



LVP180007 Rev. C

LP-30 Pulse Point™



INSTALLATION, OPERATION & MAINTENANCE MANUAL

SAFETY INFORMATION

Before installing the Pulse Point level switch, please read these instructions and familiarize yourself fully with the requirements and functions of the sensor.

Do not dispose of the carton or packing material until the unit has been inspected for damage. If the unit is received damaged, notify the carrier or the factory for instructions. Failure to do so may void your warranty.

The Pulse Point sensor is a precision device. Very high voltage is present on the fork terminals. Always remove power before servicing.

All wiring must conform to NEC requirements or local electrical codes.

If any questions or problems arise during installation of this equipment, please contact the Bindicator Applications Department at 800-778-9242 or 864-574-8960.

TABLE OF CONTENTS

1.0 PRODUCT DESCRIPTION	PAGE
1.1 Function	4
1.2 Applications	4
1.3 Features	4
1.4 Model Code Identification	5
1.5 Technical Specifications	6
1.6 Dimensions	6
2.0 HANDLING & STORAGE	
2.1 Inspection and Handling	7
2.2 Storage	7
3.0 MECHANICAL INSTALLATION	
3.1 Guidelines	7
3.2 Mounting	8
4.0 ELECTRICAL WIRING	
4.1 Guidelines	10
4.2 Connection Information / Wiring Diagram	10
5.0 SET-UP & PROGRAMMING	
5.1 Operation	11
5.2 Set-up / User Options	11
6.0 MAINTENANCE / PARTS LIST	
6.1 Preventative Maintenance	14
6.2 Spare / Replacement Parts	14
7.0 TROUBLESHOOTING	15
8.0 APPENDIX	16

1.0 PRODUCT DESCRIPTION

1.1 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 recognizes this loss of signal and causes the output relay to change state.

1.2 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 easily sense material as light as 2 lbs/cubic foot (32kg/cubic meter). It can be applied in any free flowing dry material up to 9/16" (14.3mm) in particle size.

1.3 Features

Features of the LP-30 Pulse Point include:

- Various models, mounting configurations, and fork coatings available to suit almost any application
- No calibration required
- Adjustable time delay
- Selectable fail-safe operation (high or low level)

1.4 Model Code Identification

The Pulse Point LP-30 Series are integral units, which have the electronics and tuning fork in the same enclosures. The fork may be pipe extended up to 10 feet.

LP-30 Series

LP3 - - A - - G - - 10 -

Type (Specify insertion length in inches if applicable)

- 0 = No Pipe Extension (Standard NPT Mounting)
- A = Galvanized 3/4" Pipe Extension
- B = 316 SS 3/4" Pipe Extension
- 1 = Mild Steel Mounting Plate & Galvanized 3/4" Pipe Extension
- 3 = 304 SS Mounting Plate & 316 SS 3/4" Pipe Extension

Mounting Configuration

- A = 1 1/2" NPT Mounting
- B = 1 1/2" Pipe Extended
- C = 1 1/4" Mounting
- D = 1 1/4" Pipe Extended

Enclosure Rating

- G = General Purpose - NEMA 4X

Voltage

- 1 = 120VAC
- 2 = 240VAC
- 3 = 100 VAC (Consult Factory)

Enclosure Material

- A = Aluminum, Polyester Coated

Tuning Fork

- 1 = 316 SS
- 3 = 316 SS - Teflon® Coated

Pulse Point™ LP-30

Note: For direct replacement of Roto-Bin-Dicator control, order the 1 1/4" Pulse Point mounting configuration.

1.5 Technical Specifications

LP-30 Series

Power Requirements	120 VAC or 240 VAC or 100 VAC, 50/60 Hz
Power Consumption	5 VA
Operating Temperature	Electronics: -40° F to 140° F (-40° C to 60° C); Tuning Fork: -55° F to 248° F (-48° C to 120° C)
Output	6A SPDT @ 240 VAC or 28 VDC
Pressure Rating	150 psi (10.5 kg/cm ²) with 1½" NPT; 5 psi (0.35 kg/cm cm ²) with with mounting plate
Time Delay	Field programmable: ON, OFF or both; Adjustable (0-20 sec)
Fail Safe	Field selectable high/low level
Enclosure Material	Polyester coated aluminum
Enclosure Rating	General purpose NEMA 4X
Tuning Fork	316 SS standard; 316 SS with Teflon coating
Conduit Entry	3/4" NPT Dual
Mounting	1½" or 1¼" NPT; Extended forks can be mounted directly through 1½" or 1¼" NPT coupling
Mounting Plate Material	Mild Steel, 304 SS
Extended Pipe Material	Galvanized or 316 SS
Maximum Pipe Extension	10 ft (3 m)
Status Indicator	None
Minimum Material Density	2 lbs/ft ³ (32 kg/m ³)

1.6 Dimensions

Figures 1 and 2 illustrate the dimensions of the standard 1½" and 1¼" LP-30 units. See the Appendix beginning on page 16 for additional dimensions.

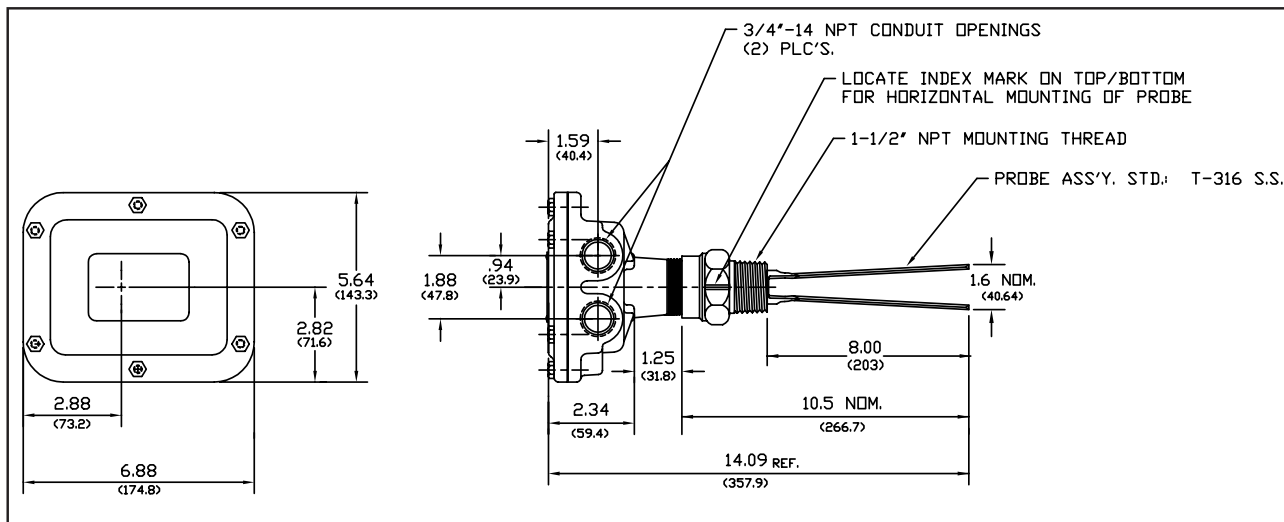


Figure 1. 1½" LP-30 Dimensions

in (mm)

