Barton®

MODELS 200A/227A/227C
DIFFERENTIAL PRESSURE INDICATOR

200A use 199 DPU
227A uses 224 DPU
227**C** uses 224**C** DPU


Model 200A


Model 227A

Installation Manual

Version 03D77d
ID#10055
4/2003

CONTENTS

[**This manual is for the Indicator only - before installing or operating** this instrument, **refer to the separate DPU manual** that is appropriate for the instrument model listed above.]

SAFETY

Before installing this instrument, become familiar with the installation instructions in Section 2 and in the separate 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 DPU manual that is appropriate for the instrument model.)**

PRODUCT WARRANTY STATEMENT

The product warranty applicable to this Barton instrument is as stated on the back (last page) 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 Barton Customer Service department during normal business hours at (626) 961-2547. In Europe, contact Barton Instrument Systems, Ltd. (3 Steyning Way, Bognor Regis, West Sussex, P022 0TT, England) at 44-1243-826741.

RECORD OF CHANGES

CHANGE NO.	DATE	DESCRIPTION
200A Manual (Previous Versions)		
93I1	2/93	pg.1-3, 2-1/8" DP range changed from 0-75 psi to 0-100 psi; Added ref. to bezel glass to Fig. 5-1.;Table 5-1 (items 17 & 19)
98F9	6/98	Rev. Name/Logo; drawing# pg. 6-1 and drawing pg. 6-2.
227A/227C (Previous Versions)		
90K4	11/90	Reformatted document
92E2	5/92	Revised parts list (Table 5-1) - Items 11 & 14
Combined 200A/227A/227C Manual (Replaces IDs: 10050, 10120, & 10121		
03D77d	**4/03**	Combined 200 & 227 manuals; booklet format; removed DPU specific information/appendixes - refer to separate DPU manual.

SECTION 1 - INTRODUCTION

1-1. General

The Barton Models 200A and 227A/C measure differential pressure, fluid flow rate, or liquid level. For fluid flow measurements, the indicator is connected by piping to the low- and high-pressure sides of a primary device (e.g., orifice plates, venturis, or flow tubes) located in the process run. For liquid level applications, variations in the level of the liquid within the process vessel produce changes in differential pressure used to indicate the liquid height.

The indicating pointer travels through a 270 degree arc over a six-inch diameter scale. The movement has a micrometer screw for range adjustment. Pointer hub adjustment can be made without removing the scale plate or pointer. Range and linearity adjustments are accessible after removal of the scale plate.

1-2. Main Components

The 200A consists of two major components: an actuating unit (DPU) and the case enclosed indicating instrument.

A. Actuating Unit (DPU) - 200A uses 199 DPU, 227A uses a 224 DPU, and 227C uses a 224C DPU. For detailed information on the actuating DPU, see the appropriate (separate) DPU manual.

B. Indicator

1-3. Indicator Specifications

Accuracy:

0-10" w.c. to 0-349" w.c. (255 mm to 890 m)	±1/2% of full scale DP
0-350" w.c. to 0-100 psi (890 m to 6.7 bar)	±3/4% of full scale DP
Temperature Limits	-40°F/°C to +180°F (+80°C); +35°F to +180°F (+1°C to +80°C) for water filled units
Dimensions	per model number and housing rating. See ODD Drawings in Section 5.

1-4. Theory of Operation

The bellows within the DPU moves in response to changes in the DP monitored at the high and low pressure sides of the primary device installed in the process run. The DPU bellows movement is mechanically transferred to the indicator mechanism through a rotating torque tube shaft. As the torque tube rotates, the drive arm transmits the motion through the connecting link to the indicating pointer. The pointer travels through a 270 degree arc to indicate measurement on the 6-inch scale plate.

The 6-inch scale can be printed as required, in uniform increments for DP, SP, or liquid height or in square-root increments for direct flow measurements. Special scales can be furnished to indicate the amount of liquid in a tank.

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SECTION 2 - INSTALLATION

2-1. General

The instrument should be inspected at time of unpacking to detect any damage that may have occurred during shipment. ***Note:*** *The DPU was checked for accuracy at the factory — do not change any of the settings during examination or accuracy will be affected.*

For applications requiring special cleaning/precautions, a polyethylene bag is used to protect the instrument from contamination. This bag should be removed only under conditions of extreme cleanliness.

2-2. Mounting/Piping/DPU Installation

Refer to the appropriate (separate) DPU Manual for the instrument model being installed.

NOTICE: Do not turn instrument by grasping the instrument case - this can result in damage to the case. Always thread pipe into instrument.

2-3. Startup

For startup procedures, **warning notices**, and information, refer to the separate DPU Manual that is appropriate for the instrument model being installed.

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SECTION 3 - MAINTENANCE/CALIBRATION

3-1. Required Tools

Tool	Purpose
Pointer puller	Pointer removal
Small screwdriver	Calibration adjustments
Medium screwdriver	Bezel removal/DPU bracket screws
Spanner wrench (p/n 0163-0005B)	DPU Range screw adjustment
1/8" Open-end wrench	Calibration adjustments

3-2. DPU Test/Calibration/Maintenance Equipment

Refer to the appropriate (separate) DPU Manual.

3-3. Bezel and Lens Installation and Removal

Whenever the bezel/lens is installed, the bezel gasket (0277-0026C) must be installed as shown below:

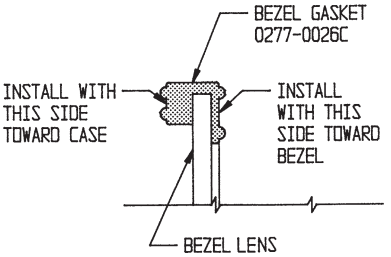


Figure 3-1. Bezel/Lens

To remove the bezel and cover lens:

1. Loosen three screws on the front of bezel.
2. Tilt out bottom of bezel and slide bezel upward.

The two snubbers (0266-0028C) on the scaleplate should not be compressed against the lens cover and the pointer should not touch the lens.

Notice

Ensure correct bezel gasket orientation before placing instrument back in service. Incorrect bezel gasket orientation will cause the instrument indicator to jam, resulting in inaccurate readings.

3-4. 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 by holding pointer with fingers and turning hub with a wrench. 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.

(Continued on next page...)

3-4. Calibration Check (Cont.)

4. To test for overtravel, connect pressure source to high-pressure housing and vent low-pressure 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 switch calibration procedure.
6. Make sure instrument zero indication is correct; otherwise, repeat Step 2.

3-5. Pointer Installation and Removal

During adjustment and calibration of the indicating switch, it will sometimes be necessary to remove and reinstall the pointer, per the following procedures.

A. Pointer Installation

1. Position pointer on movement shaft with pointer set at zero scale. It may be necessary to enlarge the hub hole, using a tapered broach (included in the toolkit (p/n 0288-1032B).
2. Lightly tap pointer hub with a hand-set or other flat-end tool. Use perpendicular blows to avoid bending shaft.

