

MODEL 232C
DIFFERENTIAL PRESSURE INDICATOR



Installation Manual
Version 04C64a
ID#10133
4/2004

[This manual is for indicator only - see separate 224/224C DPU manual.]

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Before installing this instrument , become familiar with the instructions in Section 2 and in the separate 224/224C DPU manual.

DANGER notes indicate the presence of a hazard which will cause severe personal injury, death, or substantial property damage if warning is ignored.

WARNING notes indicate the presence of a hazard which can cause severe personal injury, death, or substantial property damage if warning is ignored.

CAUTION notes indicate the presence of a hazard which will or can cause moderate personal injury or property damage if warning is ignored.

DANGER, WARNING, and/or CAUTION notes that appear on the following pages of this manual should be reviewed before proceeding: None . (Important! Before installing or operating this instrument, review all safety notices contained in the separate 224/224C DPU manual, per models listed on front page.)

PRODUCT WARRANTY STATEMENT

The product warranty applicable to this PRIME Measurement Products, LLC is as stated on the back cover of this manual.

NOTICE: The warranty of this instrument and the associated DPU will be voided if the following limitations are exceeded:

Temperature - Do not subject the DPU to temperatures above 200°F or below -60°F (35°F minimum for water filled units).

Pressure - Do not subject the DPU to operating pressures in excess of the working pressure rating stamped on the unit or on the attached dataplate.

Corrosion - Do not subject the DPU to incompatible process media.

Sealed Components - Do not loosen or remove the torque tube gland nut, the drive arm hole plug, or the torque tube housing from the centerplate. To do so will cause loss of bellows fill fluid and render the unit inoperable.

Vibration - Do not subject the DPU to severe mechanical shock.

Shock - Do not subject the DPU to hydraulic shock.

Pulsation - Do not subject the DPU to severe pulsation.

Should any after-delivery problems arise, please contact PRIME Measurement Products Customer Service, during normal business hours, at (626) 961-2547.

RECORD OF CHANGES

CHANGE NO.	DATE	DESCRIPTION
03D99a	4/03	Initial Issue
04C64a	3/04	New PRIME Booklet format ; No Technical Changes



SECTION 1 - INTRODUCTION

1-1. General

The Model 232C is an economical DP indicator for use in applications where high accuracies are not required. It is ideally suited for measuring tank level, flowrate, and differential pressure across filters. It is actuated by a Model 224C Differential Pressure Unit (DPU).

1-2. Specifications

SWP	500 PSI (34.5 Bar) Maximum
Housings	Forged Brass
Bellows	BeCu or 316 SST
Fill Fluid	"B" (Ethylene Glycol & Water)
Connections	1/4" x 1/4" NPT
DP Ranges	0-50" w.c. to 0-100 PSID (0-124 mbar to 6.9 Bar)
Dial Size	6" (152mm)
Case/Bezel	304 Stainless Steel
Scales.....	White or Black (Uniform or Sq. Rt.)
Accuracy	±2% of Full Scale
Mounting.....	Pipe, Wall, or Panel
Temperature Range	-40°F/°C to +180°F (+82°C)

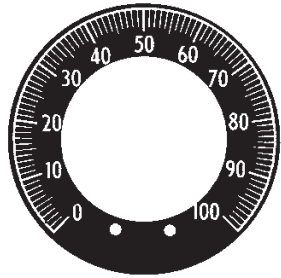


Figure 2-1. Calibration Scale Ring

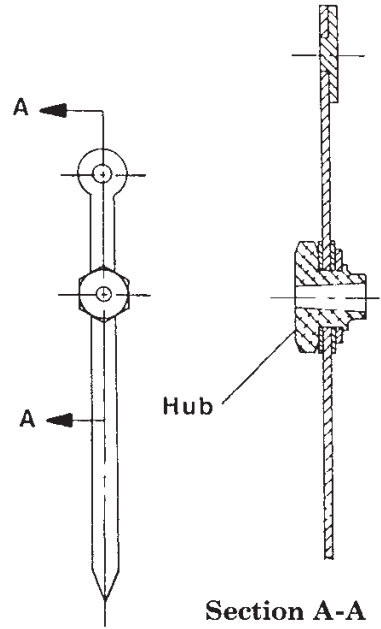


Figure 2-2. Zero Adjustment (Pointer)

SECTION 2 - MAINTENANCE/CALIBRATION

2-1. Required Tools

Tool	Purpose
Pointer puller	Pointer removal
Small screwdriver	Calibration adjustments
Medium screwdriver	Bezel removal
1/8" Open-end wrench	Calibration adjustments

2-2. DPU Test/Calibration/Maintenance

Refer to the appropriate (separate) DPU Manual for procedures and Warnings .

