELECTRICAL CONNECTIONS

Note: The Pulse Point™ can be operated from 100-240 VAC 50/60 Hz or 22-65 VDC and provides reverse polarity protection in the event of a wiring error.

PULSE POINT™ INTEGRAL MODEL ONLY

Input Power Connections

1. Refer to Figures 4 and 5 when connecting input power to the unit
2. Loosen the housing cover screws and remove cover

CAUTION: IF THE UNIT WAS SUPPLIED WITH A GASKET AVOID FOLDING, CUTTING, OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT.

Note: Two threaded ¾" NPT female conduit openings are provided in the housing to separate input and output wiring.

3. Pull approximately 4.5" of cable through conduit closest to the grounding bracket and strip as follows:
   a. Ground – ⅜" (9 to 10 mm)
   b. Power Leads – ¼" (6 to 7 mm)
4. Attach incoming ground lead to grounding bracket as shown in Figure 5

Note: The Pulse Point™ incorporates pluggable terminal blocks for ease of connection. If the terminal block is unplugged while making connections, ensure it is seated properly when reinstalled.

5. Attach power leads to terminal block as shown in Figure 5
6. Check that all wires are held tightly in place by lightly pulling each conductor

Main Relay Connections

7. Refer to Figure 4 and 6 when connecting to the main relay
8. Pull approximately 4.5" of cable through conduit and strip ¼" (6 to 7 mm)
9. Attach leads to terminal block as shown in Figure 6
10. Check that all wires are held tightly in place by lightly pulling each conductor

Auxiliary Relay Connections

11. Refer to Figure 4 and 7 when connecting to the auxiliary relay
12. Pull approximately 5.5" of cable through conduit and strip ¼" (6 to 7 mm)
13. Attach leads to terminal block as shown in Figure 7
14. Check that all wires are held tightly in place by lightly pulling each conductor
15. Reinstall the gasket, if necessary
16. Replace cover and tighten screws

PULSE POINT™ REMOTE MODEL ONLY

Input Power Connections

1. Refer to Figures 5 and 8 when connecting input power to the unit
2. Loosen set screw that locks cover in place
3. Unscrew the housing cover and remove

Note: Two threaded 3/4" NPT female conduit openings are provided in the remote housing to separate input and output wiring from the remote probe wiring.

4. Pull approximately 6" of cable through conduit closest to grounding bracket and strip as follows:
   a. Ground – 3/8" (9 to 10 mm)
   b. Power Leads – 1/4" (6 to 7 mm)
5. Attach incoming ground lead to grounding bracket as shown in Figure 5

Note: The Pulse Point™ incorporates pluggable terminal blocks for ease of connection. If the terminal block is unplugged while making connections, ensure it is seated properly when reinstalled.

6. Attach power leads to terminal block as shown in Figure 5
7. Check that all wires are held tightly in place by lightly pulling each conductor

Main Relay Connections

8. Refer to Figure 6 and 8 when connecting to the main relay
9. Pull approximately 9" of cable through conduit and strip 1/4" (6 to 7 mm)
10. Attach leads to terminal block as shown in Figure 6
11. Check that all wires are held tightly in place by lightly pulling each conductor

Auxiliary Relay Connections

12. Refer to Figure 7 and 8 when connecting to the auxiliary relay
13. Pull approximately 2.5" of cable through conduit and strip 1/4" (6 to 7 mm)
14. Attach leads to terminal block as shown in Figure 7
15. Check that all wires are held tightly in place by lightly pulling each conductor

Remote Fork Connections

16. Refer to Figure 9 when connecting the remote fork (probe)
17. Pull approximately 2.5" of cable through conduit and strip 3/16" (4 to 5 mm)
18. Connect factory supplied cable to terminals block as shown in Figure 9
19. Check that all wires are held tightly in place by lightly pulling each conductor
20. Replace cover
21. Tighten set screw to lock cover in place
22. Loosen the remote fork housing cover screws and remove cover
23. Pull approximately 4" of cable through conduit and strip 3/16" (4 to 5 mm)
24. Connect factory supplied cable to terminals block as shown in Figure 9
25. Check that all wires are held tightly in place by lightly pulling each conductor
26. Reinstall the gasket, if necessary
27. Replace cover and tighten screws

CAUTION: IF THE UNIT WAS SUPPLIED WITH A GASKET AVOID FOLDING, CUTTING, OR TEARING GASKET. DAMAGING THE GASKET CAN ALLOW MOISTURE TO ENTER THE ENCLOSURE AND DAMAGE THE UNIT.

