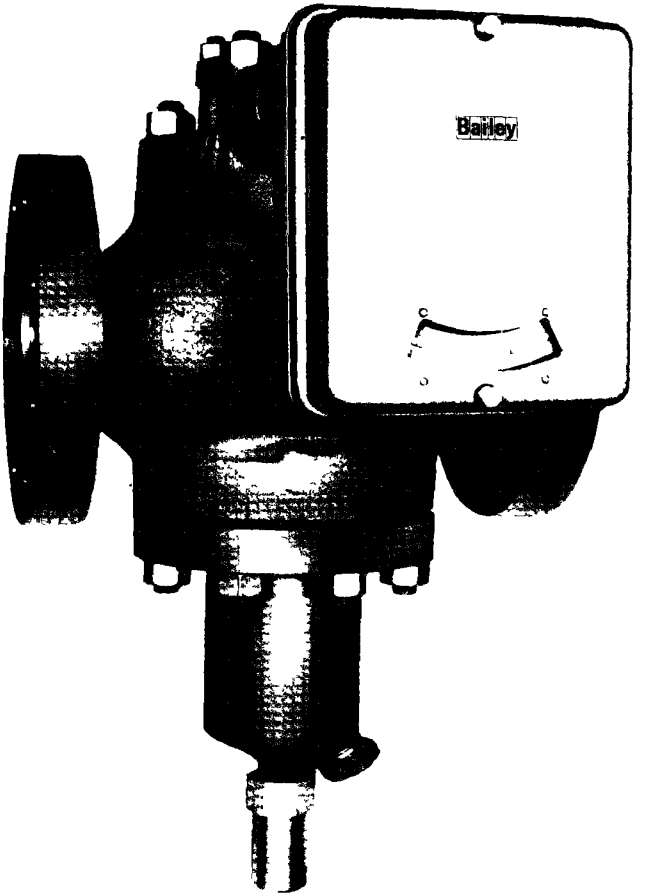
Product Instruction P22-7



Area Meter Type JR

Bailey Babcock & Wilcox

Bailey

WARNING

DO NOT INSTALL MAINTAIN OR OPERATE THIS EQUIPMENT WITHOUT READING UNDERSTANDING AND FOLLOWING PROPER Bailey Babcock & Wilcox INSTRUCTIONS AND MANUALS OTHERWISE INJURY OR DAMAGE MAY RESULT

LIST OF ILLUSTRATIONS

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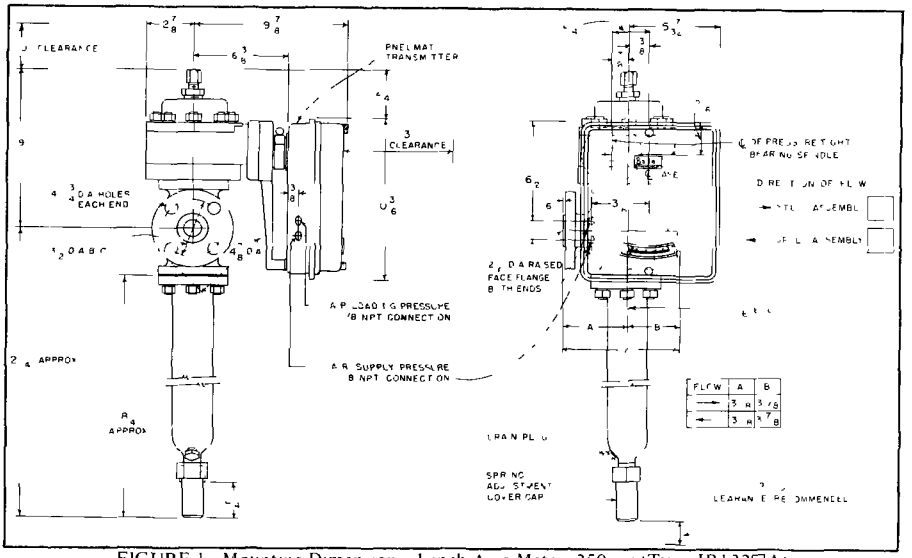


FIGURE 1 Mounting Dimensions 1 inch Area Meter, 250 psi (Type JR130□A)

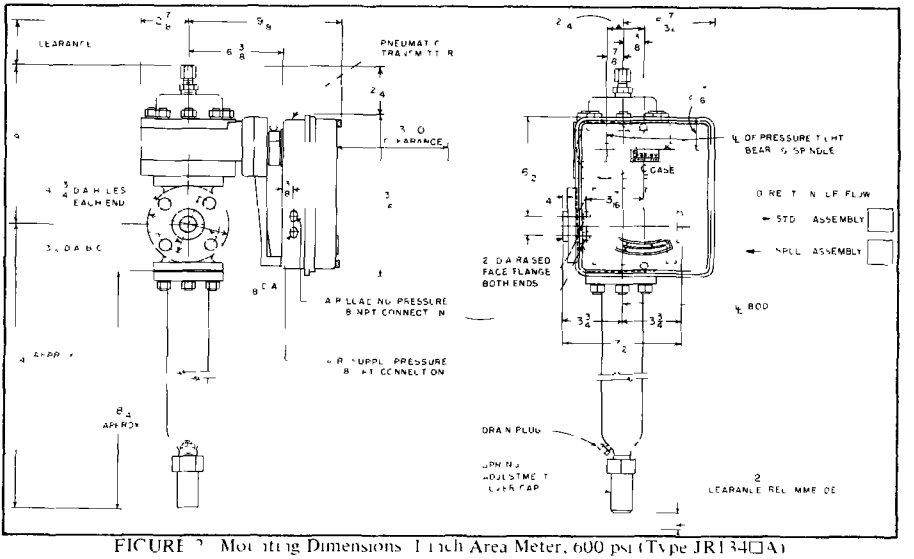


FIGURE 2 Mounting Dimensions 1 inch Area Meter, 600 psi (Type JR134□A)

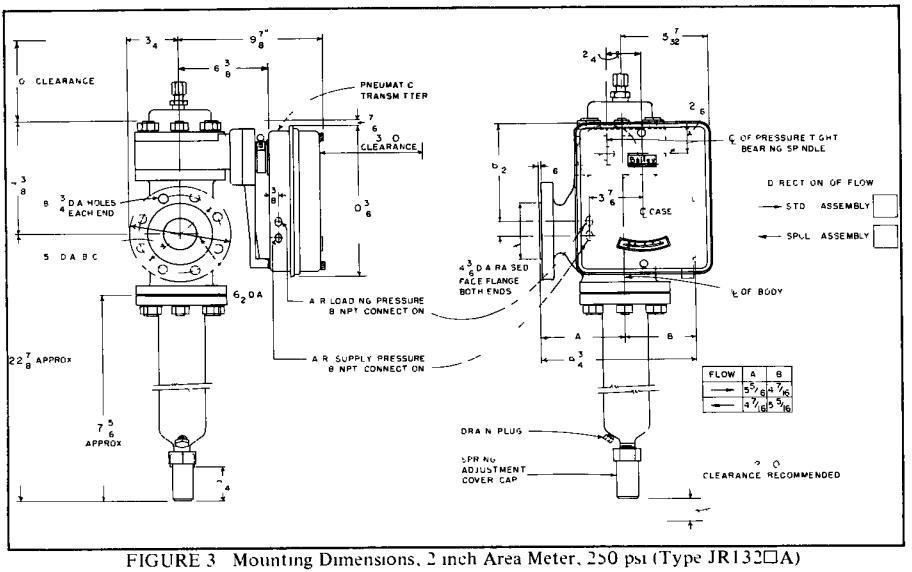


FIGURE 3 Mounting Dimensions, 2 inch Area Meter, 250 psi (Type JR132□A)

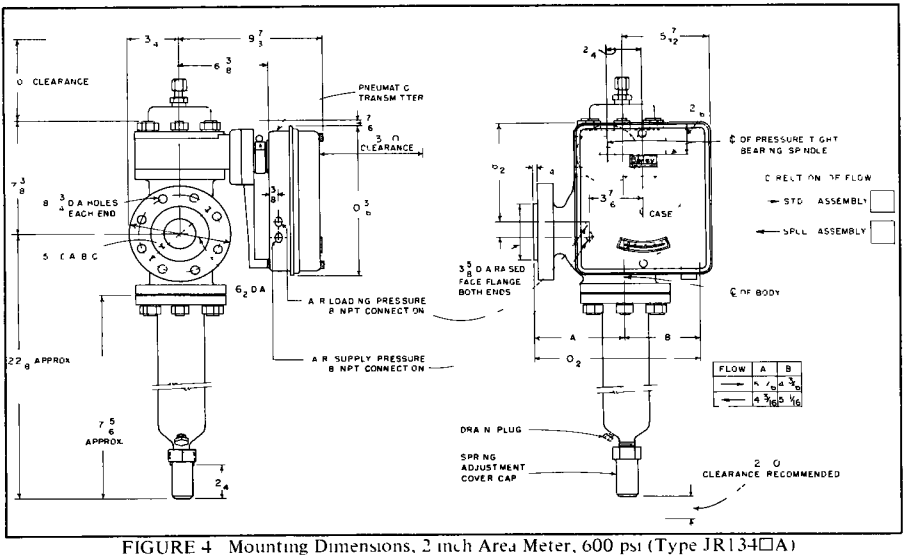


FIGURE 4 Mounting Dimensions, 2 inch Area Meter, 600 psi (Type JR134□A)