2-3. Calibration Check

Normally all that is required to put indicator into service is to verify that it remains at factory-set calibration by performing the following calibration check:

1. Securely mount indicating switch in an appropriately level position and connect DPU to a standard pressure source, per appropriate DPU manual.
2. If zero indication is incorrect, remove bezel/lens and reset pointer to zero. Note: For an exact zero setting, hold the hexagon hub with a wrench and carefully slip the pointer on its hub until it points to zero graduation (See Figure 2-2). Replace bezel/lens.
3. To test for reverse travel, connect pressure source to low-pressure housing and vent high pressure housing. Apply pressures approximately 150% of the differential pressure range. The pointer should move approximately 5% to 10% below zero. Reinstall the plug in the HP housing.
4. To test for overtravel, connect pressure source to HP housing and vent LP housing. Apply pressures approximately 150% of differential pressure range. Pointer should move approximately 5% to 10% above fullscale.
5. Apply 0%, 50% and 100% of full scale pressure. If indication is within specified limits, instrument calibration is satisfactory and no adjustments are necessary. If indications are incorrect, perform complete calibration procedure.

2-4. Complete Calibration (DP=Differential Pressure)

A complete calibration of the instrument is required whenever the DPU assembly is replaced. Refer to the appropriate (separate) DPU manual before performing this calibration procedure.

1. Check the indicator. All bearings and pivots should be free of dirt and should not have excessive end play. All screws and nuts should be properly tightened.
2. Remove the bezel/lens assembly, pointer, and scaleplate.
3. Install a calibration scale ring (Figure 2-1) and replace the pointer in the indicator, setting the pointer at zero. Note: For an exact zero setting, hold the hexagon hub with a wrench and carefully slip the pointer on its hub until it points to zero graduation.
4. Securely mount instrument in an approximately level position and connect DPU into the test setup, as described in the appropriate (separate) DPU manual.

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2-4. Complete Calibration (Cont.)

(DP=Differential Pressure)

5. To test for reverse travel, connect pressure source to LP housing and vent HP housing. Apply pressures approximately 150% of the differential pressure range. The pointer should move approximately 5% to 10% below zero. Reinstall the plug in the HP housing.
6. To test for overtravel, connect pressure source to HP housing and vent LP housing. Apply pressures approximately 150% of differential pressure range. Pointer should move approximately 5% to 10% above fullscale.

Note: Apply 150% of DP Range at least five times to each pressure housing.

7. Release all pressure to the pressure housings and reposition the pointer at ZERO (See Figure 2-2).
8. Apply 100% pressure. Observe pointer indication. If the pointer indicates more or less than 100% pressure, adjust as follows (ref. Figure 2-3):

- (a) If the pointer indicates less than full range, increase the span by closing the range adjust arm (bend towards its pivot).

- (b) If the pointer indicates more than full range, decrease the span by spreading the range adjust arm. This is accomplished by inserting a screwdriver into the crook of the arm and rotating the blade (bend away from pivot).

9. Repeat step 7, until the pointer indicates ZERO and 100% accurately.

10. Apply 50% pressure and observe the pointer indication. If pointer indicates more or less than 50% scale, adjust as follows (ref. Figure 2-3):

- (a) If the pointer indicates more than 50% scale, adjust linearity by inserting a screwdriver blade until the ends of the slot are spread sufficiently apart.
- (b) If the pointer indicates less than 50% scale, spread the ends of the lower slot in the follower arm.

11. Check the pointer indication at ZERO and FULL scale by repeating steps 6 and 7 until the desired accuracy is obtained.

12. Check the pointer indication at 25% and 75% pressure.

At this point, the instrument is calibrated.