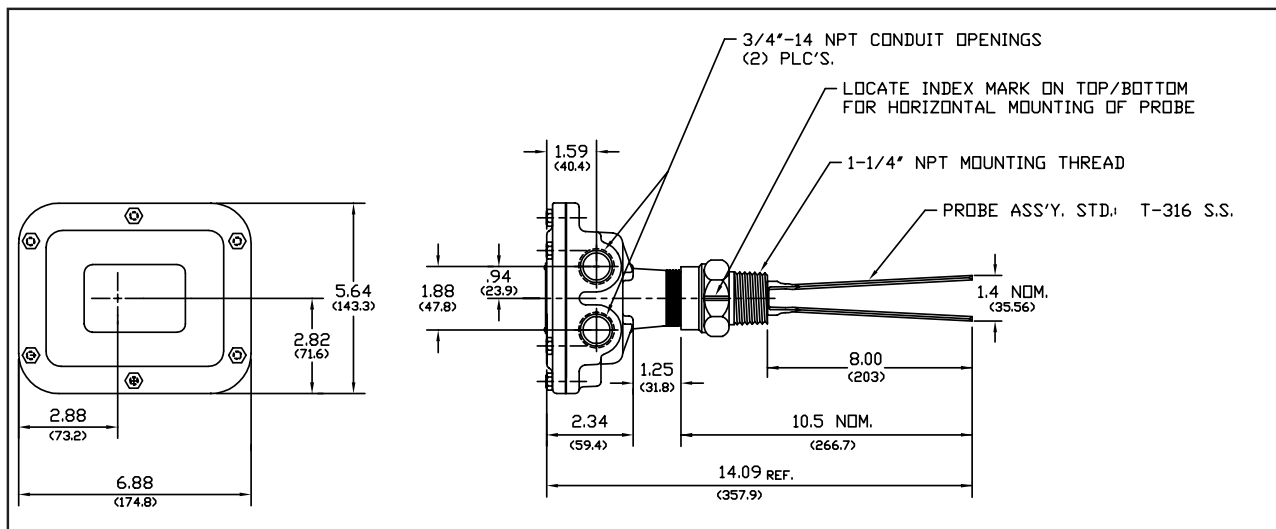


Figure 2. 1 1/4" LP-30 Dimensions

in (mm)

2.0 HANDLING & STORAGE

2.1 Inspection and Handling

Each package should be inspected upon receipt for damage that may have occurred due to mishandling during shipping. If damage is discovered, notify the shipping carrier immediately. Do not dispose of the carton or packing materials. If you have any problems or questions, consult Bindicator Customer Care at 1-800-778-9242.

2.2 Storage

If the Pulse Point sensor 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 in a non-condensing atmosphere less than 100% humidity.

Do not store a non-powered unit outdoors for a prolonged period.

3.0 MECHANICAL INSTALLATION

3.1 Guidelines

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

- The tuning fork assembly is a precision device - handle it carefully
- Remove power from the unit before making any adjustments

CAUTION: Very high voltage is present on the fork terminals

- Do not allow moisture to enter the electronics enclosure. Conduit should slope downward from the Pulse Point housing. Install drip loops. Seal conduit with silicone rubber product.
- All wiring must conform to NEC requirements or local electrical codes.

3.2 Mounting

The Pulse Point fork must be located at the position where level indication is desired. The fork 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. See Table 1 (Section 1.4) for mounting types.

- Avoid locations where high levels of vibration are present.
- The fork assembly must be horizontal or pointing downward. DO NOT mount the fork pointing upward. (See Figure 3)

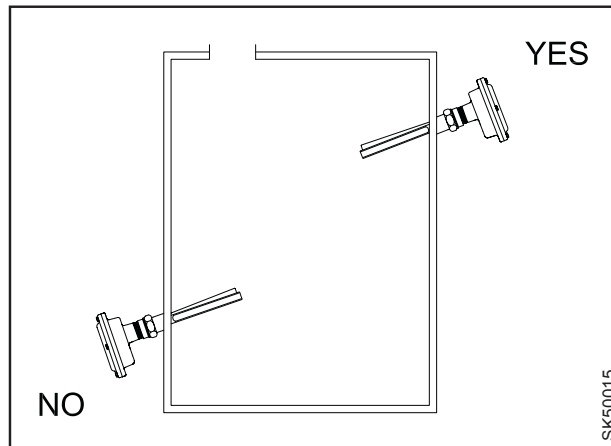


Figure 3. Mounting Dimensions

- The maximum allowable downward force on the fork assembly is 88 pounds. (See Figure 4)
- Calculate the maximum solids head height above a horizontally mounted fork as follows:

$$\text{Maximum height of material (in ft)} = \frac{2200}{\text{bulk density (lbs/ft}^3\text{)}}$$

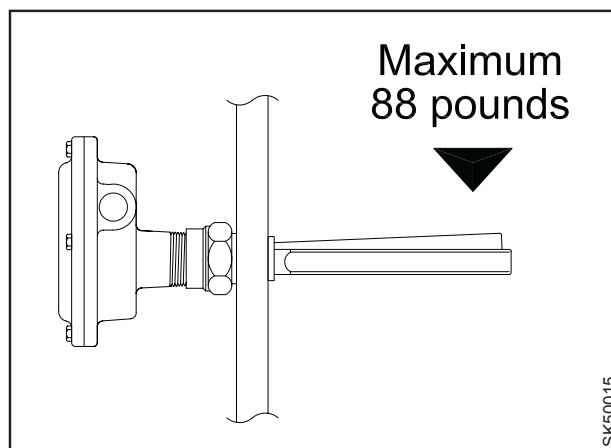


Figure 4. Maximum Downward Force

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. (See Figure 5)

