Price $5.00

BINMASTER

Taking Control . . .To A Higher Level

PRO DC Series

CAPACITANCE PROBE



OPERATING INSTRUCTIONS

PLEASE READ CAREFULLY

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REV.2

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PRO DC
GENERAL SPECIFICATIONS

Supply:	12 VDC models and 24VDC models
Supply Tolerance:	-15% +10%
Load:	1.5VA
Ambient Temperature: (Electronics)	-40° F to +185° F (-40° C to +85° C)
Sensitivity:	1 picofarad
Enclosure:	Type 4X, 5, 12
Relay Output:	DPDT contacts; 10 Amps 250 VAC
Fail-Safe:	Switch selectable "High" or "Low" level modes
Calibration:	Set when probe is uncovered: COURSE adjust; single turn potentiometer FINE adjust; single turn potentiometer
Status Indicator:	Internal LED indicates material in contact with probe.
Time Delay:	Adjustable up to 10 seconds
Probe Shield:	Automatically compensates for material buildup on the probe
Conduit Entry:	3/4" NPT

1.0 INTRODUCTION

The Bin-Master PRO DC is a point level control used to detect the presence or absence of solids or liquids. The PRO DC operates on the capacitance principle and incorporates a "Quick Set" feature to simplify calibration. The PRO DC includes switch selectable Fail-Safe output contacts and "Probe Shield" technology for ignoring material build up.

Upon installation the PRO DC is set up with the probe uncovered. The "Quick Set" feature allows simple setup and calibration of the unit to achieve low, medium, or high sensitivity settings. The PRO DC has an adjustable time delay for monitoring covered or uncovered conditions.

2.0 APPLICATIONS

For applications in pressurized vessels up to 1500 PSI, the PRO DC should be mounted with the 3/4" stainless steel coupling.

Application temperatures for the various probes are:

1. Delrin Sleeved Stainless Steel:	250 Deg. F
2. Teflon Sleeved Stainless Steel:	500 Deg. F
3. Flush Mount (Polyethylene):	180 Deg. F
4. Flush Mount (Teflon):	250 Deg. F
6. Flexible Extension:	250 Deg. F

The Delrin and Teflon sleeved stainless steel probe should be used when mounting the PRO DC in a highly corrosive atmosphere. Bare metal stainless steel probes are suitable for granular or liquid material that is not electrically conductive. For electrically conductive material, a coated (insulated) probe must be used.

3.0 INSTALLATION

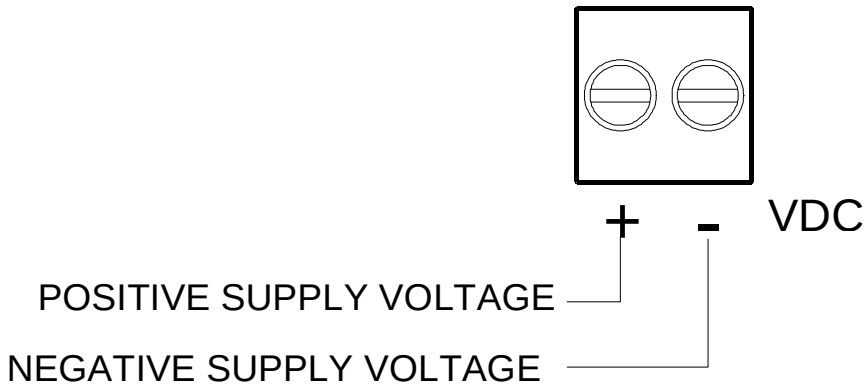
3.1 Location and Mounting

The probe should be located out of the direct flow of material. The PRO DC is designed to mount utilizing either a standard 1 1/4" NPT coupling or optional 3/4" NPT coupling. When the PRO DC is used with the flush mount probe, the flush mount probe mounts directly to the vessel wall using a 7" diameter bolt circle. Refer to Figures 1.1 through 1.4 for illustrations on installation, mounting options, and different probe combinations.

3.2 Input Power and Field Wiring

The PRO DC is available in 12 VDC and in 24 VDC models. Before applying power check the supply voltage rating on the nameplate of the PRO DC to confirm that you have the correct voltage rating for your power supply. Field wiring should conform to all national and local electrical codes and any other agency or authority having jurisdiction over the installation.

Confirm that the power supply wires are connected with the correct polarity as shown below.



