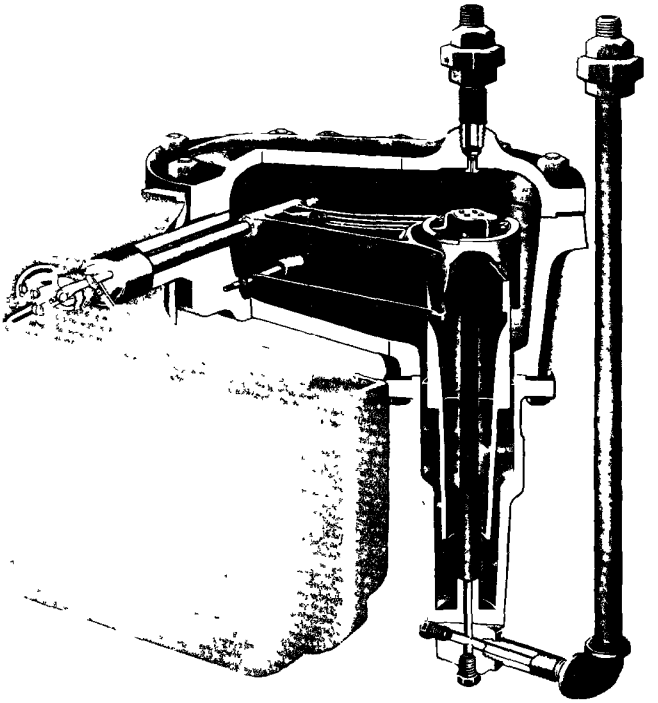


TYPE CC OR DC FLOW MECHANISM
800 PSIG SERVICE PRESSURE

Bailey Babcock & Wilcox

INDEX

CROSS REFERENCES

Type of Equipment	Instruction Section
Bailey Recorders and Indicators (includes Integrator)	M11-1
Pneumatic Flow Transmitter, Type CC13	P22-4
Electric Flow Transmitter	
Type CC12, Model K or P (AC Service)	E22-2
Type CC12, Model VA (DC Service)	E22-5
Bailey Boiler or Ratio Meter	
Air Flow Mechanism	M61-1
Recording Mechanism	M11-1
Instrument Connecting Piping	G18-1
Orifices and Flow Nozzles	G22-1

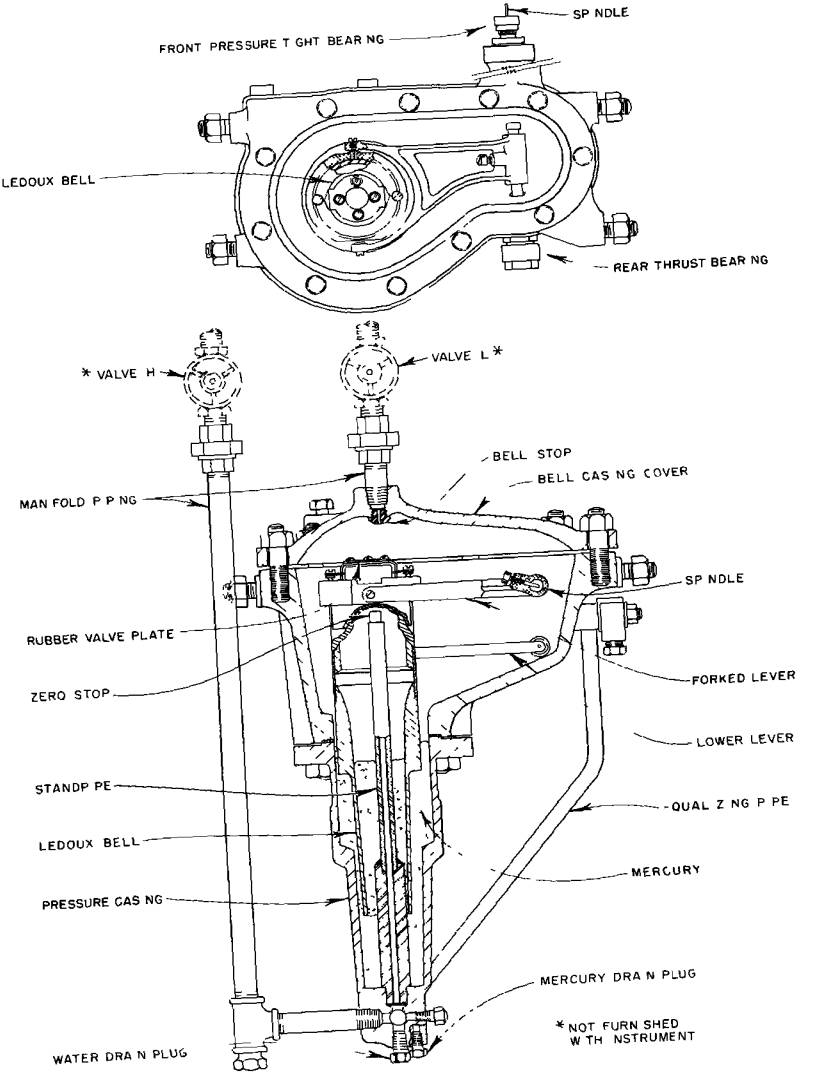


FIGURE 1 Type CC or DC Flow Mechanism

INSTALLATION

1. Mount instrument as outlined under "Installation" in Instruction Section covering Recorder, Indicator, or Transmitter (see "Cross References", page 3)

2. Level instrument at flow mechanism pressure casing gasket recess (Figure 3) to insure that Ledoux bell operates without friction. Level instrument from left to right and from front to back. Then fasten securely.