Figure 4: LP-2000 Integral Enclosure with Cover Removed

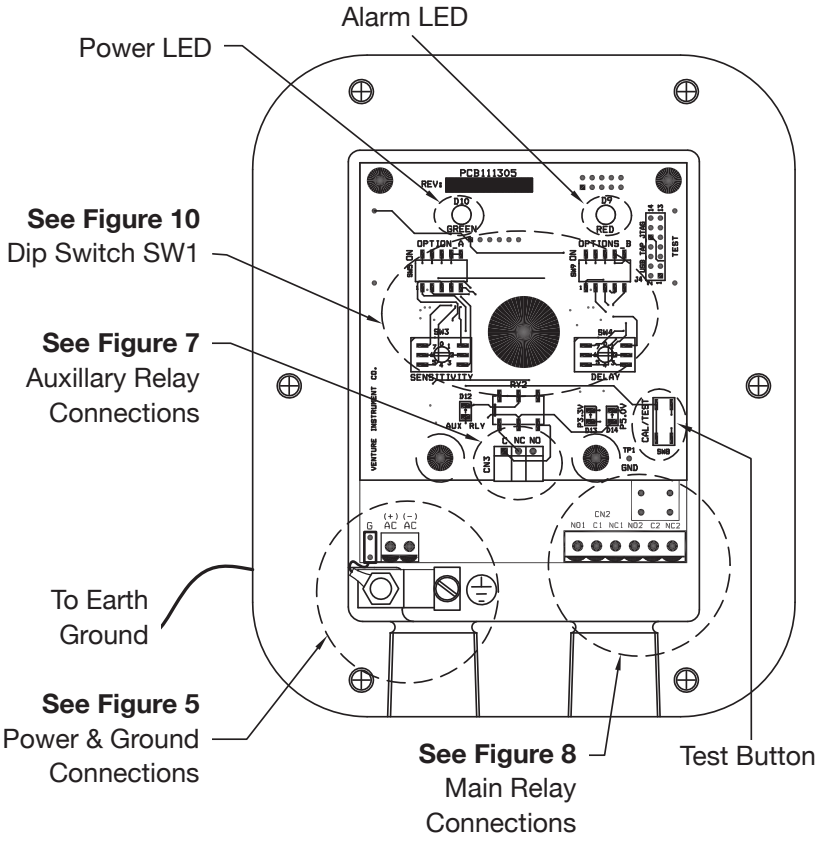


Figure 5: Power and Ground Connections

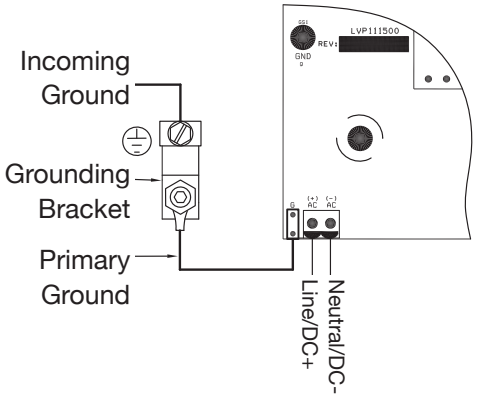


Figure 6: Main Relay Connections

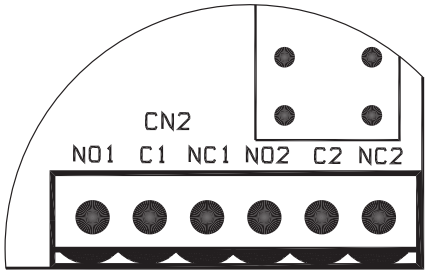


Figure 7: Auxiliary Relay Connections

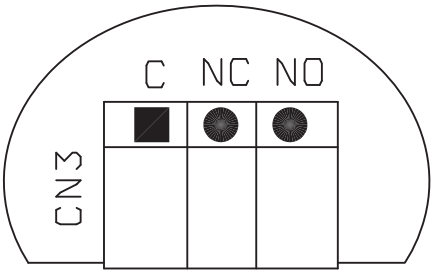


Figure 8: LP-2000 Remote Enclosure with Cover Removed

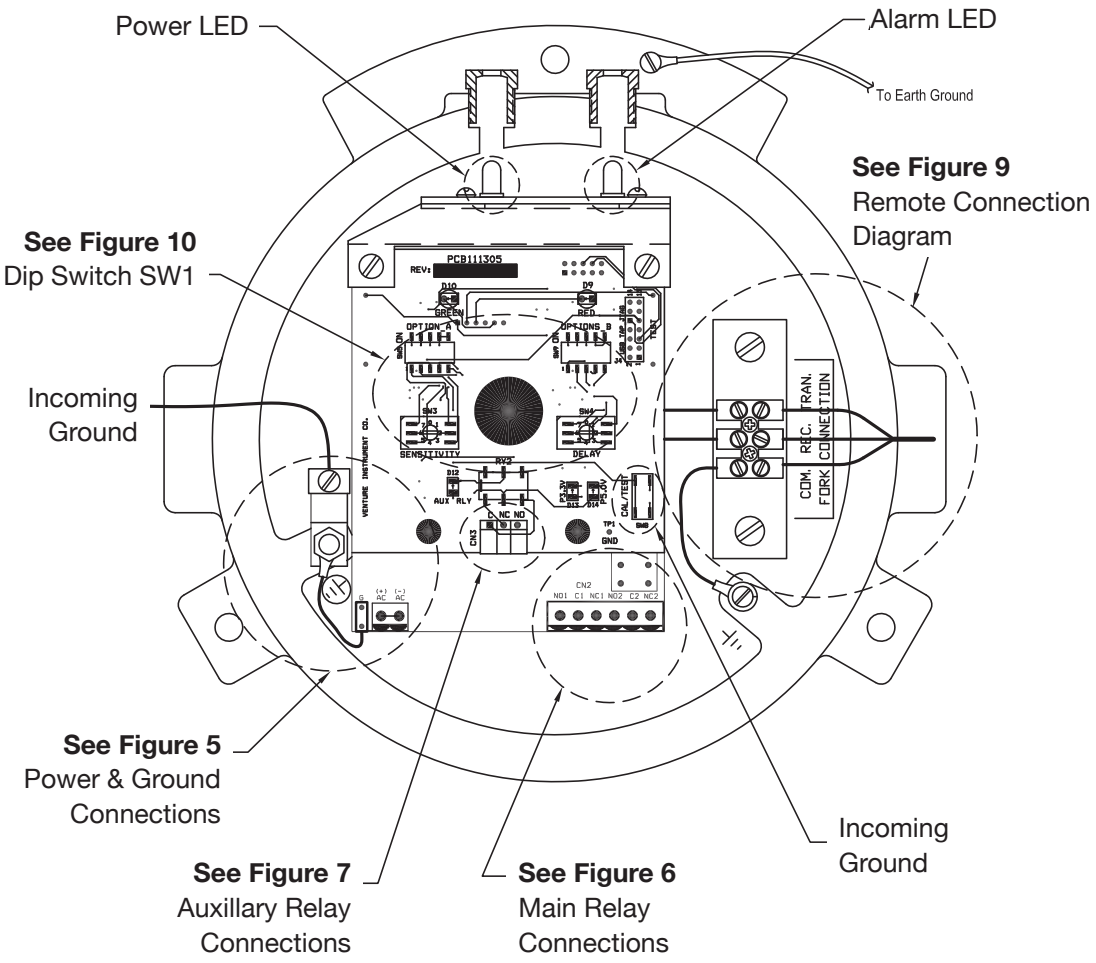
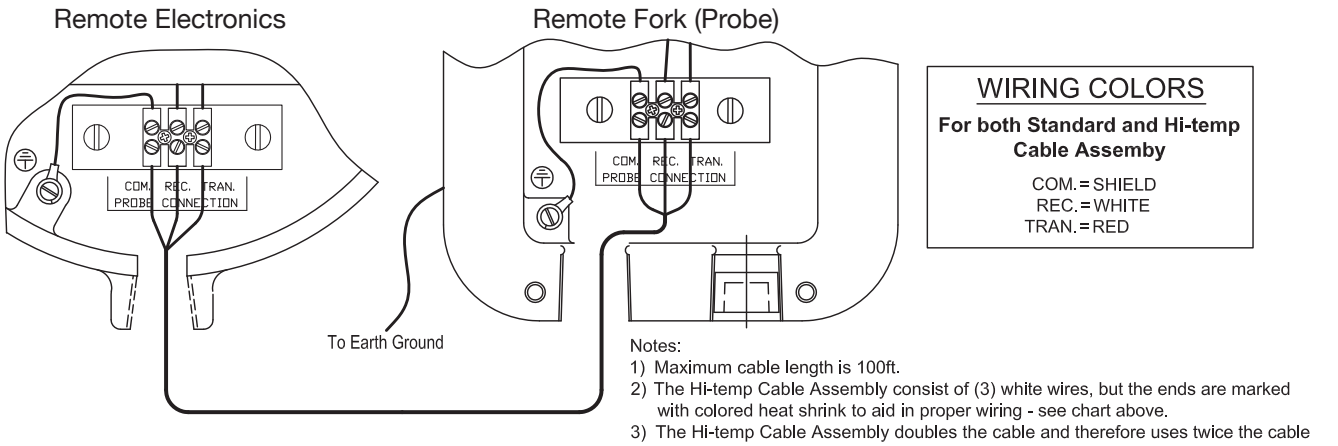