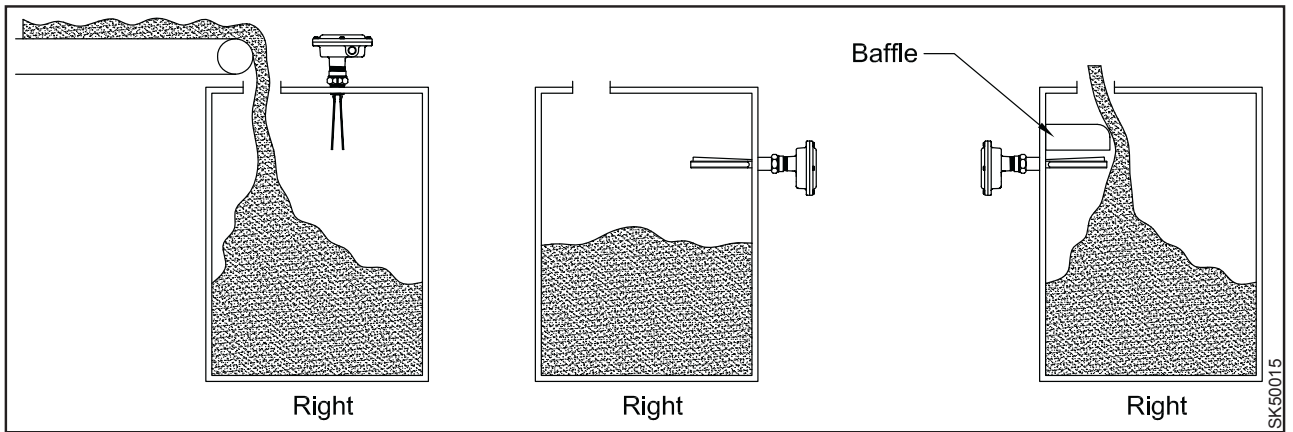


Figure 5. Mounting in Relation to Flow of Material

If the fork is mounted horizontally, it must be positioned so that the material will not accumulate on top of or between the tines. There is an index mark on the mounting nut to assist in proper positioning of the fork. (See Figure 6)

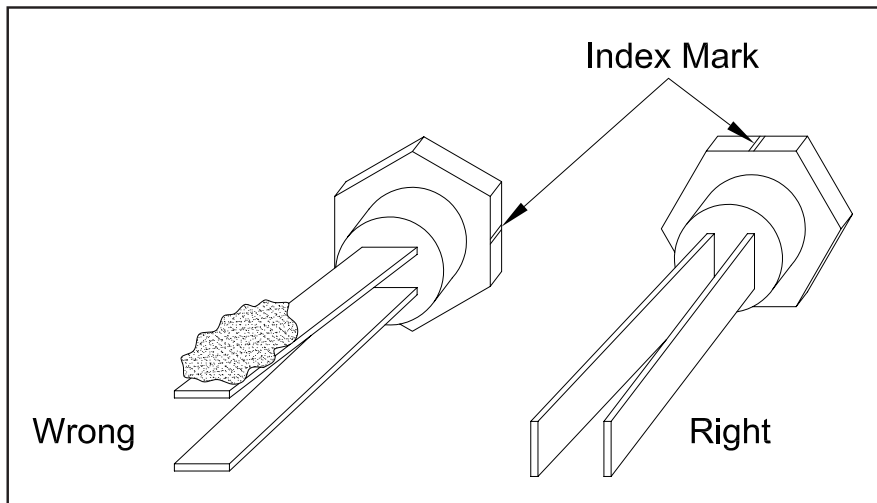


Figure 6. Index Mark

4.0 ELECTRICAL WIRING

4.1 Guidelines

Electrical connections to the LP-30 Pulse Point are shown in drawing LVP180011. All wiring must be completed in accordance with applicable electrical codes.

4.2 Connection Information / Wiring Diagrams

The markings at TB-2 on the circuit board indicate the status of the relay contacts when the unit is operating in non-alarm condition, which is the powered, unalarmed state. This status may be opposite that of other brands of level controls. Contacts as marked on TB2 are not the relays nomenclature, but are marked so contacts are in “normal” positions when unit is powered and unalarmed (see Section 5.2).

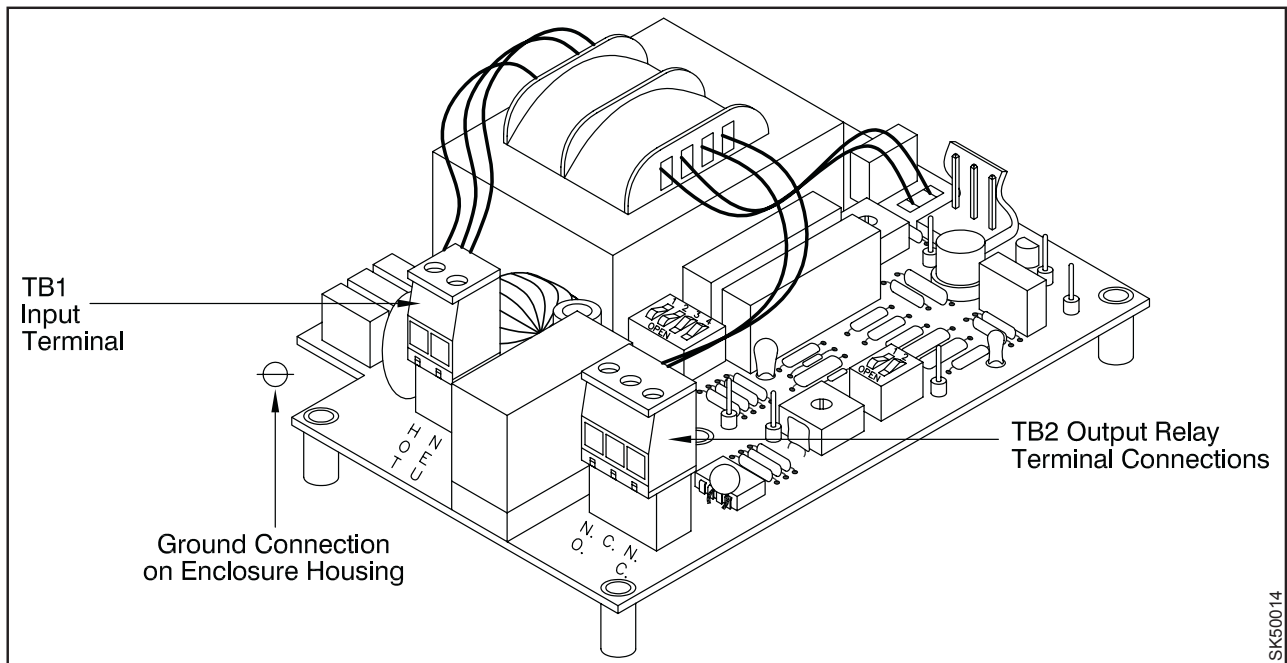


Figure 7. TB2 Output Relay Terminal Connections

5.0 SET-UP & PROGRAMMING

5.1 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 light LED will be lighted whenever power is applied to the unit. The status of the red LED will be determined by the selected fail-safe mode and whether or not the fork is allowed to vibrate. (Refer to Fail-Safe Operation section below)

