

VRF-1000 Series

Integral Electronics with Opti-Sense™

Installation, Operation, and Maintenance Manual

CAUTION

It is essential that all instructions in this manual be followed precisely to ensure proper operation of the equipment.



VRF180000
Revision H
October 2011

SAFETY INFORMATION

Before installing the VRF-1000, please read these instructions and be completely familiar with the requirements and functions of the sensor.

The VRF-1000 sensor must only be installed and operated as described in this instruction manual. Note that other actions can cause damage for which Bindicator® does not take responsibility. If the model is not installed correctly or used in unapproved applications, dangers may arise such as product overflow.

Ensure that all personnel installing, wiring, and calibrating this device are suitably qualified. All wiring must conform to current National Electrical Code (NEC) requirements or local electrical codes. Please be aware that any modification of the equipment may cause injury or death.

If any questions or problems arise during the installation of this equipment, please contact the Bindicator® Applications Department at (800) 778.9242 or (864) 574.8960.

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CHAPTER 1. PRODUCT DESCRIPTION

FUNCTION

The VRF-1000 is a line powered (AC or DC) material level sensor that outputs a DPDT relay contact. The electronics and probe are integral. It is a point level sensor used to detect the presence or absence of material at a point inside a tank, bin, or other vessel. Material coming in contact with the unit's probe causes its output relay to change state, thereby indicating to the user the presence of material.

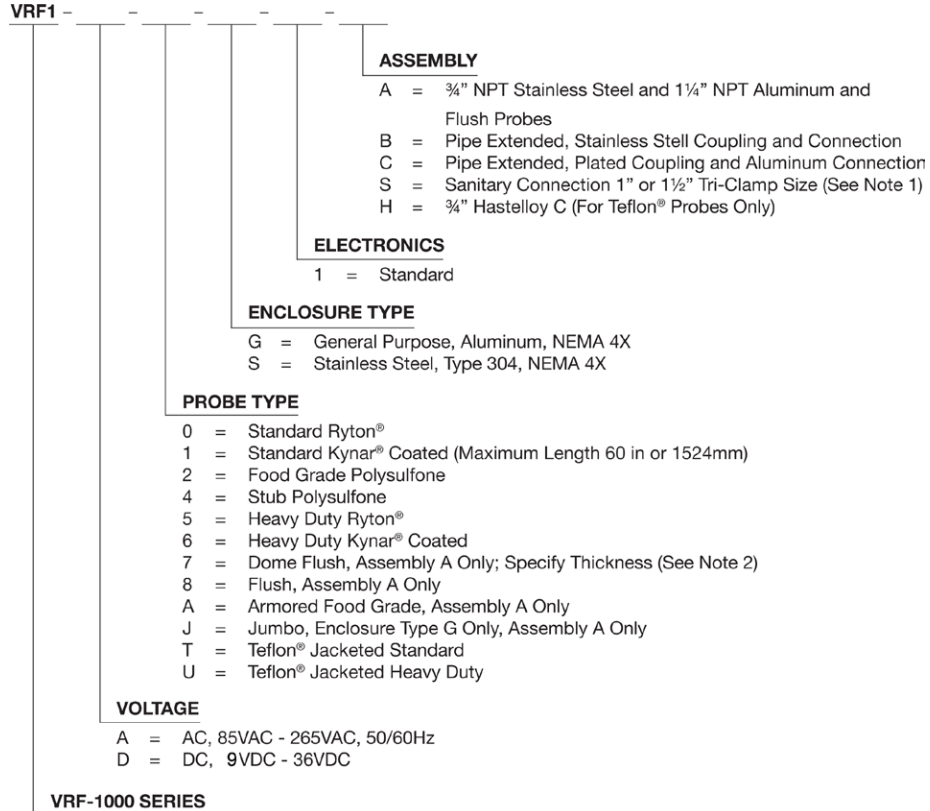
Operation of the VRF-1000 is based upon the Bindicator® Opti-Sense™ technology using Variable Radio Frequency (VRF™) which automatically selects the optimal operating frequency (20kHz to 100kHz) of the low voltage signal applied to the probe, depending on the probe circuit impedance.

A dual core microprocessor scans the probe circuit and digitally analyzed voltage and current values to characterize the complex impedance seen by the probe. The digital signal processor continuously analyzed the conductance and susceptance of the probe circuit and calculates when to alarm the unit.

APPLICATIONS

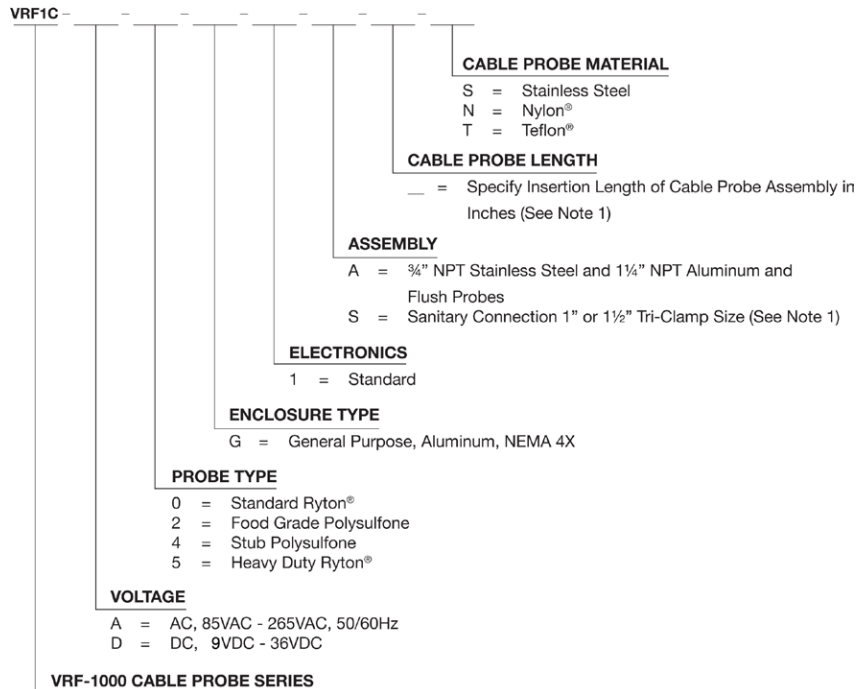
This model is ideal for the point level detection of granulars, powders, liquids, and slurries. In addition, it is effective in the measurement of materials with a dielectric constant as low as 1.2.

MODEL CODE IDENTIFICATION



Note 1: For 3A Sanitary Certification, add "3A" at the end of the model code. Assembly S must be used and either Probe Type 2 (Food Grade Polysulfone) or Probe Type 4 (Stub Polysulfone) must be used.

Note 2: Thickness of probe must be specified: 3/8 in., 1/2 in., 5/8 in., or 3/4 in. wall thickness.



Note 1: Maximum length is 45 ft. (13.72m) = 540 in. (1,371.6cm).

TECHNICAL SPECIFICATIONS/APPROVALS

ELECTRONICS

Line Voltage	AC Models 85VAC to 265VAC; DC Models 10VDC to 36VDC
Power Consumption	5.5 watts maximum
Output Relay	2 form C (DPDT), 6A at 240VAC, 6A at 30VDC, minimum load 12V/100mA
Temperature Range	-40° F to +158° F (-40° C to +70° C)
Sensitivity Settings	See Chapter 5
Selectable Time Delay	See Chapter 5

PROBES

Standard Duty	316 Stainless Steel and Ryton®, 150 PSI (10.5kg/cm ²) -100° F to +450° F (-73° C to +232° C)
Standard Kynar® Coated	316 Stainless Steel and Ryton® coated with Kynar®, 50 PSI (3.5kg/cm ²) -100° F to +250° F (-73° C to +121° C)
Food Grade	316 Stainless Steel and Polysulfone, 150 PSI (10.5kg/cm ²) -30° F to +300° F (-34° C to +149° C)
Stub	316 Stainless Steel and Polysulfone, 150 PSI (10.5kg/cm ²) -30° F to +300° F (-34° C to +149° C)
Heavy Duty	316 Stainless Steel and Ryton®, 150 PSI (10.5kg/cm ²) -100° F to +450° F (-73° C to + 232° C)
Heavy Duty Kynar® Coated	316 Stainless Steel and Ryton® coated with Kynar®, 50 PSI (3.5kg/cm ²) -100° F to +250° F (-73° C to +121° C)
Flush and Dome Flush	316 Stainless Steel and Epoxy, 50 PSI (3.5kg/cm ²) -30° F to +200° F (-34° C to +93° C)
Armored Food Grade	316 Stainless Steel and Food Grade Epoxy, 150 PSI (10.5kg/cm ²) -30° F to +230° F (-34° C to +110° C)
Jumbo	316 Stainless Steel and Epoxy, 50 PSI (3.5kg/cm ²) -30° F to +200° F (-34° C to +93° C)
Teflon® Jacketed	316 Stainless Steel and FEP Teflon®, 50 PSI (3.5kg/cm ²) -30° F to +250° F (-34° C to +121° C)
Teflon® Jacketed Heavy Duty	316 Stainless Steel and FEP Teflon®, 50 PSI (3.5kg/cm ²) -30° F to +250° F (-34° C to +121° C)
Fly Ash	316 Stainless Steel and Ryton® coated with Kynar®, 50 PSI (3.5kg/cm ²) -100° F to +250° F (-73° C to +121° C)

APPROVALS

FM Approved	Electrical measurement equipment for use in indoor/outdoor (NEMA 4X, IP66) unclassified locations.
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DIMENSIONS

See the Appendix for appropriate model drawings and applicable housing and probe dimensions.