Figure 9: Remote Connection Diagram



Notes:
1) Maximum cable length is 100ft.
2) The Hi-temp Cable Assembly consist of (3) white wires, but the ends are marked with colored heat shrink to aid in proper wiring - see chart above.
3) The Hi-temp Cable Assembly doubles the cable and therefore uses twice the cable to cover a distance. For example: To cover a 50ft span, it takes100ft of hi-temp cable.

VI. SET-UP

WARNING: VERY HIGH VOLTAGE IS PRESENT ON THE FORK TERMINALS.
REMOVE POWER FROM THE UNIT BEFORE INSTALLING, REMOVING, OR MAKING ADJUSTMENTS

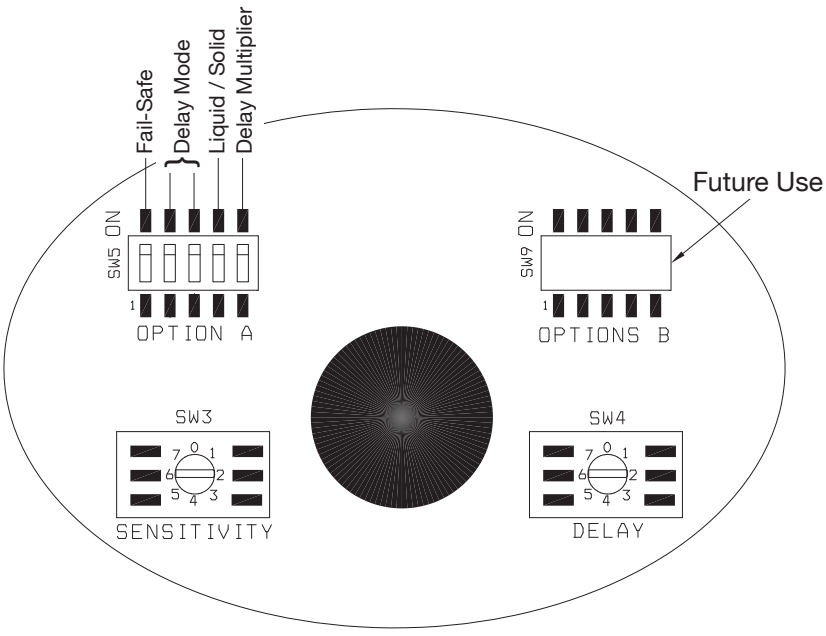
OPERATION

The Pulse Point™ does not require calibration. When power is applied to the unit, the tines of the fork will begin vibrating (if the fork is not impeded by contact with material or some other object). The green Power LED will be illuminated whenever power is applied to the unit. The status of the red Alarm LED is determined by the selected fail-safe mode and whether or not the fork is vibrating. (Refer to Fail-Safe Operation section.)

PRODUCT OVERVIEW

Figures 4 and 8 show the electronics of the integral and remote versions of the Pulse Point™ respectively. The figures show the location of the electrical connections, dip switches SW5, two rotary switches SW3 and 4, and the Power and Alarm LEDs. This section will discuss configuring the Pulse Point™ for optimum performance in a given application. The settings of the Pulse Point™ are controlled by SW3 through 5 as shown in Figure 10.

Figure 10: Switch Functions



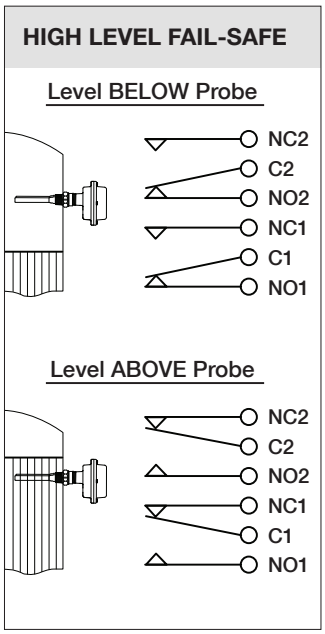
BUILD UP DETECTION

If the Pulse Point™ detects that product is beginning to build up on the forks and may inhibit normal operations of the unit, the auxiliary relay will drop out and the Power LED will flash. To avoid false readings, remove the Pulse Point™ and clean material adhered to the forks and reinstall.

FAIL-SAFE SELECTION

The Pulse Point™ is factory set for high level fail-safe operation. The Fail-Safe is controlled by SW5, Position 1. Refer to Figure 11 to determine the Fail-Safe mode that suits your application.

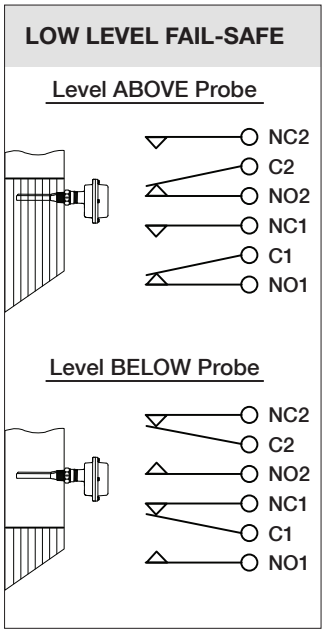
Figure 11: Fail-Safe Operation



HIGH LEVEL FAIL-SAFE OPERATION (DEFAULT)

- DIP switch SW5-1 is OFF.
- Alarm State (material above the forks):
  - Main Relay is de-energized
    - Relay NC contacts are closed
    - Relay NO contacts are open
  - Alarm LED is on
- Non-Alarm State (material below the forks):
  - Main Relay is energized
    - Relay NC contacts are open
    - Relay NO contacts are closed
  - Alarm LED is off

Note: If the electrical power fails, the main relay turns OFF, giving the same indication as if material is above the fork.