5.2 Set-Up / User Options

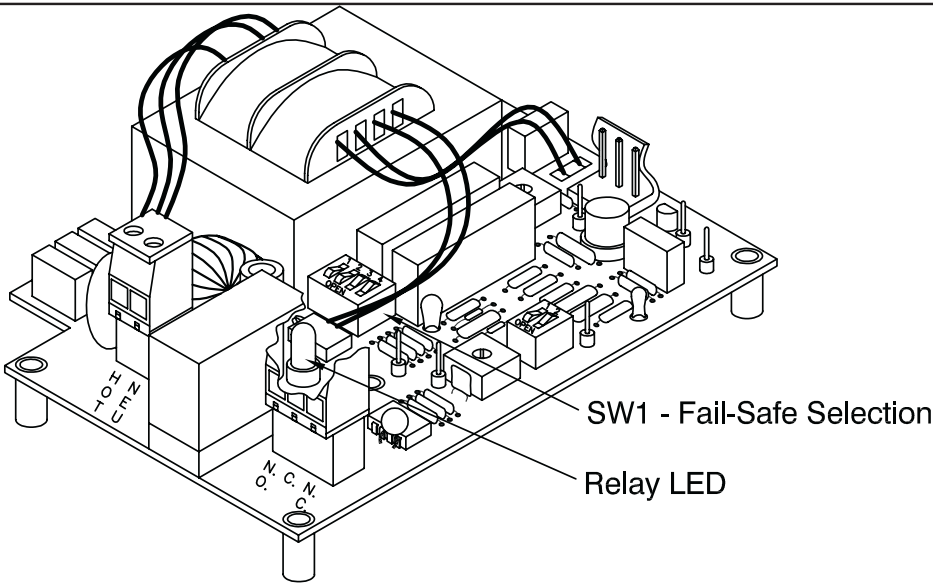
The Pulse Point allows the user to control several operating characteristics to suit individual applications.

Fail-Safe Selection

The output relay on the Pulse Point is energized when the unit is operating in non-alarm state. This is known as “fail-safe” operation; the Pulse Point will give an alarm indication in the event of power failure.

Fail-safe operation may be selected for high-level (HLFS) or low-level (LLFS) applications by setting the 4 DIP switches of SW1 as shown in Figure 8. The chart below shows the various operating conditions, which will exist in each of the fail-safe modes:

<u>Fail-Safe Mode</u>	<u>Fork Status</u>	<u>Relay Status</u>	<u>Red LED</u>	<u>Terminal N.O. to C</u>	<u>Terminal N.C. to C</u>
HLFS	Vibrating	Energized	On	Open	Closed
HLFS	Not vibrating	Not Energized	Off	Closed	Open
LLFS	Vibrating	Not Energized	Off	Closed	Open
LLFS	Not Vibrating	Energized	On	Open	Closed



Fail-Safe Mode	SW1 - Switches				Illustration
	1	2	3	4	
High Level Fail-Safe (HLFS)	Closed	Closed	Open	Open	
Low Level Fail-Safe (LLFS)	Open	Open	Closed	Closed	

Table 2: Fail-Safe Mode Switches

Time Delay Selection

"Time delay" is the interval between change of fork status (vibrating or not vibrating) and change of output relay status (alarmed or not alarmed).

There are four modes of time delay operation as selected by setting the 2 DIP switches of SW2 as shown in Figure 9.

- "A" - delay between start of fork vibration and relay change
- "B" - delay between stoppage of fork vibration and relay change
- "C" - delay between both start and stoppage of fork vibration and relay change
- "D" - minimum delay

Potentiometer R8 adjusts the time delay interval. Minimum time delay is zero seconds (R8 fully counter-clockwise); maximum time delay is 20 seconds (R8 fully clockwise).

Note: Pulse Point units are shipped from the factory with SW2 in "minimum delay" R8 adjusted for minum time delay.