CHAPTER 2. HANDLING AND STORAGE

INSPECTION AND HANDLING

The VRF-1000 is individually packed to provide adequate protection during shipping and has been tested and calibrated at the manufacturing facility. When the unit 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 materials. Notify the shipping carrier immediately. If any problems arise, please contact Bindicator® at (800) 778.9242 or (864) 574.8060.

STORAGE

After receiving the VRF-1000, care should be taken to avoid damage. If the unit is not scheduled to be installed immediately after delivery, the following steps should be taken:

1. After inspection, repackage the unit into its original packaging.
2. Select a clean, dry site for storage. Location should be free of vibration, shock, and impact hazards.

If the VRF™ point level unit will be in storage for more than 30 days, it must be stored in a non-condensing atmosphere with less than 100% relative humidity.

DO NOT STORE THE UNPOWERED UNIT OUTDOORS FOR A PROLONGED PERIOD.

CHAPTER 3. MECHANICAL INSTALLATION

GUIDELINES

The probe can be mounted on the side of the vessel horizontally, or on the top of the vessel vertically. The probe should be located out of the direct flow of material into the vessel.

MOUNTING

Consult the appropriate dimensional drawing in the Appendix for mounting information related to the model ordered.

CHAPTER 4. ELECTRICAL INSTALLATION

GUIDELINES

The VRF™ unit is a line powered point level switch with a DPDT isolated relay contact output. Wiring will consist of:

- Grounding
- Input supply line power
- Output relay contacts for signal/control

CONDUIT-CABLE CONNECTION

Two threaded 0.75 in. 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 0.75 in. - 14 NPT plug with pipe sealant in order to maintain approval requirements.

INPUT POWER

The VRF™ unit is either an AC or DC input model. Consult the model codes in Chapter 1 and the nameplate of the unit to determine the proper power supply.

CONNECTION INFORMATION

See Figures 4.1 and 4.2 for location of input and output wiring.

WARNING!

Either AC or DC power is to be connected to the power input depending on the model. Consult the nameplate of the unit and Chapter 1 to determine what type of power is required. Consult Chapter 1 for the allowable voltage ranges.

CONNECTION INFORMATION/WIRING DIAGRAM

See Figure 4.1 for location of input and output terminal blocks. Agency approved insulated barrel type terminals are supplied in the input terminal block to provide additional safety. These terminals must be used in order to maintain approval requirements. See Figure 4.2 for output contact positions during stages of operation.

WARNING!

An electrical earth ground connection must be made to the housing input ground screw located inside the enclosure. See Figure 4.1 for location. This connection is needed for both electrical safety and proper operation of the unit. This is required for both AC and DC units.

WARNING!

The external ground wire (included) MUST be attached to the wall or the top of the metal vessel in order to provide the proper reference to the probe.

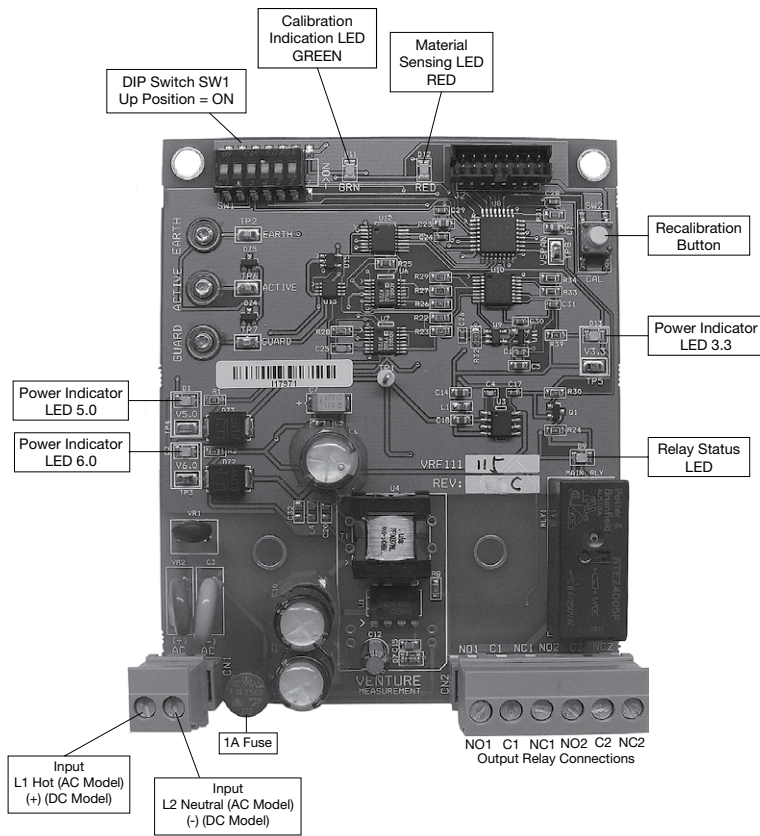


Figure 4.1 - VRF-1000 Electronics.

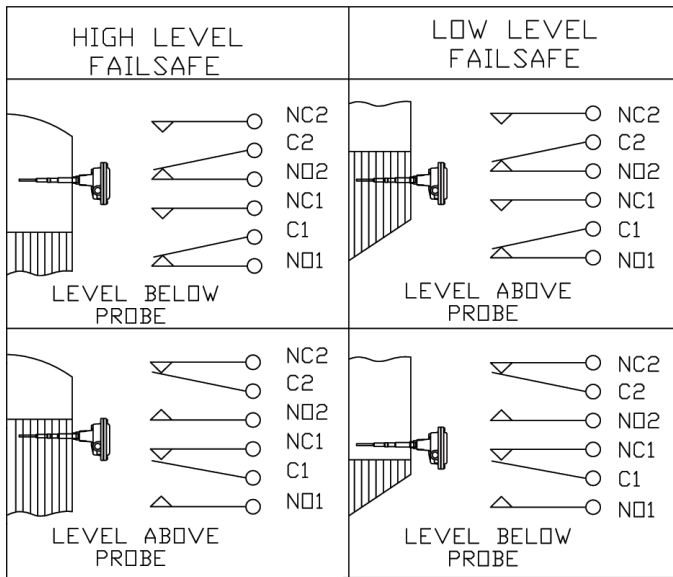


Figure 4.2 - High/Low Level Fail-Safe.

The output relay contacts are labeled in the un-powered alarm state. The relay is energized when the VRF-1000 is not alarmed. This status may be opposite that of other Bindicator® brand units. If the VRF-1000 is replacing an older Model RF-8000 or RF-9000 Series unit, connections will need to be opposite. If a connection was made to the NC1 terminal of the RF-8000 or RF-9000 Series unit, connect now to the NO1 terminal of the VRF-1000. C1 and C2 connections remain the same.

CHAPTER 5. SET-UP AND CALIBRATION

OPERATION

The VRF™ unit will begin operating when powered up. The sensitivity, fail-safe, and time delay settings can be made without power applied. Recalibration will require that the unit be powered. Changes to the sensitivity, fail-safe, and time delay do not require a recalibration.

SETTINGS AND ADJUSTMENTS

FAIL-SAFE SELECTION

The VRF™ is shipped from the manufacturing facility in the high level fail-safe condition. This setting is made on DIP switch SW1, position 5. See Figure 4.1 in Chapter 4.

HIGH LEVEL FAIL-SAFE OPERATION

DIP Switch SW1 position 5 is ON.