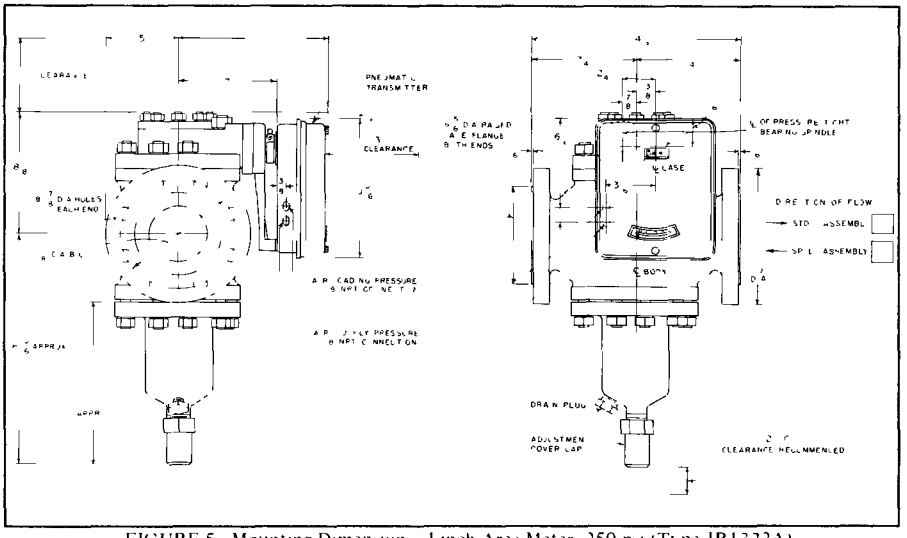


FIGURE 5 Mounting Dimensions, 4 inch Area Meter, 250 psi (Type JR132?A)

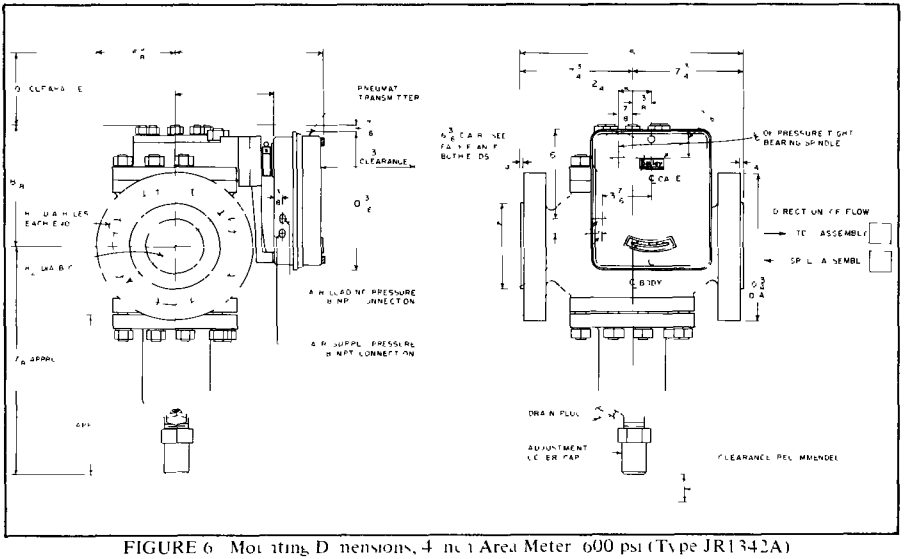


FIGURE 6 Mounting Dimensions, 4 inch Area Meter 600 psi (Type JR1342A)

INSTALLING THE AREA METER

The Type JR13 Area Meter is shipped completely assembled (A spring puller to be used as a calibration tool is also shipped with each meter)

1 Install meter directly in pipe line between standard mating flanges Loading spring should hang vertically Meter body flanges are 150 or 600 psig ANSI standard raised face design Refer to Figures 1 thru 6 for applicable mounting dimensions

2 Transmitter is mounted on meter with indicating scale facing outward when direction of flow is left to right If it is necessary, due to inaccessibility or lack of clearance, to reverse Transmitter, topwork assembly of Area Meter can be rotated 180 degrees on meter body Refer to "Rotating Topwork Assembly"

3 A dampener is included with all 1 inch and 2 inch Area Meters The dampener reduces meter pulsation occurring primarily in marine applications If dampener is not required for the specific meter application, remove rod as follows

a Remove cover screws (or locknuts from studs) and cover

b Hold metering plug stem locknut (Figure 10) with wrench to prevent stem from moving (Movement of stem will disturb factory calibration)

c Unscrew dampener rod from threaded extension of metering plug stem Discard dampener rod

d Replace cover

4 Refer to Instruction Section G18 2 for recommended methods and precautions for installing connecting tubing

5 Inspect indicating and transmitting mechanism connecting linkage for damage Remove shipping screw (identified by red warning tag) in lower right hand corner of Transmitter case

6 If meter is used for measurement of highly viscous fluids, such as pitch

a Heat and insulate entire meter body, including spring housing Steam tracing, electrical strip heaters, or a heating cable is recommended for heating Fiber glass or a similar material is recommended for insulating Keeping meter body temperature at flowing fluid temperature prevents less active fluid in meter from solidifying in spring chamber making meter inaccurate and/or inoperative

b If necessary, replace drain at bottom of spring housing with a nipple and valve assembly to facilitate blowdown procedures

c Install a bypass line around meter to facilitate checking meter operation particularly if flow thru the meter is constant over an extended period

7 Check Transmitter calibration as outlined under "Transmitter Adjustment Checks"

ROUTINE SERVICING

MEASURING MECHANISM

1 Every three or four months, remove drain plug from bottom of spring housing and thoroughly flush meter body Flush meter body more frequently if measured fluid tends to congeal

INDICATING AND TRANSMITTING MECHANISM

Weekly

1 Press Booster Unit orifice clean out plunger (Figure 7) to insure that orifice remains open and clean

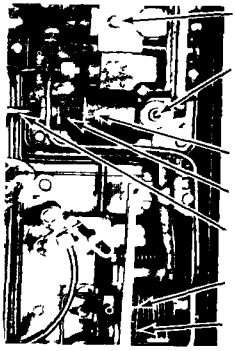


FIGURE 7 Routine Maintenance Check Points

NOTE Perform this operation only when associated equipment in the system has been transferred to MANUAL operation to ensure that the process will not be disturbed

2 Inspect nozzle tip and vane (Figure 7) for deposits of oil or dirt If necessary clean with a common solvent

Monthly

1 Inspect Booster Unit exhaust valve (Figure 7) for accumulations of oil, dirt, and or moisture If necessary replace filter in supply pressure port as follows

a Disconnect supply air tubing (Figure 7) and remove filter cap O Ring, and filter spring (Items 6, 7 and 8, Figure 29)

b Remove and replace filter assembly Make certain new filter is installed with open end facing inward

c Reassemble parts and reconnect tubing

CAUTION Filter in supply pressure port is included as added protection only and is not intended as a *replacement for the required clean* air supply

Periodically

1 Check air supply Make certain that clean air, free of oil dirt and moisture, is supplied to the Booster Unit

2 Clean Transmitter Deposits of oil and dirt make instrument operation sluggish or inaccurate

CORRECTIVE MAINTENANCE

If system operation indicates a discrepancy in pressure measurement which is suspected or traced to the Transmitter, check the following possible sources of error

TRANSMITTER OPERATION CHECKS

Transmitter must be in perfect calibration (see "Calibrating the Area Meter")

2 Air supply must be accurate and from a clean regulated source (Presence of oil around vane nozzle indicates contaminated supply source)

3 The vane nozzle and Booster Relay must be free of dirt or dust

4 Connecting piping to Transmitter must be clean and free of corrosion Sluggish operation may indicate corrosive build up in piping

5 All connecting tubing must be air tight Check all tubing for leakage with a leak detecting solution

6 Check operation of Booster Unit (see "Booster Unit Operation Checks", below)

7 Faulty records or measurements are often caused by the process itself Examine indications, records and system component operation carefully to locate faulty component equipment

BOOSTER UNIT OPERATION CHECKS

1 Push vane against nozzle to block air flow from nozzle (Figure 8) Transmitter output pressure should immediately start to increase to full supply pressure

2 Pull vane away from nozzle far enough to allow an unrestricted air flow from the nozzle

Transmitter output pressure should immediately start to decrease to zero

3 If Booster unit does not operate as described in steps 1 and 2, push orifice clean out plunger (Figure 7) to clear orifice (when performing this operation, make certain process will not be disturbed) If Booster continues to operate incorrectly, make the following checks and corrective adjustments

a Check that adjustable vane end is correctly positioned (Figure 8) When vane end is correctly positioned, nozzle tip is opposite center of vane (thinnest area) when midrange measured pressure is applied to Transmitter To adjust vane end position, apply midrange measured pressure to Transmitter, loosen nut holding vane end in place, and reposition vane end

b Check that vane is parallel to plane of nozzle tip (Figure 8) With Booster unit "at balance", press lightly against vane with pointed instrument at four or more points around nozzle tip (above, below, on either side) If pressure at any of these points produces the relationship shown in Figure 8, Sketch B, either vane is not parallel to plane of nozzle tip or there is a burr on nozzle tip To adjust, bend vane slightly If vane and nozzle tip relationship is still incorrect, rub a fine emery cloth across nozzle tip to remove possible burr

c Repeat steps 1 and 2 under "Booster Unit Operation Checks" above and note output pressure reading If Booster unit output is incorrect see "Fault Correction Chart"