3 Assemble short lengths of manifold piping (furnished with instrument) to bell casing (Figure 1). For air or gas flow measurement, note that high pressure pipe H consists of a volume chamber to absorb pressure surges (Figure 2).

4. Make piping connections to Primary Element in accordance with Instruction Section G18 1, "Instrument Connecting Piping".

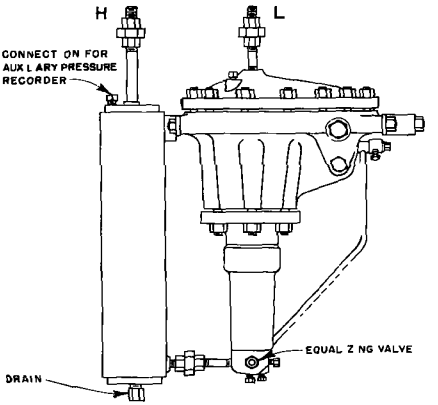


FIGURE 2 - Piping With Volume Chamber for Air or Gas Flow Measurement

PREPARATION FOR SERVICE

If instrument is being placed in service for the first time, follow steps 1 thru 11.

1 Remove strings, blocking, and packing from inside pressure casing. Handle all moving parts with care to prevent damage and misalignment.

2 Check that pressure casing passages (Figure 3) are clear as follows:

a. With equalizing valve closed, blow compressed air thru high pressure pipe H (Figure 1)until air flows freely thru top of standpipe

b. Open equalizing valve with key furnished.

c. Cover top of standpipe with thumb Blow compressed air thru high pressure pipe until air flows freely thru equalizing passage inside pressure casing (beneath spindle)

3 Mercury required to operate flow mechanism is shipped in a plastic container Carefully pour mercury into pressure casing, making sure none enters standpipe (To avoid splatter, pressure casing may be half filled with distilled water before pouring mercury into pressure casing. DO NOT add water if used for air or gas measurement.) Do not spill mercury during filling operation

4. Place depth gage across top of gasket recess (Figure 3) and measure depth of mercury level from gasket recess of pressure casing. End of gage should just touch surface of mercury without denting it. Measured depth should correspond to figure stamped on Ledoux bell casing (Figure 4). If measured depth is greater than depth marked on casing, add pure mercury to bring level to required depth

5. Check that calibrating weights have not become detached from bell. Bind loose weights to bell with wire keepers wound around heads of locking screws (Figure 4)

6. Install Ledoux bell in pressure casing as follows (refer to Figure 4).

a For steam or water flow measurement only, remove brass screw from top of Ledoux bell

b. Grasp forked lever in one hand and lower bell thru bell holder, fitting bell clamp ends into recess on each side of bell holder. Do not force forked lever beyond normal travel limit.

c. With bell clamp ends resting on bottom slot in bell holder, turn bell 90 degrees to right or left.

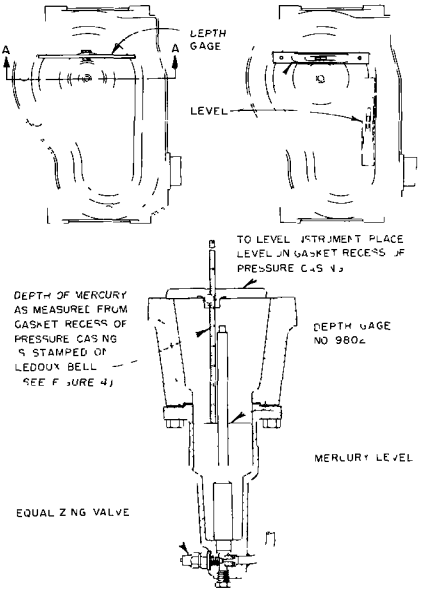


FIGURE 3 Level Instrument and Check Mercury Depth

d Slowly lower bell and forked lever assembly until bell rests on top of standpipe.

e. Lock bell in place by turning locking screws clockwise to draw ends of bell clamp against top groove in bell holder.

f For air or gas flow measurement only, press Ledoux bell cap (Figure 5) firmly over top of bell Make certain cap does not rub against forked lever thru its full range of travel

7 For steam or water flow measurement only, fill pressure casing nearly to top with clean distilled water. With equalizing valve open, remove air from bell as follows

a Grasp bell around top and slowly move bell up and down to allow trapped air to escape thru air vent hole Continue this operation until no more air bubbles appear Do not raise bell above water level in pressure casing

b. Check that Ledoux bell settles from a position corresponding to 10% flow to zero within one minute If not, check as follows

(1) air trapped under bell
(2) dirt accumulation on standpipe
(3) bell rubbing against standpipe or pressure casing

8. If instrument is being placed in service for the first time, see "Preparation for Service" in Instruction Section covering recording indicating, or transmitting component

9. Check flow mechanism calibration as outlined on page 9

10. Close pressure casing as follows

a. For steam or water flow measurement, replace brass screw in Ledoux bell

b. Position cover gasket in recess of pressure casing (Figure 3).

c. Bolt cover to casing Tighten cover nuts to 25-30 ft lb torque.

d For steam or water flow measurement, remove plug from top of pressure casing cover. Open equalizing valve and slowly pour water thru cover plug hole until casing is completely filled with water. Replace and tighten plug Continue to pour water into low pressure connection L until water flows from high pressure connection H