If the electrical power fails, the relay turns OFF. This indicates material as if the tank is full.

Relay status LED is ON when no material is present, and OFF when material is present.

Alarm LED (red) is OFF when no material is present, and ON when material is present.

Relay NC output contacts are open when no material is present and closed when material is present.

NO output contacts are closed when no material is present and open when material is present.

LOW LEVEL FAIL-SAFE OPERATION

DIP Switch SW1 position 5 is OFF.

Relay status LED is OFF when no material is present, and ON when material is present.

Alarm LED (red) is OFF when no material is present, and ON when material is present.

Relay NC output contacts are closed when no material is present and open when material is present.

Relay NO output contacts are open when no material is present and closed when material is present.

SENSITIVITY SETTING

The VRF™ is shipped from the manufacturing facility in the 2pF setting. This setting is made on DIP switch SW1 positions 1 and 2. See Figure 4.1.

SW1 Position 1	SW1 Position 2	Time Delay
Off	Off	1pF, High
Off	On	2pF
On	Off	5pF, Medium
On	On	10pF, Low

TIME DELAY SETTING

The VRF™ is shipped from the manufacturing facility in the minimum time delay setting. This setting is made on DIP switch SW1 positions 3 and 4. This setting will delay the time between when the VRF™ unit senses material and the output relay changes state. The delay is only in this direction, regardless of fail-safe setting. There will be no delay when the material leaves the probe. See Figure 4.1.

SW1 Position 3	SW1 Position 4	Time Delay
Off	Off	1 second
Off	On	4 seconds
On	Off	8 seconds
On	On	15 seconds

ENABLE AUTOMATIC CALIBRATION FEATURE

The VRF-1000 is shipped from the manufacturing facility with the EZ-CAL™ II feature disabled (OFF). If automatic calibration/recalibration is desired, set the SW1 DIP switch position 6 to ON. When enabled, the unit will automatically recalibrate whenever it senses a lower capacitance than the previously calibrated point. Sensing only air, or a lower material level than previous sensed, will initiate a recalibration.

Note

Conductive or excessive material build-up on the Pro-Guard section of the probe will cause the probe to recalibrate to a lower than normal point. DO NOT turn this feature on if excessive build-up is likely.

This unit can also be manually calibrated by pressing the recalibration push button. See Figure 4.1. The probe must not have material level present when calibration is performed.

CHAPTER 6. START-UP AND OPERATION

The VRF-1000 will begin operating when powered up. Once properly installed in the application, it should be calibrated when material is below the probe. If the automatic calibration feature is turned ON, the unit will self calibrate to the current conditions, assuming that there is no material on the probe. If there is material present, and the automatic calibration is ON, the unit will automatically recalibrate when material level drops below the probe.

If the unit is powered on a bench prior to installation, or moved from one installation to another, recalibration is required. Momentarily press the calibration push button. See Figure 4.1 for location. The green calibration indication LED will turn OFF, then after 1 second will illuminate, to indicate that calibration is complete. If the green LED is flashing, the unit is not properly calibrated. Check all ground connections and retry.

CHAPTER 7. MAINTENANCE AND SPARE PARTS LIST

If it should become necessary to replace any parts on the VRF-1000 Series unit, please contact Bindicator® at (800) 778.9242 or (864) 574.8060. Please note the model number and date code from the nameplate located on the cover of the unit. Please have this information available at the time of calling. A Bindicator® representative will be of assistance in identifying what replacement parts are available for that particular model.

REPLACEMENT PROBES

PART NUMBER	DESCRIPTION
LHF110016	Heavy Duty Probe (Probe 5)
LHF110044	Heavy Duty Probe, Kynar® Coated (Probe 6)
LRF110007	Standard Probe (Probe 0)
LRF110062	Food Grade Probe (Probe 2)
LRF110072	Flush Mount Probe (Probe 8)
LRF110078	Stub Probe (Probe 4)
LRF110084	Standard Probe, Kynar® Coated (Probe 1)
LRF110121	Ceramic Probe (Probe 3)
LRF110251	$\frac{3}{8}$ " Thick Dome Flush Probe (Probe 7)
LRF110252	$\frac{1}{2}$ " Thick Dome Flush Probe (Probe 7)
LRF110253	$\frac{5}{8}$ " Thick Dome Flush Probe (Probe 7)
LRF110254	$\frac{3}{4}$ " Thick Dome Flush Probe (Probe 7)
LRF110905	Jumbo Probe
LRF110939	Teflon® Jacketed Standard Probe (Probe T)
LRF110940	Teflon® Jacketed Heavy Duty Probe (Probe U)
LRF120139	Dome Flush Probe Adapter
LRF150055	Armored Food Grade Probe (Probe A)
LRF110951	Fly Ash Probe (Probe F)
LRF110991	Mini Ceramic Probe (Probe M)

REPLACEMENT ELECTRONICS

PART NUMBER	DESCRIPTION
VRF111115	Printed Circuit Board (AC)
VRF111205	Printed Circuit Board (DC)
LUC037783	1A fuse

CHAPTER 8. TROUBLESHOOTING

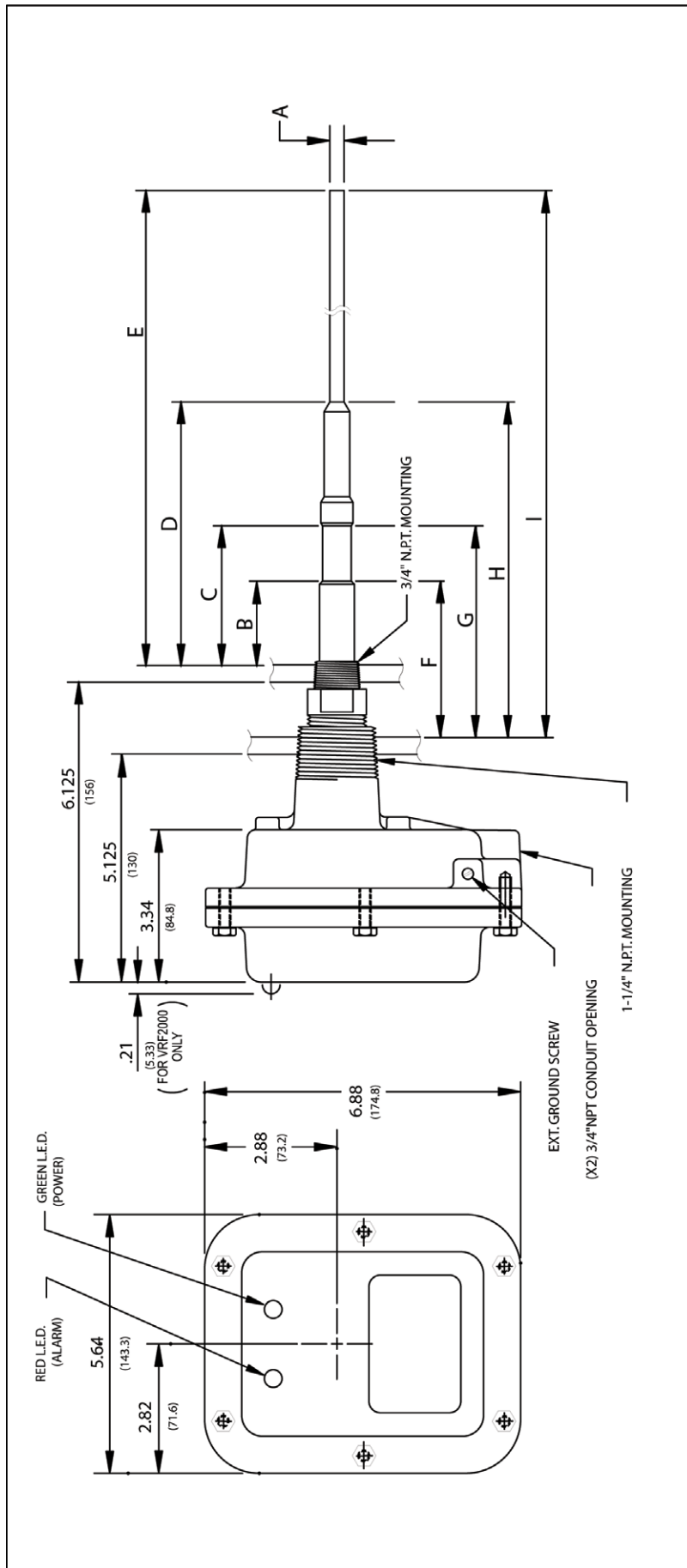
If problems are experienced with the VRF-1000 unit, check the following:

- Proper input voltage. If correct, the “Power Indication LED” should be illuminated. See Figure 4.1 for location.
- Check that a good electrical earth ground is terminated to the “Input Ground Connection” screw on the internal housing of the unit.
- Check that the external ground wire is connected from the housing to the tank top or wall, if mounted in a metal tank.
- Recalibrate the unit as described in Chapter 6.
- Check for excessive material build-up or physical damage to the probe.