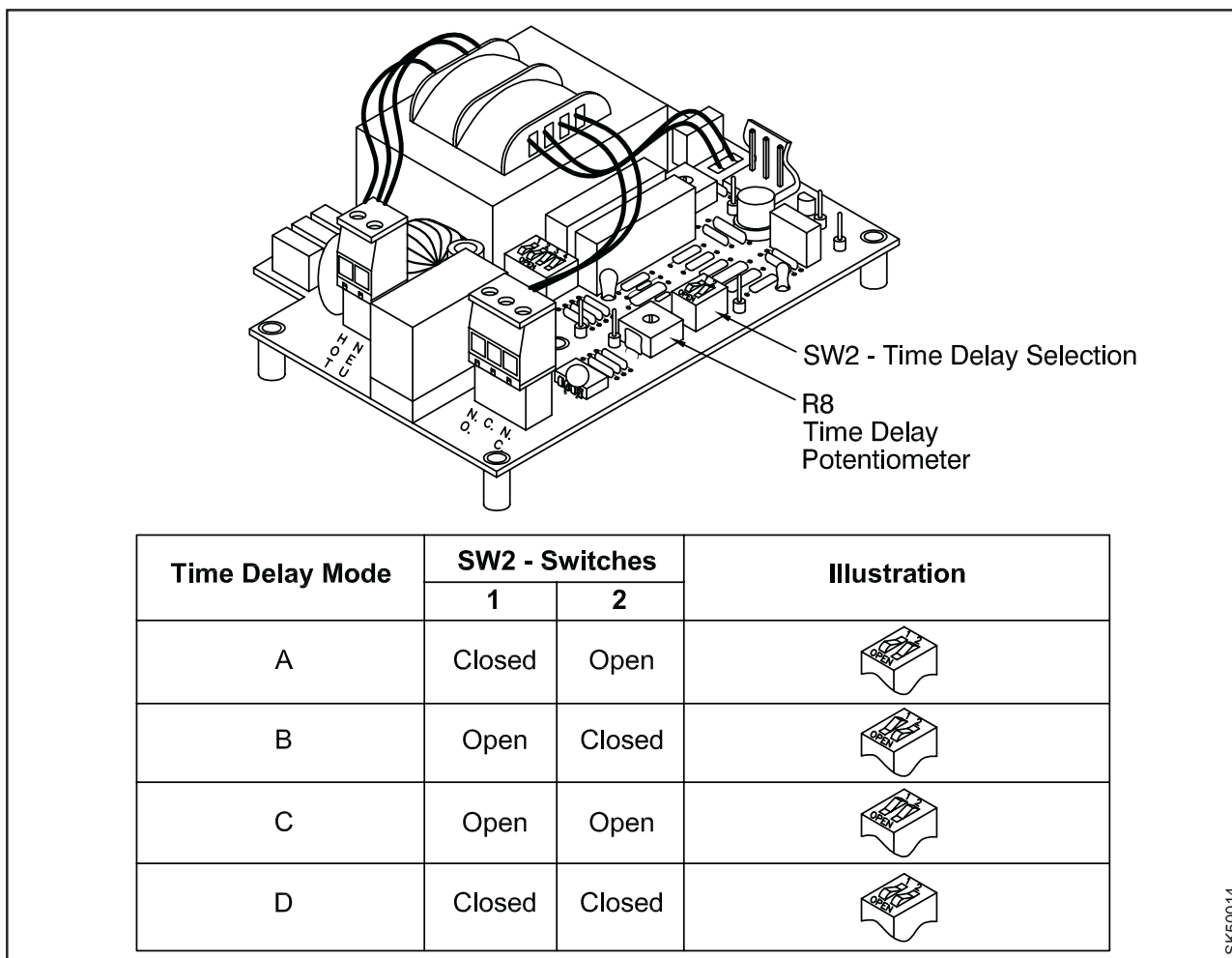
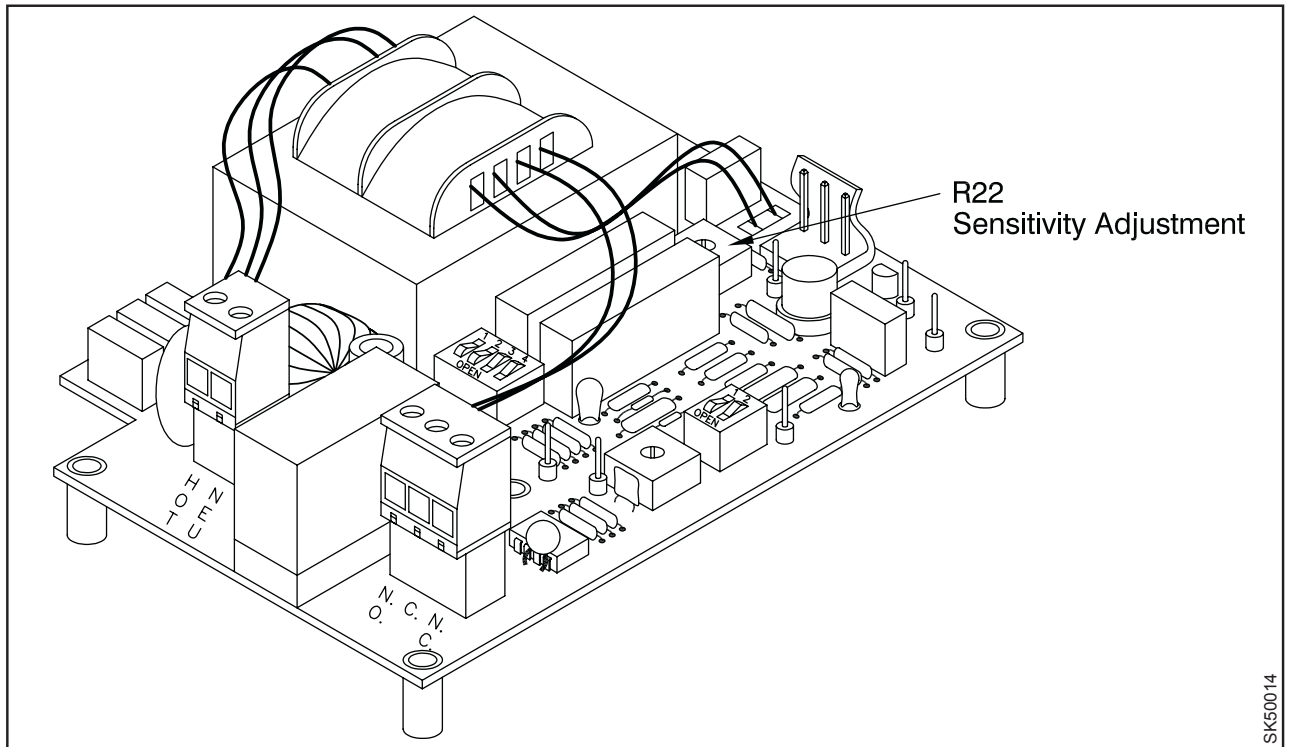


Figure 9. Time Delay Set-up

Sensitivity Adjustment

For most applications the sensitivity control R22 should be left in the factory default position (fully clockwise). For applications with very low density materials, the fork drive should be reduced by turning potentiometer R22 counter-clockwise (see Figure 10).



SK50014

Figure 10. R22 Sensitivity Adjustment

6.0 MAINTENANCE / PARTS LIST

6.1 Preventative Maintenance

No scheduled preventative maintenance is required for Pulse Point units when properly applied and installed correctly.

6.2 Spare / Replacement Parts

<u>Product Code</u>	<u>Description</u>
Electronics	
LVP130302	120VAC Printed Circuit Board
LVP110257	240VAC Printed Circuit Board
LVP130307	100VAC Printed Circuit Board (consult factory for availability)
Tuning Forks	
LVP130300	1½" NPT Integral Tuning Fork 316 SS
LVP130301	1½" NPT Extended Tuning Fork 316 SS
LVP130310	1¼" NPT Integral Tuning Fork 316 SS
LVP130311	1¼" NPT Extended Tuning Fork 316 SS
LVP130316	1½" Standard Tuning Fork Teflon® Coated
LVP130318	1¼" Standard Tuning Fork Teflon® Coated
LVP130320	1¼" Extended Tuning Fork Teflon® Coated
LVP130325	1½" Extended Tuning Fork Teflon® Coated
Mounting Plates	
LVP110059	1½" NPT Mild Steel Mounting Plate
LVP110060	1½" NPT 304 SS Mounting Plate
LVP110130	1¼" NPT Mild Steel Mounting Plate
LVP110071	1¼" NPT 304 SS Mounting Plate
Flanges	
LUB042612	2" with 1¼" NPT Tapped Female, 316 SS
LUB042901	2" with 1¼" NPT Tapped Female, Carbon Steel
LUB042615	2" with 1½" NPT 304 SS
LUB042761	3" with 1¼" NPT Tapped Female, 316 SS
LUB042603	3" with 1¼" NPT Tapped Female, Carbon Steel
LUB042740	3" with 1½" NPT 316 SS
LUB042940	3" with 1½" NPT 304 SS
LUB042733	3" with 1½" NPT Carbon Steel
LUB042855	4" with 1¼" NPT Tapped Female, 304 SS
LUB042910	4" with 1¼" NPT Tapped Female, Carbon Steel

7.0 TROUBLESHOOTING

The following section may be used as a troubleshooting guide in the unlikely event that problems are found with operation of the Pulse Point.