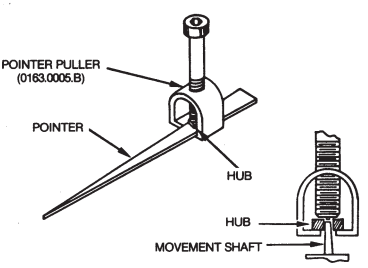


Figure 3-2. Pointer Puller

3. Check indicating switch for calibration over its entire range (refer to Switch Calibration in this section). If indicating switch is correctly calibrated, secure pointer to movement shaft by tapping hub with a hand-set or other flat-end tool.

B. Pointer Removal

Pointer is removed with Barton Pointer Puller (p/n 0163-0005B), which is included in the toolkit (p/n 0288-1032B).

1. Slide pointer puller along pointer until pin protruding from tip of screw in pointer puller is directly over movement shaft and arms of pointer puller are directly under pointer.
2. Gently turn knurled head of screw clockwise, pushing pin against movement shaft and lifting pointer with arms. Finger pressure should be sufficient to pull the pointer free. If more pressure is required, an Allen wrench (inserted into head of the screw) can be used. However, care should be exercised: too much pressure can cause the pin to break.

3-6. 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. Securely mount instrument in an approximately level position and connect DPU into the test setup, as described in the appropriate (separate) DPU manual.

(Continued on next page...)

3-6. Complete Calibration (Cont.) (DP=Differential Pressure)

2. Attach linkage between drive arm and movement. Fig. 3-3 shows alignment at 50% DP. Inspect parts for straightness and pivot-fit without binding.
3. Set pointer at zero on scale by slipping pointer on hub. Hold tip of pointer and turn hub with wrench.
4. Apply 100% DP. If pointer exceeds 100% on scale, lengthen range arm. Remove pressure.
5. Set zero and span, using hub for zero adjustment and range adjust screw on the movement for span adjustments.

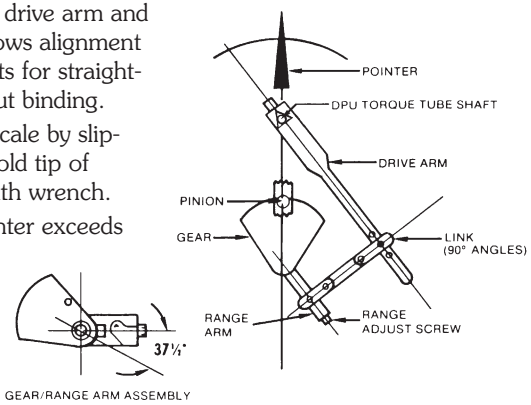


Figure 3-3. Linkage at 50% DP

6. Apply 50% DP. If pointer does not indicate 50% scale, a linearity adjustment is necessary. Loosen drive arm screw and move arm to shift pointer in direction of error (approx. 10:1). Tighten drive arm screw.
7. Release pressure and reset pointer at zero. Check the span. If gear in movement reaches limit of travel as a result of linearity adjustment (step 6), slip range arm along gear approximately 5 degrees from normal 37.5 degree angle to approximately 43 degrees. Range arm is slipped by applying pressure to range arm with thumb, while holding gear firmly in place. Retest pointer response at 50% and 100% DP, and adjust linkage until readings are acceptable.
8. Apply 0%, 25%, 50%, 75%, 100%, 75%, 50%, 25%, and 0% of DP consecutively to instrument without overshoot. Lightly tap indicator to overcome friction. Pointer should accurately indicate each applied pressure.
10. Test instrument repeatability by applying 0%, 50%, 0%, 50% DP. Indicator should accurately indicate each applied pressure.
11. Set overrange stops to prevent pointer from striking snubbers on scale. See para. 3-7 (Overrange Stop Adjustment). Tighten all screws. Test setting by manually moving pointer from zero position to 50%, then let the pointer return freely. An off-set in zero reading indicates pointer slippage. If necessary, tap pointer hub to tighten it to shaft.

3-7. Overrange Stop Adjustment

1. Apply sufficient pressure to the high pressure housing to deflect the pointer against the snubber on the scale plate. Slide the upper overrange stop against the drive arm and tighten the overrange stop screw.
2. Apply sufficient pressure to the low pressure housing to deflect the pointer against the zero stop snubber on the scale plate. Slide the zero-stop against the drive arm and tighten the zero-stop screw.
3. Remove the pointer and calibration scale. Replace the pointer at zero (adjust zero as necessary). Replace the lens and bezel assembly.

3-8. DPU Maintenance

DPU inspection/cleaning/repair/service procedures, along with applicable **WARNING notices**, are presented in the appropriate (separate) DPU manual.

3-9. Locking Drive Arm to Torque Tube

(Also see appropriate (separate) DPU manual.)

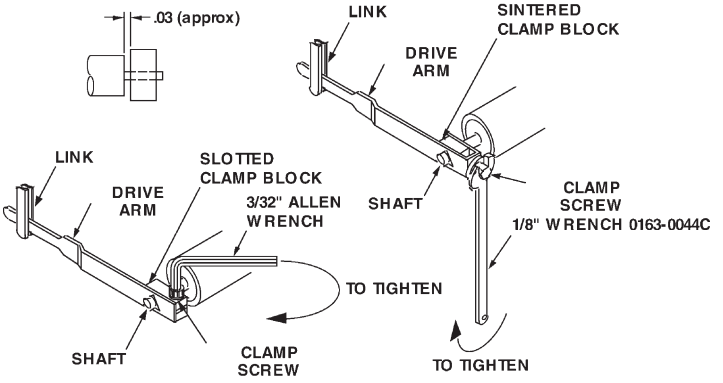


Figure 3-9. Locking Drive Arm to Torque Tube

1. Slip drive arm over torque tube shaft; clear end of torque-tube housing by approximately 0.030-inches before securing to prevent interference.
2. To tighten drive arm assembly onto torque-tube shaft:
   a. While supporting block/shaft, tighten clamp screw until snug to shaft.
   b. Still supporting block/shaft, tighten clamp screw an additional:
      - Sintered: 1/3 to 1/2 turn (This screw can normally turn one full revolution before breaking.)
      - Slotted: 1/4 to 1/3 turn (The slot in the slotted clamp block should still be open.)

3-10. Troubleshooting

Refer to Table 3-1 for troubleshooting information. Also, see the appropriate (separate) DPU manual.