If further assistance is needed, please contact Bindicator® Customer Care at (800) 778.9242 or (864) 574.8060.

APPENDIX

DRAWING NUMBER	DRAWING DESCRIPTION
VRF185001	Dimensional Drawing for GP VRF-1000 and VRF-2000
VRF185002	Dimensional Drawing for VRF-1000 and VRF-2000 GP Cable Probe
VRF185003	Dimensional Drawing for Dome Flush Probe VRF-1000 and VRF-2000
VRF185004	Outline Drawing VRF Extended, G/P Type "B" Mounting
VRF185005	Outline Drawing VRF Extended, G/P Type "C" Mounting
VRF185006	Dimensional Drawing for GP VRF-1000 and VRF-2000 (Sanitary Mounting)
VRF185007	Wiring for VRF-1000
VRF185009	Dimensional Drawing for Flush Probe VRF-1000 and VRF-2000 GP/XP
VRF185010	Dimensional Drawing for VRF-1000 and VRF-2000 Teflon® Coated
VRF185011	Dimensional Drawing for VRF-1000 and VRF-2000 Jumbo Probe
VRF185012	VRF-1000 and VRF-2000 Sanitary Cable Probes (Stub and Food Grade)



I	15.25 (387.5)	19.25 (489)	15.62 (396.7)	19.62 (498.35)	15.25 (387.35)
H	7.00 (178)	11.75 (298.5)	7.00 (178)	11.75 (298.5)	3.63 (92.2)
G	4.50 (114.5)	10.00 (254)	4.50 (114.5)	10.00 (254)	3.25 (82.55)
F	3.38 (86)	8.5 (216)	3.38 (86)	8.5 (216)	2.75 (69.85)
E	14.25 (362)	18.25 (463.5)	14.62 (371.4)	18.62 (472.95)	14.25 (362)
D	6.00 (152.5)	10.75 (273)	6.00 (152.5)	10.75 (273)	2.63 (66.8)
C	3.50 (89)	9.00 (228.5)	3.50 (89)	9.00 (228.5)	2.25 (57.2)
B	2.38 (60.5)	7.50 (190.5)	2.38 (60.5)	7.50 (190.5)	1.75 (44.5)
A	.31 DIA. (8)	.38 DIA. (9.5)	.31 DIA. (8)	.38 DIA. (9.5)	.31 DIA. (8)
APPROX DIM'S	STD. & FOODGRADE	H.D.	STD. KYMAR COATED	H.D. KYMAR COATED	STUB

DO NOT SCALE DIM'S. ARE IN INCHES BRACKETED DIMENSIONS ARE IN MILLIMETERS	SE	6-26-06	NBC	6-26-06
FLIPPED CONDUIT OPENINGS TO BOTTOM	ECN #	06-245	NBC	6-26-06
NET RELEASE	DRAWN BY	6-26-06	APPRO BY	DATE
REVISIONS				

venture
MEASUREMENT

150 VENTURE BLVD.
SPARTANBURG, SC 29306

FILE: VRF185001 REF: _____

MATERIAL: _____ FINISH: _____

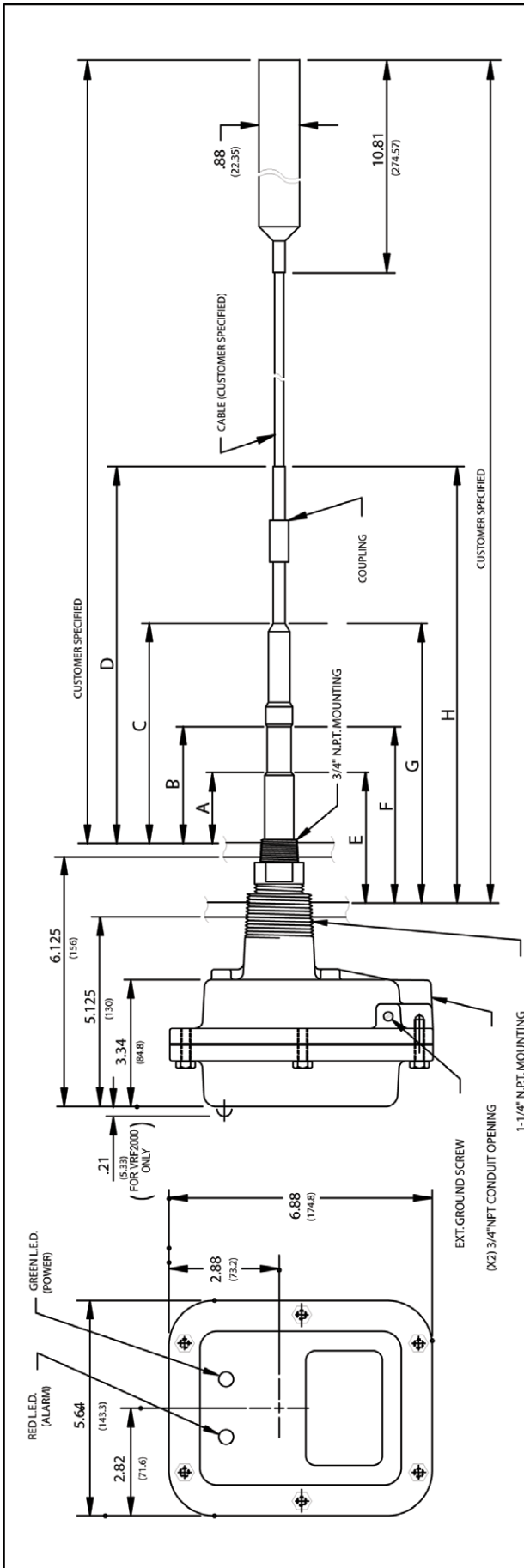
TITLE: DIMENSIONAL DWG FOR GP VRF1000 & VRF2000

SCALE: NONE

SIZE: B

SHEET 1 of 1

PART: VRF185001

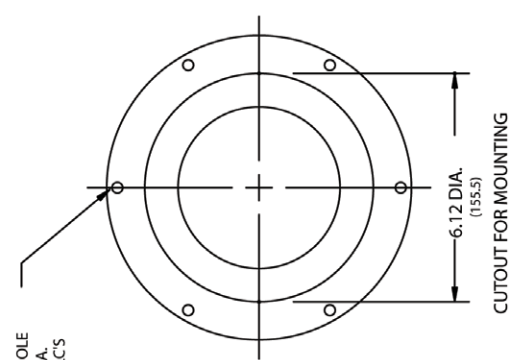


Note:
1. Only the VRF2000 has lights

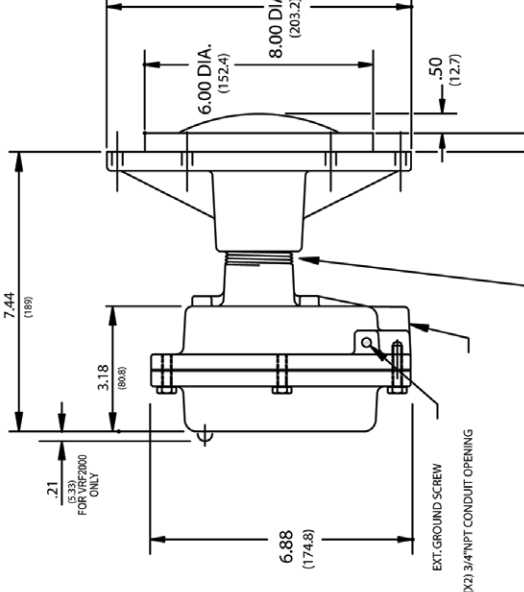
H	11.50 (292.1)	16.25 (412.8)	8.12 (206.2)
G	7.00 (178)	11.75 (298.5)	3.63 (92.2)
F	4.50 (114.5)	10.00 (254)	3.25 (82.6)
E	3.38 (86)	8.50 (216)	2.75 (69.9)
D	10.50 (266.7)	15.25 (387.4)	7.12 (180.8)
C	6.00 (152.5)	10.75 (273)	2.63 (66.8)
B	3.50 (89)	9.00 (228.5)	2.25 (57.2)
A	2.58 (65.5)	7.50 (190.5)	1.75 (44.5)
APPROX DIM'S	STD. & FOODGRADE	H.D.	STUB