NOTE: The PRO DC grounds the negative power supply lead. The PRO DC can not be powered from a positive grounded system.

3.3 Grounding

An equipment grounding connection (earth ground) must be supplied to the unit for safety and to insure proper operation of the unit. This unit uses earth ground as a reference for calibration and detecting a covered or uncovered condition. Therefore, the vessel in which the PRO DC is mounted must be made of metal, or a suitable metal ground plate must be installed where the PRO DC is mounted.

4.0 FAIL-SAFE SELECTION

4.1 Description

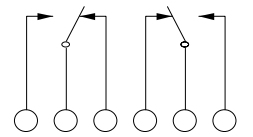
A Fail-Safe condition means that the relay contact positions are set up so that in the event of a power failure the relay will be de-energized and the contacts will indicate a condition that is deemed safe for the application. (Refer to FIGURE 2.1 for the location of the Fail-Safe selection switch.)

4.2 Fail-Safe High

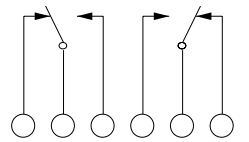
Fail-Safe High means that the relay will be energized when the probe is uncovered and will de-energize when the probe is covered. In this mode, a power failure will cause the relay contacts to indicate that the probe is covered whether it is or not.

FAIL SAFE HIGH RELAY CONTACT POSITION

UNCOVERED



COVERED

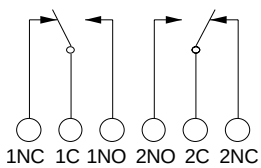


4.3 Fail-Safe Low

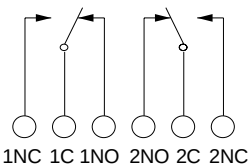
Fail-Safe Low means that the relay will be de-energized when the probe is uncovered and will energize when the probe is covered. In this mode, a power failure will cause the relay contacts to indicate that the probe is uncovered whether it is or not.

FAIL SAFE LOW RELAY CONTACT POSITION

UNCOVERED



COVERED



5.0 CALIBRATION

The PRO DC Quick Set calibration uses two single turn potentiometers making calibration very simple. One potentiometer labeled COARSE is used to compensate for the capacitance of the empty vessel. The other potentiometer labeled FINE is used to set up the desired sensitivity. Refer to FIGURE 2.1 for the location of these potentiometers on the printed circuit board. A tool for adjusting the COARSE and FINE potentiometers is provided inside the top cover of the PRO DC. The cover has a convenient clip for storing the tool so it will always be available.

NOTE: Accurate calibration requires that the appropriate probe is attached to the PRO DC and the unit installed in the vessel. The probe must be UNCOVERED and material well below it.

5.1 Calibration Verification

Following calibration adjustment, the sensitivity setting that you have selected should be checked by verifying that the PRO DC senses a covered probe condition with your material.

5.2 Calibration Procedure

1. Turn both the COARSE and FINE potentiometers fully counter clockwise (CCW). The internal COVERED indicator light should be OFF.

2. Turn the COARSE potentiometer slowly clockwise (CW) to the point where the COVERED indicator light just turns ON and stays on.

3. Turn the FINE potentiometer slowly clockwise (CW) until the COVERED indicator light just turns OFF. (If the COARSE potentiometer has been carefully adjusted, this should occur when the FINE potentiometer is between the 8 and 10 O'clock position.) Now continue to turn the FINE potentiometer clockwise (CW) to the desired sensitivity setting.

HIGH sensitivity:	1/16 to 1/8 turn (1 to 3 picofarad)
MEDIUM sensitivity:	1/8 to 1/4 turn (3 to 6 picofarad)
LOW sensitivity:	1/4 to 1/2 turn (6 to 12 picofarad)

NOTE: It may be convenient to think of the FINE potentiometer as a clock face where the distance between consecutive hour numbers represent a change in sensitivity of approximately 2 picofarad. Thus turning the FINE potentiometer clockwise one hour position past the point at which the COVERED indicator just turns OFF would provide a sensitivity of approximately 2 picofarad. Two-hour positions past that point would provide approximately 4 picofarad sensitivity, etc.