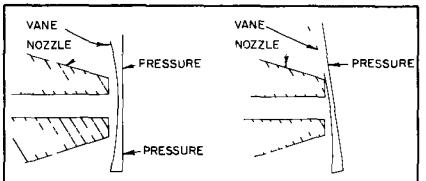
VANE REPLACEMENT (Figure 24)

1 Remove instrument from service and remove cover

2 Remove screws (47) holding vane and operating lever assembly (60) Remove assembly and disconnect vane (front) drive link (23)

3 Replace vane and operating lever assembly

4 Reconnect vane drive link and reposition vane and operating lever assembly



SKETCH A

VANE PARALLEL TO PLANE OF NOZZLE TIP LIGHT PRESSURE APPLIED TO POINT INDICATED TO VANE AT ANY POINT PRODUCES RELAY OUTPUT PRESSURE AROUND NOZZLE PRODUCES SLIGHT INCREASE IN RELAY OUTPUT PRESSURE AND NOZZLE MOVES AWAY FROM VANE

SKETCH B

VANE NOT PARALLEL TO PLANE OF NOZZLE TIP LIGHT PRESSURE APPLIED TO POINT INDICATED PRODUCES RELAY OUTPUT PRESSURE DECREASE AND NOZZLE MOVES TOWARD VANE PRESSURE APPLIED TO ANY OTHER POINT AROUND NOZZLE HAS SAME EFFECT AS SKETCH A

FIGURE 8 Vane Nozzle Relationship

NOZZLE REPLACEMENT (Figure 24)

1 Remove instrument from service and remove cover

2 Loosen nozzle screw (44) and screw (39) holding capillary clip (40) Disconnect nozzle air line (64) at Booster Unit connection (65)

3 With pliers, carefully withdraw nozzle air line (64) from nozzle clamp block (61)

4 Replace nozzle air line (64) assembly and reassemble

NOTE When replacing nozzle, readjust the vane and nozzle relationship as described under "Booster Unit Operation Checks"

BELLOWS AND VANE MECHANISM REPLACEMENT (Figure 24)

1 Remove instrument from service and remove cover

2 Loosen screw (44) and carefully remove nozzle from nozzle clamp block (61)

3 Remove three screws (41) holding bellows and vane mechanism Remove air line from bellows at tee (38)

4 Pull assembly forward and disconnect vane and nozzle arm drive link (23) from vane and nozzle adjustable arms (24)

5 To rep ace bellows only, remove three screws (53), elastic stop nut (43), hex nut (54) and lockwas ier (55) Remove hex nut (49) and lockwasher (50)

a Remove two screws (47) holding bel lows beam assembly to bellows beam hinge

b Rep ace be lows

6 To reassemble, perform steps 1 thrt 5 in reverse order

BOOSTER UNIT REPLACEMENT

(Figure 24)

1 Remove instru ent from service and re move Transmitter cover

2 Loosen hose clamp

3 Disco nect loading air ine at oading con nector Disco nect supply air line at supply connector

4 Disconnect connecting link from adjustable arm (note position) Remove 6 32 screw securing drive arm, sector plate and adjustable arm and remove from spindle (Note position of items on spindle before removing)

5 Remove locating screw

6 Disconnect all tubing at Booster Relay

7 Make certain 10 32 pan head screw (used for shipping purposes only) has been removed

BOOSTER UNIT FAULT CORRECTION CHART

FAULT	PROBABLE CAUSE	CORRECTION
Booster u nit output is incorrect with an increase in measured pressure	1 Supply air not passing thru filter (Item 5, Figure 29)	1. Replace filter at supply port (see "Routine Maintenance") and observe Transmitter operation.
	2 Blocked supply passage (Figure 8) to diaphragm and rod assembly (Item 19, Figure 29)	2 Remove cover (Item 17, Fig ure 29) Make certain cover gas ket (Item 16) is not blocking pass age from supply port
	3. Exhaust valve (Figure 15) not properly seated.	3 Check visually If necessary, replace exhaus valve or seat (Items 12 and 22, Figure 29) Make certain exhaust seat is aligned with inlet seat and that valve re taining pin (in valve retaining spring, Item 11) is centered in valve (Item 12).
Booster unit output is in correct with a decrease in measured pressure.	1. Blocked line from Booster unit to nozzle (Figure 15).	1. Remove and clean nozzle air line (Figure 15).
	2 Inlet valve (Item 12, Figure 29) improperly sea ed	2 Remove exhaust seat and valve (Items 22 and 12, Figure 29) Inspect seat and valve for evidence of improper seating. If necessary, replace valve or diaphragm and rod assembly (Item 19)
	3 Leakage at either diaphragm pivot of diaphragm and rod assembly (Item 19, Figure 29)	3 Remove diaphragm and rod assembly (Item 19 Figure 29) and inspect diaphragms. If nec essary, replace diaphragm and rod assembly.

8 Remove mechanism support bracket from Transmitter housing

9 Remove three 10 32 screws in back of mechanism support bracket securing Booster Relay

10 To reassemble perform steps 1 thru 9 in reverse order After reassembly, refer to "Transmitter Adjustment Checks" to check position of drive arm, sector plate and adjustable arm

DISASSEMBLY OF AREA METER

If Type JR13 Area Meter must be disassembled for maintenance or repair follow procedure below and refer to Figures 25, 26, 27 or 28

1 Remove meter from service Remove drain plug from housing assembly and allow fluid to drain from valve body

2 Remove Transmitter cover Disengage connecting link from adjustable range arm (Figure 11)

3 Remove sealing cap from bottom of housing assembly

4 Screw spring puller rod (shipped with Meter) into bottom of adjusting screw and pin assembly Pull rod and remove two 5/16 inch nuts and washer Gradually release rod to prevent spring from snapping when tension is relieved Do not disassemble spring puller rod

5 Remove hex head screws (750 psi) or hex nuts (600 psi) and separate housing assembly from valve body

6 Disconnect loading spring (including adjustment screw and pin assembly and threaded spring puller rod) from spring hanger and pin assembly

7 Remove hex head cap screws (or hex nuts from studs) securing cover Remove cover

8 To remove housing and adapter plate assembly use procedure below applicable to specific Area Meter size

NOTE It is not necessary to remove lockplate or disturb stop screw settings when removing housing and adapter plate assembly

a 1 inch Area Meter Remove two 1/4 20 fillister head screws securing housing and adapter plate assembly While lifting housing and adapter plate, grasp metering plug stem and dampener rod and lift simultaneously Lift both assemblies until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip free of bearing plates Remove assembly (including Transmitter) from adapter plate Remove 3/8 16 socket head screws Remove adapter plate from valve body

b 2 inch Area Meter Remove two 1/4 20 fillister head screws securing housing and adapter plate assembly to valve body While lifting housing and adapter plate assembly, grasp metering plug stem and lift simultaneously Lift both assemblies until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip free of bearing plates Remove housing and adapter plate assembly (including Transmitter) from valve body

c 4 inch Area Meter Remove 3/4 10 hex head screws (750 psi) or 3/4 10 hex nuts (600 psi) securing housing and adapter plate assembly to valve body (Note position of two extra long 3/4 10 screws when removing) While lifting housing and adapter plate assembly, grasp metering plug stem and lift simultaneously Lift both assemblies until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip free of bearing plates Remove housing and adapter plate assembly (including Transmitter) from valve body

9 If pressure tight bearing spindle assembly or Transmitter must be removed from housing and adapter plate assembly, follow procedure outlined below

a Note position of sector plate on spindle assembly Remove 6 32 screw to release adjustable range arm and sector plate from spindle assembly shaft

b Carefully remove pressure tight bearing cap and follower and washer assembly

c Remove pressure tight bearing body and O ring (Replace O ring when reassembling)

d Remove forked lever screw securing drive lever assembly to spindle assembly shaft

e Hold drive lever assembly in position From front of Transmitter, carefully pull spindle assembly shaft to remove from housing

CAUTION Use care when removing shaft to avoid damage to spindle bearing surface

f To remove Transmitter, loosen hose clamp and remove three 5/16 inch cap screws (Replace O ring when reassembling)

g To replace O ring between adapter plate and spindle housing remove four 1/2 13 socket head screws

h Replace damaged parts Lubricate O rings Reassemble housing and adapter plate assembly Torque 1/2 13 screws to 35 ft lb Install spindle assembly shaft and Transmitter Torque pressure tight bearing body to 30 ft lb

NOTE When inserting spindle assembly shaft thru drive lever assembly, rotate shaft until tapped hole in shaft lines up with hole for forked lever screw

10 Remove following parts as a complete assembly Lift out of valve body metering plug stem and dampener rod assembly (dampener rod used on 1 inch and 2 inch Meters only) upper bearing, lower bearing, spring, stop washer (used on 1 inch and 2 inch Meters only), metering plug and spring hanger and pin assembly