11 Place instrument in service as outlined under Operation"

OPERATION

Starting Instrument
Steam or Water Flow

Before placing instrument in service, make certain there is flow thru line at source of measurement

1. Blow down connecting piping as outlined in Instruction Section G18 1, "Instrument Connecting Piping" For steam flow measurement, allow sufficient time for steam to condense in connecting lines before proceeding

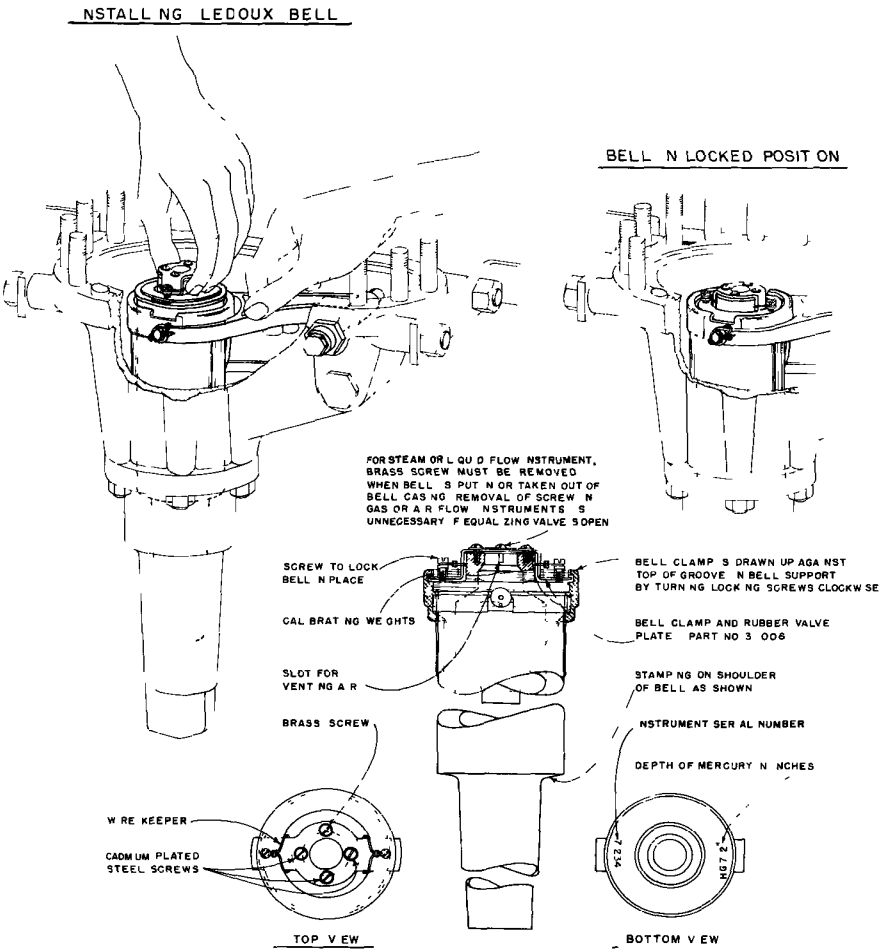


FIGURE 4 - Installation of Ledoux Bell

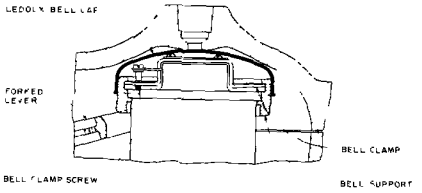


FIGURE 5 Ledoux Bell Cap for Air and Gas Flow Measurement

2. Refer to Figure 1 Connect instrument piping to manifold piping at unions H and L. Tighten unions only hand tight.

3 With instrument valves H and L closed open equalizing valve.

4. Loosen union H slightly Crack valve H and allow liquid to bleed thru union until water flows smoothly and free of bubbles. Tighten union and close valve H. Repeat this operation on L side of instrument

5 If instrument is mounted above Primary Element, open air cocks at ends of risers in connecting lines and allow excess air to escape.

6. Slowly open valve L, close equalizing valve, and slowly open valve H Instrument should respond immediately when valve H is opened.

7. Check installation for leakage as outlined under Inspecting for Leakage

Starting Instrument
Air or Gas Flow

Before placing instrument in service, make certain there is flow thru line at source of measurement

1 Blow down connecting piping as outlined in Instruction Section GI8-1.

2. Refer to Figure 2 Make instrument piping connections to manifold piping at unions H and L

3. With instrument valves H and L closed, open equalizing valve

4. Slowly open valve L, close equalizing valve, and slowly open valve H Instrument should respond immediately when valve H is opened

5 Check installation for leakage as outlined under "Inspecting for Leakage below

Inspecting for Leakage

1. Check for leakage at pressure casing joints If leakage exists, remove instrument from service (see below) and check gasket for damage or incorrect installation, replace if defective Perform steps 10 and 11 under "Preparation for Service" to return instrument to service

2 Inspect front pressure tight bearing (inside Recorder, Indicator, or Transmitter case) for leakage (refer to 'Corrective Maintenance", page 11.

3 Inspect entire connecting piping installation for leakage For instruments measuring air or gas, check for leakage with a soapsuds solution

Removing from Service

1 Refer to Figure 1 If instrument is to be removed from service temporarily, close valves H and L and immediately open equalizing valve Pen or pointer should go to zero within one minute

2. If instrument is to be out of service for an extended period or if internal maintenance is required, close shut off valves at source of measurement, disconnect unions at manifold piping, and open instrument valves H and L to permit connecting lines to drain (for steam or liquid flow measurement, do not return instrument to service until pressure is restored to lines to prevent air from entering connecting lines).