Table 3-1. 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

SECTION 4 - PARTS DRAWING/LIST

4-1. Model 200A

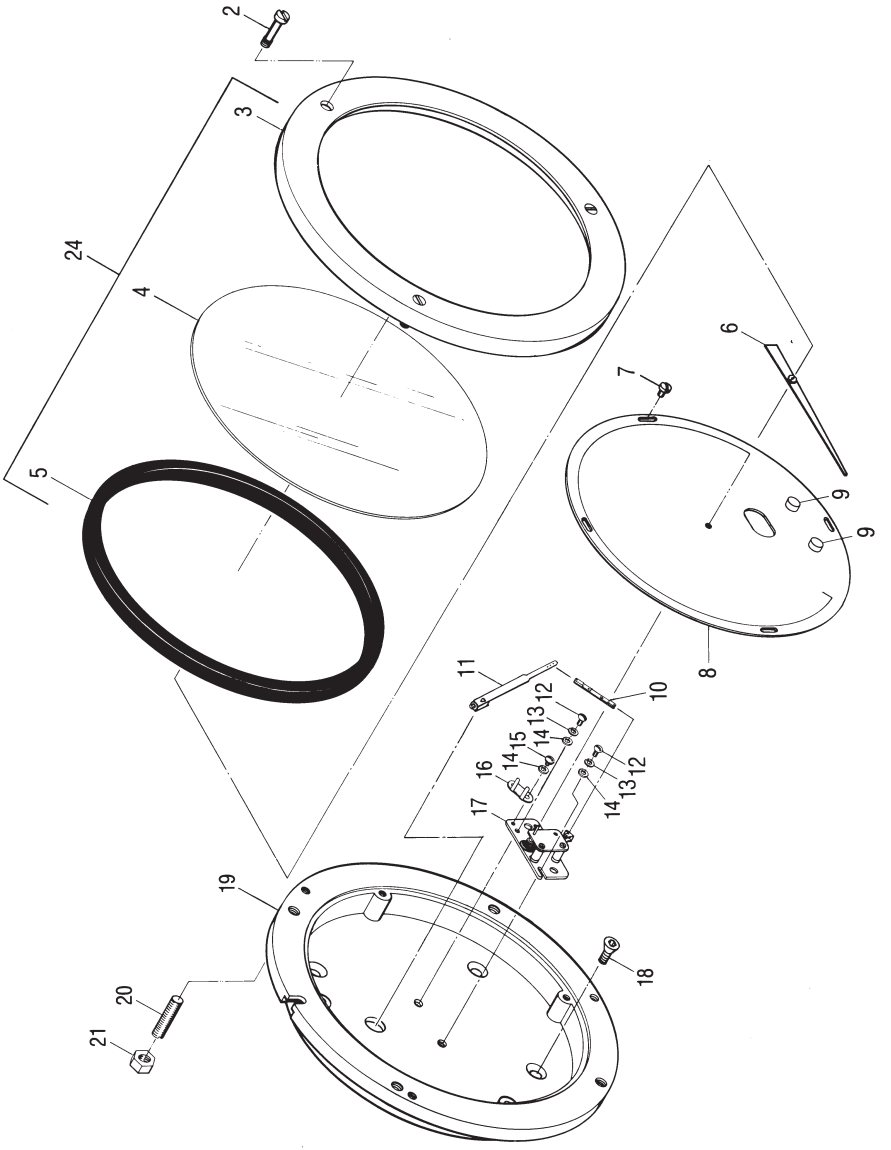


Figure 4-1. 200A Parts Drawing

Table 4-1. 200A Parts List

Item	Description	Part No.	Per Unit
1	DIFFERENTIAL PRESSURE UNIT (DPU) (NOT SHOWN) 200A USES 199 DPU	SEE DPU MANUAL	1
2*	SCREW, BEZEL	0181-0007C	3
3	BEZEL (PART OF ITEM #24)	0277-0029C	1
4*	LENS, COVER (PART OF ITEM #24)	0181-0038C	1
5*	GASKET, BEZEL (PART OF ITEM #24)	0277-0026C	1
6*	POINTER ASSEMBLY:		1
	WHITE	0288-0030B	
	BLACK	0288-0031B	
7*	SCREW, SCALE PLATE, 4-40 x 3/16, SST, SLTD. FILH.	0114-0023J	4
8**	SCALE PLATE		1
	WHITE ON BLACK BACKGROUND	0200-0051C	
	BLACK ON WHITE BACKGROUND	0200-1014C	
9	STOP, SNUBBER	0226-0028C	2
10*	LINK ASSEMBLY	0288-0036B	1
11	DRIVE ARM ASSEMBLY	0200-0015B	1
12	SCREW, 4-40 x 1/4, SST, RDH.	0111-0034J	2
13	WASHER, SPLIT LOCK, #4, SST	0003-0062K	2
14	WASHER, FLAT, #4, SST	0003-0096K	3
15	SCREW, 4-40 X 3/16, SST, SLTD, BDGH.	0117-0012J	1
16	BAR, STOP, OVERRANGE	0288-0028C	1
17	MOVEMENT ASSEMBLY	0288-0035B	1
18*	SCREW, 1/4-20 X 1/2, STL. CD. PL., SKT. FLH.	0240-0009J	4
19	CASE	0200-0052C	1
20	SCREW, 1/4-20 X 1, STL. CD. PL., SLTD., SSCR	0340-0003J	4
21	NUT, 1/4-20, HEX, STL. CD. PL.	0500-0010J	4
22	PLATE, FLUSH MOUNTING ADAPTER (ITEMS 20 AND 21 USED WITH ITEM 22)(NOT SHOWN)	0200-0014C	1
23	STUD, BEZEL, RETAINING, DRIV-LOK	0004-0005K	1
24	BEZEL ASSEMBLY	0277-0018B	1
25	CALIBRATION KIT (NOT SHOWN)	0288-1032B	1

Notes: * Indicates recommended spare part; ** SCALE PLATE INDENTIFICATION: If the scale plate shows an SCR number, this will identify it. Otherwise, provide the following information:
1. Square Root or Linear Graduations
2. Scale (e.g., 0-100, 25-0-100, etc.)
3. Number of Graduations (linear scales only)
4. Data (e.g., PSI (bar), inches of water column (meter), etc.)
5. Standard plates have black background

When ordering parts, specify serial number of instrument.