1 Do not disassemble items removed in step 10 unless replacement of parts is necessary If disassembly is necessary, remove dampener rod (used on 1 inch and 2 inch Meters only) and locknut (Pt No 197214 3) Replace damaged parts and reassemble The locknut determines position of upper and lower bearing on metering plug stem Reset locknut as follows

a Install locknut on metering plug stem

b Turn locknut until there is 5/16 inch between start of threads on stem and top of locknut (For 1 inch, 600 psi, 3/4 inch stroke Meters only the distance should be set at 3/16 inch)

c For 1 inch and 2 inch Meters only Assemble dampener rod onto threaded extension of metering plug stem Use extreme care when tightening dampener rod Overtightening may shear or deform threads causing loss of concentricity between stem and dampener rod Parts have been inspected for concentricity and are issued as a matched set

12 If valve cage must be replaced, use slot in bottom of cage and unscrew from valve body

REASSEMBLY OF AREA METER

Refer to Table of Torque Values for parts requiring a specific torque value when reassembling

1 If valve cage was removed screw cage into valve body Tighten to specified torque value

2 Lower valve stem and dampener rod assembly (dampener rod used on 1 inch and 2 inch meters only), upper bearing, lower bearing spring, stop washer, metering plug and spring hanger and pin assembly into valve body

3 To reassemble housing and adapter plate assembly use procedure below applicable to Area Meter size

a 1 inch Area Meter Position adapter plate on valve body and secure with 3/8 16 socket head screws Torque screws to specified value While lowering housing and adapter plate assembly (including Transmitter) into position, grasp metering plug stem and dampener rod assembly and lift until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip into position between bearing plates Lower both assemblies into position making certain holes in housing and adapter plate assembly are in alignment with dowel pins in adapter plate Secure assembly with two /4 20 fillister head screws

b 2 inch Area Meter While lowering housing and adapter plate assembly (including Transmitter) into position grasp metering plug stem and dampener rod assembly and lift until stem moves back and forth sufficient amount to permit pin of drive lever assembly to slip into position between bearing plates Lower both assemblies into position making certain holes in housing and adapter plate assembly are in alignment with dowel pins in valve body Secure assembly with two /4 20 fillister head screws

c 4 inch Area Meter While lowering housing and adapter plate assembly (including Transmitter) into position, grasp metering plug stem and lift until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip into position between bearing plates Lower both assemblies into position,

TABLE OF TORQUE VALUES

NOTE When assemb ng nstrument, app y app cab e torque va ue be ow to nuts on greased studs Further t ghten ng on y ncreases stud tens on w thout ncreas ng compress on of O r ng gasket s nce there s meta to meta contact between the mat ng surfaces f ɛ jo nt eaks, d sassemb e and nspect O r ng for cuts cr damage Meta surface must be smooth and c ean

Meter S ze	Part Name	Locat on	Service Pressure 250 psig	600 psig
1 Inch	P T B Body	P T B and Sp nd e Assemb y	30 ft b	30 ft b
	7/16 14x3 1/4 Hex Hd Screw	Ho d ng Cover to Adapter P ate	30 ft b	30 ft b
	3/8 16x1 Socket Hd Screw	Ho d ng Adapter P ate to Va ve Body	20 ft b	20 ft b
	Va ve Cage	ns de Va ve Body	12 ft b	12 ft b
	3/8 16x1 Hex Hd Screw	Ho d ng Hous ng Assemb y to Va ve Body	20 ft b	
	3/8 16 Hex Nut	Ho d ng Hous ng Assemb y to Va ve Body		20 ft b
	1/2 13x1 1/2 Soc Hd Screw	Ho d ng Adapter P ate to Hous ng	35 ft b	35 ft b
2 Inch	P T B Body	P T B and Sp nd e Assemb y	30 ft b	30 ft b
	7/16 14x3 1/4 Hex Hd Screw	Ho d ng Cover to Va ve Body	30 ft b	
	7/16 14 Hex Nut	Ho d ng Cover to Va ve Body		30 ft b
	Va ve Cage	ns de Va ve Body	35 ft b	35 ft b
	7/16 14x1 1/4 Hex Hd Screw	Ho d ng Hous ng Assemb y to Va ve Bod y	30 ft b	
	7/16 14 Hex Nut	Ho d ng Hous ng Assemb y to Va ve Body		30 ft b
	1/2 13x1 1/2 Soc Hd Screw	Ho d ng Adapter P ate to Hous ng	35 ft b	35 ft b
4 Inch	P T B Body	P T B and Sp nd e Assemb y	30 ft b	30 ft b
	1/2 13 Hex Nut	Ho d ng Cover to Hous ng and Adapter P ate Assemb y	50 ft b	50 ft b
	3/4 10x2 Hex Hd Screw	Ho d ng Hous ng and Adapter P ate Assemb y to Va ve Body	160 ft b	
	3/4 10 Hex Nut	Ho d ng Hous ng and Adapter P ate Assemb y to Va ve Body		160 ft b
	Va ve Cage	ns de Va ve Body	80 ft b	80 ft b
	3/4 10x1 3/4 Hex Hd Screw	Ho d ng Hous ng Assemb y to Va ve Body	160 ft b	
	3/4 10 Hex Nut	Ho d ng Hous ng Assemb y to Va ve Body		160 ft b
	1/2 13x1 1/2 Soc Hd Screw	Ho d ng Adapter P ate to Hous ng	35 ft b	35 ft b

making certain holes in housing and adapter plate assembly are in alignment with dowel pins in valve body. Install 3/4-10 hex head screws (250 psi) or 3/4-10 hex nuts on studs (600 psi). Tighten screws or nuts to specified torque value. (Make certain two extra long 3/4-10 screws are installed in correct location.)

4. Attach loading spring (inc luding adjustment screw and pin assembly and threaded spring puller rod) to spring hanger and pin assembly.

5. Position housing assembly on valve body. Install hex head screws (250 psi) or hex nuts on studs (600 psi) and torque to specified value.

6. Assemble Transmitter connecting link to adjustable range arm (Figure 11).

7. If metering plug stop screw settings have been disturbed, set stops as follows:

a. Loosen two 10-32 screws holding lock plate.

b. Lift metering plug stem until Transmitter pointer reads approximately 1/32 inch beyond 100% scale (assuming Transmitter calibration is correct).

c. Hold valve stem in position and turn three fillister head stop screws down until screws touch top of metering plug stop washer.

d. Lower metering plug stem to 0% position on scale. Tighten two 0-32 screws to lock stop screws in place.

8. Position cover on housing and adapter plate assembly. Install hex head screws (or hex nuts on studs) and torque to specified value.

9. 1 Inch and 2 Inch Area Meters only. With cover installed, remove drain valve. Install 6-32 screw or threaded rod into metering plug stem and dampener rod assembly. Move screw or rod up and down to simulate full stroke of metering plug. Make certain binding or rubbing does not occur between dampener rod and center hole in cover. If binding does occur, loosen screws or hex nuts and shift cover slightly (movement will be limited by dowel pins) to insure equal clearance around dampener rod. If clearance problems still exist, refer to "Repositioning of Dowel Pins". Locate procedure applicable to Area Meter size. Included in procedure will be steps for removing old dowel pins and relocating cover. Do not attempt to place Meter in service until clearance problems have been resolved. If binding or rubbing does not occur, remove 6-32 screw or threaded rod from dampener rod.

10. Replace drain plug in housing assembly.

11. Calibrate Area Meter as described under "Complete Calibration Procedure".

12. After Meter has been calibrated, set tension on loading spring as described under "Resetting Loading Spring".

ROTATING TOPWORK ASSEMBLY

Rotation of topwork mechanism can be accomplished with minimum disturbance of calibration by carefully following the procedure outlined below.

NOTE: In all cases, flow thru the meter must be in accordance with arrow stamped on valve body flange.

1. Remove meter from service. Remove drain plug from housing assembly and allow fluid to drain from valve body.

2. Remove Transmitter cover. Disengage connecting link from adjustable range arm (Figure 11).

3. Remove sealing cap from bottom of housing assembly.

4. Screw spring puller rod (shipped with meter) into bottom of adjusting screw and pin assembly. Pull rod and back off two 5/16 inch nuts. Gradually release rod to prevent spring from snapping when tension is relieved. Leave spring puller rod assembled.

1 Inch Area Meter Only

1. Remove cap screws and separate cover from housing and adapter plate assembly.

2. Remove two 1/4-20 fillister head screws holding housing and adapter plate assembly to adapter plate.

3. While lifting housing and adapter plate assembly to clear pins grasp metering plug stem

and dampener rod assembly and lift simultaneously. Lift both assemblies until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip free of bearing plates. Remove housing and adapter plate assembly.

4 Punch mark adapter plate and valve body. This will insure that adapter plate will not be installed in same position when reassembled.

5 Remove 3/8-16 hex head screws holding adapter plate to valve body.

NOTE: It is not necessary to remove lockplate or disturb setting of stop screws when removing adapter plate from valve body.

6 Position adapter plate on valve body. Rotate adapter plate until alignment mark is 180 degrees from alignment mark on valve body. Install two 3/8-16 hex head screws finger tight.

7 Push bearing down (compressing spring) until bearing passes thru inside diameter of lockplate. Check clearance and concentricity of outside diameter of bearing to inside diameter of lockplate. Install remaining 3/8-16 hex head screws and torque to 20 ft-lb.