3 If instrument is to be relocated, remove Ledoux bell and mercury from pressure casing before moving instrument Allow inside of casing to dry thoroughly before storing Do not coat inside of casing with oil or rust preventative

4. Seal manifold piping connections H and L from dirt or moisture

5 To return instrument to service, follow instructions under Preparation for Service , steps 4 thru 11

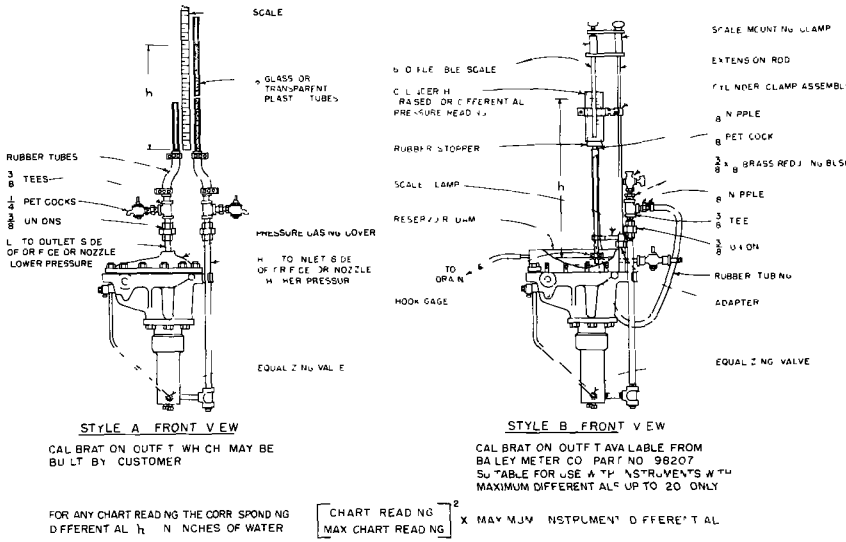


FIGURE 6 Calibration Outfit for Instruments Measuring Steam or Liquid Flow

ADJUSTMENT AND CALIBRATION

Calibration Testing Outfits

To check instrument calibration, use a testing outfit similar to the type shown in Figure 6 or 7 Figure 6 shows two testing outfits for calibrating instruments measuring steam or liquid flow. Calibration is accomplished by applying differential heads to the instrument and checking the resulting readings against the corresponding chart or scale value given in Table I.

When using Style A outfit

1. Assemble calibration outfit as shown.

2. With equalizing valve and petcock on H side open, pour clean water into glass tube on L side until water flows thru open petcock

3 Close petcock H and pour more water in L pipe. Allow water levels in H and L to equalize (Squeeze rubber tube connections to remove trapped air.) Then close equalizing valve

4 To take reading pour water into glass tube on H side

When using Style B outfit

1 Position cover gasket on top of pressure casing then bolt on reservoir dam.

2. With equalizing valve open, check that Ledoux bell rests on top of standpipe, recording pen reads zero, air is not trapped under bell (see step 7b under "Preparation for Service"), and brass screw on top of bell is secure.

3. Slowly pour water into cylinder H until reservoir dam is half full Open petcock and squeeze rubber tubing to remove trapped air. Raise and lower cylinder H several times, opening petcock to release trapped air each time cylinder is above petcock

4 With cylinder H at lower extension of rod, allow water levels in cylinder and reservoir dam to equalize With levels equal, bell should rest on standpipe and pen or pointer should read zero chart or scale If not, make

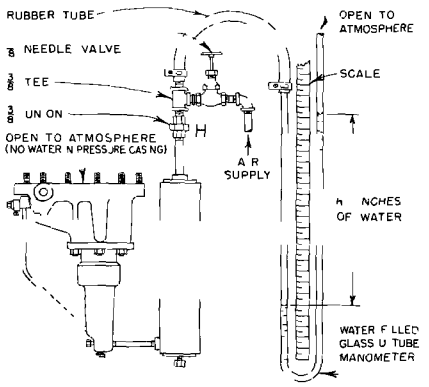


FIGURE 7 - Calibration Outfit for Instruments Measuring Air or Gas Flow

check in step 7b under "Preparation for Service", page 5. Then close equalizing valve

5 When checking calibration, always observe the following

a. Add water to cylinder H whenever it is to be raised so water level never goes below bottom of cylinder. (This prevents air from entering rubber tubing.)

b Before taking any differential head reading, adjust scale so point of hook gage just touches surface of water in pressure casing

Calibration Procedure

1. For special ranges refer to Specification Sheet in front of this Instruction Book

2 For Electric or Pneumatic Transmitters, refer to Transmitter Instruction Section for preliminary adjustment of transmitting mechanism Then check flow mechanism as outlined below

NOTE If instrument has been in service, clean flow mechanism thoroughly as outlined in steps *1 thru 8 under "Service Outline page 12*, before proceeding with calibration

3 Refer to Table I Apply head corresponding to 70% flow Pen or pointer should read 70% chart or scale

4 Increase head slightly then return to value in step 3. Pen or pointer should return to 70% chart or scale Correct amount of mercury in pressure casing until average chart or scale reading is 70%.

a If reading is low, add a few grams of pure mercury

b. If reading is high, remove mercury

NOTE Readings taken with pen or pointer coming up to differential head or scale reading will be slightly less than readings taken coming down to the same head. When calibrating the instrument, therefore use the average of these two readings If readings differ by more than 3% at 10% chart or scale or by 1% at 40% and 70% chart or scale, check for excessive friction in mechanism (see step 7b under "Preparation for Service").

