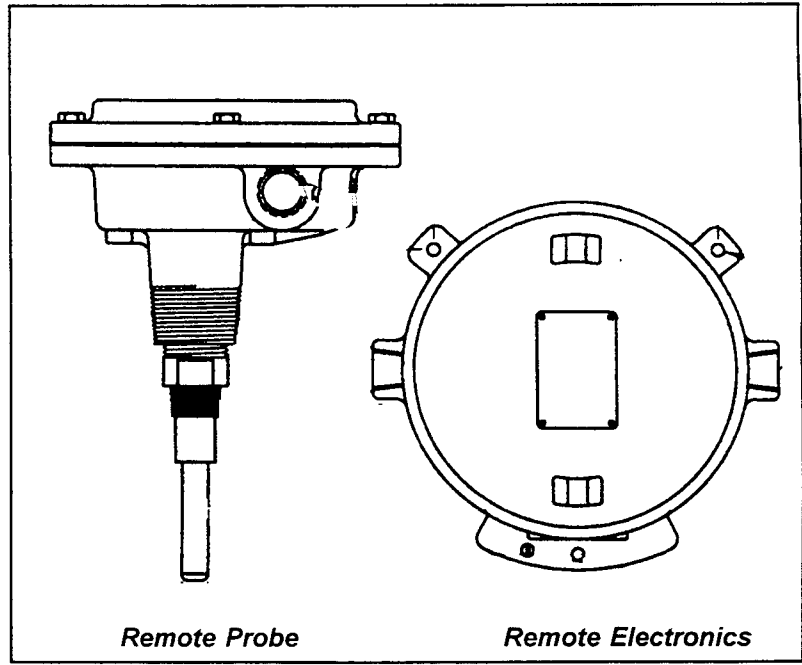
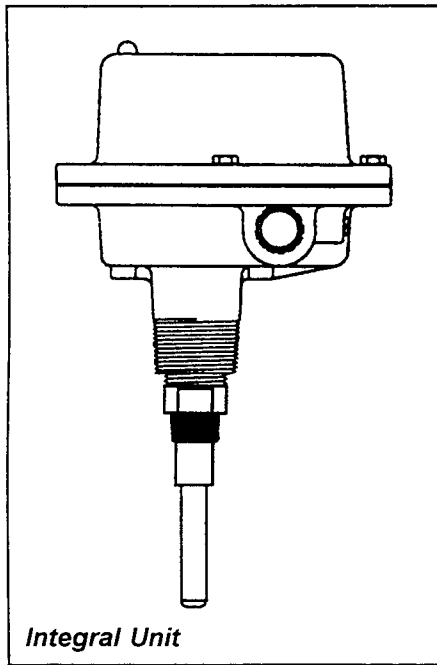


Flo-Guard®

Broken Bag Detector

Installation & Operation Manual



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Customer Service: (800) 778-9242
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email: sales@bindicator.com

Flo-Guard
Broken Bag Detector
Installation and Operation Manual
05/98 Rev. A. LPD180001

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Important!
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.
Thank you!

1.0 INTRODUCTION

The *Flo-Guard*[®] is a supersensitive flow detection switch which can be used to detect dust particles in bag houses or flow loss of dry, solid, powder or granulated materials, such as coal, plastic or salt. The unique combination of detecting the motion of flowing dust or sensing the loss of flow is provided through the micro-controller designed into the circuitry. The micro-controller is also used to provide many other features which make this instrument the most reliable sensor of its type on the market.

The *Flo-Guard*[®] can be used to detect the flow of dust, or granules in nearly any material handling system. It will sense dust resulting from a broken bag in a dust collector and it will also sense solid particles in other material handling equipment -- for example, a flow through a chute. This device does not sense the presence or absence of material...rather the flow of material as it moves past the probe.

Lights...The *Flo-Guard*[®] has two externally visible LEDs -- the green to indicate power and the red indicates the alarm status.

Triboelectric Technology...Is the transfer of electrons which takes place when flowing media strikes or contacts a solid object in the flow path.

Alarm Verification...The micro-controller is constantly checking the incoming signal. This feature prevents false triggers from short term voids or a momentary change in the particles flowing past the probe. Alarm verification allows greater reliability than other switches using triboelectric technology.

Sense Dust Particles or Solids Flow...The micro-controller allows the sensor to operate in a broad range of applications. The same *Flo-Guard* can detect dust flowing in one application, or plastic pellets being pneumatically conveyed in another. This multiple application orientated unit, eliminates the necessity of having different sensors in service stock.

Patented Temperature Compensation...Generally, high accuracy sensors are sensitive to ambient temperature changes. Special consideration has been given to temperature fluctuations with a patented design which uses a "floating reference point". This allows the detection circuit to automatically adjust to extreme temperature swings with no effect on its ability to detect visible levels of dust.

External fob Function Test...As with many **BINDICATOR**[®] switches, the *Flo-Guard*[®] has a standard function test feature. This allows the operator to test the sensor without removing the cover or the unit from the application. The "Function Test" simulates a "flow of material past the probe". This test is accomplished with the use of a magnetic fob, held against the outside of the enclosure. If the flow is already present, the function test will have no effect on the unit.

Sensitivity Selection...Due to various materials to be sensed by the *Flo-Guard*[®], **BINDICATOR**[®] provides a ten (10) channel selector switch to adjust the sensor to the desired sensitivity.