4-2. Model 227A/227C

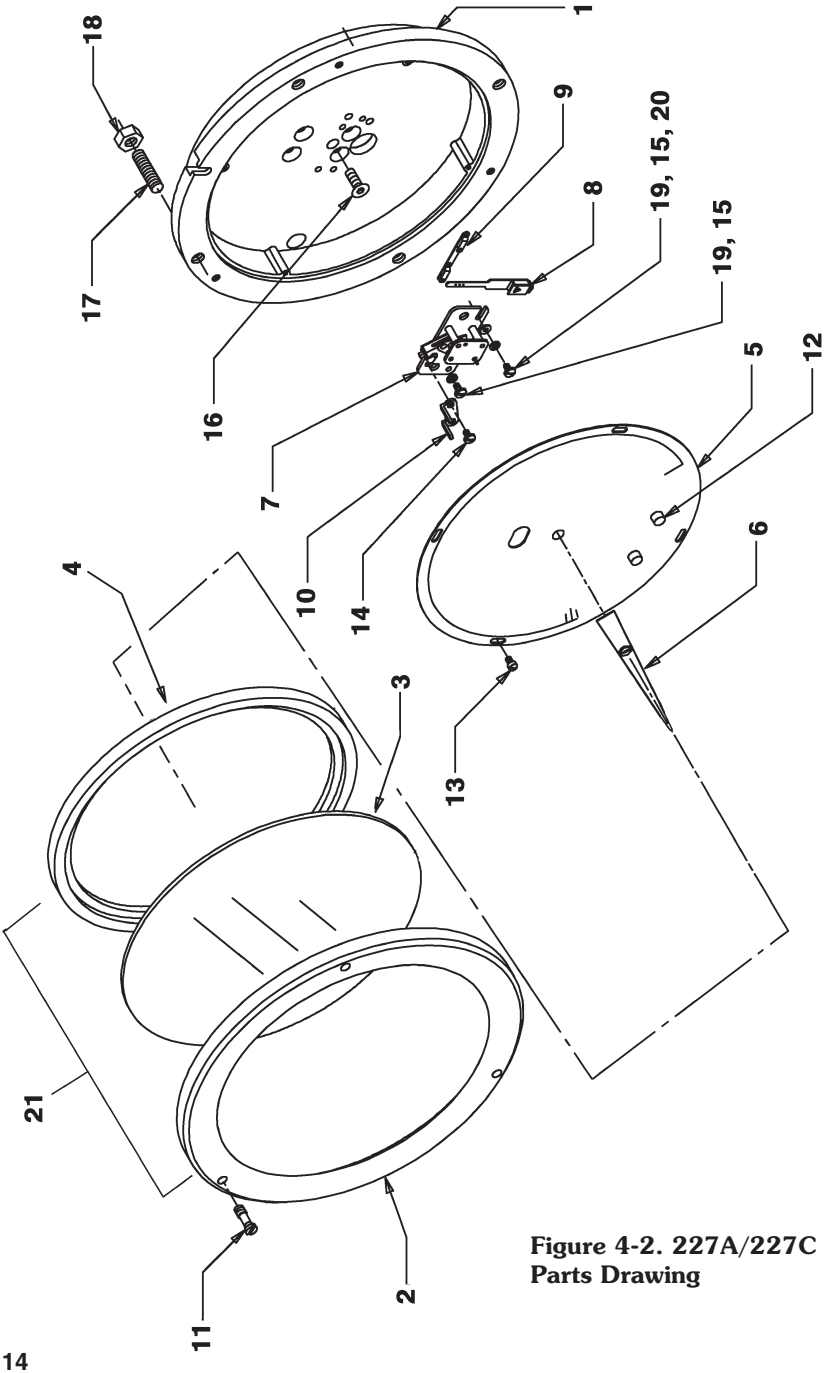


Figure 4-2. 227A/227C Parts Drawing

Table 4-2. 227A/227C Parts List

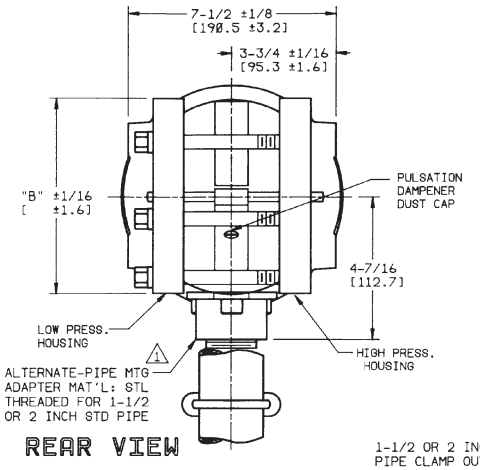
Item	Description	Part No.	Per Unit
1	CASE, INDICATOR	0227-0014C	1
2	BEZEL (PART OF ITEM #21)	0277-0029C	1
3*	LENS, COVER (PART OF ITEM #21)	0181-0038C	1
4*	GASKET (PART OF ITEM #21)	0277-0026C	1
5**	SCALE PLATE		1
	WHITE ON BLACK BACKGROUND	0227-0013C	
	BLACK ON WHITE BACKGROUND	0227-1003C	
6*	POINTER ASSEMBLY:		1
	WHITE	0288-0030B	
	BLACK	0288-0031B	
7	MOVEMENT ASSEMBLY	0288-0035B	1
8	DRIVE ARM ASSEMBLY	0226-0023B	1
9	LINK ASSEMBLY	0226-0020B	1
10	STOP BRACKET	0288-0028C	1
11*	BEZEL SCREWS, SST	0181-0007C	3
12	SNUBBER	0226-0028C	2
13	SCREW, SL FIL. HD. 4-40 X 3/16, SST	0114-0023J	4
14*	SCREW, BD. HD., 4-40 X 3/16, SST	0117-0012J	1
15*	WASHER, SPLIT LOCK, #4, SST	0003-0062K	2
16	SCREW, FLAT HD., #10 X 1/2	0240-0019J	6
17	SCREW, SLOTTED SET, 1/4-20 X 1	0340-0003J	4
18	NUT	0500-0010J	4
19	SCREW, RD. HD., 4-40 X 1/4, SST	0111-0034J	2
20	WASHER, FLAT, #4, SST	0003-0096K	1
21	BEZEL ASSEMBLY (ITEMS 2, 3, & 4)	0277-0018B	1
22	DIFFERENTIAL PRESSURE UNIT (DPU) (NOT SHOWN) 227A USES 224 DPU 227C USES 224**C** DPU	SEE DPU MANUAL	1
23	CALIBRATION KIT (NOT SHOWN)	0288-1032B	1

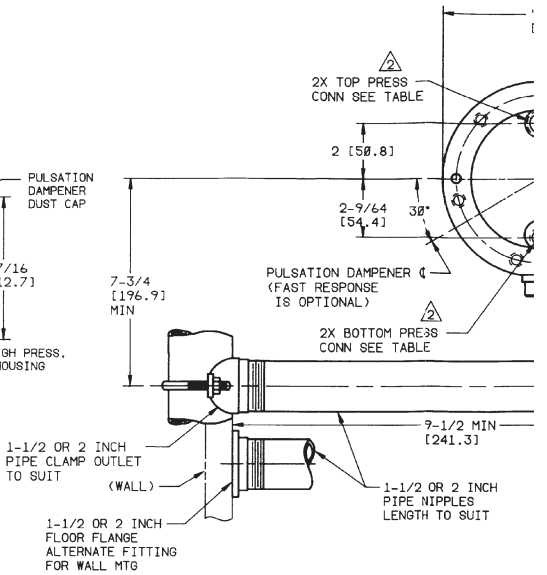
Notes: * Indicates recommended spare part; ** SCALE PLATE INDENTIFICATION: If the scale plate shows an SCR number, this will identify it. Otherwise, provide the following information:
1. Square Root or Linear Graduations
2. Scale (e.g., 0-100, 25-0-100, etc.)
3. Number of Graduations (linear scales only)
4. Data (e.g., PSI (bar), inches of water column (meter), etc.)
5. Standard plates have black background

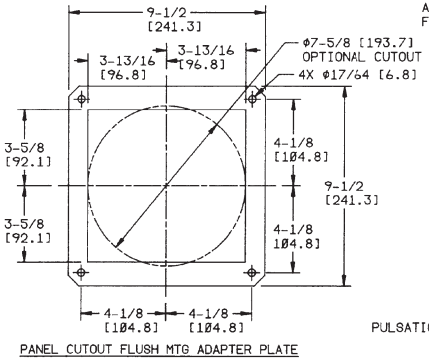
When ordering parts, specify serial number of instrument.