5.3 Sensitivity Selection

Sensitivity Setting (typical)	Dielectric Constant of Material
HIGH sensitivity:	4 or less
MEDIUM sensitivity:	4 to 10
LOW sensitivity:	10 or higher

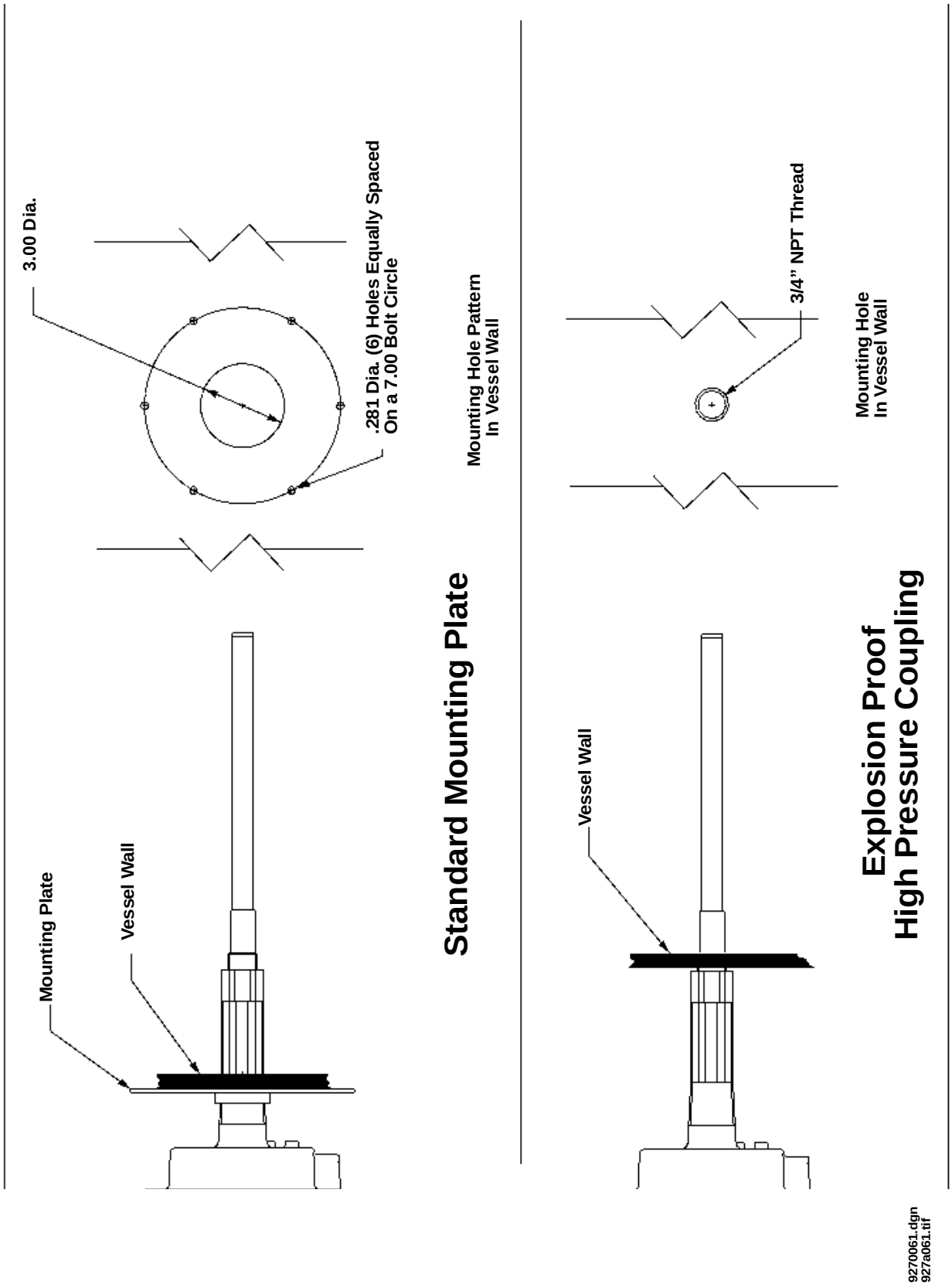


Figure 1.1

6.0 TIME DELAY

The PRO DC has an adjustable time delay of up to 10 seconds. This is a time delay for the output to change states from an uncovered to a covered condition and from a covered to an uncovered condition. This time delay affects the relay contacts only. The internal LED (DS1) will immediately respond to a change in covered or uncovered condition regardless of the time delay setting.

Minimum time delay is when the DELAY potentiometer is set fully counter-clockwise. (Refer to FIGURE 2.1 for the location of the DELAY potentiometer.) Maximum time delay is with the DELAY potentiometer set fully clockwise.