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

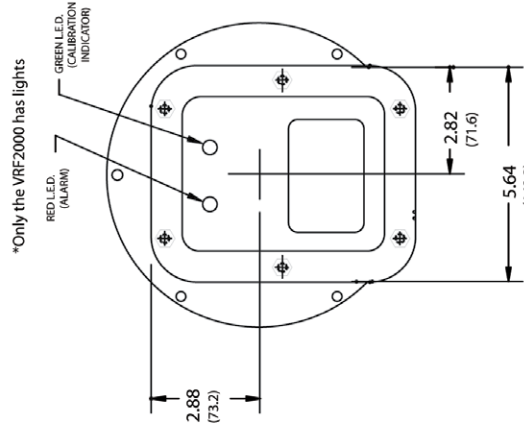
		TITLE DIMENSIONAL DWG FOR VRF1000 & VRF2000 GP CABLE PROBE	
SCALE NONE	SIZE B	REF LRF180176	FILE VRF185002
150 VENTURE BLVD. SPARTANBURG, SC 29306		MATERIAL *****	FINISH *****
INIT. RELEASE A		DATE 06-4-96	DATE 10-24-06
REVISIONS		APPROVED BY NBC	DATE 10-24-06
PART VRF185002		SHEET 1 of 1	



9/32" (7.1) DIA. HOLE ON A 7.44" (189.0) BOLT DIA. 6-PLC'S



4 OPTIONS CUSTOMER SPECIFIED



*Only the VRF2000 has lights

MOUNTING SURFACE PREPARATIONS

1. LAY OUT TWO CONCENTRIC CIRCLES ON BIN WALL AT POINT WHERE THE RF LEVEL CONTROL IS TO BE MOUNTED. ONE CIRCLE TO BE 6-1/8" DIA.; THE OTHER 7-7/16" DIA.
2. CUT OUT 6-1/8" DIA. CIRCLE.
3. LAY OUT SIX EQUALLY SPACED HOLES ON 7-7/16" DIA. CIRCLE. DRILL OR TAP FOR 1/4" BOLTS OR CAP SCREWS.

"CAUTION"

WHEN MOUNTING EXPLOSION PROOF UNITS, NEVER ADJUST THE ORIENTATION OF THE PROBE OR PROBE HOUSING BY TURNING THE HOUSING SECTION. THIS WILL BREAK INTERNAL WIRES AND PERMANENTLY DAMAGE THE PROBE.

FOR "FLUSH PROBE" UNITS, THE POSITION MUST BE ADJUSTED BY REMOVING THE MOUNTING BOLTS AND MOVING THE ENTIRE PROBE AND HOUSING.

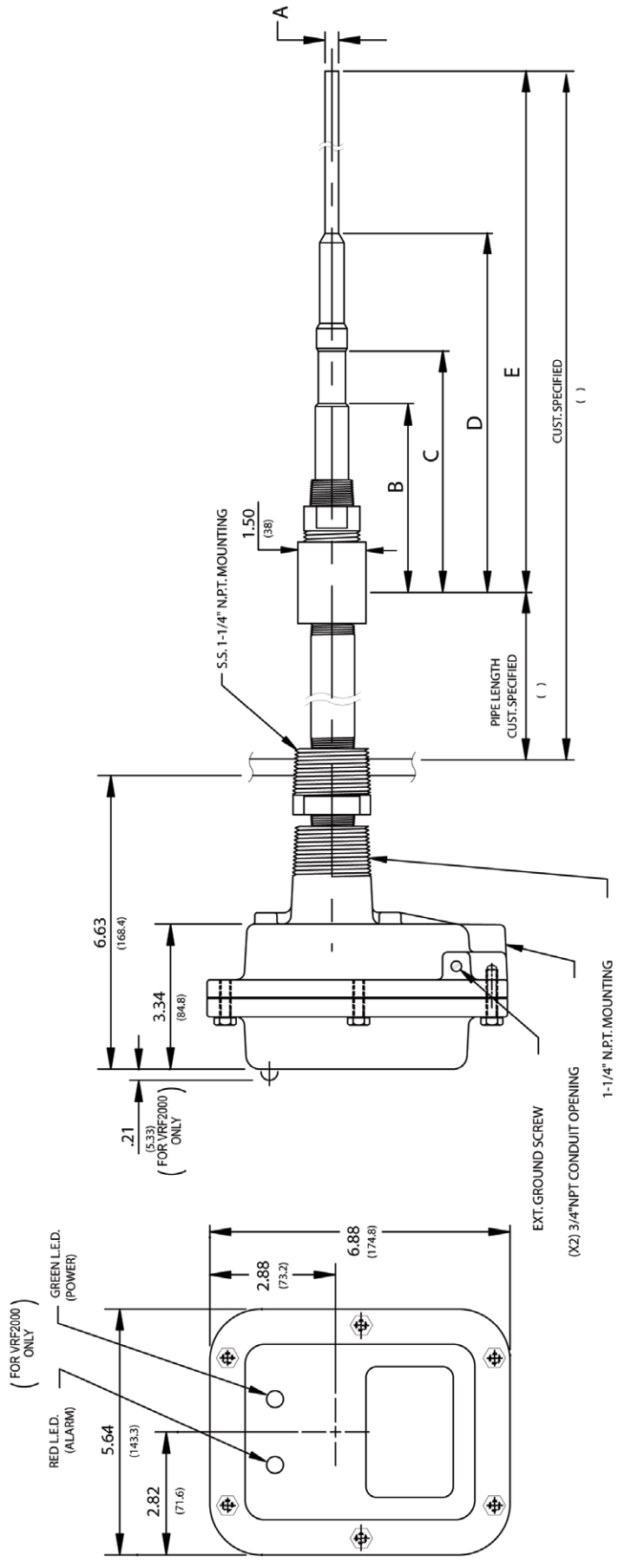
venture MEASUREMENT		TITLE DIMENSIONAL DWG FOR DOME FLUSH PROBE VRF1000 & VRF2000 GP	
FILE VRF185003	REF	MATERIAL	PART
UNIVERSITY BUSINESS LABORATORY 1000 UNIVERSITY DRIVE SPRINGFIELD, SC 29306		FINISH	VRF185003
B ADDED XP to Thickbook ADDED XP notes	07-423	9-5-07	1
A INTR RELEASE	07-042	SE NBC	1
	ECN #	DATE	DATE
		APPRO BY	DATE
		DRAWN BY	DATE
		DATE	DATE