5. Refer to Table I Apply head corresponding to 10% flow Pen or pointer should read 10% chart or scale

6 Decrease head then return to value in step 5. Pen or pointer should return to 10% chart or scale Correct calibrating weights until average chart or scale reading is 10%

a If reading is low, remove calibrating weights (Figure 4) from top of Ledoux bell to correct reading

b If reading is high, add weights

TABLE I

Per Cent Chart or Scale	Differential Pressure Ranges Inches of Water at 68F			
	0 to 53"	0 to 57 22"	0 to 120"	0 to 129 55
10	53	57	1 20	1 30
20	2 12	2. 29	4 80	5 18
30	4 77	5 15	10 80	11 66
40	8 48	9 16	19 20	20 73
50	13 25	14 31	30 00	32 39
60	19 08	20 30	43 20	46 64
70	25 97	28 04	58. 80	63 48
80	33 92	36 32	76 80	82 91
90	42. 93	46 35	97 20	104 94
100	53 00	57 22	120 00	129 55

7 If calibrating weight adjustment was necessary in step 6, repeat steps 3 and 4 to recheck 70% reading

8 Repeat steps 3 thru 8 until average readings at 10% and 70% are correct. With correct 10% and 70% readings, all other readings will be within the accuracy of the instrument providing the instrument is clean, free from friction, and no air is trapped under Ledoux bell

9 Apply zero head to instrument If pen or pointer does not return to zero chart or scale. check for air trapped under bell (see step 7b under "Preparation for Service"). Then repeat entire calibration procedure

10. If Recorder includes an integrator, check integrator calibration as outlined in Instruction Section M11 1. Use cylinder H or manometer to give pen readings.

11 Perform steps 10 and 11 under "Preparation for Service', page 5, to return instrument to service.

ROUTINE MAINTENANCE

1 Thoroughly clean and flush pressure casing once a year, removing rust and scale. Refer to "Service Outline", page 12

2 For instruments measuring air or gas flow, periodically open drain valve in bottom of volume chamber (Figure 2) and remove moisture If volume chamber must be drained frequently, install settling chambers in lines as shown in Instruction Section G18 1

3. Check that reservoirs used for steam and hot water measurement are maintained level (lengthwise) with each other. Refer to Instruction Section G22-1

4. Periodically check for leakage at connecting piping joints with soapsuds solution (for air or gas applications). If connecting piping becomes hot, piping (or equalizing valve) may have sprung a leak. Immediately remove instrument from service for repair. Refer to Instruction Section G18 1

5. Periodically blowdown connecting piping to prevent plugging with dirt, scale, or sediment. Make certain all piping, fittings, and valves are satisfactory for maximum pressure and temperature that may be encountered. If connecting piping tends to collect considerable dirt, install settling chambers. Refer to Instruction Section G18-1 Whenever steam lines have been blowndown, allow sufficient time for steam to condense before placing in service.

6. Do not oil moving parts. Oil, instead of being beneficial, causes dirt to accumulate and interferes with operation

CORRECTIVE MAINTENANCE

For corrective maintenance procedures for Recording, Indicating, or Transmitting component, refer to applicable Instruction Section under 'Cross References", page 3

Pen or Pointer Fails to Come to Zero

1 Close equalizing valve. Close valve H and open valve L

2. Crack union below valve H and allow water to bleed thru connection

3 When no further pen or pointer motion is evidenced (Ledoux bell resting on standpipe), quickly tighten union

4 If pen or pointer does not read zero, reset it as outlined in applicable Instruction Section covering Recording, Indicating, or Transmitting component (see "Cross References", page 3).

5. If, after returning instrument to service, pen or pointer fails to come to zero, thoroughly clean and check calibration as outlined under Service Outline page 12.

Front Pressure Tight Bearing Leaks

If front pressure tight bearing (Figure 9) shows evidence of leakage, tighten bearing cap finger tight. If leakage continues, replace washer as follows

1 If instrument includes an integrator, remove integrator roller arm while instrument is in service and is recording or indicating upward on chart or scale (see Instruction Section M11 1)

2 Close instrument valves H and L and immediately open equalizing valve (Figure 1).

3 When pen or pointer reaches zero, loosen drive arm set screw and carefully remove drive arm from spindle (do not scratch or bend spindle)

4. Remove bearing cap and washer and follower assembly (Figure 9) from spindle

5. Replace washer and follower assembly as a unit.

6 Reassemble bearing cap, tighten to finger tightness

7. Assemble drive arm to spindle and tighten set screw. Make certain pen or pointer is on zero (or as close as possible if instrument includes an integrator or other linkage).

8 To return instrument to service, refer to "Operation", page 6

9. If instrument includes an integrator, replace integrator roller arm when pointer reaches 50% scale

10. Test for instrument zero setting as outlined under "Pen or Pointer Fails to Come to Zero above

Instrument Does Not Check Weighed Water Test or Other Known Standard

1. Check flow mechanism for friction

2 For a Recorder

a Check that correct chart, chart or scale factors, and integrator factor are used

b. Check flowing conditions of fluid to determine if correction factors are required (see Instruction Section G99 2)

3. Check pointer (and integrator) zero setting (see Instruction Section M11-1)

4 For Recorders, check chart drive timing

5. Check integrator calibration (Instruction Section M11 1)

6 Inspect instrument for leakage (see "Routine Maintenance", page 11)

7. Inspect Primary Element installation (see Instruction Section G22-1)

8 Check instrument calibration (see Adjustment and Calibration ', page 9)

Service Outline

1. Refer to Figure 1 Close instrument valves H and L and open equalizing valve Remove plug from pressure casing cover Remove casing cover and cover gasket.