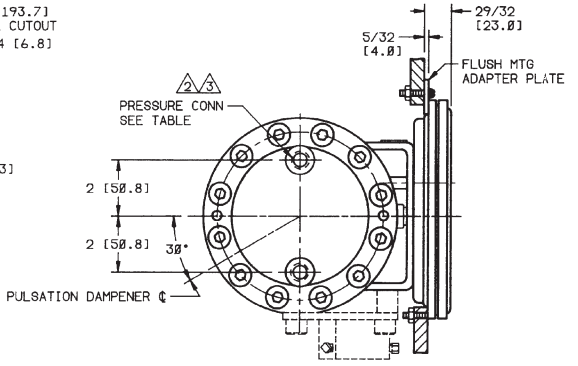
SECTION 5 - INSTALL/DIMENSIONAL DRAWINGS

5-1. 200A Drawing (0200-09043)



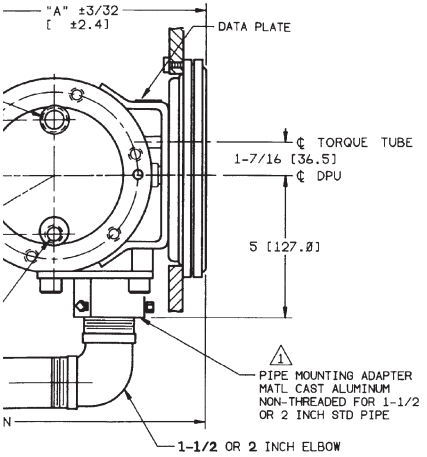






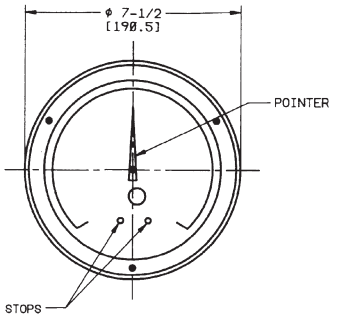
1000 PSI	8-29/32 [226.2]	ø6-5/8 [168.3]	1/2 NPT 2	1/4 NPT 2	12	FGD SST,316
					6	FGD STL,C1018
						CAST ALUM
2500 PSI	9-5/32 [232.6]	ø7-1/8 [181.0]	1/2 NPT 2	1/4 NPT 2	6	FGD STL,C1018
3000 PSI					12	FGD SST,316
4500 PSI						FGD STL,4142
6000 PSI			9/16-18 2	9/16-18 3	12	FGD STL,4142
						FGD SST,329
6000 PSI			1/2 NPT 2	1/4 NPT 2	12	FGD STL,4142
						FGD SST,329
PRESSURE RATING	DIM "A"	DIM "B"	TOP PRESSURE CONN	BOTTOM	NO. OF BOLTS	HSG MATERIAL

REVISIONS			
REV	EO/DRN	DESCRIPTION	DATE
Ø8	25913	REDRAWN	2-17-93



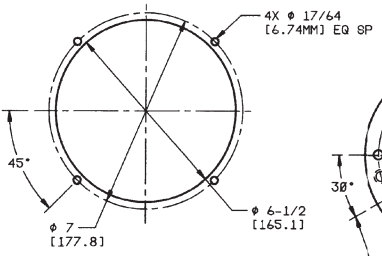
SIDE VIEW

PIPE MOUNTING

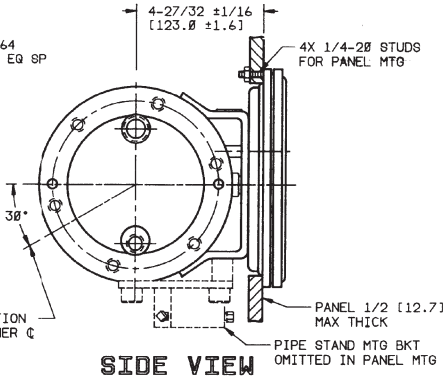


FRONT VIEW

(MOUNTING NOT SHOWN)



PANEL MOUNTING CUTOUT



SIDE VIEW

PANEL MOUNTING

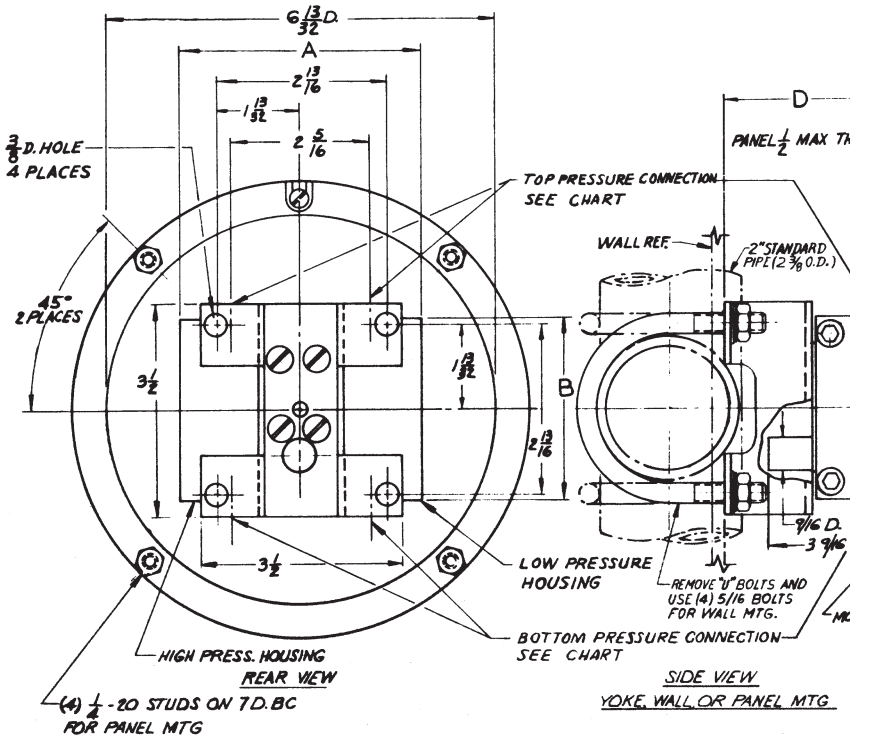
6. DIMENSIONS IN [ ] ARE IN MILLIMETERS.
5. FOR PANEL MOUNT REMOVE HEADS & PIPE MOUNTING BRACKET.
4. ALL STANDARD PIPE FITTINGS FURNISHED BY CUSTOMER.
3. SUITABLE FOR USE WITH AMINCO FITTINGS: AMERICAN INSTR. CO., SILVER SPRING, MD, OR EQUIV.
2. CAN BE REVERSED WHEN ORDERED OR ROTATED 180° IN THE FIELD.
1. PIPE MTG ADAPTER OF CAST ALUMINUM WILL BE FURNISHED UNLESS OTHERWISE SPECIFIED. SPECIFY PIPE SIZE WHEN ORDERING THREADED STEEL ADAPTER.