8 Lower reversed housing and adapter plate assembly into position while grasping metering plug stem and dampener rod assembly and lifting until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip into position between bearing plates. Lower both assemblies into position, making certain holes in housing and adapter plate assembly are in alignment with dowel pins in adapter plate. If assembly is impossible, refer to "Repositioning Dowel Pins".

9 Make certain pin of drive lever assembly is correctly located between bearing plates. Carefully check clearances between inside surface of drive lever assembly arms and outside diameter of bearing plates. If either arm is touching bearing plates, remove housing and adapter plate assembly.

10 Grind or file inside face of drive lever assembly arm (opposite of arm with pin). Remove all metal particles from inside housing. Reassemble housing and adapter plate assembly (step 8) and check clearance (step 9). If clearance is good and no binding occurs, install two 1/4-20 fillister head screws and tighten. If a clearance problem still exists after grinding arm of drive lever assembly, proceed to "Repositioning Dowel Pins".

11 Assemble Transmitter connecting link to range arm and check zero adjustment. If parts have not been damaged and position of locknut on metering plug stem and dampener rod assembly has not been changed, zero adjustment should be correct. If zero adjustment is not correct check calibration as outlined under "Complete Calibration Procedure".

12 Remove drain valve and reducer bushing from cover. Install reversed cover and a minimum of two 7/16-14 hex head screws.

13 Install 6-32 screw or threaded rod in top of metering plug and dampener rod assembly. Move screw or rod up and down to simulate full stroke of metering plug. Check for binding of internal components. Any misalignment will cause friction between hole in cover and metering plug stem and dampener rod assembly.

14 If clearance is good and no binding occurs, install remainder of 7/16-14 and torque to 30 ft-lb. Proceed to step 16.

15 If binding occurs, disassemble cover. Remove two 3/16-inch dowel pins in housing and adapter plate assembly. Reassemble cover and reposition until vertical movement of metering plug stem and dampener rod assembly can travel full stroke of metering plug without binding. Secure cover using 7/16-14 screws. Locate two thru holes in cover. Drill two 3/16-inch holes (1910-inch max.), 7/32-inch deep in housing and adapter plate assembly. Remove cover and clean all metal particles from drilling area. Install two 3/16-inch dowel pins in new location. Reassemble cover. Install 7/16-14 hex head screws and torque to 30 ft-lb.

16 Remove 6-32 screw or threaded rod from metering plug stem and dampener rod assembly. Install reducer bushing and drain valve assembly in cover.

17 Reassemble drain plug in housing assembly. Refer to "Resetting Loading Spring" for assembly of drain and sealing cap.

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2 Inch Area Meter Only

1 Remove cap screws (250 psi) or hex nuts (600 psi) and separate cover from housing and adapter plate assembly

2 Remove two 1/4-20 fillister head screws holding housing and adapter plate assembly to valve body

3 While lifting housing and adapter plate assembly to clear dowel pins grasp metering plug stem and dampener rod assembly and lift simultaneously. Lift both assemblies until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip free of bearing plates

NOTE It is not necessary to remove lockplate or disturb setting of stop screws when removing housing and adapter plate assembly

4 While lowering reversed housing and adapter plate into position grasp metering plug stem and dampener rod assembly and lift until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip into position between bearing plates. Lower both assemblies into position making certain holes in housing and adapter plate assembly are in alignment with dowel pins in valve body. If assembly is impossible, refer to "Repositioning Dowel Pins"

5 Make certain pin of drive lever assembly is correctly located between bearing plates. Carefully check clearance between inside surface of drive lever assembly arms and outside diameter of bearing plates. If either arm is touching bearing plates, remove housing and adapter plate assembly

6 Grind or file inside face of drive lever assembly arm (opposite of arm with pin). Remove all metal particles from housing. Reassemble housing and adapter plate (step 4) and check clearance (step 5). If clearance is good and no rubbing or binding occurs, install two 1/4-20 fillister head screws and tighten. If clearance problems still exist after grinding arm of drive lever assembly, proceed to "Repositioning Dowel Pins"

7 Assemble Transmitter connecting link to range arm and check zero adjustment. If parts have not been damaged and position of locknut on metering plug stem and dampener rod has not been changed, zero adjustment should be correct. If zero adjustment is not correct, check calibration as outlined under "Complete Calibration Procedure"

8 Remove drain valve and reducer bushing from cover. Install reversed cover and a minimum of two 7/16-14 hex head screws (250 psi) or two 7/16-14 hex nuts (600 psi). Tighten screws or nuts finger tight

9 Install 6-32 screw or threaded rod in top of metering plug stem and dampener rod assembly. Slowly move screw or rod up and down to simulate full stroke of metering plug. Check for binding of internal components. Any misalignment will cause friction between hole in cover and metering plug stem and dampener rod assembly

10 If clearance is good and no binding occurs, install remainder of 7/16-14 screws or 7/16-14 hex nuts. Torque screws or nuts to 30 ft lb. Proceed to step 13

11 If binding occurs disassemble cover. Remove two 3/16 inch dowel pins in housing and adapter plate assembly. Reassemble cover and reposition until vertical movement of metering plug stem and dampener assembly can travel full stroke of metering plug without binding. Secure cover using 7/16-14 screws or 7/16-14 hex nuts. Locate two drill holes in cover. Drill two 3/16 inch holes (1.910 inch max.) 7/32 inch deep in housing and adapter plate assembly. Remove cover and clean all metal particles from drilling area. Install two 3/16 inch dowel pins in new location. Reassemble cover. Install screws or nuts and torque to 30 ft lb

12 Remove 6-32 screw or threaded rod from metering plug stem and dampener rod assembly. Install reducer bushing and drain valve assembly in cover

13 Reassemble drain plug in housing assembly. Refer to "Resetting Loading Spring" for assembly of spring and sealing cap

4 Inch Area Meter Only

1 Remove hex nuts from studs and separate cover from housing and adapter plate assembly

3 Remove 3/4 10 hex head screws (250 psi) or 3/4 10 hex nuts (600 psi) holding housing and adapter plate assembly to valve body Note position of two extra long 3/4 10 hex head screws when removing

3 While lifting housing and adapter plate assembly to clear dowel pins, grasp metering plug stem and lift simultaneously Lift both assemblies until stem moves back and forth a sufficient amount to permit pin of drive lever assembly to slip free of bearing plates

NOTE It is not necessary to remove lockplate or disturb setting of stop screws when removing housing and adapter plate assembly

4 For 600 psi meter only Note difference in length of two studs in valve body Interchange two long studs with two short studs diametrically opposite

5 While lowering reversed housing and adapter plate assembly into position, grasp metering plug stem and lift until stem moves back to slip into position between bearing plates Lower both assemblies into position, making certain holes in housing and adapter plate are in alignment with dowel pins in valve body If assembly is impossible, refer to "Repositioning Dowel Pins"

NOTE When installing housing and adapter plate assembly (600 psi meter) use care to prevent damage to threads of valve body studs

6 Make certain pin of drive lever assembly is correctly located between bearing plates Carefully check clearance between inside surface of drive lever assembly arms and outside diameter of bearing plates If either arm is touching bearing plates, remove housing and adapter plate assembly

7 Grind or file inside face of drive lever assembly arm (opposite of arm with pin) Remove all metal particles from housing Reassemble housing and adapter plate (step 5) and check clearance (step 6) If clearance is good and no rubbing or binding occurs, install 3/4 10 hex head cap screws or 3/4 10 hex nuts and retorque to 160 ft lb (Make certain two extra long 3/4 10 screws are installed in correct location) If clearance problems still exist after grinding, proceed to "Repositioning Dowel Pins"

8 Install 6 32 screw or threaded rod in top of metering plug stem Slowly move screw or rod up and down to simulate full stroke of metering plug Check for binding of internal components If binding occurs, locate problem area Disassemble housing and adapter plate and rework or replace parts

9 Assemble Transmitter connecting link to adjustable range arm and check zero adjustment If parts have not been damaged and position of locknut on metering plug stem has not been changed, zero adjustment should be correct If zero adjustment is not correct, check calibration as outlined under "Complete Calibration Procedure"

10 Remove 6-32 screw or threaded rod from metering plug stem

11 Assemble reversed cover and install 1/2-13 hex nuts Torque nuts to 50 ft lb

12 Reassemble drain plug in housing assembly Refer to "Resetting Loading Spring" for assembly of spring and sealing cap

REPOSITIONING OF DOWEL PINS

NOTE If dowel pins must be removed to allow repositioning of components due to clearance problems, installation of new dowel pins is recommended This procedure would assure correct reassembly at a later date in addition to holding components in position when installing and tightening the attaching screws or nuts

Follow procedure below applicable to specific Area Meter

1 Inch Area Meter Only

1 If initial assembly of housing and adapter plate was impossible or clearance problems still exist after grinding arm of drive lever assembly, remove housing and adapter plate assembly from adapter plate

2 Remove two 1/4 inch dowel pins from adapter plate Drill holes an additional 3/16 inch deep Reassemble pins in adapter plate making certain pins are flush with surface of adapter plate If necessary, carefully grind excess portion of pins

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3 Reassemble reversed housing and adapter plate assembly When pin of drive lever assembly is between bearing plates, reposition housing until clearance is obtained between inside surface of drive lever assembly arms and outside diameter of bearing plates Secure housing using two 1/4 20 fillister head screws

4 Repositioning of housing and adapter plate assembly affects clearance between metering plug stem and dampener rod assembly and cover Remove two 3/16 inch dowel pins from housing and adapter plate assembly