2 For instruments measuring air or gas flow, remove cap from top of Ledoux bell For instruments measuring steam or water flow, remove brass screw from top of bell (Figure 4)

3 Remove Ledoux bell as follows (refer to Figure 4)

a Grasp forked lever in one hand and loosen locking screws (several turns counter clockwise)

b Raise forked lever and rotate bell to a position where it can be lifted out of bell holder. Do not lift forked lever beyond normal travel limit.

c. Slowly lift bell from pressure casing to prevent mercury from being pulled into standpipe and to permit pressures to equalize thru air vent hole

4 For instruments measuring steam or water flow, remove water drain plug at bottom of pressure casing (Figure 1) to drain water to top of standpipe Siphon remaining water from pressure casing to about 1, 2 inch above mercury Do not draw mercury out with water

5. Remove mercury drain plug (Figure 1) Drain mercury into glass or earthen container (or other material which will not amalgamate with mercury)

6 With drain plugs removed, thoroughly flush casing. Remove all grease, dirt or sediment on walls of casing and standpipe

7. With brush and scouring power remove grease and dirt from inside and outside of Ledoux bell Wipe with clean cloth

8. Check all moving parts and linkage for friction

9 Check mercury for dirty or dull appearance Skim off deposits of amalgam scum from top of mercury or strain thru cloth If mercury remains dull, replace with new mercury

10 Return instrument to service as outlined under "Preparation for Service", page 5

REPLACEMENT PARTS

Spare Parts Kit

The Spare Parts Kits shown in Figures 8 and 9 should be carried in stock Specify the Spare Parts Kit part number to order a complete kit.

Ordering Individual Parts

Figures 8 and 9 are Parts Drawings for the Type CC and DC Flow Mechanism Figure 10 is a Parts Drawing for Rear Thrust Bearing Assembly and Figure 11 is a Parts Drawing of a recommended Calibration Outfit Normally these drawings will apply to the units furnished However, there may be individual differences in specific units because of

a Design changes made since the printing of this Instruction Section

b Special design of equipment furnished to make it more suitable for special applications

Therefore, when ordering parts, assure receipt of correct replacements by specifying on order