2.0 SPECIFICATIONS

2.1 Integral Electronics and Probe

<i>Enclosure:</i>	General Purpose NEMA 4/5 Dust Ignition-proof NEMA 7/9 (<i>pending</i>)
<i>Enclosure Material:</i>	Polyester coated Aluminum
<i>Line Voltage:</i>	120VAC ($\pm 15\%$) 50/60 Hz 240VAC ($\pm 15\%$) 50/60Hz
<i>Power Consumption:</i>	5 watts @ 120VAC 5 watts @ 240VAC
<i>Control Relay:</i>	5 A DPDT, 120VAC, 240VAC or 28VDC
<i>Temperature Range:</i>	electronics -40°F to 160°F (-40°C to 71°C); probe 250°F (121°C)
<i>Fail-safe:</i>	Field Selectable presence or absence of material
<i>Time Delay:</i>	1, 5, 10, or 15 seconds selectable for both "on" and "off"
<i>Dimensions:</i>	See Hookup Drawing at the back of this manual
<i>Probe Material:</i>	316 SS
<i>Probe Insulator Material:</i>	Teflon
<i>Mounting:</i>	3/4" NPT 316 SS or 1-1/4" NPT aluminum
<i>Pressure Range:</i>	30 psi (2.11 kg/cm ²), 1-1/4" NPT aluminum mount 50 psi (3.5kg/cm ²), 3/4" NPT SS mount

2.2 Remote Electronics

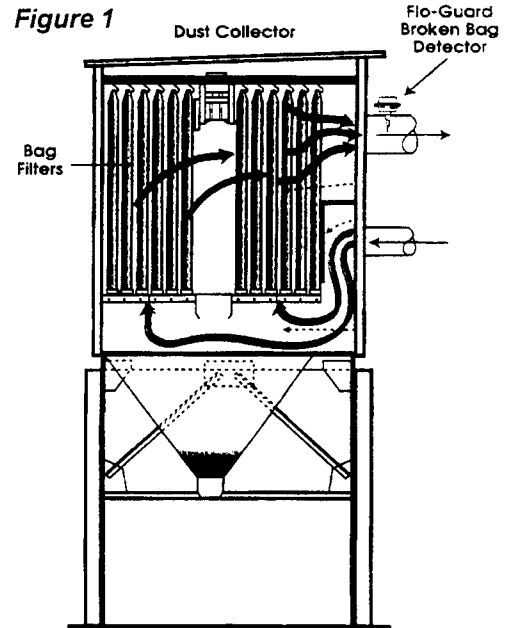
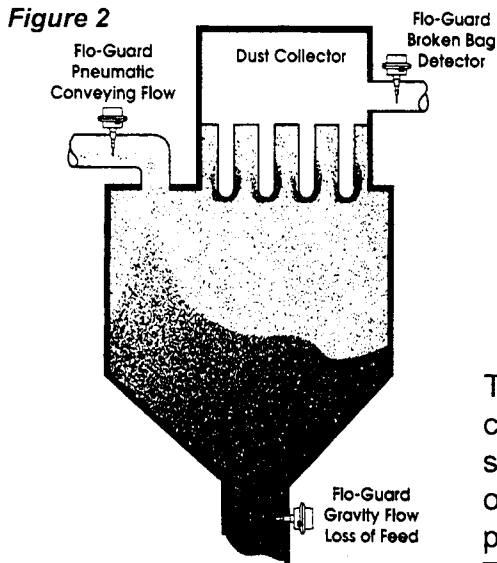
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<i>Fail-safe:</i>	Field Selectable presence or absence of material
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2.3 Remote Probe

<i>Dimensions:</i>	See Installation Drawing at the back of this manual
<i>Enclosure Material:</i>	Polyester coated Aluminum
<i>Probe Material:</i>	316 SS
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<i>Mounting:</i>	3/4" NPT 316 SS or 1-1/4" NPT aluminum
<i>Pressure Range:</i>	30 psi (2.11 kg/cm ²), 1-1/4" NPT aluminum mount 50 psi (3.5kg/cm ²), 3/4" NPT SS mount
<i>Temperature:</i>	250°F (121°C)

3.0 OPERATION

The Bindicator Flo-Guard is a broken bag detector which is used to detect the flow of dust, granular or powdered material as it moves past the probe. This unit does not sense the presence or absence of material.



The Flo-Guard particle detector is a supersensitive switch that can be used to detect dust particles in bag houses or flow of solid materials such as coal in a chute. The unique combination of detecting the motion of flowing dust or sensing loss of flow is provided through the micro-controller designed into the circuit. The micro-controller is also used to provide many other features which make this instrument the most reliable sensor of its type.

4.0 APPLICATION CONSIDERATIONS

The Flo-Guard® is mounted on a 3/4" or 1-1/4" NPT half coupling welded to the side of a pipe, duct, or chute.

The preferred installation site is in a straight portion of a vertical pipe, at least 12 inches from any elbows, reduction fittings, or other obstructions.

When the Flo-Guard® is installed in a straight portion of a horizontal pipe the probe tip must have sufficient clearance from the wall, eliminating the possibility of product buildup.

See **Figure 3** for the proper mounting instructions.

Whether the Flo-Guard® is mounted vertically or horizontally the insulator portion should just barely penetrate into the flow stream.

When installing the Flo-Guard® in a nonmetallic pipe, duct, or chute, ***please consult factory.***

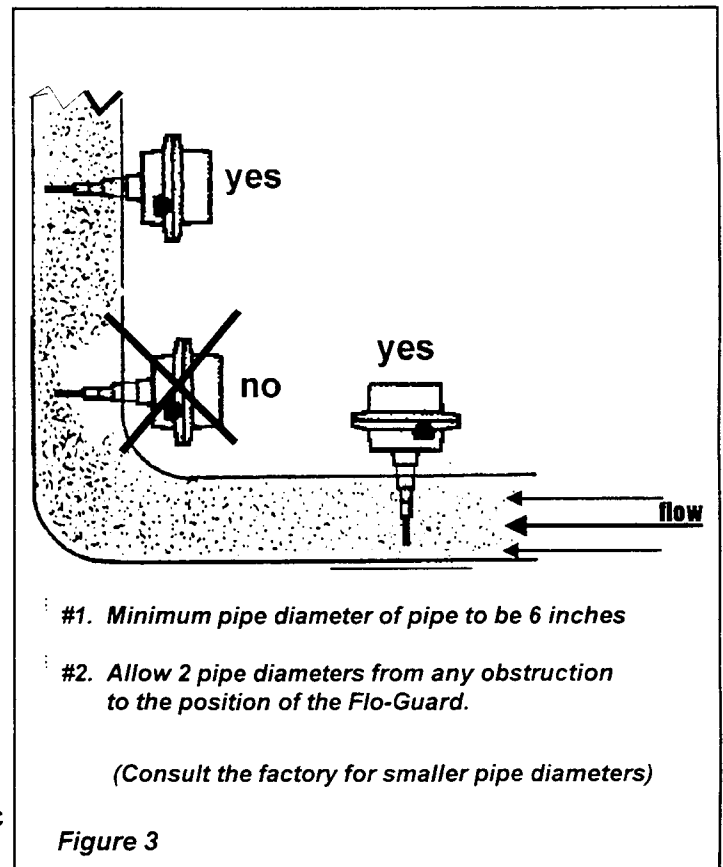


Figure 3

5.0 INSTALLATION PROCEDURE

5.1 Probe Location and Mounting

The probe should be located in the direct flow of the material.