Problem: Fork vibrates, but unit will not alarm

Solution: Make sure problem is not an improperly set time delay.
Test by turning R8 fully counter-clockwise to set time delay to minimum.
Verify proper setting of fail-safe switches, SW1. See section 5.2 Set-Up / User Options on page 11.

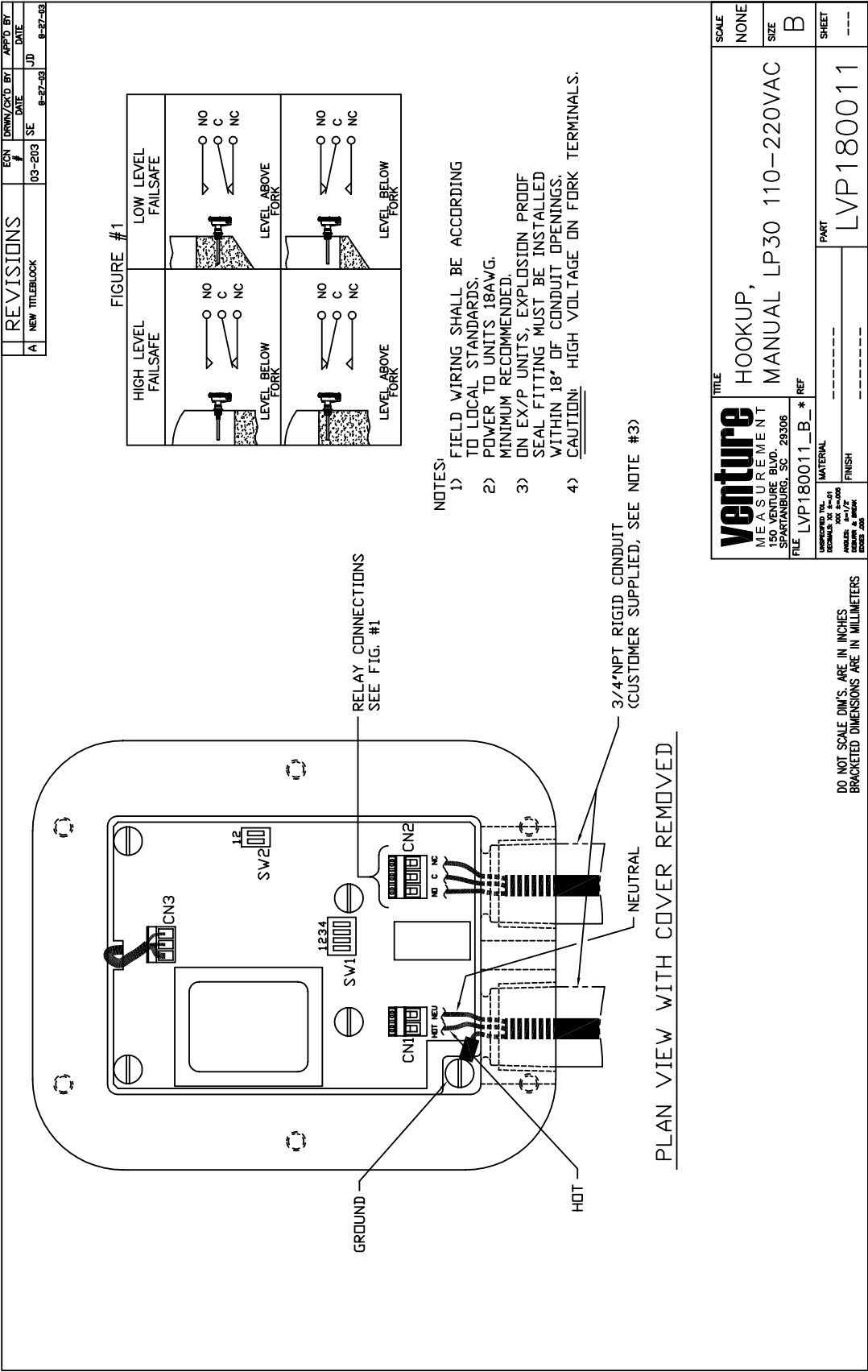
Contact your local factory representative if additional assistance is needed. Please provide the following information:

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

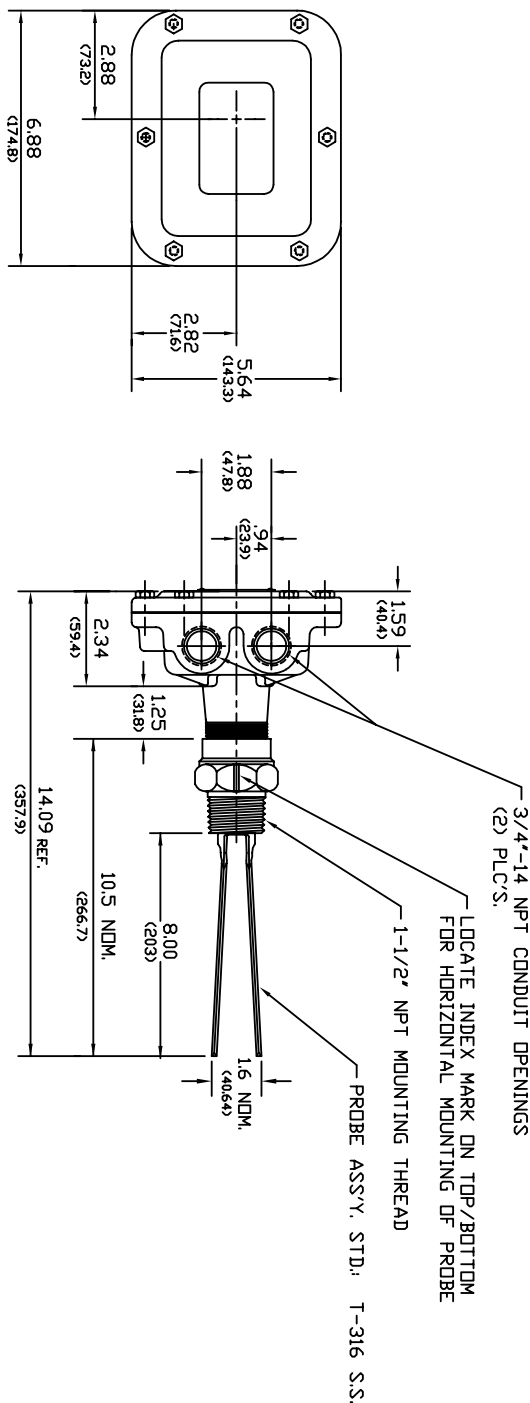
If your local representative is unable to determine the cause of difficulty, you will be referred to a factory engineer. Equipment shipped back to the factory without proper authorization will be refused and returned at the shipper's expense.