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

REVISIONS

REVISONS		ECN	DRAWN/CHECKED BY	APPROVED BY
A	INT. RELEASE	07-549	SE	NBC
			DATE	DATE
			2-2-97	2-2-97

TYPE "B" MOUNTING



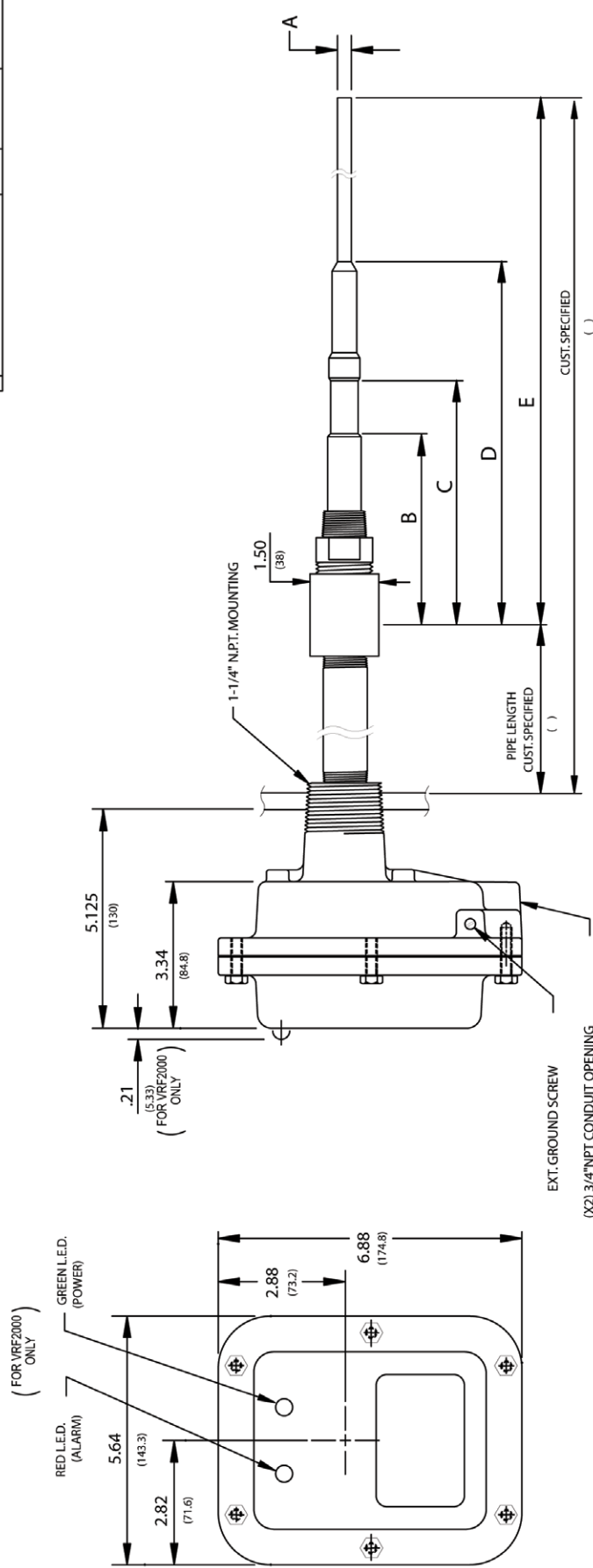
TITLE		SCALE	
venture MECHANICAL 150 VENTURE BLD. SPARTANBURG, SC 29306		NONE	
FILE	REF	SIZE	SHEET
VRF185004		B	1 of 1
MATERIAL		PART	
FINISH		VRF185004	

APPROX DIM'S		STD. & FOODGRADE		H.D. KYNAR COATED		STD. KYNAR COATED		H.D. KYNAR COATED		STUB	
E	16.50 (419)	20.50 (521)	16.88 (428.75)	20.88 (530.35)	16.50 (419)						
D	8.50 (216)	13.25 (336.5)	8.50 (216)	13.25 (336.5)	5.13 (130.3)						
C	5.88 (149)	11.50 (292)	5.88 (149)	11.50 (292)	4.63 (117.6)						
B	4.75 (121)	10.00 (254)	4.75 (121)	10.00 (254)	4.13 (105)						
A	.31 DIA. (8)	.38 DIA. (9.5)	.31 DIA. (8)	.38 DIA. (9.5)	.31 DIA. (8)						

DO NOT SCALE DIMS. ARE IN INCHES BRACKETED DIMENSIONS ARE IN MILLIMETERS											
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REVISIONS		ECN #	DRAWN BY	APP'D BY
A	INT. RELEASE	07-049	SE	NBC
			DATE	DATE
			2-2-07	2-5-07

TYPE "C" MOUNTING



EXT. GROUND SCREW

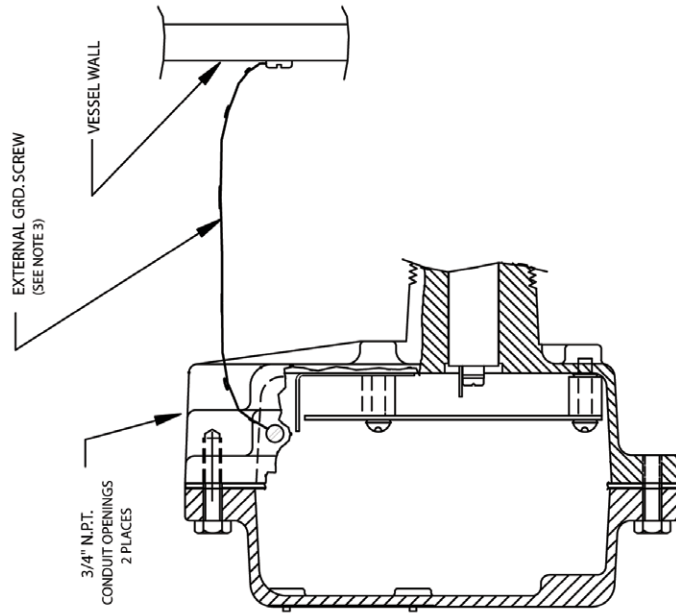
(X2) 3/4" NPT CONDUIT OPENING

APPROX DIM'S	STD. & FOODGRADE	H.D.	STD. KYNAR COATED	H.D. KYNAR COATED	STUB
E	16.50 (419)	20.50 (521)	16.88 (428.75)	20.88 (530.35)	16.50 (419)
D	8.50 (216)	13.25 (336.5)	8.50 (216)	13.25 (336.5)	5.13 (130.3)
C	5.88 (149)	11.50 (292)	5.88 (149)	11.50 (292)	4.63 (117.6)
B	4.75 (121)	10.00 (254)	4.75 (121)	10.00 (254)	4.13 (105)
A	.31 DIA. (8)	.38 DIA. (9.5)	.31 DIA. (8)	.38 DIA. (9.5)	.31 DIA. (8)

DO NOT SCALE DIMS ARE IN INCHES
BRACKETED DIMENSIONS ARE IN MILLIMETERS

TITLE		SCALE
venture MEASUREMENT 150 VENTURE BLVD. SPARTANBURG, SC 29306		NONE
FILE	VRF185005	SIZE
REF		B
MATERIAL		SHEET
FINISH		1 of 1
PART	VRF185005	

OUTLINE DRAWING
VRF EXTENDED, G/P
TYPE "C" MOUNTING



EXTERNAL GRD. SCREW
(SEE NOTE 3)

VESSEL WALL

3/4" N.P.T.
CONDUIT OPENINGS
2 PLACES

RELAY CONN.
(SEE FIG. 1)

INPUT POWER

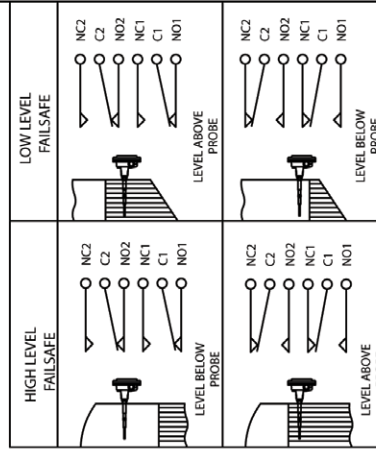
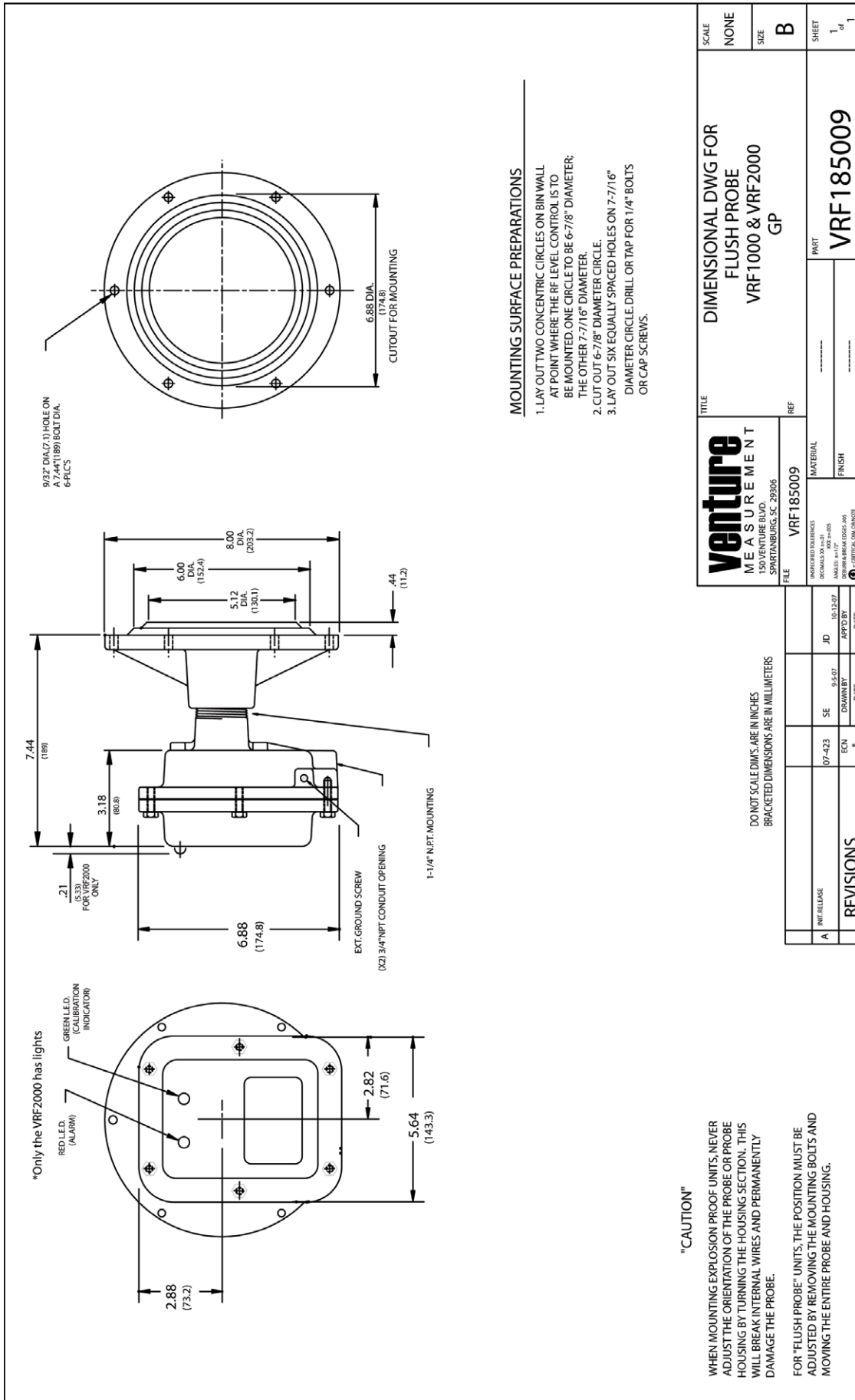