Type "A" Assembly Configuration has been designed to mount on either a 1-1/4" Aluminum or a 3/4" Stainless Steel NPT coupling. The 1-1/4" mounting is rated for 30 psi (2.11kg/cm²). The 3/4" mounting is rated for 50 psi (3.5kg/cm²).

5.2 Installation and Hookup

Field wiring should conform to the requirements of the National Electrical Code and any other agency or authority having jurisdiction over the installation. Refer to the drawings listed in **Section 9.0** for proper installation, hookup and wiring instructions.

5.3 Fail-Safe Selection

The Flo-Guard is shipped from the manufacturer in the "P" fail-safe condition. This means the alarm occurs at presence of flow of material. See **Section 6.3** for more details.

Presence Operation - When material flow is present, the output relay de-energizes indicating an alarm condition. Use this setting in broken filter bag applications. See **Figure 5** (SW1-P)

Absence Operation - When material flow is absent, the output relay de-energizes indicating an alarm condition. Use this setting in flow sensing applications where flow is normal, and an alarm is needed if the flow of material stops. See **Figure 5** (SW1-A)

5.4 Adjustments

See **Section 6.2**

6.0 CONFIGURATIONS

6.1 Power

Apply appropriate power (see model code for power input) to L1 (H) & L2 (N). Ground Unit Chassis to earth using green grounding screw inside the enclosure near the conduit opening.

Note: Unit must be grounded for proper operation.

6.2 Sensitivity Setting

Sensitivity is adjusted with unit installed in a clean air system. From position "0" rotate sensitivity switch clockwise until Yellow LED is off. If Yellow LED flickers, increase switch position to next higher value until yellow LED remains off.

Position "0" = Most Sensitive
Position "9" = Least Sensitive

6.3 Alarm Conditions

- With Fail-safe jumper in Position "A" relay de-energizes with material absence
- With Fail-safe jumper in Position "P" relay de-energizes with material present

Note: Relay contacts labeled in shelf state (De-energized)

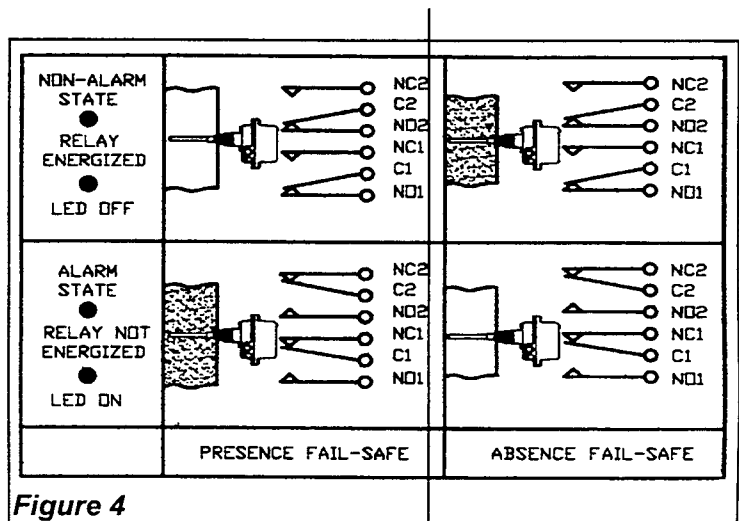


Figure 4

6.0 CONFIGURATIONS Continued...

6.4 Time Delay

To obtain your required Time Delay, position the switches as follows:

Switch 1 off, Switch 2 off,	=	1 Second
Switch 1 on, Switch 2 off,	=	5 Seconds
Switch 1 off, Switch 2 on,	=	10 Seconds
Switch 1 on, Switch 2 on,	=	15 Seconds

6.5 Selections

The "SELECT" jumper determines when the TIME-DELAY is activated. The jumper is normally in place when shipped from the factory and can be removed to alter the delay sequence (see below).

With "Select" Jumper Intact:

With the jumper in place, the unit is configured as a Dust-Sensor. The delay is activated when particle (dust) flow is detected and an alarm will occur after the predetermined delay. The alarm will reset instantly once airstream has cleared.

With "Select" Jumper Removed:

With the jumper removed, the unit is configured as a Flow-Sensor. The delay is activated upon loss of particle flow and the alarm will occur after the predetermined delay. The alarm will reset instantly once particle flow returns.

Note: If select jumper is removed and unit was used as a Dust-Sensor, the unit would alarm instantly (when dust is detected) the delay would activate once airstream has cleared.