1. The complete nomenclature (stamped on instrument nameplate) of instrument for which parts are desired

2. The Parts Drawing on which each part is illustrated. (The Parts Drawing Number is given in the Figure caption.)

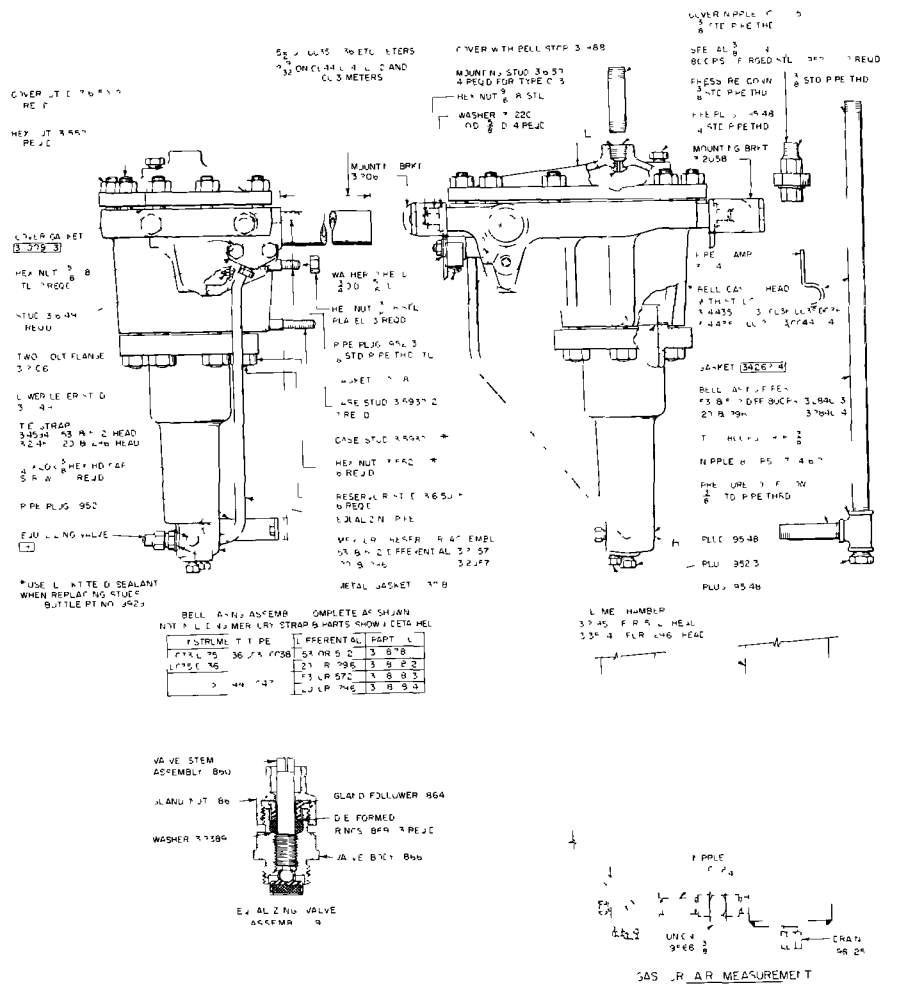
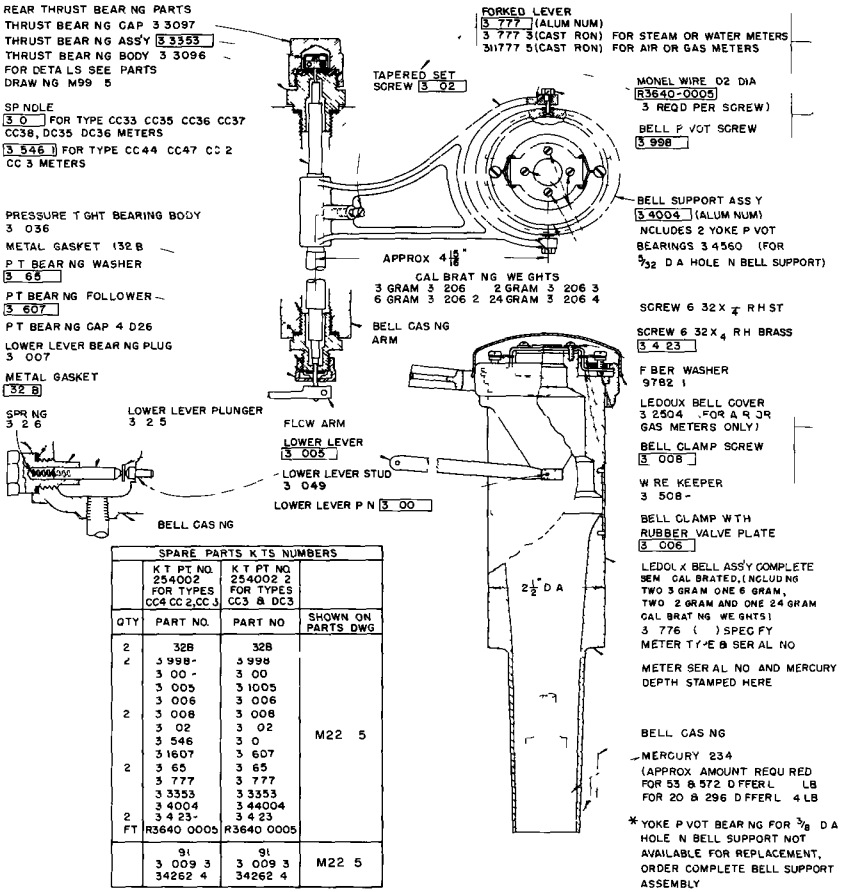


FIGURE 8 Parts Drawing M22 5, Type CC or DC Ledoux Bell Pressure Casing, 800 PSIG Service Pressure



SPARE PARTS K TS NUMBERS			
	K T PT NO. 254002 FOR TYPES CC4 CC 2, CC 3	K T PT NO. 254002 2 FOR TYPES CC3 & DC3	
QTY	PART NO.	PART NO	SHOWN ON PARTS DWG
2	32B	32B	M22 5
4	3 998-	3 998	
	3 00 -	3 00	
	3 005	3 1005	
	3 006	3 006	
2	3 008	3 008	
	3 02	3 02	
	3 546	3 0	
	3 1607	3 607	
2	3 65	3 65	
	3 777	3 777	
	3 3353	3 3353	
	3 4004	3 44004	
2	3 4 23-	3 4 23	
FT	R3640 0005	R3640 0005	
	91 3 009 3 34262 4	91 3 009 3 34262 4	M22 5

NOTE [ ] CENT F ES PART NCLUDED N SPARE PARTS K TS

FIGURE 9 - Parts Drawing M22 15, Type CC orDC Ledoux Bell Flow Mechanism, 800 PSIG Service Pressure