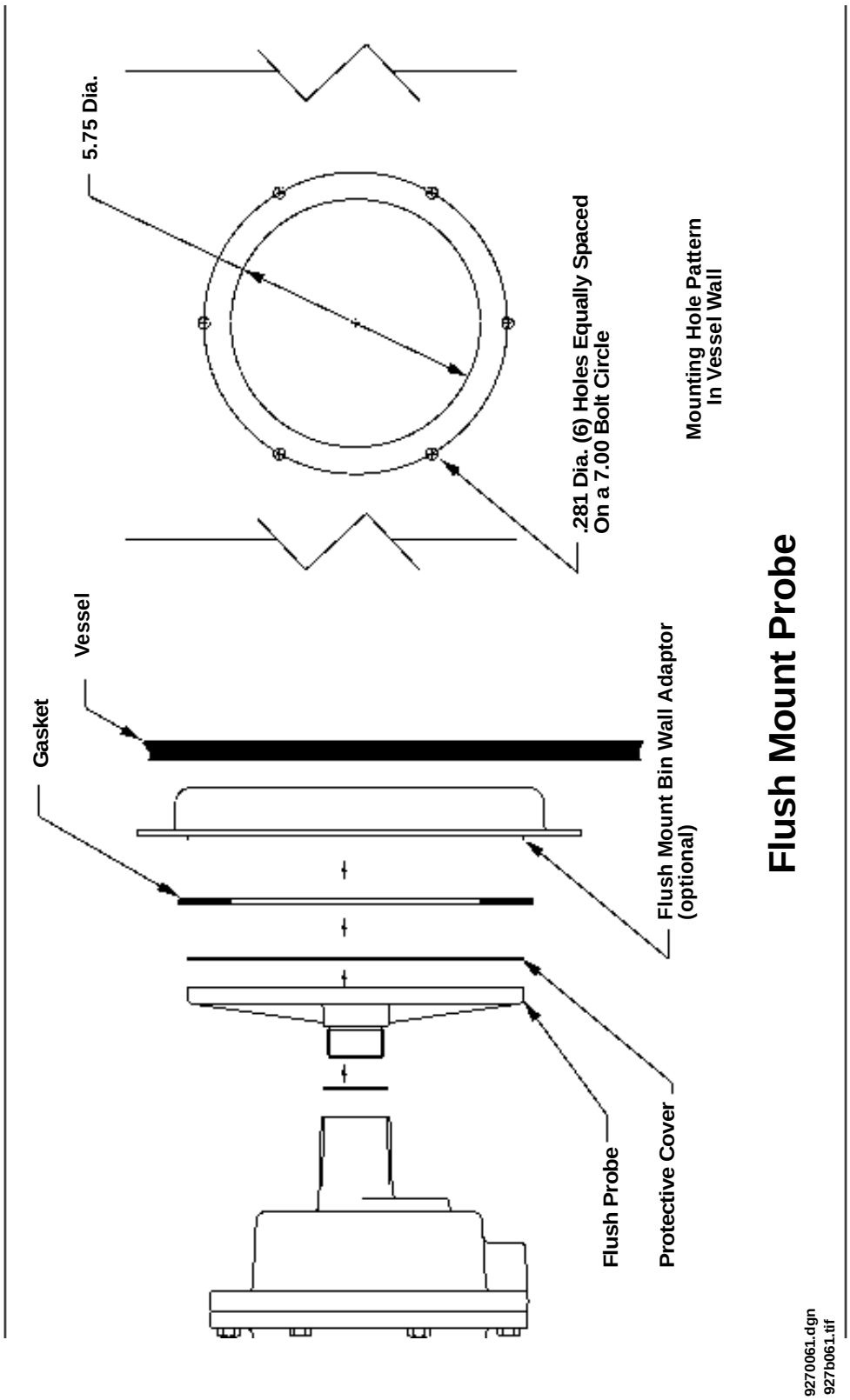


Figure 1.2

A tool for adjusting the TIME DELAY potentiometer is provided inside the top cover of the PRO DC. The cover has a convenient clip for storing the tool so it will always be available.

7.0 WARRANTY AND CUSTOMER SERVICE

7.1 Limited Warranty

The manufacturer warrants this equipment for two (2) years according to the following terms:

1.) This warranty extends to the original purchaser only and commences on the date of original purchase. The original purchaser must mail to the manufacturer the "Warranty Registration" card to confirm the equipment purchase. Failure to do so may void the warranty.