5 Remove drain valve and reducer bushing from cover Position cover on housing and adapter plate assembly Install 6 32 screw or threaded rod in top of metering plug and dampener rod assembly Reposition cover until vertical movement of stem and dampener rod assembly can travel full stroke of metering plug without binding Secure cover using 7/16 14 hex head screws and torque to 30 ft lb

6 Locate two thru holes in cover Drill two 3/16 inch holes (.1910 inch max.), 1/4 inch deep in housing and adapter plate assembly Remove cover and install two 3/16 x 1/2 inch dowel pins in new location

7 Locate two thru holes in housing and adapter plate assembly Drill two 1/4 inch holes (.254 inch max.), 5/16 inch deep in adapter plate Remove housing and adapter plate assembly Install two 1/4 inch dowel pins in new location

8 Reassemble housing and adapter plate assembly Install two 1/4 20 fillister head screws and tighten

9 Replace cover and install 7/16 14 hex head screws Torque screws to 30 ft lb

10 Remove 6 32 screw or threaded rod from metering plug stem and dampener rod assembly Install reducer bushing and drain valve in cover

11 Install drain plug in housing assembly Refer to "Resetting Loading Spring" for assembly of spring and sealing cap

2 Inch Area Meter Only

1 If initial assembly of housing and adapter plate was impossible or clearance problems still exist after grinding arm of drive lever assembly remove housing and adapter plate assembly from valve body

2 Remove two 1/4 inch dowel pins from valve body Drill holes an additional 3/16 inch deep Reassemble pins in valve body, making certain pins are flush with surface of valve body If necessary, carefully grind excess portion of pins

3 Reassemble reversed housing and adapter plate assembly When pin of drive lever assembly is between bearing plates reposition housing until clearance is obtained between inside surface of drive lever assembly arms and outside diameter of bearing plates Secure housing using two 1/4 20 fillister head screws

4 Repositioning of housing and adapter plate assembly affects clearance between metering plug stem and dampener rod assembly and cover Remove two 3/16 inch dowel pins from housing and adapter plate assembly

5 Remove drain valve and reducer bushing from cover Position cover on housing and adapter plate assembly Install 6 32 screw or threaded rod in top of metering plug stem and dampener rod assembly Reposition cover until vertical movement of stem and dampener rod assembly can travel full stroke of metering plug without binding Secure cover using 7/16 14 hex head screws (250 psi) or 7/16 14 hex nut (600 psi) and torque to 30 ft lb

6 Locate two thru holes in cover Drill two 3/16 inch holes (.1910 inch max.), 1/4 inch deep in housing and adapter plate assembly Remove cover and install two 3/16 x 1/2 inch dowel pins in new location

7 Locate two thru holes in housing and adapter plate assembly Drill two 1/4 inch holes (.254 inch max.), 5/16 inch deep in valve body Remove housing and adapter plate assembly Install two 1/4 inch dowel pins in new location

8 Reassemble housing and adapter plate assembly Install two 1/4 20 fillister head screws and tighten

9 Replace cover and install 7/16 14 hex head screws (250 psi) or 7/16 14 hex nuts (600 psi) and torque to 30 ft lb

10 Remove 6 32 screw or threaded rod from metering plug stem and dampener rod assembly Install reducer bushing and drain valve in cover

11 Install drain plug in housing assembly Refer to "Resetting Loading Spring" for assembly of spring and sealing cap

4 Inch Area Meter Only

1 If initial assembly of housing and adapter plate was impossible or clearance problems still exist after grinding arm of drive lever assembly, remove housing and adapter plate assembly from valve body

2 Remove two 1/4 inch dowel pins from valve body Drill holes an additional 3/16 inch deep Reassemble pins in valve body, making certain pins are flush with surface of valve body If necessary, carefully grind excess portion of pins

3 Reassemble reversed housing and adapter plate assembly When pin of drive lever assembly is between bearing plates, reposition housing until clearance is obtained between inside surface of drive lever assembly arms and outside diameter of bearing plates Secure housing using 3/4 10 hex head screws (250 psi) or 3/4 10 hex nuts (600 psi) and torque to 160 ft lb (Make certain two long 3/4 10 hex head screws are in correct location

4 Install 6 32 screw or threaded rod in top of metering plug stem Slowly move screw or rod up and down to simulate full stroke of metering plug Check for binding of internal components If binding occurs, locate problem area Disassemble housing and adapter plate assembly and rework or replace parts

5 If no binding occurs, locate two thru holes in housing and adapter plate assembly Drill two 1/4 inch holes (.254 inch max) 5/16 inch deep in valve body Remove housing and adapter plate assembly Install two 1/4 inch dowel pins in new location

6 Reassemble housing and adapter plate assembly Install 3/4 10 hex head screws (250 psi) or 3/4 10 hex nuts (600 psi) and torque to 160 ft lb

7 Remove 6 32 screw or threaded rod from metering plug stem

8 Position reversed cover on housing and adapter plate assembly Install 1/2 13 hex nuts and torque to 50 ft lb

9 Reassemble drain plug in housing assembly Refer to "Resetting Loading Spring" for assembly of spring and sealing cap

CALIBRATING THE AREA METER

The Type JR13 Area Meter (except those 4 inch meters for measurement of viscous fluids) is factory calibrated before shipment and the adjustment points are marked with red paint The meter should require no further adjustment However, before placing in service, make the adjustment checks outlined under "Transmitter Adjustment Checks"

These adjustment checks consist of checking the flow and output pressure pointer readings at 0% 50% and 100% scale To check the readings at 50% and 100% it is necessary to assemble Calibrating Micrometer (Part No 663811 1) and Adapter (Part No 663821 1) to the top of the metering plug stem and cover and then set the meter for the desired stroke position To assemble and set the micrometer, refer to "Positioning Metering Plug" below

POSITIONING METERING PLUG

1 For 1 inch and 2 inch Area Meters Remove dampener rod from metering plug stem as outlined in step 3 under "Installing the Area Meter" Do not discard rod

2 With meter removed from service (no flow thru meter), remove drain plug from bottom of spring housing (Figure 14) and drain meter

3 Remove sealing cap from bottom of spring housing

4 Attach spring puller (shipped with instrument) to lower end of adjustment screw (Figure 9) Tighten spring puller bracket against bottom of spring housing with 6 32 hex nut

5 Back off lock nut and adjustment nut from adjustment screw to free spring Do not allow

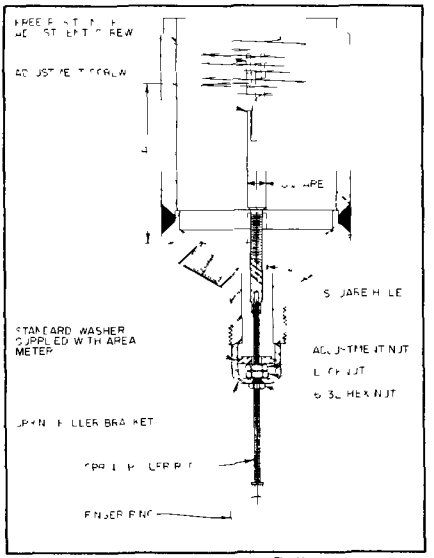

FIGURE 9 Spring Puller

spring to snap free relieve tension gradually by backing off 6-32 hex nut Leave spring puller attached to adjustment screw

6 Place adapter on micrometer (Figure 10)

7 For 1 inch and 2 inch Area Meters Remove reducer bushing and drain valve assembly from top of meter body cover (Figure 26 or 27)

8 For 4 inch Area Meters Remove drain valve from top of meter body cover (Figure 28 or 29)

9 Turn locknut and handle against brass nut (Figure 10) Insert spindle thru drain valve hole in meter body cover Screw spindle into top of metering stem by turning knob

10 Screw micrometer and adapter into drain valve hole in meter body cover Turn micrometer barrel up or down until thimble reads zero

11 With metering plug stop washer down against cage (meter at zero), turn handle down until it contacts barrel end Lock handle in place with locknut