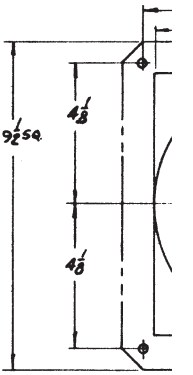
NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
TOLERANCES ARE: FRACT ± 1/32; .XX ± .01; .XXX ± .005; ANGLES ± 2°
REMOVE ALL BURRS AND SHARP EDGES EQUIVALENT TO .01R MAX.
SURFACE ROUGHNESS 125

BARTON CITY OF INDUSTRY, CA U.S.A.		
TITLE: OUTLINE DIM DWG, M200 DIFF PRESS IND,WALL/PNL		
SIZE: D	FSCM NO.: 05991	DRAWING NO.: 0200-08043
SCALE	C/R 02-17-93	SHEET 1 OF 1

5-2. 227A Drawing (0227-09013) Standard



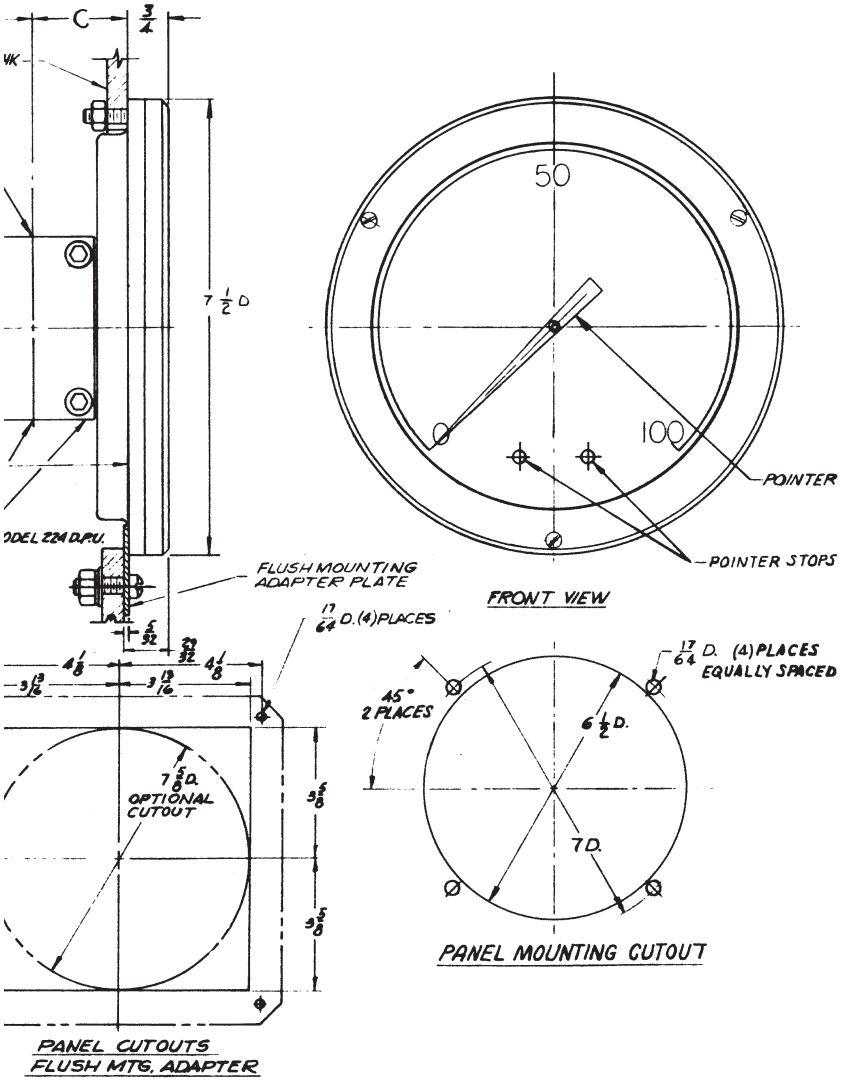


2. ⊕ CAN BE REVERSED WHEN ORDERED OR CAN BE ROTATED 180° IN THE FIELD.

1. ⊖ SUITABLE FOR USE WITH AMINCO FITTINGS OR EQUIV. (AMERICAN INST. CO. SILVER SPRINGS, MD.)

NOTES.

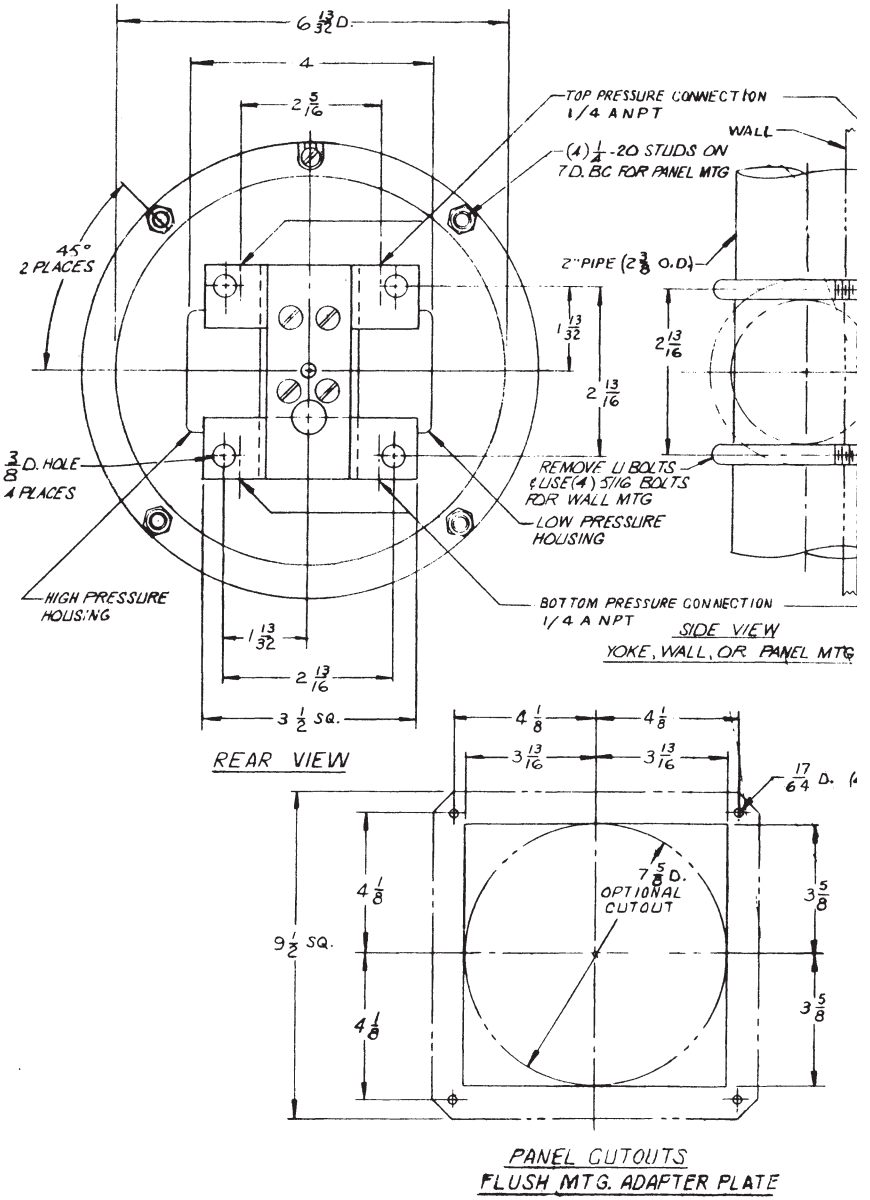
PRESSURE RATING	HOUSING MATERIAL	TOP PRESSURE CONNECTIONS	BOTTOM PRESSURE CONNECTIONS	A	B	C	D
10 000 PSI	E4140 ALLOY ST.	1/4 ANPT ⊖ 9/16-18 UNF	1/4 ANPT ⊖ 9/16-18 UNF	4 3/8	3 1/4	1 51/64	2 3/4
6000 PSI	316 ST. ST.	⊕ 1/2 ANPT ⊖ 9/16-18 UNF	⊕ 1/4 ANPT ⊖ 9/16-18 UNF				
	CR. ST. C1018	⊕ 1/2 ANPT ⊖ 9/16-18 UNF	⊕ 1/4 ANPT ⊖ 9/16-18 UNF				
3000 PSI	316 ST. ST.	⊕ 1/2 ANPT	⊕ 1/4 ANPT	4 1/8			
	CR. ST. C1018	⊕ 1/2 ANPT	⊕ 1/4 ANPT				
1500 PSI	316 ST. ST.	1/4 ANPT	1/4 ANPT	4	2 15/16	1 43/64	2 5/8
	CR. ST. C1018						
1000 PSI	BRASS BAR FED. SPEC QQ-B-637	1/8 ANPT	1/8 ANPT				