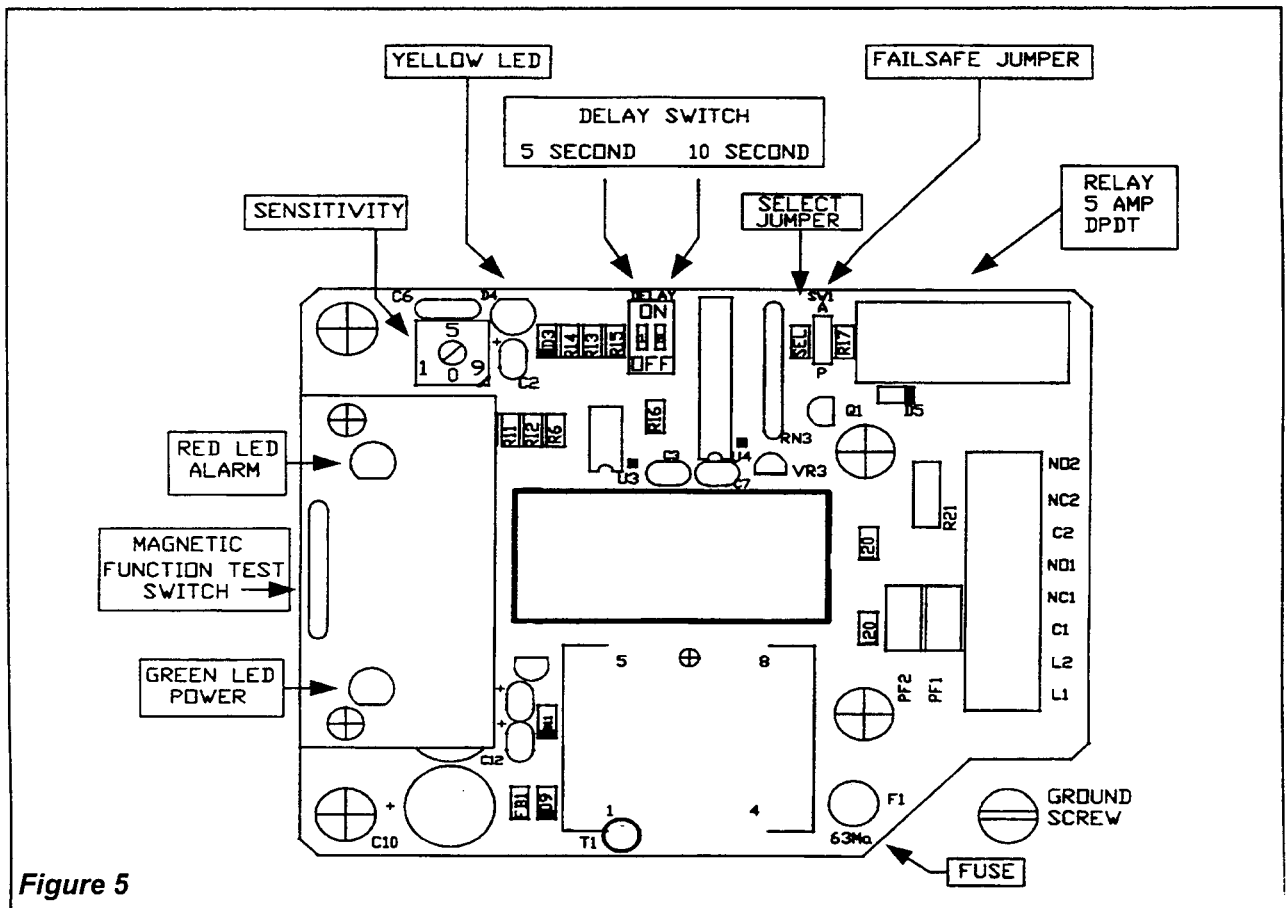


Figure 5

7.0 TROUBLESHOOTING

Contact your Sales representative or the factory.

8.0 WARRANTY

Refer to the Manufacturer's General Terms and Conditions of Sale for warranty information.

9.0 DRAWINGS *(located at the back of this manual)*

LPD1E0000	Outline Drawing Integral Particle Detector
LPD1E0001	Outline Drawing Remote Particle Detector
LPD1E0002	Hook-up Drawing Integral Particle Detector
LPD1E0003	Hook-up Drawing Remote Particle Detector
LPD1E0004	Outline Drawing Integral with Air Purge
LPD1E0008	Outline Drawing Remote with Air Purge
LRF110028	Remote Cable Termination Assembly

10.0 MODEL SELECTION

Integral Unit

PD1 - - - - -

<p>Assembly Configuration A = 3/4" NPT SS and 1-1/4"NPT aluminum P = Air purge option with 3/4" NPT SS</p> <p>Voltage 1 = 120VAC 2 = 240VAC</p> <p>Enclosure Type G = General purpose NEMA 4/5 X = Explosion proof UL Listed/C-UL Listed*</p> <p>Probe Insertion Length (3/4" mount) See Note 1 L03 = 3" (76.2mm) from 3/4" NPT L06 = 6" (152.4mm) from 3/4" NPT L12 = 12" (304mm) from 3/4" NPT L(xx) = Special ((specify inches) See Note 2)</p> <p>Probe Type 0 = Standard</p> <p>Electronics A = Standard sensitivity with function test</p>

Integral Particle Flow Detector

Note 1: For insertion length on 1-1/4"NPT mount, add 1.25"(31.75mm)

Note 2: When ordering this option please specify the probe insertion length in inches (within parenthesis) after special option. Example: **L(18")**

* UL Approved to CSA Standards

10.0 MODEL SELECTION Remote Unit Continued...

Electronics

PD2 - E

Voltage
 1 = 120VAC
 2 = 240VAC

Enclosure Type
 G = General purpose NEMA 4/5
 X = Explosion proof UL Listed/C-UL Listed*

Electronics
 A = Standard sensitivity with function test

Electronic Unit
 Probe and Cable are separate items. (See Note 2)

Remote Particle Flow Electronics

Probe

PD2 - P

Enclosure Type
 G = General purpose NEMA 4/5
 X = Explosion proof UL Listed/C-UL Listed*

Probe Insertion Length (3/4" mount) (See Note 4)
 L03 = 3" (76.2mm) from 3/4" NPT
 L06 = 6" (152.4mm) from 3/4" NPT
 L12 = 12" (304mm) from 3/4" NPT
 L(xx) = Special ((specify inches) See Note 3)

Probe Type
 0 = Standard

Assembly Configuration
 A = 3/4" NPT SS and 1-1/4" NPT aluminum

Remote Probe Assembly
 Electronics and cable are separate items(See Note 2)

Remote Particle Flow Probe, (See Note 1)

Note 1: The total length of cable is not to exceed 250 feet (76.2m) from electronics.