12 To set meter at any desired stroke position

a Lift handle Do not turn

NOTE Lifting the assembly by the handle relieves the load on the micrometer screw while the barrel is turned This prevents excessive wear of the screw threads thus maintaining accuracy

b With handle lifted turn barrel until thimble reads desired stroke (50% or 100% stroke)

c Lower handle until it contacts barrel end

DISASSEMBLING MICROMETER

1 To disassemble micrometer from meter

a Turn barrel to zero

b Turn locknut and handle up against brass nut

c Remove spindle from metering plug stem by turning knob

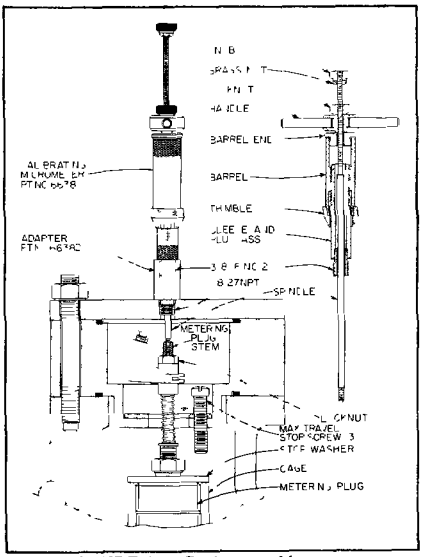

FIGURE 10 Calibrating Micrometer

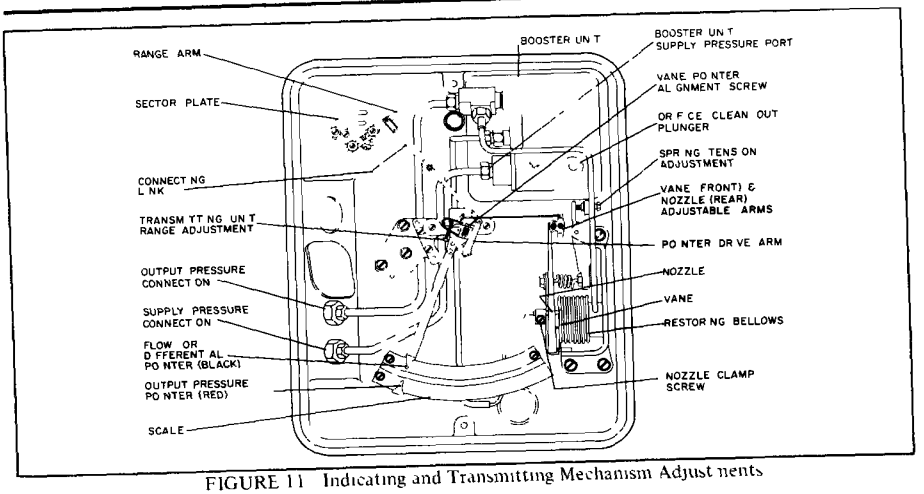

FIGURE 11 Indicating and Transmitting Mechanism Adjust nents

d Remove micrometer and adapter from body cover

e For 1 inch and 2 inch Area Meter Remove meter body cover Replace reducer bushing and drain valve assembly in cover Screw dampener rod into threaded extension of metering plug stem Replace cover on meter body

f For 4 inch Area Meter Replace drain valve in meter body cover

TRANSMITTER ADJUSTMENT CHECKS

1 With no flow thru meter, flow pointer and output pressure pointer should read zero scale

a If flow pointer does not read zero scale, adjust pointer zero adjustment (Figure 13) until reading is correct

b If output pressure pointer does not read zero scale, adjust nozzle pointer alignment screw (Figure 13) until reading is correct

2 Using the Calibrating Micrometer as outlined under "Positioning Metering Plug", set metering plug at 50% and 100% stroke Flow and output pressure pointers should read 50% and 100% scale, respectively If not, perform "Complete Calibration Procedure" outlined below

3 If readings are correct, refer to "Disassembling Micrometer" and "Resetting Loading Spring"

COMPLETE CALIBRATION PROCEDURE

If meter is being calibrated following corrective maintenance or repair, perform the steps outlined under "Positioning Metering Plug" before proceeding further

Flow (Black) Pointer

1 Set metering plug at 50% stroke Flow pointer should read 50% scale +1/32 inch If pointer reads correctly, proceed to step 5 If pointer reads incorrectly, make the necessary adjustments in steps 2, 3, and 4

2 Check for parallel linkage (Figure 14)

a Range arm Line A should be at right angles to connecting link

b Connecting link should be at right angles to Line B (thru pointer drive arm pivot and lower connecting pin of connecting link)

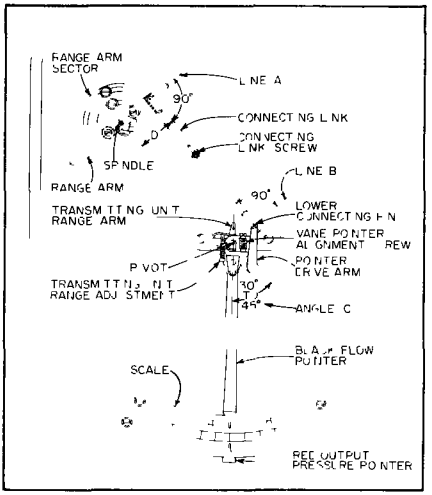

FIGURE 10 Spindle and Flow Pointer Linkage at 50% Scale

3 If parallel linkage exists but pointer does not read 50% scale turn pointer zero adjustment screw (Figure 3) until pointer reads correctly Proceed to step 5

4 If parallel linkage does not exist in step 3 above, make the following adjustments

a Loosen two range arm sector screws and connecting link screw

b Rotate range arm sector until range arm is at right angles with connecting link Adjust length of connecting link until link is at right angles to Line B

c Tighten screws

d With metering plug set for 50% stroke and parallel linkage established, pointer should read 50% scale If not, turn pointer zero adjustment screw until pointer reads correctly

5 Set metering plug at 0% stroke Flow pointer should read zero scale +1 32 inch If pointer reads correctly, proceed to step 7 If pointer reads incorrectly, make the necessary adjustments outlined below

a Return metering plug to 50% stroke

b Loosen range arm screws

c If pointer reading was greater than zero lengthen range arm slightly, increasing Dimension D Tighten screws

d If pointer reading was less than zero, shorten range arm slightly decreasing Dimension D Tighten screws

e Check for parallel linkage in steps 1 2, 3 and 4

6 Set metering plug for 0% stroke If pointer still reads incorrectly, repeat steps 5 and 6 until correct pointer readings are obtained for 50% and zero scale

7 Set metering plug for 100% stroke Flow pointer should read 100% scale If pointer reads correctly, set metering plug for 50% zero and 100% scale and check respective scale readings Then proceed to "Output Pressure" below If pointer reads incorrectly make the necessary adjustments outlined below

a Loosen connecting link screw

b If pointer reading was greater than 100% scale, tighten connecting link slightly Tighten screw

c If pointer reading was less than 100% scale, shorten connecting link slightly Tighten screw

d Return metering plug to 50% stroke If pointer does not read 50% scale turn pointer zero adjustment screw to obtain correct reading

8 Set metering plug for 0% stroke If pointer reads zero scale, proceed to step 10 below If pointer does not read zero scale repeat steps 5a, b, c, and d only then make the following adjustments

a Loosen range arm sector screws and rotate sector until range arm is at right angles with connecting link

b Reset pointer on 50% scale by turning pointer zero adjustment screw

9 Repeat step 8 until pointer reads correctly at 50% and zero scale

10 Repeat steps 7 8, and 9 until pointer reads correctly at zero, 50% and 100% scale

11 Adjust max travel stop screws (Figure 10) to limit pointer to 1/16 1/32 inch beyond the 100% scale mark, when the plug is at its highest position

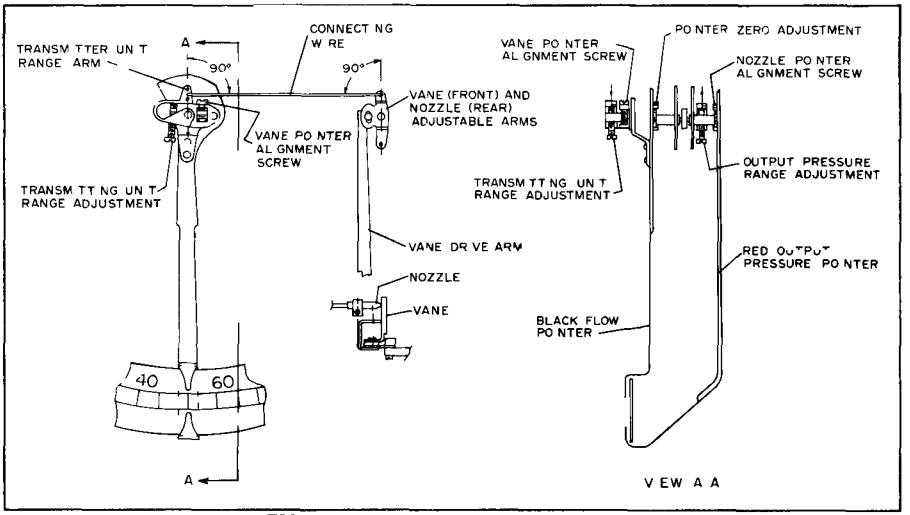

FIGURE 13 Indicating Pointer Adjustments

Output Pressure

Insert an accurate pressure gage (0 30 psig) in output pressure line or connect gage directly into output pressure connection (see Figure 11) If Transmitter is being bench tested, avoid pulsations in the pressure by inserting a volume chamber or 30 feet of 1/4 inch tubing in output pressure line between Transmitter and test gage

2 Apply supply pressure to Transmitter

3 Disconnect connecting link from pointer drive arm at lower connecting pin (Figure 13) so black level pointer may be moved freely by hand

4 Manually position black level pointer at 50% scale Output pressure should read 15 psig for 3 27 range or 9 psig for 3 15 range If not, adjust vane pointer alignment screw (Figure 13) to position transmitting unit range arm so that left end of connecting wire is on extended centerline of black pointer Reset output pressure to midrange value by adjusting spring tension adjustment (Figure 11)

5 Manually position black pointer at zero and 100% scale and observe output pressure readings on test gage (If red pointer is hitting mounting bosses turn nozzle pointer alignment screw slightly to shorten pointer travel) Gage should read 3 and 27 psig for 3 27 range or 3 and 15 psig for 3 15 range If pointer reads correctly, proceed to "Output Pressure (Red) Pointer" If not, proceed to step 6 or 7, whichever is applicable

6 If output error is linear (that is output pressure range evenly divided on both sides of midrange value), turn transmitting unit range adjustment screw (Figure 12) counterclockwise to decrease range or clockwise to increase range

7 If output pressure range is non linear, (i e not equally divided on both sides of midrange loading pressure) position black pointer to 50% scale

a Compare output loading pressure with pressures read at 0% and 100% and determine difference in pressure spans between upper and lower halves of scale

b Adjust vane pointer alignment screw to change output pressure (in direction of largest pressure span) by an amount equal to one half the difference as determined in step a

c Turn spring tension adjustment to return output loading pressure to proper midrange value

5 Repeat steps 4, 5, 6 and 7 until correct output pressure readings are obtained at maximum, minimum, and midrange scale values. Then proceed to "Output Pressure (Red) Pointer". If, however, correct output pressure readings cannot be obtained, proceed to step 9.