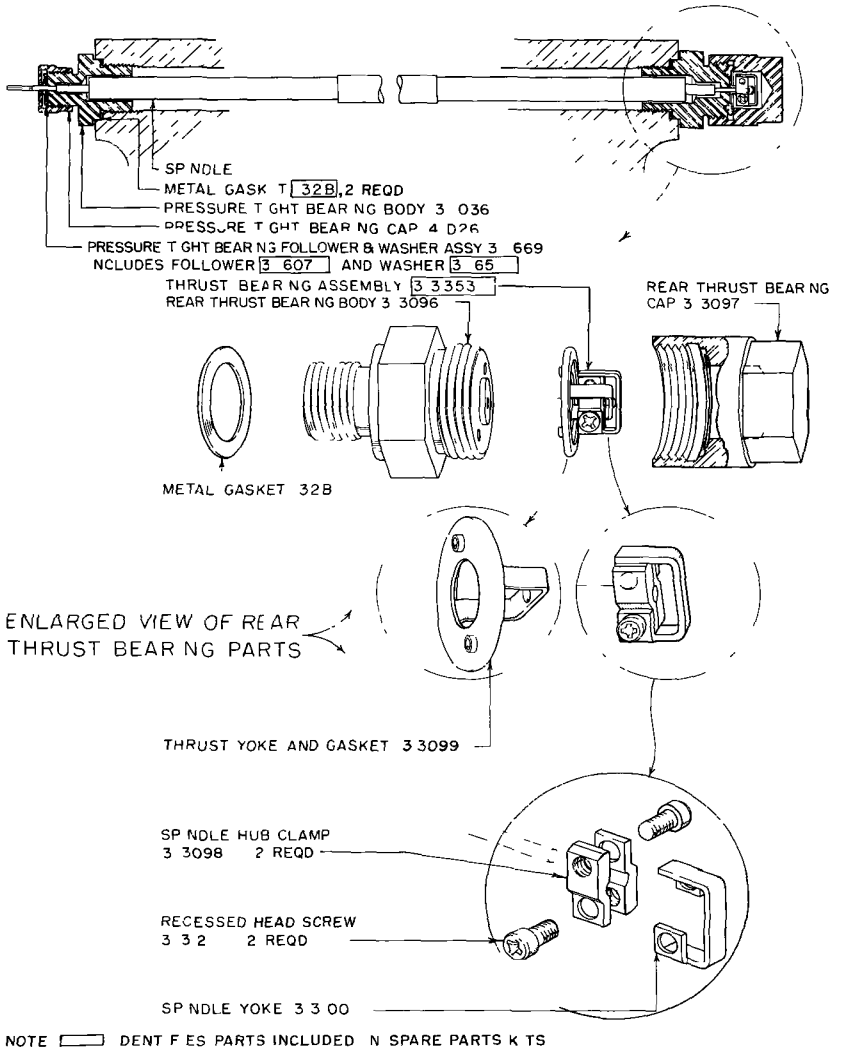


FIGURE 10 - Parts Drawing M99-15, Rear Thrust Bearing and Spindle Assembly

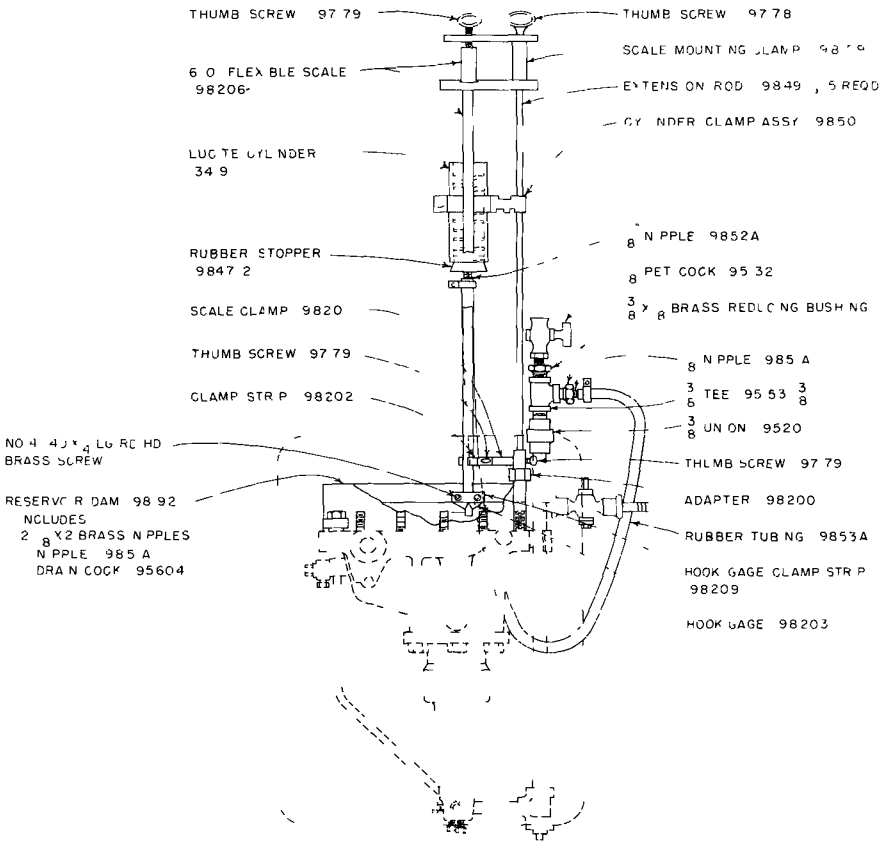


FIGURE 11 - Parts Drawing G99 45, Calibration Outfit Pt. No. 198207A1

Product Warranty

Bailey Meter Company warrants the products manufactured by it to be free from defects in material and workmanship and will repair or replace, at its option, free of charge, f o b its factory such part or parts which prove defective within one year from date of shipment In respect to any products which are not an integral part of a product manufactured by the Company, the warranty given by the manufacturer thereof shall apply

Shipping Damage

We strongly recommend that you inspect and test your instrument as soon as you receive it If the instrument is damaged or operates improperly, notify the carrier for inspection of the shipment The carrier's claim agent will prepare a report of damage a copy of which should be forwarded to your nearest Bailey District Office (see back cover for location) The District Office will then tell you how to have the instrument repaired or replaced

Service

The Bailey Meter Company is vitally concerned that your Bailey instrument provides continued, fine performance This instruction manual is designed to fully describe the correct installation, operation and maintenance of your instrument under recommended conditions If the need arises, factory trained Service Engineers are on call for prompt, in plant maintenance Telephone or wire your nearby Bailey District Office to make arrangements for this service.

Replacement Parts and Supplies

Complete parts drawings and recommended spare parts kit information are included in this instruction manual When replacement parts or supplies are required for maintenance of your Bailey instrument, contact your nearest Bailey District Office (see back cover for location) Always specify complete data on the instrument nameplate on your inquiry or order for parts Common parts are available for shipment within 48 hours on a speed order basis

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