LOW LEVEL FAIL-SAFE OPERATION

- DIP switch SW5-1 is ON.
- Alarm State (material below the forks):
  - Main Relay is de-energized
    - Relay NC contacts are closed
    - Relay NO contacts are open
  - Alarm LED is on
- Non-Alarm State (material above the forks):
  - Main Relay is energized
    - Relay NC contacts are open
    - Relay NO contacts are closed
  - Alarm LED is off

Note: If the electrical power fails, the main relay turns OFF, giving the same indication as if material is below the fork.

TIME DELAY SETTINGS

The time between when the Pulse Point™ senses material, or its absence, and the output relay changes state is field programmable using SW5 Positions 2 and 3. The delay can be for when the product touches the fork or when the product leaves the fork or both regardless of the fail-safe setting.

SW5 Position 2	Delay Mode
ON	The selected delay by the SW4 is applied when material touches the probe
OFF	There is no delay when material touches the probe
SW5 Position 3	**Delay Mode**
ON	The selected delay by the SW4 is applied when material leaves the probe
OFF	There is no delay when material leaves the probe

The duration of the delay is determined by SW4 in conjunction with SW5-5. When active, SW5-5 multiplies the delay by a factor of 5. The functionality of each switch is shown in the tables below.

Note: There is a fixed internal delay when material leaves the fork and this delay varies from 1 to 3 seconds depending on the sensitivity settings. The LP-2000 is factory set for the minimum delay.

SW4	SW5 Position 5	Delay Time (seconds)
0	OFF	1-3 (see Note)
1	OFF	1
2	OFF	3
3	OFF	4
4	OFF	6
5	OFF	9
6	OFF	18
7	OFF	30
0	ON	1-3 (see Note)
1	ON	5
2	ON	15
3	ON	20
4	ON	30
5	ON	45
6	ON	90
7	ON	150

SENSITIVITY SETTINGS

The LP-2000 provides 8 levels of sensitivity which are selected using SW3 as shown in the table below. The Pulse Point™ is factory set for the lowest sensitivity. To adjust the sensitivity of the LP-2000, SW5 Position 4 must be in the OFF position to disable the liquid/solid interface function. The table below is for illustration purposes, of a vertically mounted unit only, and results will vary depending on material properties and conditions. The values in this table are shown with material density of 0.8 lbs/ft^3 at 77° F (25° C). For units mounted horizontally, where sensitivity settings are less significant; it is recommended that SW3 be set to Position 7 to minimize material build-up on the forks.

SW3	Fork Voltage	Insertion Depth (inches)
0	FACTORY RESERVED	
1		
2	173	1.5
3	190	1.8
4	206	2.1
5	223	2.4
6	240	2.7
7	280	3.5

Note: If the liquid/solid interface (LP-2000 only) is activated then the sensitivity function is disabled.

LIQUID/SOLID INTERFACE

To activate the liquid/solid interface SW5 Position 4 must be in the ON position. When this feature of the LP-2000 is enabled, the sensitivity selection by the SW3 will be ignored.

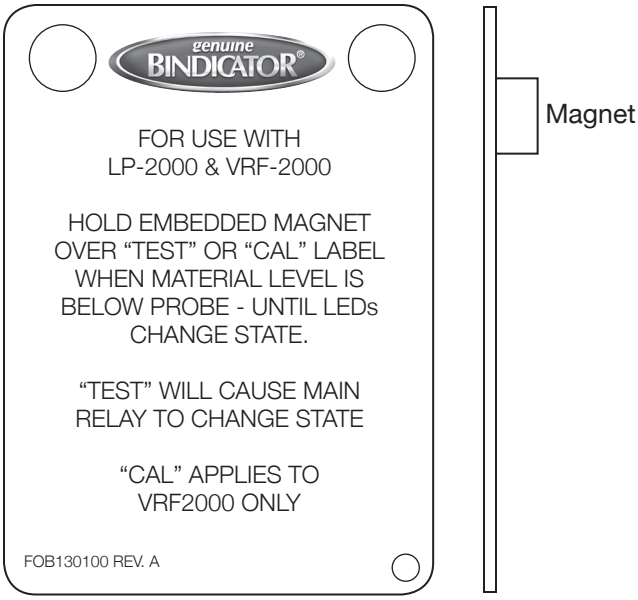
Note: Activating liquid/solid interface will disable the sensitivity function.

TEST

The LP-2000 provides a means for self-test using the magnetic FOB provided with the unit. When the unit is not in material (forks vibrating) place and hold the FOB over the “TEST” label on the cover. If the unit is functioning properly, the unit will alarm according to the selected fail-safe mode as shown below. When the test is completed and results verified, simply move the FOB away from the unit.

- High fail-safe:
  - Main relay de-energizes
  - Red ALARM LED is on
- Low fail-safe
  - Main relay energizes
  - Red ALARM LED is off

Figure 12: Magnetic FOB



VII. MAINTENANCE

PREVENTATIVE MAINTENANCE

No scheduled preventative maintenance is required for the Pulse Point™ units when properly applied and installed correctly. There is no cleaning required for the unit before or during installation.

VIII. TROUBLESHOOTING

	SYMPTOM	POSSIBLE CAUSE	SOLUTION
Auxiliary Relay Is De-energized	Main relay is de-energized	Supply voltage is not within manufacturer recommended range	Connect unit to recommended power supply and recheck both relays operations
	Main relay is energized	Relay contacts are not within recommended current rating OR Possible component failure	Replace Electronics inside the unit