Note 2: Order remote cable assembly as a separate item.

Note 3: When ordering this option please specify the probe insertion length in inches (within parenthesis) after special option. Example: **L(18")**

Note 4: For insertion length on 1-1/4" NPT mount, add 1.25" (31.75mm)

*** UL Approved to CSA Standards**

Cable

RFC -

Length In Feet

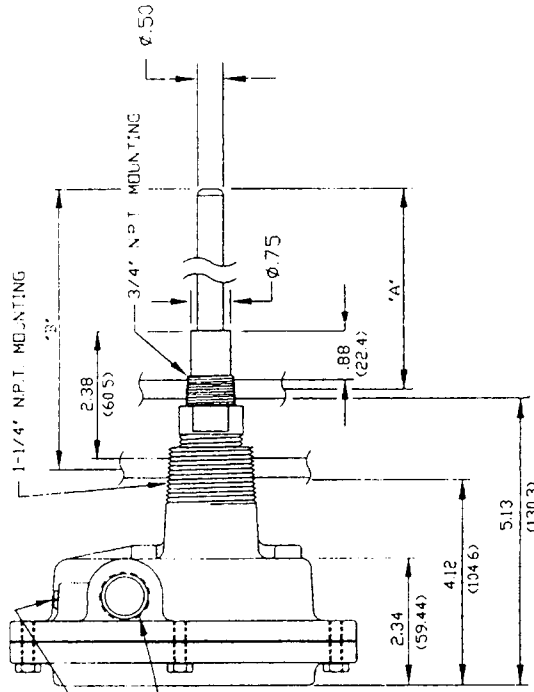
Cable Type
 B = Low Temperature (160°F(71°C))

Special Note: Individual conduit is required for each cable. **DO NOT INSTALL MORE THAN ONE CABLE** in a conduit or raceway or along with other conductors.

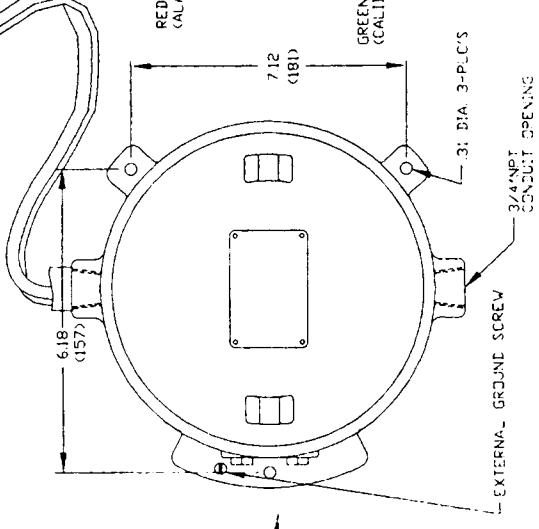
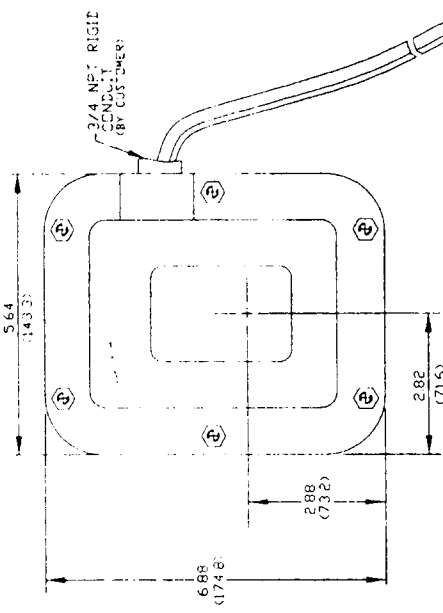
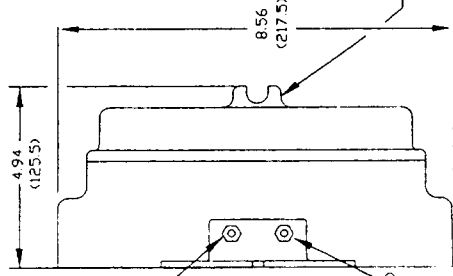
Remote Cable Assembly

Note: Exact length required because cable is factory terminated.

REVISIONS		DATE	BY	APP'D
B	DRAWING REVISED PER ECO#96-011	7/17/95	[Signature]	[Signature]



ACTIVE ROD, SPEC.	SPECIFIED	SPECIFIED
LPD120003	ACTIVE ROD.12'	12.00
LPD120002	ACTIVE ROD.12'	13.38
LPD120001	ACTIVE ROD.6'	5.00
LPD120000	ACTIVE ROD.3'	3.00
PART #	DESCRIPTION	DIM 'A'
		DIM 'B'



DET. REQ'D	DESCRIPTION	WATER PART
DRAWN	CHECKED	APPROVED
D. STOKES	HEWLET	W. JR.
DATE	DATE	DATE
7/17/95	10/7/95	10/7/95
SCALE	SIZE	PART OR DRAWING
NONE	B	LPD1E001