8.0 APPENDIX

<u>Drawing Description</u>	<u>Drawing Number</u>	<u>Page Number</u>
LP-30 110/220 VAC Hookup	LVP180011	17
LP-30 1½" Dimensions	LVP180012	18
LP-30 1¼" Dimensions	LVP180018	19
LP-30 1½" Stainless Steel Extended Dimensions	LVP180013	20
LP-30 1¼" Stainless Steel Extended Dimensions	LVP180020	21
LP-30 1½" Galvanized Steel Extended Dimensions	LVP180014	22
LP-30 1¼" Galvanized Steel Extended Dimensions	LVP180019	23

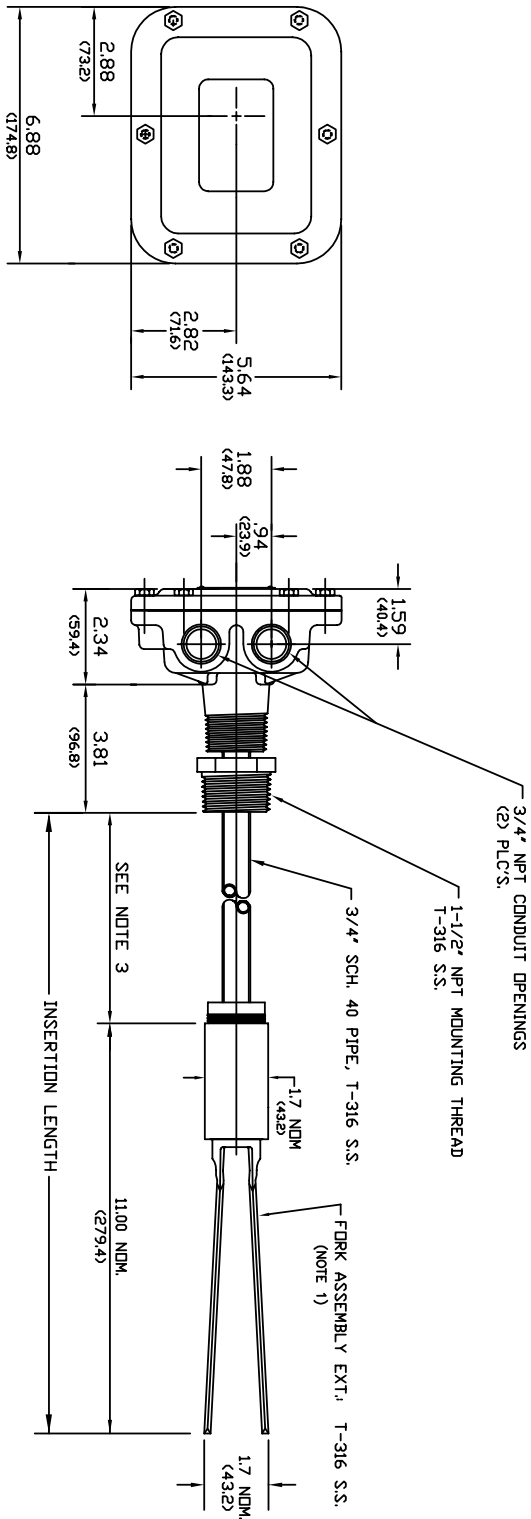


REVISIONS		EON #	DATE	BY	DATE
A	UPDATED TITLE FROM 1-1/2"	99-205	---	TK	---
B	REVISED TO SHOW CURRENT NPT THREADS	03-203	SE	6-19-03	JD



DO NOT SCALE DIM'S. ARE IN INCHES
BRACKETED DIMENSIONS ARE IN MILLIMETERS

Venture MEASUREMENT 150 VENTURE BLVD. SPARTANBURG, SC 29306 FILE LVP180012_B _X _REF		TITLE OUTLINE, MANUAL 1-1/2" PULSE POINT		SCALE NONE	
UNFINISHED SURFACES REMAIN AS CAST FINISH PROVIDE A FINISH CODE AND REF.		PART LVP180012		SHEET ---	