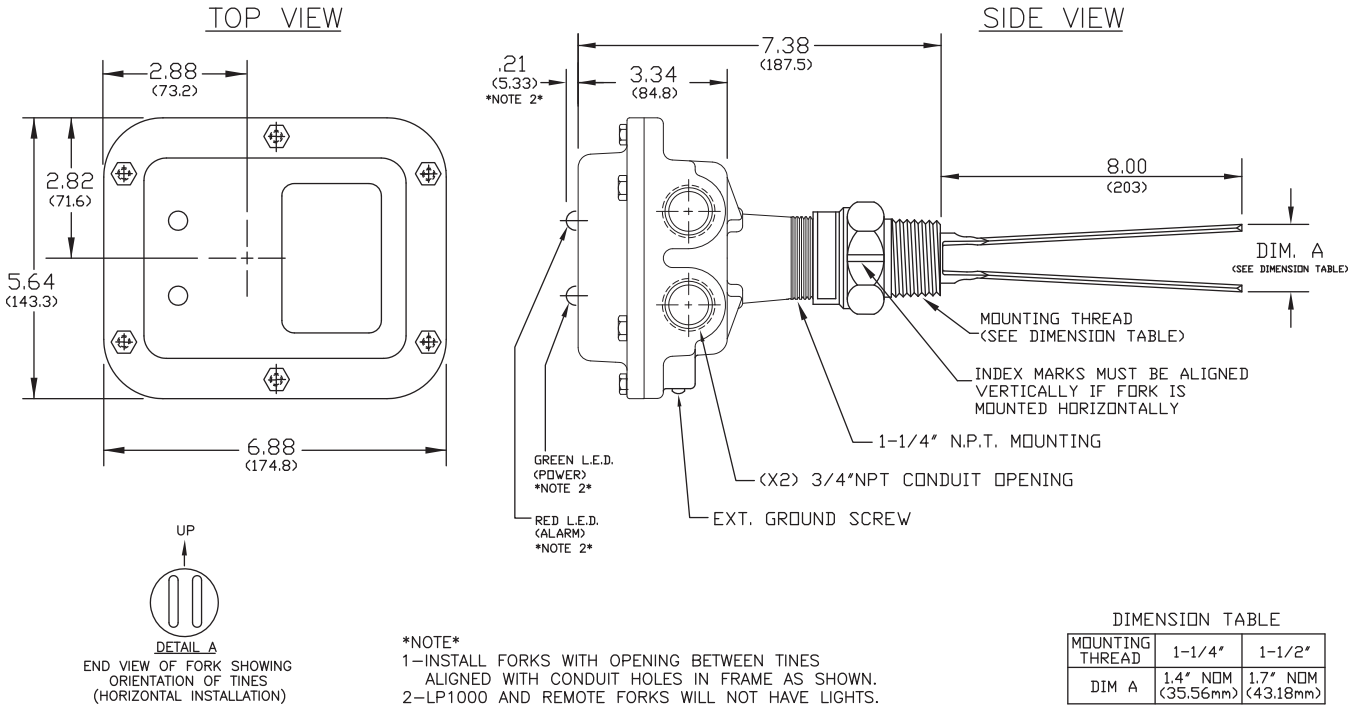
Contact your local factory representative if additional assistance is needed. Please provide the following information:

- Model number
- Date of Purchase
- Application information (type of material, mounting configuration, etc.)
- Description of problem

If your local representative is unable to determine the cause of difficulty, you will be referred to a factory engineer. Equipment shipped back to the factory without proper authorization will be refused and returned at the shipper's expense.

IX. DIMENSIONAL DRAWINGS

Type 1A and 2A: Standard Dimensions for LP-1000/2000 with 1 ¼" or 1 ½" NPT Mounting



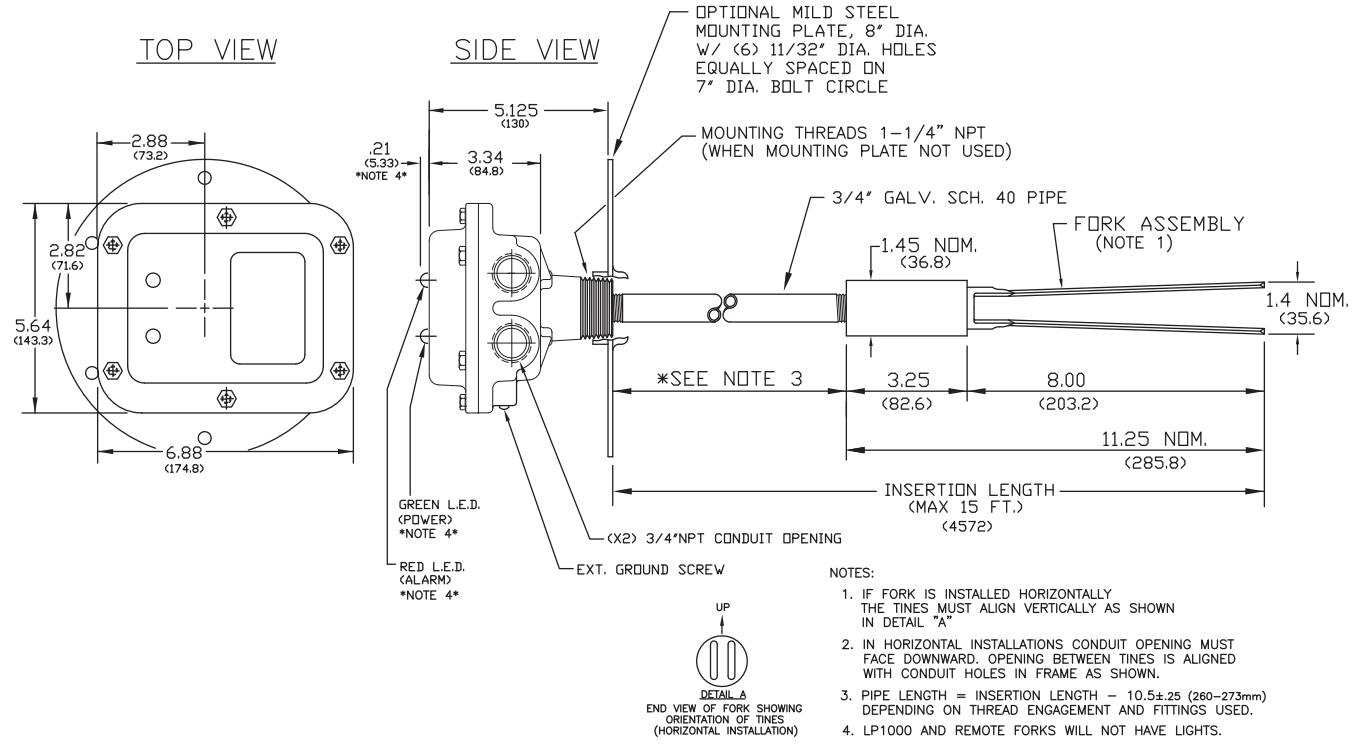
NOTE
1—INSTALL FORKS WITH OPENING BETWEEN TINES ALIGNED WITH CONDUIT HOLES IN FRAME AS SHOWN.
2—LP1000 AND REMOTE FORKS WILL NOT HAVE LIGHTS.