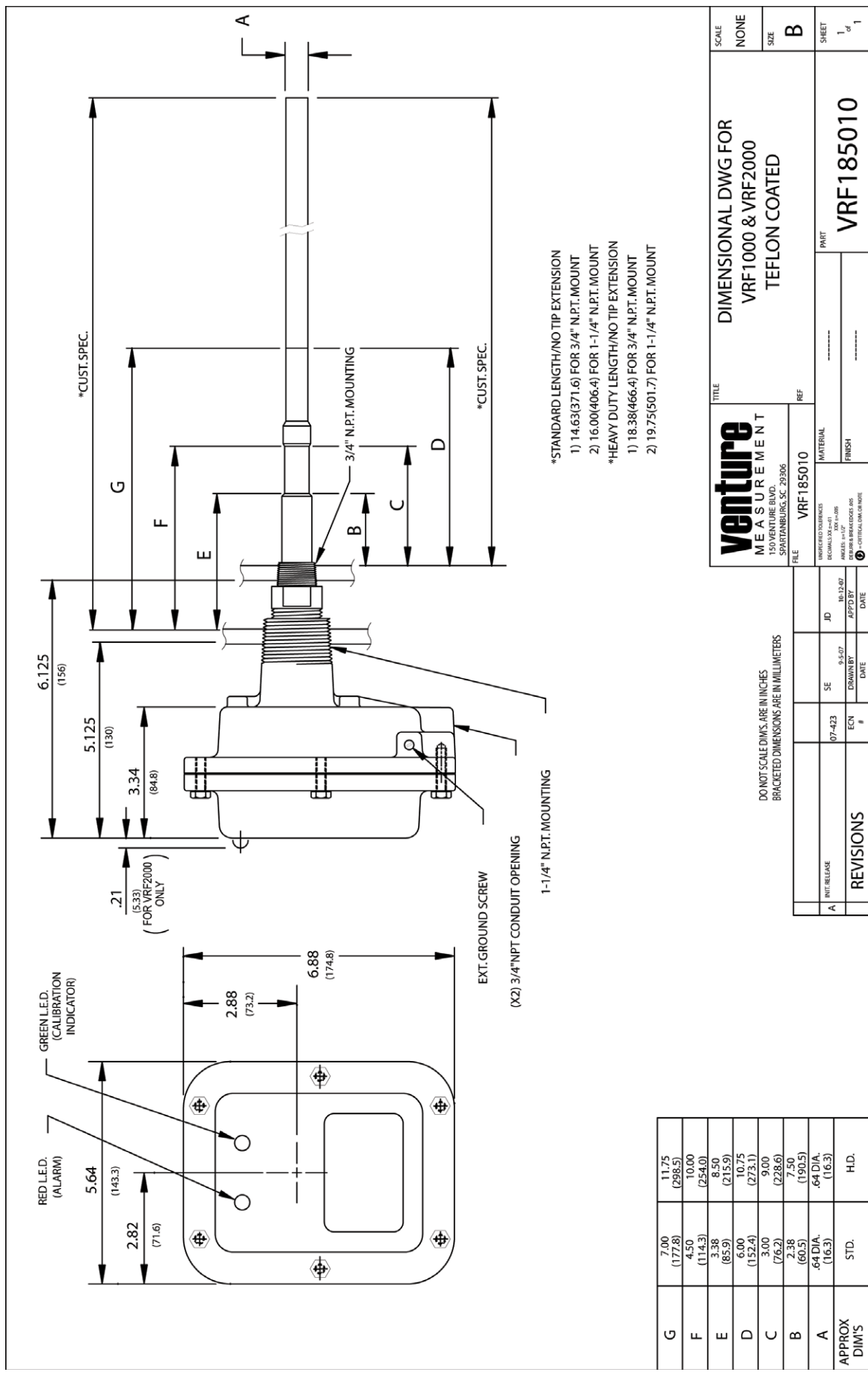
FIGURE 1

- NOTE: 1) FIELD WIRING SHALL BE ACCORDING TO LOCAL STD.
 2) POWER TO UNITS (TB2) 18 AWG MINIMUM RECOMMENDED.
 3) ATTACHING GRD. WIRE FROM EXT. GRD. LUG ON RF UNIT TO VESSEL IS THE PREFERRED METHOD OF GROUNDING THE UNIT.
 4) ON X/P UNITS, EXPLOSION PROOF SEAL FITTING MUST BE INSTALLED WITHIN 18" OF CONDUIT OPENING.

venture MEASUREMENT 1500 PARKWAY SPARTANBURG, SC 29306		TITLE WIRING for VRF1000	SCALE NONE
FILE VRF185007	REF	PART VRF185007	SIZE B
REVISIONS A INCREASE	07-23 SE 06:00 ECN #	MATERIAL FINISH	SHEET 1 of 1
APPROVED BY JD DATE	DRAWN BY DATE	CHECKED BY DATE	DESIGNED BY DATE

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 BRACKETED DIMENSIONS ARE IN MILLIMETERS