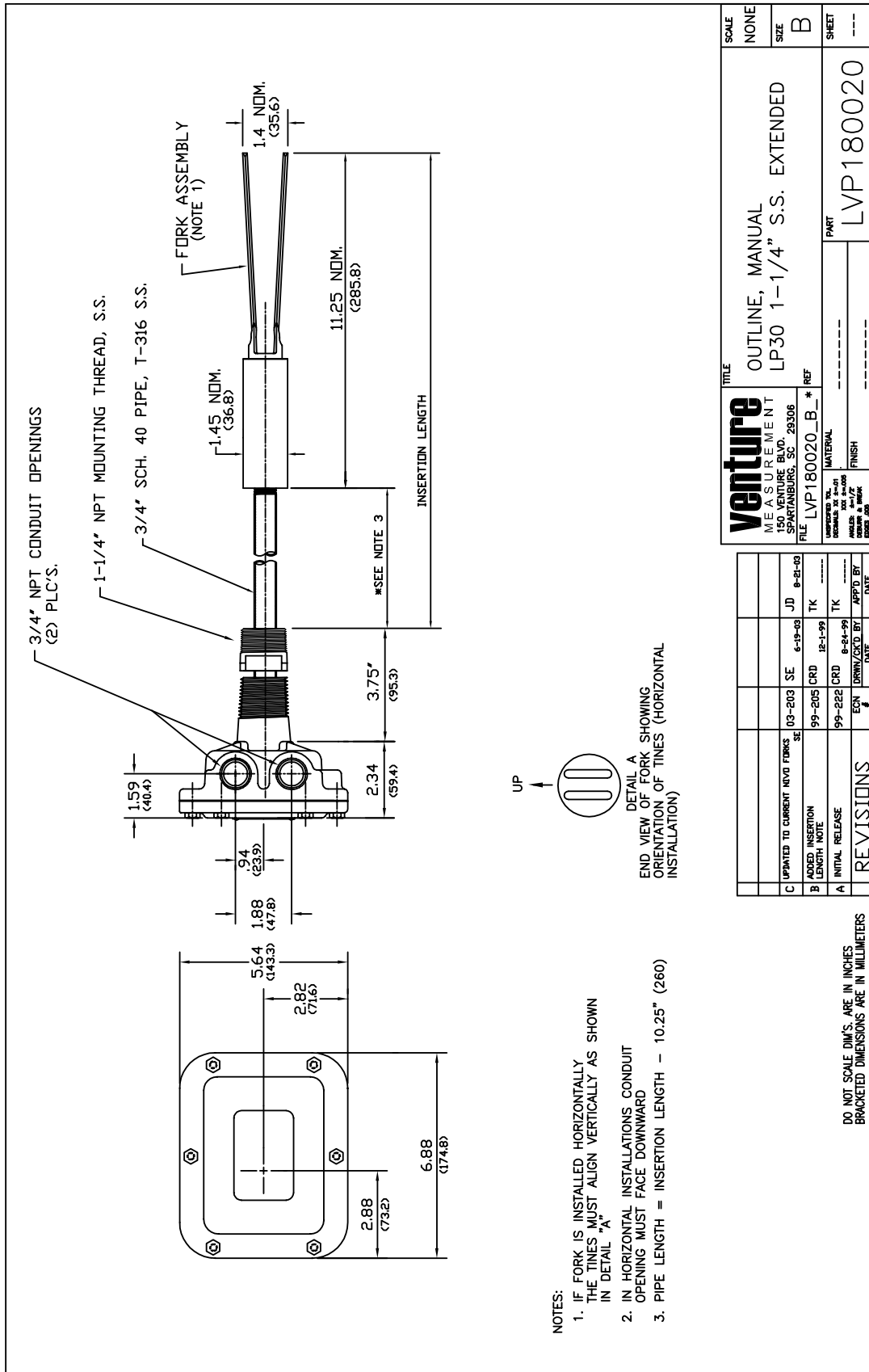


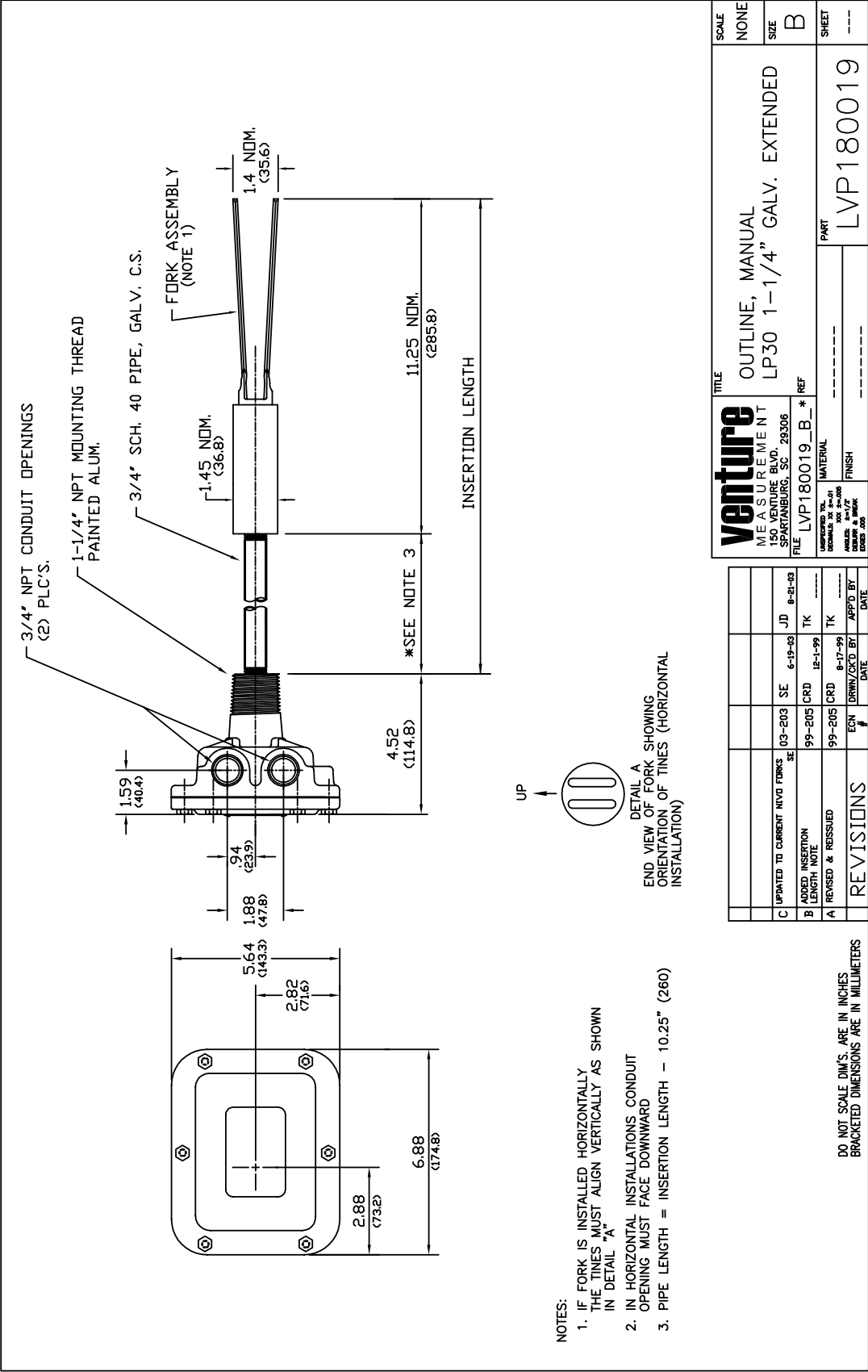
- NOTES:
1. IF FORK IS INSTALLED HORIZONTALLY THE TINES MUST ALIGN VERTICALLY AS SHOWN IN DETAIL "A"
 2. IN HORIZONTAL INSTALLATIONS CONDUIT OPENING MUST FACE DOWNWARD
 3. PIPE LENGTH = INSERTION LENGTH - 10.25" (260)

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

REV	DESCRIPTION	DATE	BY	CHKD	DATE
A	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
B	UPDATED TO CURRENT NING FORKS	03-2003	SE	JD	8-21-03
C	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
D	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
E	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
F	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
G	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
H	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
I	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
J	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
K	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
L	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
M	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
N	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
O	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
P	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
Q	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
R	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
S	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
T	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
U	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
V	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
W	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
X	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
Y	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
Z	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03

REV	DESCRIPTION	DATE	BY	CHKD	DATE
A	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
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F	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
G	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
H	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
I	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
J	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
K	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
L	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
M	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
N	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
O	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
P	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
Q	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
R	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
S	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
T	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
U	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
V	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
W	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
X	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
Y	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03
Z	FORK LENGTH 10.25 WAS 11.75	03-2003	SE	JD	8-21-03







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venture
MEASUREMENT

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