DIMENSION TABLE

MOUNTING THREAD	1-1/4"	1-1/2"
DIM A	1.4" NOM (35.56mm)	1.7" NOM (43.18mm)

Type 4B & 4D: Galvanized ¾" Pipe Extension Dimensions for LP-1000/2000 with 1 ¼" NPT Mounting

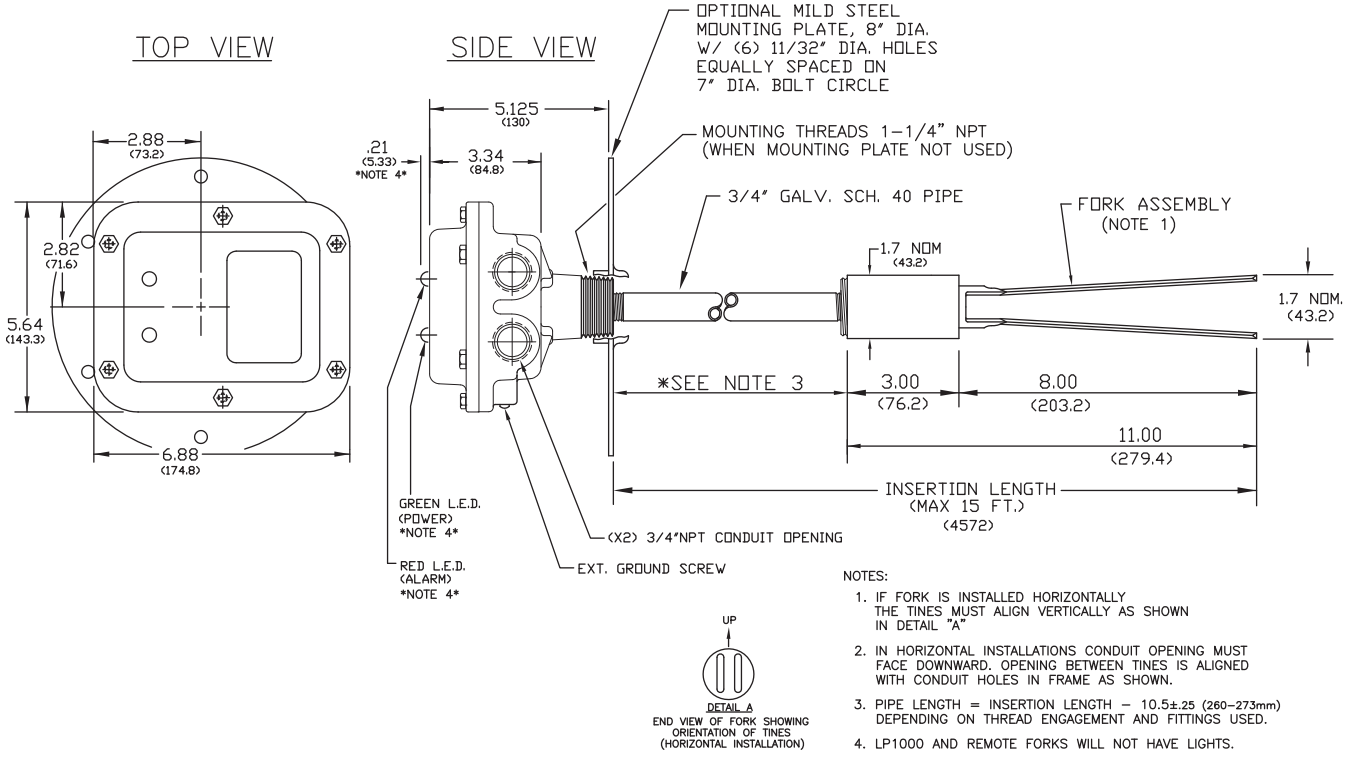
Shown with optional 8", Mild Steel Mounting Plate



NOTES:
1. IF FORK IS INSTALLED HORIZONTALLY THE TINES MUST ALIGN VERTICALLY AS SHOWN IN DETAIL "A"
2. IN HORIZONTAL INSTALLATIONS CONDUIT OPENING MUST FACE DOWNWARD. OPENING BETWEEN TINES IS ALIGNED WITH CONDUIT HOLES IN FRAME AS SHOWN.
3. PIPE LENGTH = INSERTION LENGTH – 10.5±.25 (260–273mm) DEPENDING ON THREAD ENGAGEMENT AND FITTINGS USED.
4. LP1000 AND REMOTE FORKS WILL NOT HAVE LIGHTS.

Type 3B & 3D: Galvanized ¾" Pipe Extension Dimensions for LP-1000/2000 with 1 ½" NPT Mounting