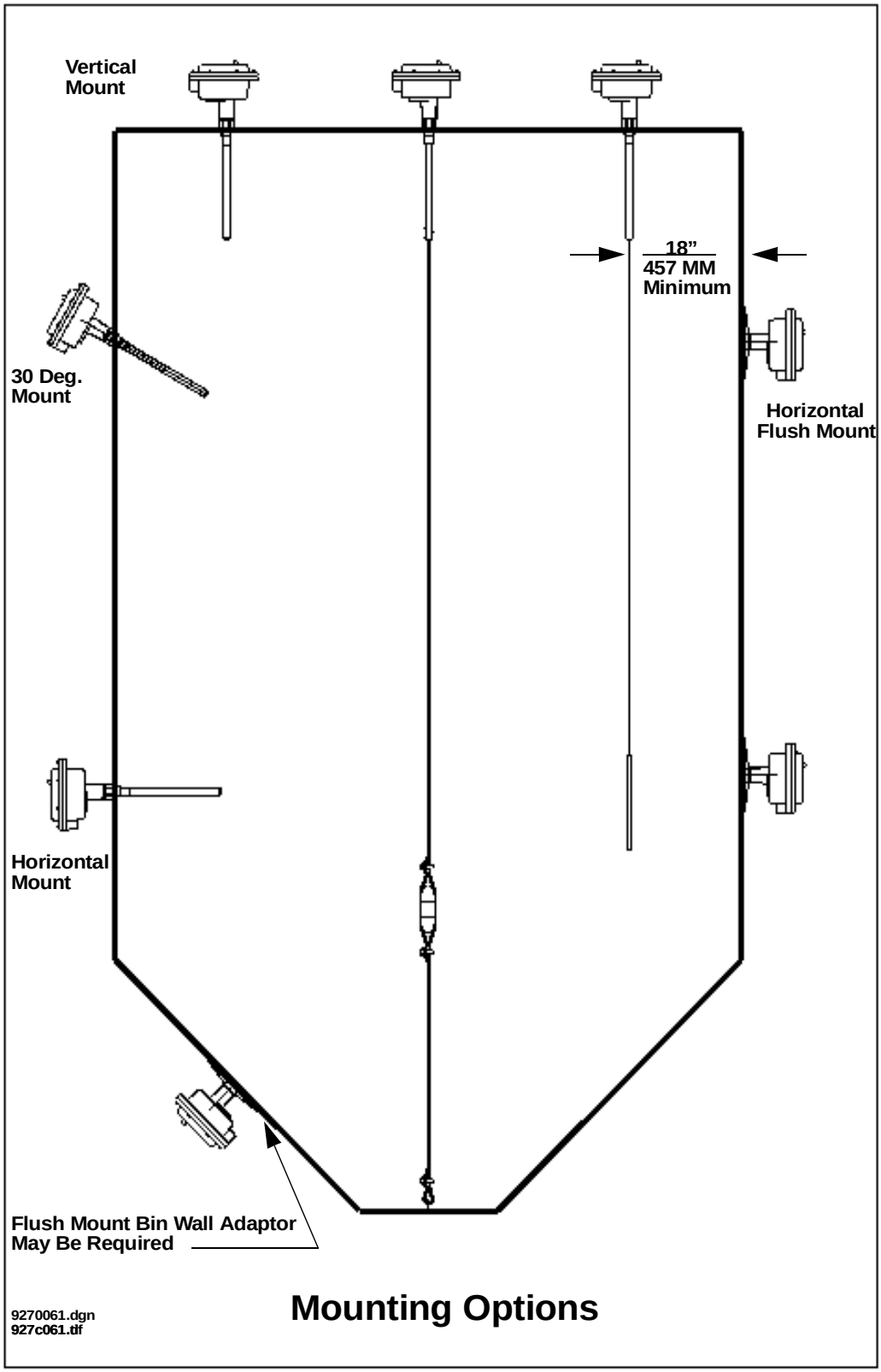


Figure 1.3

2.) The manufacturer will repair or replace any part of this equipment found to be