13. Carefully remove the pointer and calibration scale ring.

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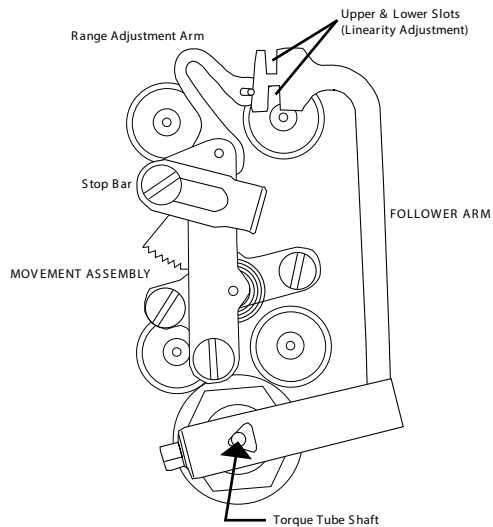


Figure 2-3. Span/Linearity Adjustment

2-4. Complete Calibration (Cont.) (DP=Differential Pressure)

14. Reassemble the remaining parts, as follows:

- (a) Install the scale plate and secure it with the mounting screws.
- (b) Mount the pointer assembly onto the hub so it indicates ZERO on the scale. Note: For an exact zero setting, hold the hexagon hub with a wrench and carefully slip the pointer on its hub until it points to zero graduation.
- (c) Install the bezel/lens assembly.

2-5. Troubleshooting

Refer to Table 2-1 for troubleshooting information. Also, see the separate 224/224C DPU manual.

Table 2-1. Troubleshooting

Problem	Possible Source	Probable Cause	Corrective Action
Low or No Indication	DPU	-	See separate DPU manual
	Indicator	Loose movement Out of calibration Dirty or corroded mechanism Pointer loose	Tighten/replace movement Calibrate unit Clean/replace mechanism Tighten pointer
High Indication	Piping or primary source	-	See separate DPU manual
	DPU	-	See separate DPU manual
	Indicator	Loose arms Out of Calibration	Tighten mechanism Calibrate unit
Erratic Indication	Primary Element	-	See separate DPU manual
	Piping	-	See separate DPU manual
	DPU	-	See separate DPU manual
	Indicator	Movement dragging or dirty Pointer dragging on scale plate	Adjust/clean movement Adjust pointer position

Product Warranty

A. Warranty

PRIME Measurement Products, LLC warrants that at the time of shipment the products manufactured by PRIME Measurement Products, LLC and sold hereunder will be free from defects in material and workmanship, and will conform to the specifications furnished by or approved by PRIME Measurement Products, LLC.

B. Warranty Adjustment

- (1) If any defect within this warranty appears, Buyer shall notify PRIME Measurement Products, LLC immediately.
- (2) PRIME Measurement Products, LLC agrees to repair or furnish a replacement for, but not install, any product which within one (1) year from the date of shipment by PRIME Measurement Products, LLC shall, upon test and examination by PRIME Measurement Products, LLC, prove defective within the above warranty.
- (3) No product will be accepted for return or replacement without the written authorization of PRIME Measurement Products, LLC. Upon such authorization, and in accordance with instructions by PRIME Measurement Products, LLC, the product will be returned shipping charges prepaid by Buyer. Replacements made under this warranty will be shipped prepaid.

C. Exclusions from Warranty

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- (2) Components manufactured by any supplier other than PRIME Measurement Products, LLC shall bear only the warranty made by the manufacturer of that product, and PRIME Measurement Products, LLC assumes no responsibility for the performance or reliability of the unit as a whole.
- (3) "In no event shall PRIME Measurement Products, LLC be liable for indirect, incidental, or consequential damages nor shall the liability of PRIME Measurement Products, LLC arising in connection with any products sold hereunder (whether such liability arises from a claim based on contract, warranty, tort, or otherwise) exceed the actual amount paid by Buyer to PRIME Measurement Products, LLC for the products delivered hereunder."
- (4) The warranty does not extend to any product manufactured by PRIME Measurement Products, LLC which has been subjected to misuse, neglect, accident, improper installation or to use in violation of instructions furnished by PRIME Measurement Products, LLC.
- (5) The warranty does not extend to or apply to any unit which has been repaired or altered at any place other than at PRIME Measurement Products, LLC factory or service locations by persons not expressly approved by PRIME Measurement Products, LLC.

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