Shown with optional 8", Mild Steel Mounting Plate

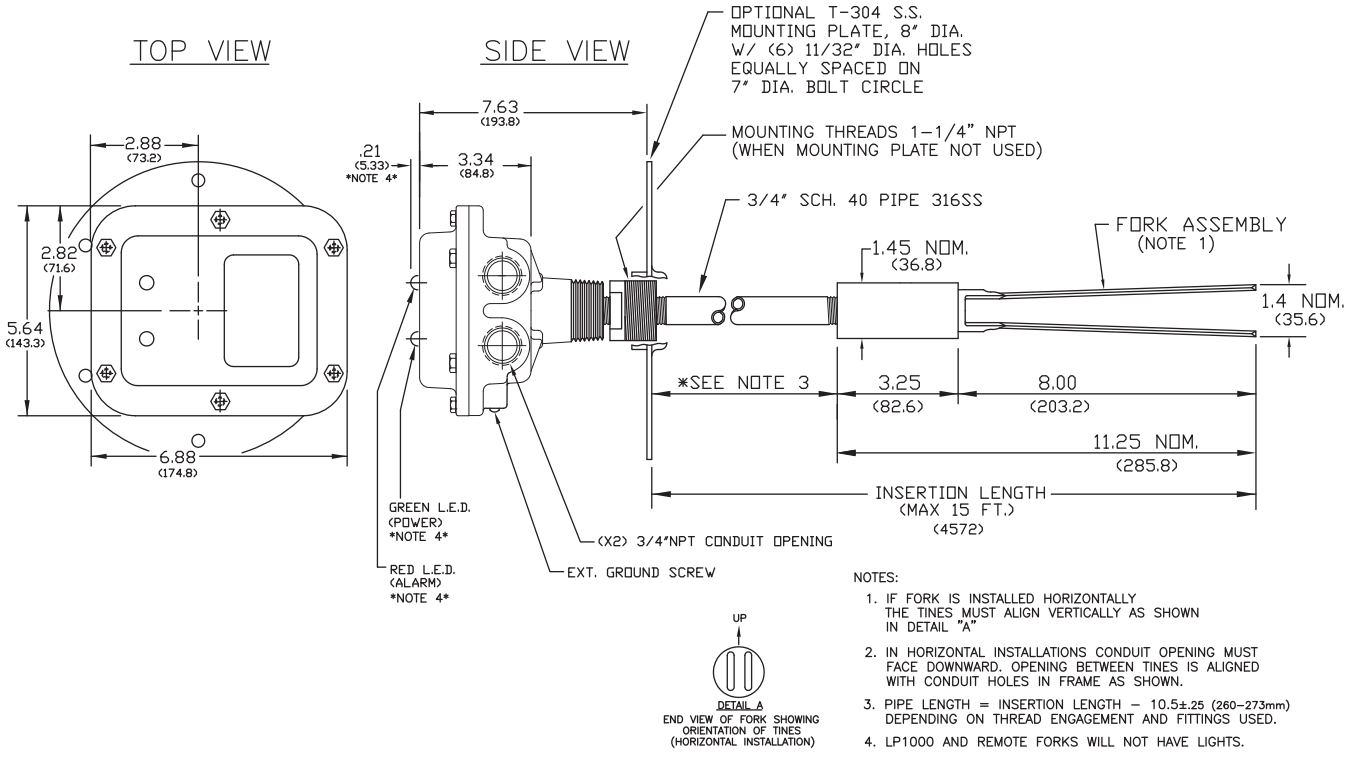


NOTES:

1. IF FORK IS INSTALLED HORIZONTALLY THE TINES MUST ALIGN VERTICALLY AS SHOWN IN DETAIL "A"
2. IN HORIZONTAL INSTALLATIONS CONDUIT OPENING MUST FACE DOWNWARD. OPENING BETWEEN TINES IS ALIGNED WITH CONDUIT HOLES IN FRAME AS SHOWN.
3. PIPE LENGTH = INSERTION LENGTH – 10.5±.25 (260–273mm) DEPENDING ON THREAD ENGAGEMENT AND FITTINGS USED.
4. LP1000 AND REMOTE FORKS WILL NOT HAVE LIGHTS.

Type 4C & 4E: 316 Stainless Steel ¾" Pipe Extension Dimensions for LP-1000/2000 with 1 ¼" NPT Mounting

Shown with optional 8", 304 Stainless Steel Mounting Plate

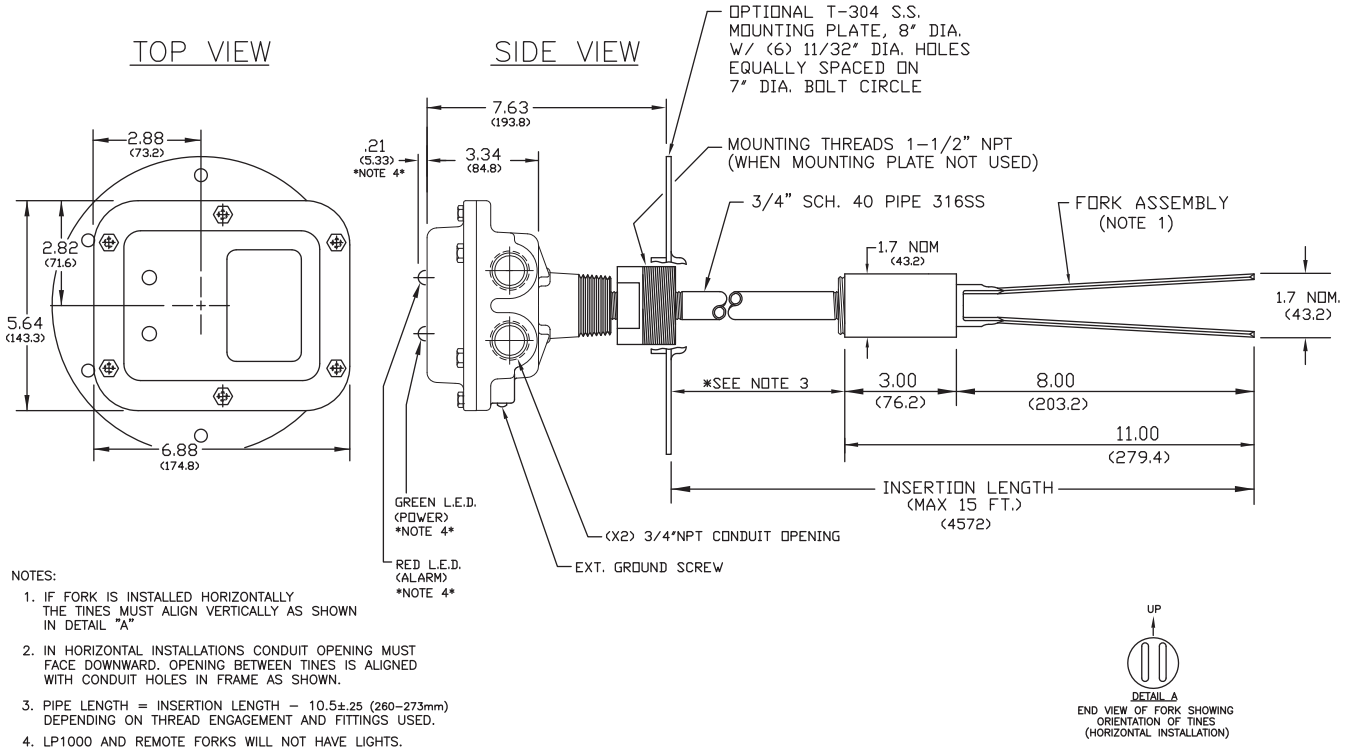


NOTES:

1. IF FORK IS INSTALLED HORIZONTALLY THE TINES MUST ALIGN VERTICALLY AS SHOWN IN DETAIL "A"
2. IN HORIZONTAL INSTALLATIONS CONDUIT OPENING MUST FACE DOWNWARD. OPENING BETWEEN TINES IS ALIGNED WITH CONDUIT HOLES IN FRAME AS SHOWN.
3. PIPE LENGTH = INSERTION LENGTH – 10.5±.25 (260–273mm) DEPENDING ON THREAD ENGAGEMENT AND FITTINGS USED.
4. LP1000 AND REMOTE FORKS WILL NOT HAVE LIGHTS.