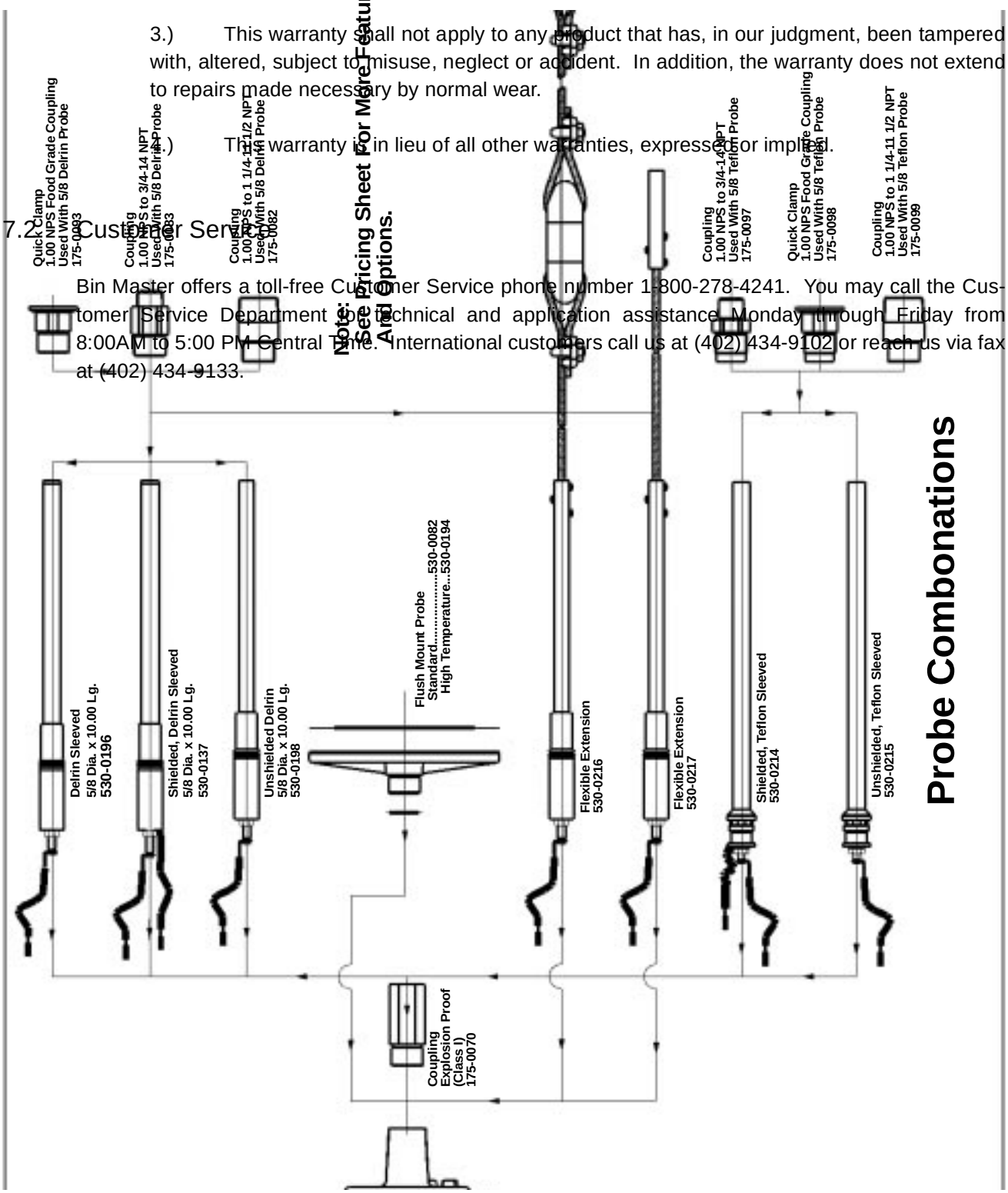
defective, provided such part is delivered prepaid, to the factory. Manufacturer's obligation is limited to the cost of material and labor to repair or replace and does not include transportation expenses.

3.) This warranty shall not apply to any product that has, in our judgment, been tampered with, altered, subject to misuse, neglect or accident. In addition, the warranty does not extend to repairs made necessary by normal wear.

4.) This warranty is in lieu of all other warranties, expressed or implied.

7.2 Customer Service

Bin Master offers a toll-free Customer Service phone number 1-800-278-4241. You may call the Customer Service Department for technical and application assistance, Monday through Friday from 8:00AM to 5:00 PM Central Time. International customers call us at (402) 434-9102 or reach us via fax at (402) 434-9133.