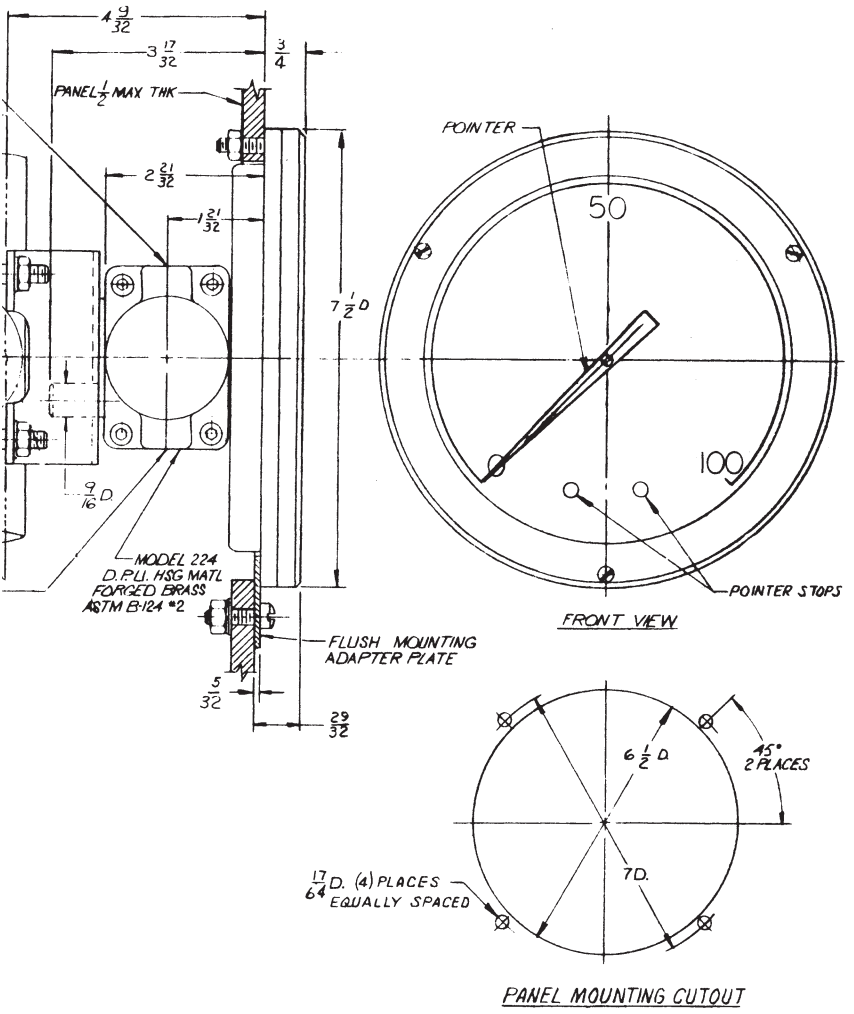


OUTLINE DIM MOD. 227 & 227A DIFF. PRESS. IND. YOKE, WALL OR PANEL MTG		
		DWG. 0227-0901-3 012

SECTION 5 - INSTALL/DIMENSIONAL DRAWINGS (Cont.)

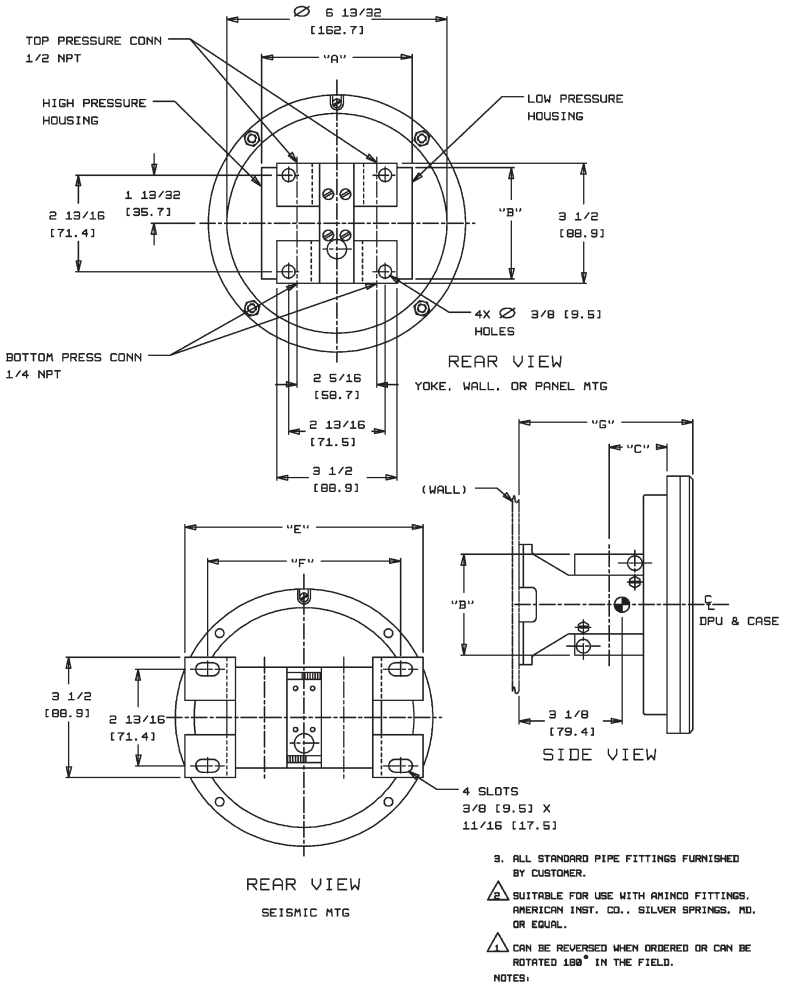
5-3. 227A Drawing (0227-09033) 500 psi Forged Brass