Type 3C & 3E: 316 Stainless Steel ¾" Pipe Extension Dimensions for LP-1000/2000 with 1 ½" NPT Mounting

Shown with optional 8", 304 Stainless Steel Mounting Plate



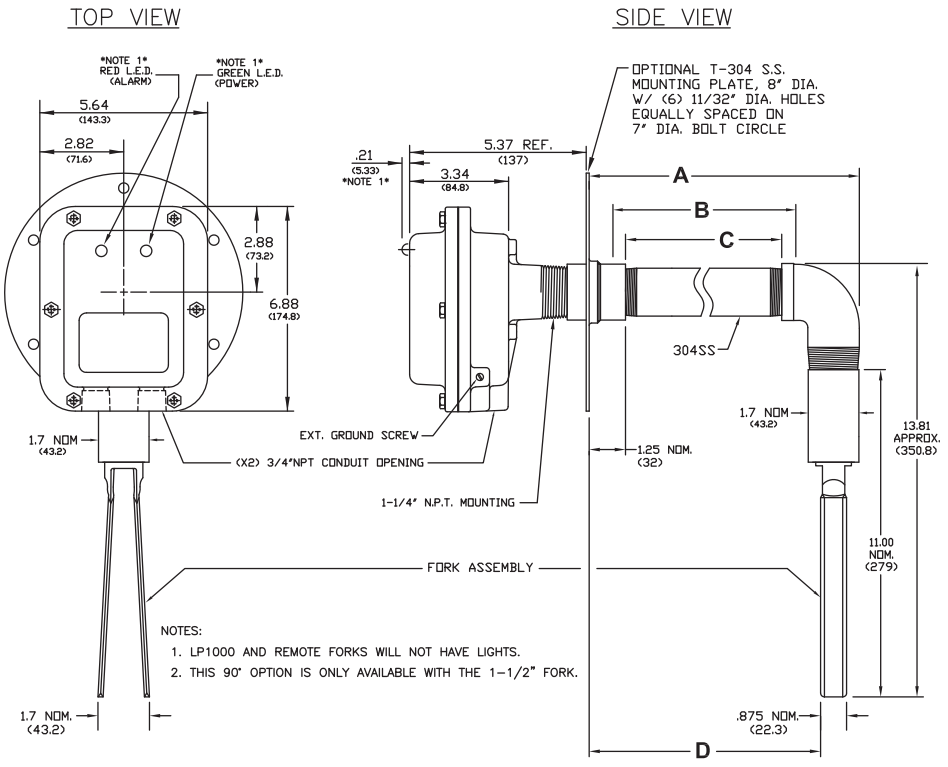
NOTES:

1. IF FORK IS INSTALLED HORIZONTALLY THE TINES MUST ALIGN VERTICALLY AS SHOWN IN DETAIL "A"
2. IN HORIZONTAL INSTALLATIONS CONDUIT OPENING MUST FACE DOWNWARD. OPENING BETWEEN TINES IS ALIGNED WITH CONDUIT HOLES IN FRAME AS SHOWN.
3. PIPE LENGTH = INSTALLATION LENGTH – 10.5±.25 (260–273mm) DEPENDING ON THREAD ENGAGEMENT AND FITTINGS USED.
4. LP1000 AND REMOTE FORKS WILL NOT HAVE LIGHTS.

DETAIL A
END VIEW OF FORK SHOWING ORIENTATION OF TINES (HORIZONTAL INSTALLATION)

Type 5F: 90° Fork Extension Dimensions for LP-1000/2000 with 1 ½" NPT Mounting

Shown with required 8", 304 Stainless Steel Mounting Plate



NOTES:

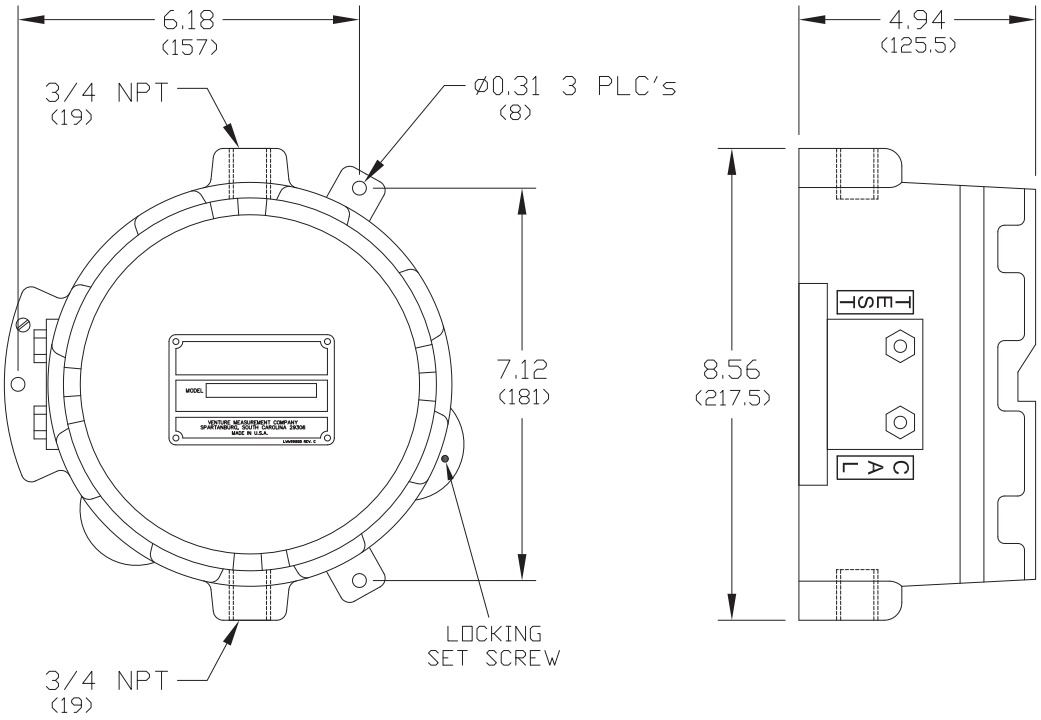
1. LP1000 AND REMOTE FORKS WILL NOT HAVE LIGHTS.
2. THIS 90° OPTION IS ONLY AVAILABLE WITH THE 1–1/2" FORK.

A = Insertion Length Min. = 4.68" Max. = 40"
B = Pipe Nipple Length (Insertion Length - 2.68")
C = Pipe Nipple Length - 1.25"
D = Insertion Length - 1.29"

* Examples *

	A Insertion Length	B Pipe Nipple Length	C Dimension	D Dimension
	14.68" (372.8)	12.00" (304.8)	10.75" (273)	13.39" (340.1)
Min. -	4.68" (101.6)	2.00" (50.8)	.75" (19)	3.39" (86.1)
Max. -	40.00" (1016)	37.32" (948)	36.07" (916)	38.71" (983.2)

Remote Turtle Demensions for LP-2000



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