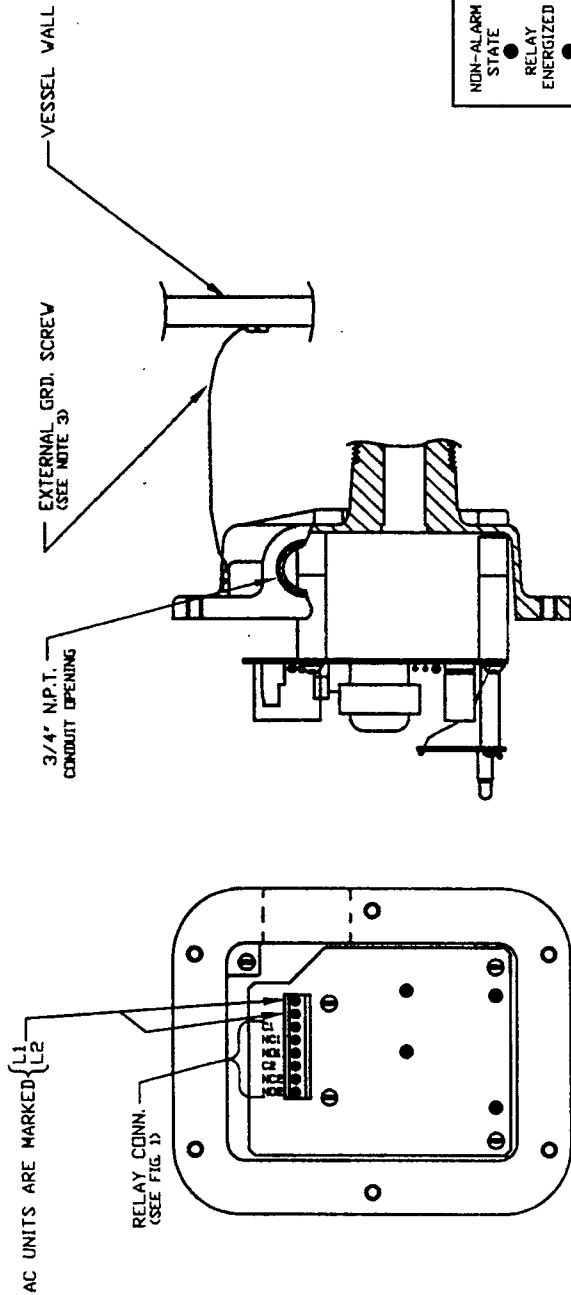
AS SPECIFIED TO ORIGINAL DRAWING NO. 444 21
 NUMBER OF SHEETS 1 OF 1
 DRAWN BY D. STOKES
 CHECKED BY HEWLET W. JR.
 DATE 7/17/95
 APPROVED BY [Signature]
 DATE 10/7/95
 SCALE NONE
 SIZE B
 PART OR DRAWING LPD1E001

BINDICATOR
 PER. FURON, MICHIGAN 48066

DO NOT SCALE DIMS ARE IN INCHES
 BRACKETED DIMS ARE IN MM.

REVISIONS

NO.	DATE	BY	APP.



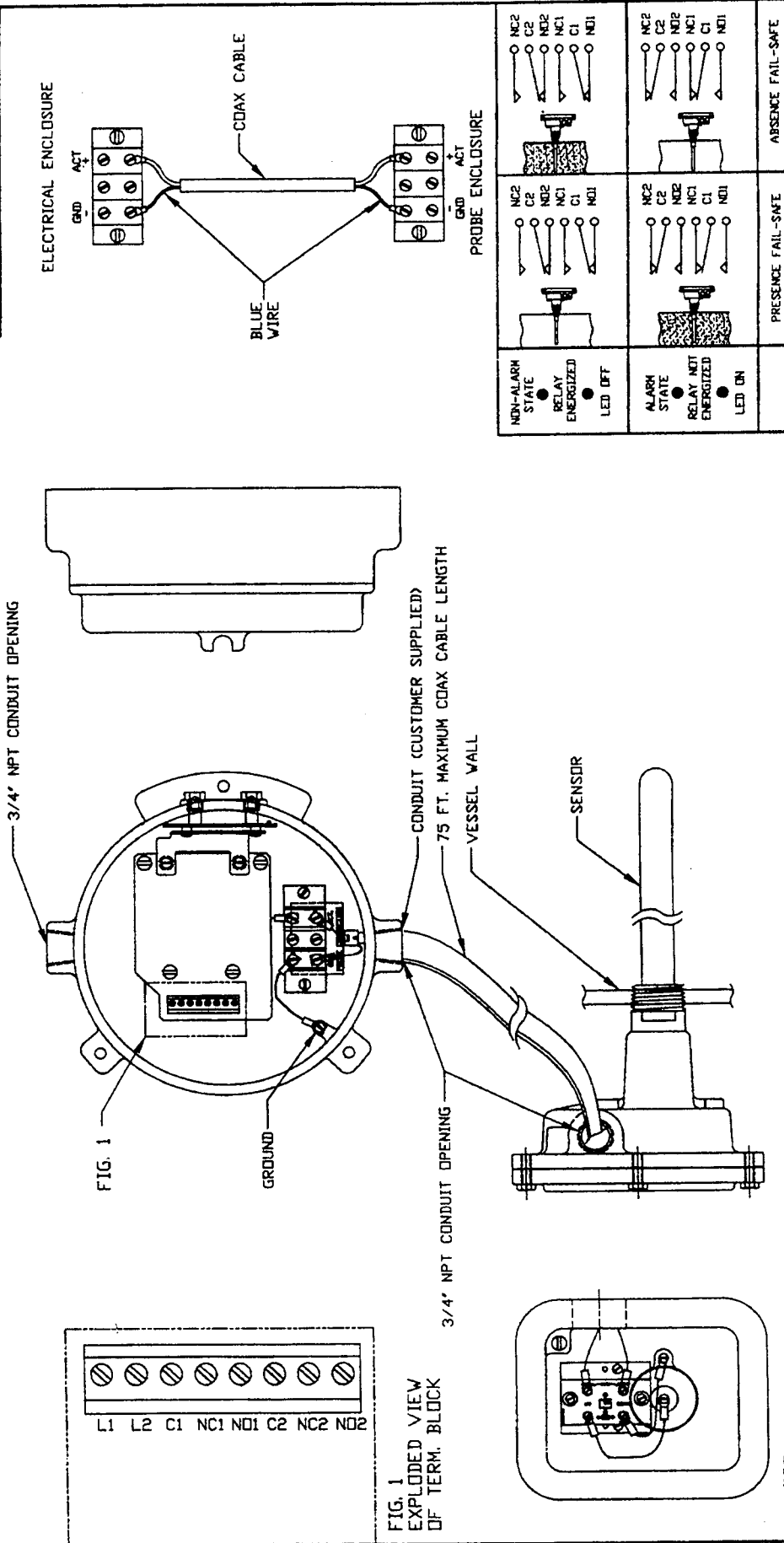
- NOTE: 1) FIELD WIRING SHALL BE ACCORDING TO LOCAL STD.
 2) POWER TO UNITS, 18 AWG MINIMUM RECOMMENDED.
 3) ATTACH GRD. WIRE FROM EXT. GRD. LUG ON UNIT TO VESSEL.
 4) ON X/P UNITS, EXPLOSION PROOF SEAL FITTING MUST BE INSTALLED WITHIN 18" OF CONDUIT OPENING.