OUTLINE DIM MOD 227 & 227A DIFF. PRESS
IND. YOKE, WALL OR PANEL MTG
500 PSI FORGED BRASS
DWG. 02 27-0903-3 007

5-4. 227C Drawing (227C-10013)



3. ALL STANDARD PIPE FITTINGS FURNISHED BY CUSTOMER.

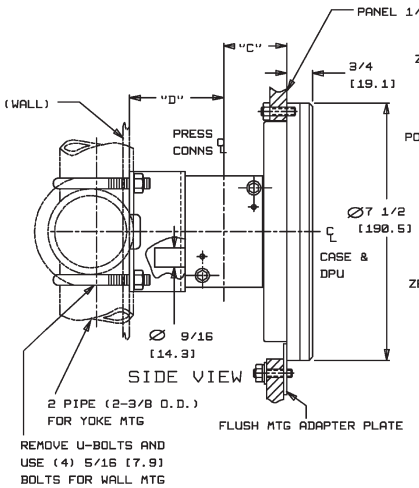
2 SUITABLE FOR USE WITH AMINCO FITTINGS. AMERICAN INST. CO., SILVER SPRINGS, MD. OR EQUAL.

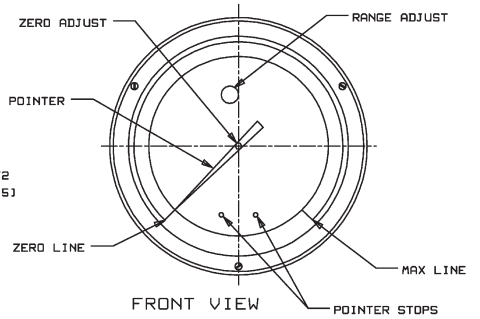
1 CAN BE REVERSED WHEN ORDERED OR CAN BE ROTATED 180° IN THE FIELD.

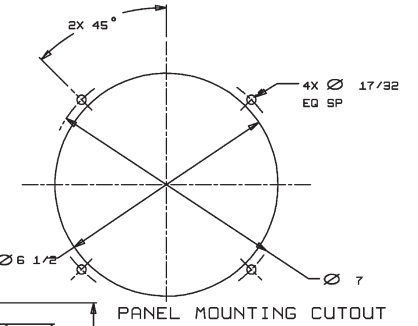
NOTES:

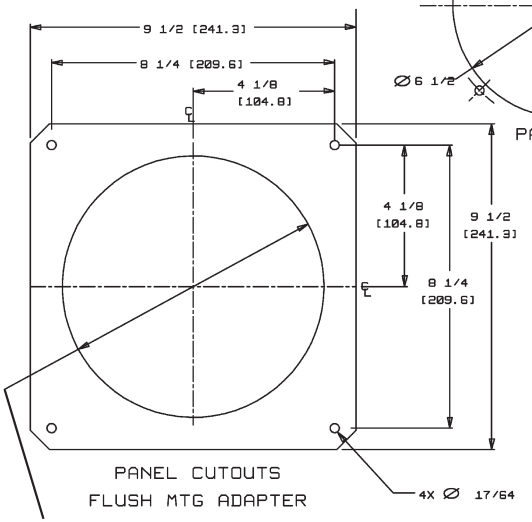
PRESSURE RATING	MATERIAL	DIM A ±.03	DIM B ±.01	DIM C	DIM D	DIM E	DIM F	DIM G	CONNECTION	
									TOP	BOTTOM
500 TO 1500 PSI	ALL	4 [101.6]	2-15/16 [74.6]	1-43/64 [42.5]	2-5/8 [66.7]	6-15/16 [176.2]	5-5/8 [142.9]	5-3/16 [131.7]	1/2 NPT 1 9/16-18 UNF 2	1/4 NPT 1 9/16-18 UNF 2
									1/4 NPT	1/4 NPT
3000 TO 10,000 PSI	ALL	4-3/8 [111.1]	3-1/4 [82.6]	1-27/32 [46.8]	2-3/4 [69.9]	7-5/16 [187.9]	8 [152.4]	5-19/64 [134.5]	1/2 NPT 7/16 MS 1/8 NPT	1/2 NPT 7/16 MS 1/8 NPT

REVISIONS			
REV	EO/DRN	DESCRIPTION	DATE
00	31596	DESIGN RELEASE	04-30-98









UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
TOLERANCES ARE:
FRACT ± 1/32
.XX ± .01
.XXX ± .005
ANGLES ± 2°
REMOVE ALL BURRS AND SHARP EDGES EQUIVLENT TO .01R MAX.
SURFACE ROUGHNESS 125

BARTON CITY OF INDUSTRY, CA U.S.A.

TITLE

OUTLINE DIM DWG, MOD 227C
DIFF PRESS INDICATOR

SIZE	FSCM NO.	DRAWING NO.
D		227C-10013

SCALE	1/2	323932.PRT	SHEET	1 OF 1

Product Warranty

A. Warranty

Barton Instrument Systems, L.L.C. warrants that at the time of shipment the products manufactured by Barton Instrument Systems, L.L.C. and sold hereunder will be free from defects In material and workmanship, and will conform to the specifications furnished by or approved by Barton Instrument Systems, L.L.C..

B. Warranty Adjustment

(1) If any defect within this warranty appears, Buyer shall notify Barton Instrument Systems, L.L.C. immediately.

(2) Barton Instrument Systems, L.L.C. agrees to repair or furnish a replacement for, but not install, any product which within one (1) year from the date of shipment by Barton Instrument Systems, L.L.C. shall, upon test and examination by Barton Instrument Systems, L.L.C., prove defective within the above warranty.

(3) No product will be accepted for return or replacement without the written authorization of Barton Instrument Systems, L.L.C.. Upon such authorization, and in accordance with instructions by Barton Instrument Systems, L.L.C., the product will be returned shipping charges prepaid by Buyer. Replacements made under this warranty will be shipped prepaid.

C. Exclusions from Warranty

(1) THE FOREGOING WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER EXPRESSED OR IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE.

(2) Components manufactured by any supplier other than Barton Instrument Systems, L.L.C. shall bear only the warranty made by the manufacturer of that product, and Barton Instrument Systems, L.L.C. assumes no responsibility for the performance or reliability of the unit as a whole.

(3) "In no event shall Barton Instrument Systems, L.L.C. be liable for indirect, incidental, or consequential damages nor shall the liability of Barton Instrument Systems, L.L.C. 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 Barton Instrument Systems, L.L.C. for the products delivered hereunder."

(4) The warranty does not extend to any product manufactured by Barton Instrument Systems, L.L.C. which has been subjected to misuse, neglect, accident, improper installation or to use in violation of instructions furnished by Barton Instrument Systems, L.L.C..

(5) The warranty does not extend to or apply to any unit which has been repaired or altered at any place other than at Barton Instrument Systems, L.L.C.'s factory or service locations by persons not expressly approved by Barton Instrument Systems, L.L.C..

Barton Instrument Systems, LLC

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