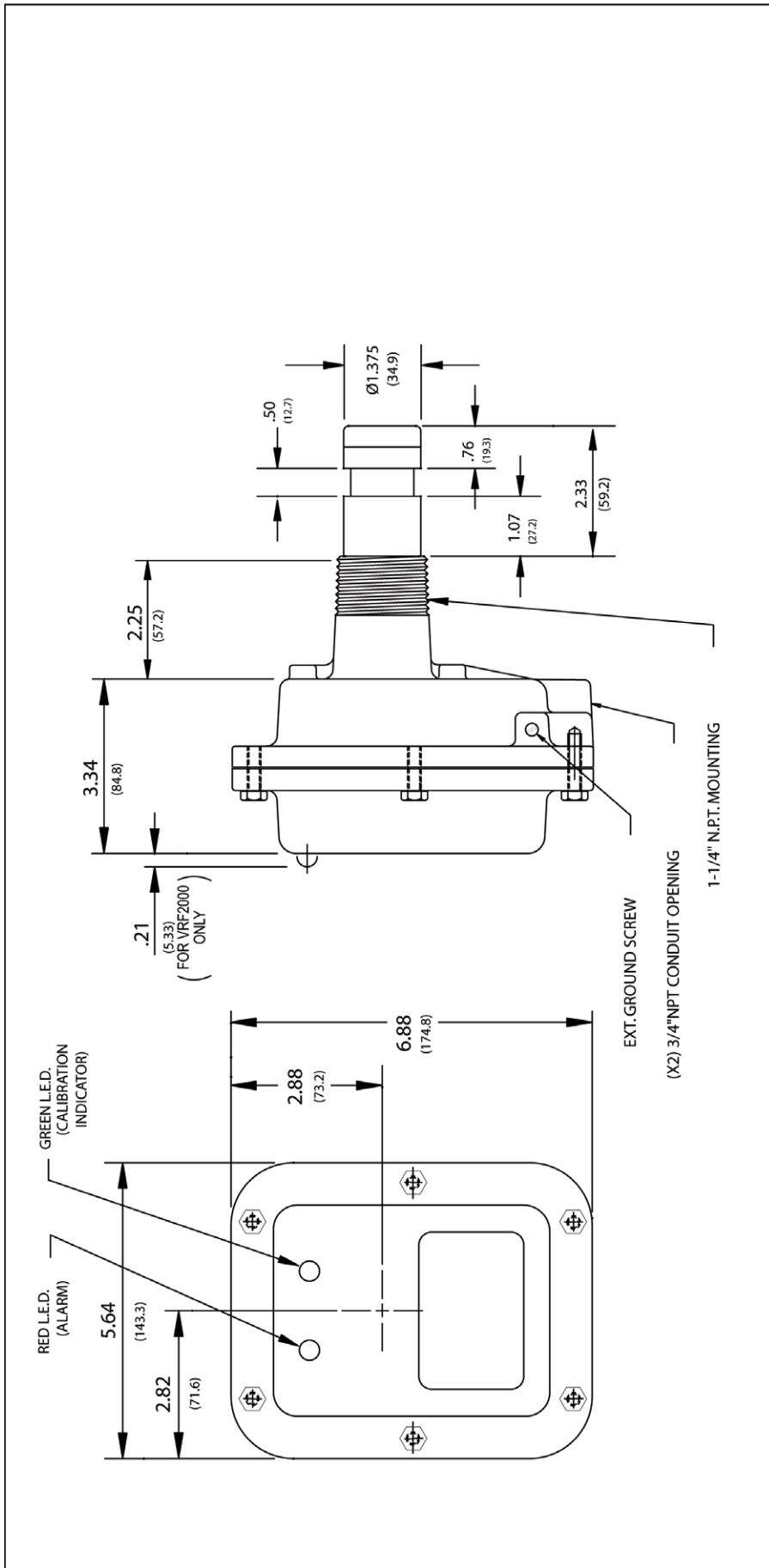
*STANDARD LENGTH/NO TIP EXTENSION
 1) 14.63(371.6) FOR 3/4" N.P.T. MOUNT
 2) 16.00(406.4) FOR 1-1/4" N.P.T. MOUNT
 *HEAVY DUTY LENGTH/NO TIP EXTENSION
 1) 18.38(466.4) FOR 3/4" N.P.T. MOUNT
 2) 19.75(501.7) FOR 1-1/4" N.P.T. MOUNT

venture MEASUREMENT 150 VENTURE BLVD. SPARTANBURG, SC 29306		TITLE DIMENSIONAL DWG FOR VRF1000 & VRF2000 TEFLON COATED	SCALE NONE
FILE VRF185010	REF	MATERIAL	SIZE B
UNPREFERRED UNITS DECIMALS IN INCHES FRACTIONS IN INCHES MILLIMETERS IN MILLIMETERS	DATE	FINISH	SHEET 1 of 1

DO NOT SCALE DIMS. ARE IN INCHES
 BRACKETED DIMENSIONS ARE IN MILLIMETERS

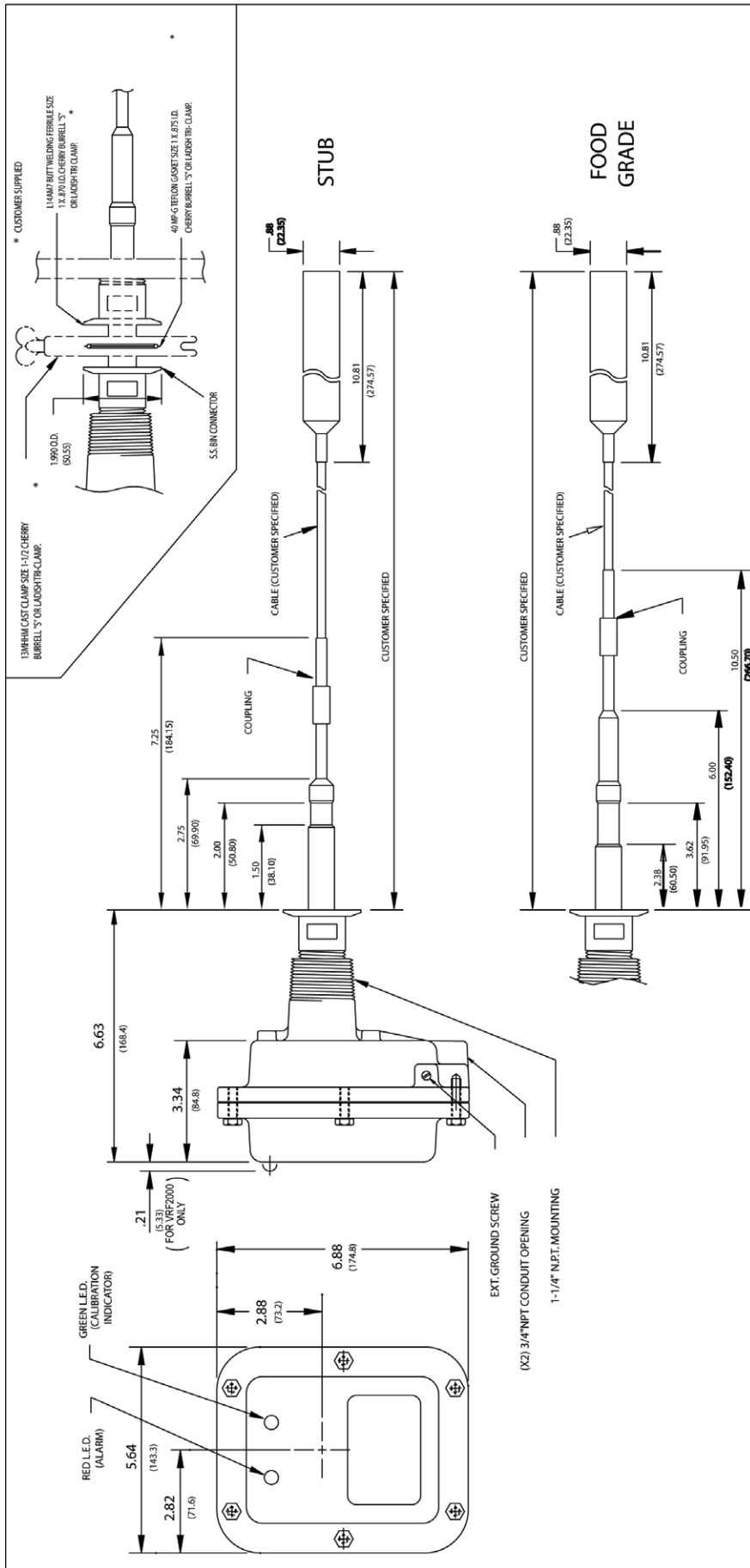
PART VRF185010	DATE	DATE	DATE
REVISIONS	ECN #	DRAWN BY	APP'D BY
A	07-423	SE	JD
INIT. RELEASE	DATE	DATE	DATE

G	7.00 (177.8)	11.75 (298.5)
F	4.50 (114.3)	10.00 (254.0)
E	3.38 (85.9)	8.50 (215.9)
D	6.00 (152.4)	10.75 (273.1)
C	3.00 (76.2)	9.00 (228.6)
B	2.38 (60.5)	7.50 (190.5)
A	.64 DIA. (16.3)	.64 DIA. (16.3)
APPROX DIM'S	STD.	H.D.



venture MEASUREMENT 150 VENTURE BLVD. SPARTANBURG, SC 29306		TITLE DIMENSIONAL DWG FOR VRF1000 & VRF2000 JUMBO PROBE		SCALE NONE		
FILE VRF185011		REF		SIZE B		
IMPROVED SERVICES 1000 W. 10TH ST. ANGELES, CA 90015 213.688.1000 WWW.VENTUREMEASUREMENT.COM		MATERIAL		SHEET 1 of 1		
PART		FINISH		VRF185011		
REVISIONS		DATE		DATE		
A	INIT RELEASE	07-423	SE	9-2-07	JD	10-12-07
			ECN		APP'D BY	

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SCALE		NONE	
SIZE		B	
SHEET		1 of 1	
venture MEASUREMENT 150 VENTURE BLVD. SPARTANBURG, SC 29595			
TITLE	VRF185012	REF	
ISSUED FOR	07-423	DATE	05-07
DESIGNED BY		APPROVED BY	
CHECKED BY		DATE	
REVISIONS			
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VRF180000
Revision H
October 2011