<p>NON-ALARM STATE</p> <p>● RELAY ENERGIZED</p> <p>● LED OFF</p>			
<p>ALARM STATE</p> <p>● RELAY NOT ENERGIZED</p> <p>● LED ON</p>			
	PRESENCE FAIL-SAFE		ABSENCE FAIL-SAFE

FIGURE 1

<p>DESIGNER: []</p> <p>CHECKED: []</p> <p>DATE: 10/18/95</p>	<p>DET. REQ'D SHI</p> <p>BRAND: []</p> <p>DIST. TO KEYS: []</p> <p>DATE: 10/18/95</p>	<p>DESCRIPTION</p> <p>APPROVED: []</p> <p>DATE: 10-20-95</p>	<p>MATERIAL PART</p> <p>MARKING: []</p> <p>DATE: 11-24-95</p>
<p>SCALE: NINE</p>		<p>SCALE: B</p>	<p>PART OR DRAWING: LPDIE0002</p>
<p>TITLE: HOOKUP DIA, FLD-GUARD</p>		<p>BINDICATOR® PORT-HURON MICHIGAN 49060</p>	

REVISIONS	DATE	BY	APP'D
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DET. REQ'D SHIT		DESCRIPTION		MATERIAL PART	
DESIGNED BY	APPROVED BY	DESIGNED BY	APPROVED BY	DESIGNED BY	APPROVED BY
DATE	DATE	DATE	DATE	DATE	DATE
10/20/95	10-20-95	10-20-95	10-20-95	10-20-95	10-20-95
SCALE		SCALE		SCALE	
NONE		B		LPDIE0003	
TITLE			HOOKUP DIAGRAM		
REMOTE FLD-GUARD			REMOTE FLD-GUARD		
BINDICATOR® PORT HURON, MICHIGAN 48060					

NOTE:
 1) FIELD WIRING SHALL BE ACCORDING TO NEC OR LOCAL STANDARDS.
 2) POWER TO TERMINAL FIG.1, 18AVG. MINIMUM RECOMMENDED.
 3) REFER TO DWG. LRF110028 FOR REMOTE CABLE TERMINATION.

REVISIONS		DATE	BY	APP'D
-	REDRAWN PER ECO#94-105	-	-	-
A	INSTR. 1 MODIFIED PER ECO 95-065	6/3/95	AC	[Signature]

FIGURE 1 (TYP BOTH ENDS)

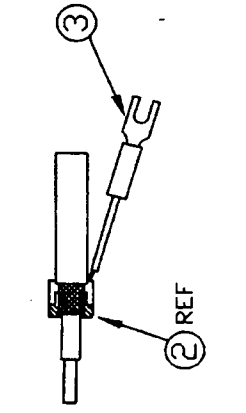


FIGURE 2A (TYP BOTH ENDS)

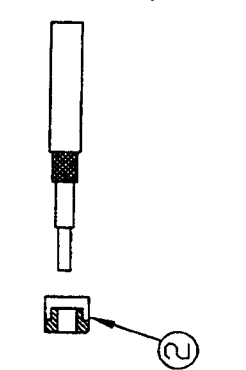


FIGURE 2B (TYP BOTH ENDS)

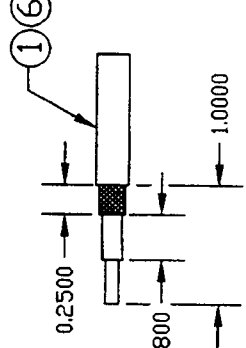


FIGURE 3 (TYP BOTH ENDS)

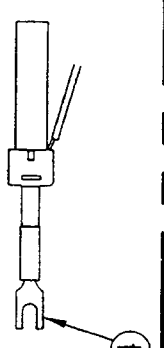


FIGURE 4 (TYP BOTH ENDS)

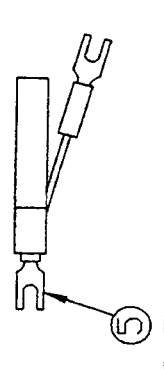


FIGURE 5

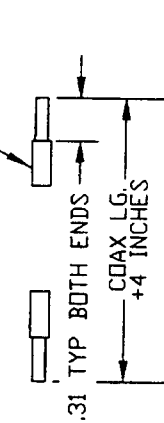
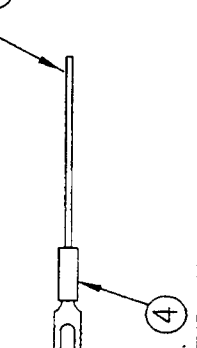


FIGURE 6 (TYP BOTH ENDS)



INSTRUCTIONS

- 1) CUT CABLE (ITEM 1 OR 6) TO LENGTH SPECIFIED ON ORDER (TO BE ONLY 12' LONGER THAN CONDUIT) (A)
- 2) STRIP BOTH ENDS OF CABLE AS SHOWN IN FIGURE 1.
- 3) INSERT THE FERRULE (ITEM 2) ON THE CABLE AS SHOWN IN FIGURE 2A & INSERT SHIELD WIRE (ITEM 3) AS SHOWN IN FIGURE 2B AND CRIMP AMP. TOOL 59500 WITH INSERT 45066-3.
- 4) INSERT TERMINALS (ITEM 4) ON CENTER CONDUCTOR OF CABLE & CRIMP USING HAND CRIMP OR RACHET (SEE FIGURE 3).
- 5) PLACE SHRINK TUBE (ITEM 5) OVER CABLE END AS SHOWN IN FIGURE 4 & HEAT SHRINK UNTIL SECURE
- 6) CUT GROUND WIRE ITEM 7 OR 8 4" LONGER THAN YOU CUT CABLE & STRIP BOTH ENDS AS SHOWN IN FIGURE 5.
- 7) INSERT TERMINALS (ITEM 4) & CRIMP USING HANDCRIMP OR RACHET (SEE FIGURE 6).