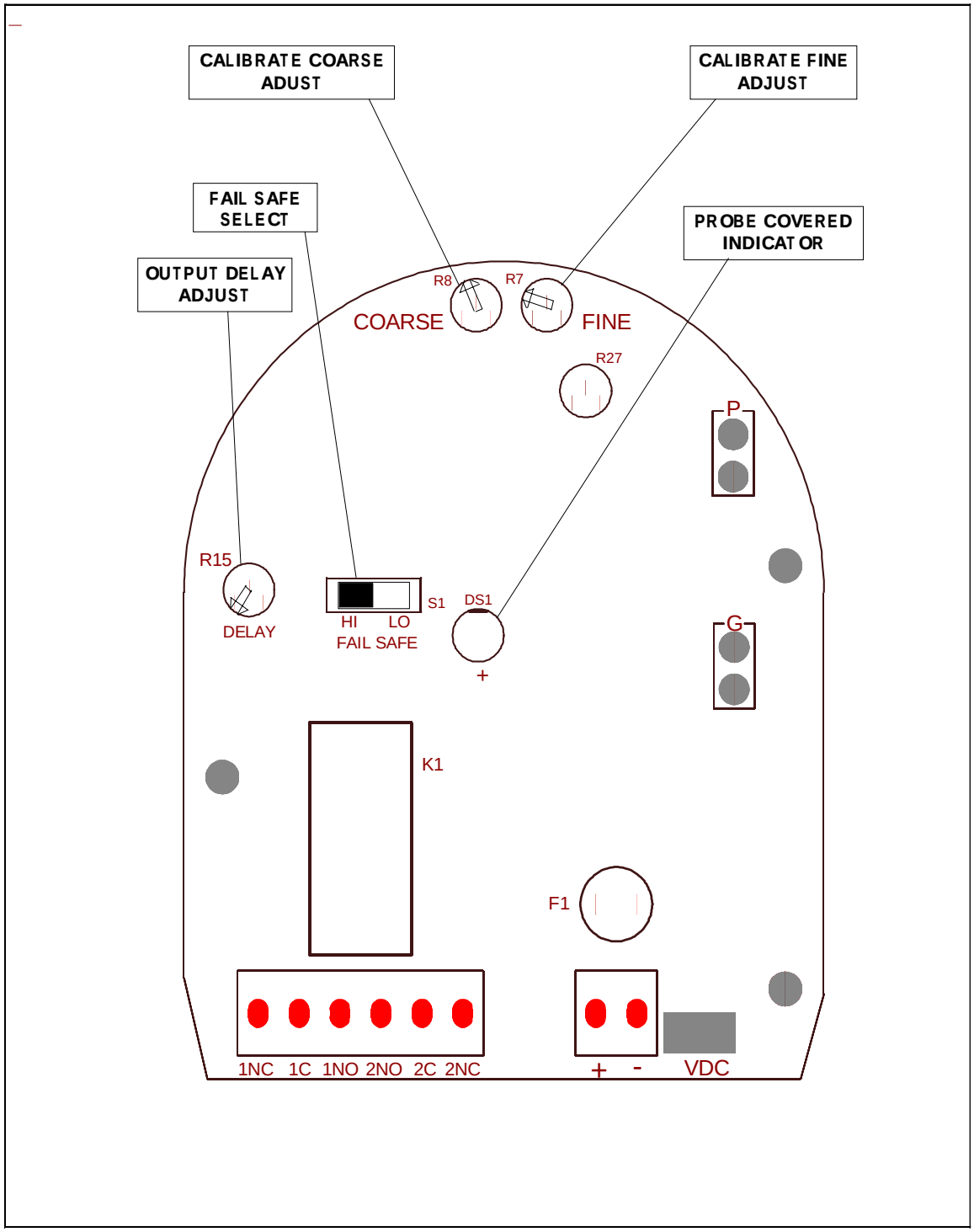

CALIBRATE COARSE ADUST
CALIBRATE FINE ADJUST
FAIL SAFE SELECT
PROBE COVERED INDICATOR
OUTPUT DELAY ADJUST
R8
R7
COARSE
FINE
R27
P
R15
DELAY
S1
HI
LO
FAIL SAFE
DS1
+
G
K1
F1
1NC 1C 1NO 2NO 2C 2NC
+ -
VDC

Figure 2.1