DO NOT SCALE DIMS. ARE IN INCHES

MATERIAL FINISH

BINDICATOR®
PORT HURON, MICHIGAN 48060

TITLE REMOTE CABLE TERMINATION ASSY

SCALE FULL B LRF110028

ASS'Y NO.	DETAILS	DESCRIPTION
LRF110028	1 THRU 5 & 8	CABLE TERM. ASSY
LRF110029	2 THRU 7	HI TEMP. CABLE TERM. ASSY

8	AR.	WIRE # 20 AWG GREEN	LUC035661
7	AR.	WIRE TEF GREEN	LUC035351
6	AR.	CABLE HI STABILITY COAXIAL	LUC035209
5	AR.	SHRINK TUBE	LUC035210
4	AR.	TERMINAL STAKON™	LUC030340
3	2	ASS'Y SHIELD WIRE	LB0022140
2	2	FERRULE	LB0032120
1	AR.	FM- 62 COAXIAL CABLE	LUC035208

DET. REQUEST	DESCRIPTION	MATERIAL PART
UNSPECIFIED TITLE	APPROVED	PROB
DESIGNED BY	ARIC C. NEAL	WJR
CHECKED BY	DATE	DATE
APPROVED BY	8/1/94	8/4/94
SCALE	SIZE	PART OR DRAWING
FULL	B	LRF110028

GENERAL TERMS AND CONDITIONS OF SALE

1. PAYMENT Terms of payment are Net 30 days and are effective from the actual date of invoice. If, in the Seller's opinion, the financial condition of the Buyer at any time-or any other circumstances do not justify the incurrence of production costs or shipment on the terms of payment specified, the Seller may require partial or full payment in advance.

2. F.O.B. All shipments are F.O.B. Seller's factory in Port Huron, Michigan, unless otherwise stated in the quotation.

3. QUOTATION AND PRICES Quoted prices are firm for thirty days and are subject to change without notice after expiration of this period. Orders calling for future deliveries will be invoiced according to prices in effect at the time of shipment.

4. TAXES Any applicable sales, use, revenue, excise or other taxes not specifically stated in the quotation are to be remitted by the Buyer directly to the appropriate regulatory agency.

5. EQUIPMENT WARRANTY/LIMITATION The following BINDICATOR products are warranted for a period of two years from date of shipment against defective materials and workmanship: RF Series, Mark III Yo-Yo, General Purpose Yo-Yo, Micro-Sonic Series, Eagle, Mach One, Leveldata, Tracker, and Levelite Series. All CELTEK and other Bindicator products are warranted for a period of one year from date of shipment against defective materials and workmanship. WE MAKE NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WHICH EXCEEDS THE FOREGOING IS HEREBY DISCLAIMED AND EXCLUDED FROM THIS CONTRACT. If the products are being acquired for resale, Buyer will make, in connection with any such resale, only those warranties contained herein and will indemnify us against any claims, causes of actions and judgements which arise from any representations, warranties or agreements made by or entered into by Buyer, other than those contained herein.

6. BUYER'S EXCLUSIVE REMEDY In the event of any breach of warranty, the sole and exclusive remedy of Buyer (or any person claiming through Buyer) shall be limited to the repair or replacement of defective products or parts, at our plant or at Seller's option, to the refund of the purchase price, provided that notice of such defects is given within six months after shipment. In no event will our liability include any incidental or consequential damages.

7. DELIVERY The Seller shall not be liable for loss or damage of any kind resulting from delay or inability to deliver or account of flood, fire, strike, labor troubles, riot, civil disturbances, accidents, acts or orders or regulations of civil or military authorities, shortages of materials, or any other cause or causes (whether or not similar in nature to any of these enumerated) beyond Seller's control.

8. PRODUCT CHANGES In keeping with our continuing policy of product improvement, we reserve the right to make changes in our products at any time, without incurring an obligation to change equipment previously shipped.

9. RETURN OF GOODS In no case may products or parts be returned without Seller's prior written permission. Products or parts returned under the aforementioned Equipment Guarantee must be shipped with transportation charges prepaid. All other returns must be shipped with transportation charges prepaid and will be subject to a restocking charge. Only products of standard Bindicator manufacture will be accepted for return. Products which are specially modified or produced to the Buyer's specifications will not be accepted for return.

10. CONTRACT FORMATION A binding contract shall not be effective until a written purchase order is received at Seller's office in Port Huron, Michigan and accepted in writing by an authorized employee of the Seller at its Port Huron office. The terms and conditions in our quotation or acknowledgment shall govern the contract and any different or additional terms in Buyer's purchase order, unless approved by Seller in writing, are hereby objected to.

11. CONSTRUCTION Any agreement arrived at shall be considered to be a Michigan contract and shall be construed under the laws of the State of Michigan.

12. CANCELLATION Request for cancellation must be in writing and referred to Bindicator. No orders will be accepted with the understanding that they may later be cancelled. If and when cancellation is approved by Bindicator, it is with the understanding that Bindicator will be fully reimbursed by payment of cancellation charge: which are to be determined by Bindicator.

13. CERTIFICATION OF NONSEGREGATED FACILITIES Our firm does not maintain facilities of a segregated nature contrary to the provision of 41 CFR 60-1.8, and further that if we have 50 or more employees and our contractual arrangements of \$50,000 or more we have complied with 41 CFR 60-1.7 concerning the annual filing of a report on Standard Form 100 (EEO-1) and with 41 CFR 60-1.40 by developing a written Affirmative Action Compliance Program.

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