9 With black pointer at midrange scale, make the following checks:

a Check that nozzle is perpendicular to vane. If not, loosen nozzle clamp screw (Figure 11) and adjust nozzle position until vane is vertical.

b Vane (front) drive arm should be parallel to centerline of black pointer and at 90 degree angle with connecting wire (Figure 13). If not, adjust vane pointer alignment screw and vane adjustable arm until the above relationship exists.

10 Repeat steps 3 thru 9 until correct midrange, minimum, and maximum range output pressure readings are obtained.

Output Pressure (Red) Pointer

The red output pressure pointer should give the same scale readings as the black flow pointer at all times when the black pointer and transmitting unit are in correct calibration. The red pointer indicates that the output pressure is correct for measured flow if both red and black pointers read the same.

1 Manually position black flow pointer at 50% scale. Red output pressure pointer should read 50% scale. If pointer reads correctly, proceed to step 2. If not, turn nozzle pointer alignment screw (Figure 13) until pointer reads correctly.

2 Manually position black pointer at minimum and maximum scale. Red pointer should read minimum and maximum scale respectively. If pointer reads correctly, remove micrometer as described under "Disassembling Micrometer". If not, make the necessary adjustments below.

a If red pointer motion was linear (that is, pointer motion evenly divided on both sides of midrange value), turn output pressure range adjustment (Figure 13) clockwise to decrease motion or counterclockwise to increase motion.

b If red pointer motion was nonlinear (that is, pointer motion not evenly divided on both sides of midrange value) loosen two screws on nozzle adjustable arm and

(1) rotate adjustable arm clockwise if motion was greater from 50% to 100% scale, or

(2) rotate adjustable arm counterclockwise if motion was greater from 50% to zero scale.

c Tighten screws on nozzle adjustable arm.

3 Repeat steps 1 and 2 until correct red output pressure pointer readings are obtained for 50%, 100%, and zero scale.

RESETTING LOADING SPRING

NOTE: Make certain loading spring is at ambient temperature before adjusting or resetting.

1 With spring puller attached to adjustment screw, and locknut, adjustment nut, and washer in position against spring puller bracket (Figure 9), turn G-handle nut until square portion of adjustment screw passes thru square hole. If there is interference, apply a wrench to flat on end of spring puller until free passage is attained.

2 When square portion of adjustment screw has passed thru square hole, start adjustment nut on adjustment screw.

3 Apply weights to spring puller finger ring until total weight including weight of spring puller equals required spring tension as given in Table I.

4 Back off locknut and adjustment nut until washer barely touches bottom of spring loading. Tighten locknut and adjustment nut against washer. If necessary, reposition adjustment nut and locknut on adjustment screw until setting is correct.

5 Remove weights and spring puller. Replace sealing cap.

TABLE I

Area Meter		Standard Differential Pressure (psi)	Total Dead Weight (lbs)*
Size (Inches)	Type		
1"	JR1323 and JR1343	10 psi	9 lbs
2"	JR1323 and JR1343	10 psi	17 1/2 lbs
4"	JR1322 and JR1342	6 psi	58 lbs

* Includes spring, pusher and calibration weight.

BOOSTER UNIT

1 Remove Booster Unit from Transmitter as outlined under "Booster Unit Replacement"

2 With Booster at test bench, make the following connections

a Connect an accurate air supply to Booster supply connection "S", 30 psig for 3 to 27 psig range, 18 psig for 3 to 15 psig range

b Install accurate test gage at Booster output tee connection Plug connection from Booster to restoring bellows

c Install accurate test gage in line from Booster Unit nozzle connection "N" (Gage must accurately measure 20 to 35 psig)

d Extend short length of rubber tubing with adjustable pinch clamp from nozzle to control flow of air from nozzle

3 Adjust pinch clamp to obtain 35 psig for 3 27 or 20 psig for 3 15 range on test gage

4 Output pressure should be approximately 15 psig for 3 27 range or 9 psig for 3 15 range If not, adjust two concentric adjustment screws in center of lower housing (Item 25, Figure 29) Turn outer screw (Item 29, Figure 29) clockwise to decrease or counterclockwise to increase output pressure

5 With nozzle back pressure at 35 (or 20) psig, and Booster unit output pressure at 15 (or 9) psig, turn inner screw (Item 27, Figure 29) clockwise until output pressure begins to decrease Then turn inner screw two turns counter clockwise

6 Remove tee, pinch clamp, plug, and supply and output connections Perform "Transmitter Adjustment Checks" before returning to operation

HOW THE AREA METER OPERATES

The Type JR13 Area Meter Transmitter is shown in Figure 14 The meter consists of a measuring mechanism and an indicating and transmitting mechanism

MEASURING MECHANISM

The measuring mechanism is contained in a housing (similar to a valve body) which consists of an internal cage, a metering plug, and a loading spring connecting the metering plug to the bottom of the spring housing

The indicating and transmitting mechanism (Figure 11) consists of a pointer and scale, a vane nozzle assembly and a booster unit Refer to "Transmitting Mechanism" for a complete description of the transmitting unit

Fluid flowing into the internal cage (Figure 14) lifts the metering plug upward As the plug moves, it uncovers the ports of the cage allowing the fluid to flow thru the cage Upward motion of the plug is opposed by the downward force of the loading spring The displacement of the plug is directly proportional to the rate of flow while force of the spring remains constant

Motion of the metering plug is directly transmitted thru a spindle and connecting linkage to position the indicating pointer and the vane of the transmitting mechanism The position of the pointer and vane reflects the position of the metering plug Since the output signal developed by the transmitting mechanism is directly proportional to the vane position, the output signal is also directly proportional to the metering plug position and to the measured rate of flow

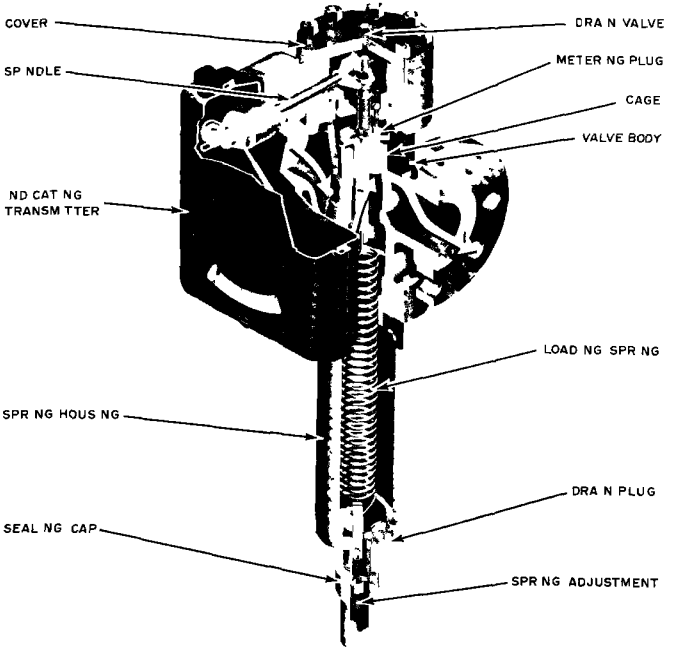

FIGURE 14 Type JR13 Area Meter

The output pressure pointer should always be opposite the flow indicating pointer to indicate that the output signal is proportional to the measured rate of flow

TRANSMITTING MECHANISM

The transmitting mechanism consists of a vane/nozzle assembly and a Booster Unit The vane is linked to the indicating pointer (black) so that vane position corresponds to the measured flow When the measured flow is constant the vane and nozzle are in their "at balance" positions and the pressure in the Booster bellows is maintained at a value which holds the U beam in an approximately horizontal position (inlet and exhaust valves closed)

An increase in measured flow repositions the spindle indicating pointer This movement causes the vane to move closer to the nozzle, retarding the flow of air from the nozzle and increasing pressure in the Booster bellows Expansion of the bellows pulls the U beam down, opening the inlet valve (as the U beam pivots at the diaphragm seals) and increasing the pressure in Chamber 3 The inlet/exhaust valve (Figure 16) is spring loaded downward (downward motion of the U beam end closes the exhaust valve and opens the inlet valve, Sketch A upward motion of the U beam end closes the inlet valve and opens the exhaust valve Sketch B)

Increased pressure in Chamber 3 is applied to the restoring bellows expanding the bellows and moving the nozzle away from the vane When pressure in Chamber 3 becomes great enough to move the nozzle to its "at balance" position, (1) the rate of air flow from the nozzle and the pressure in the Booster bellows return to their "at

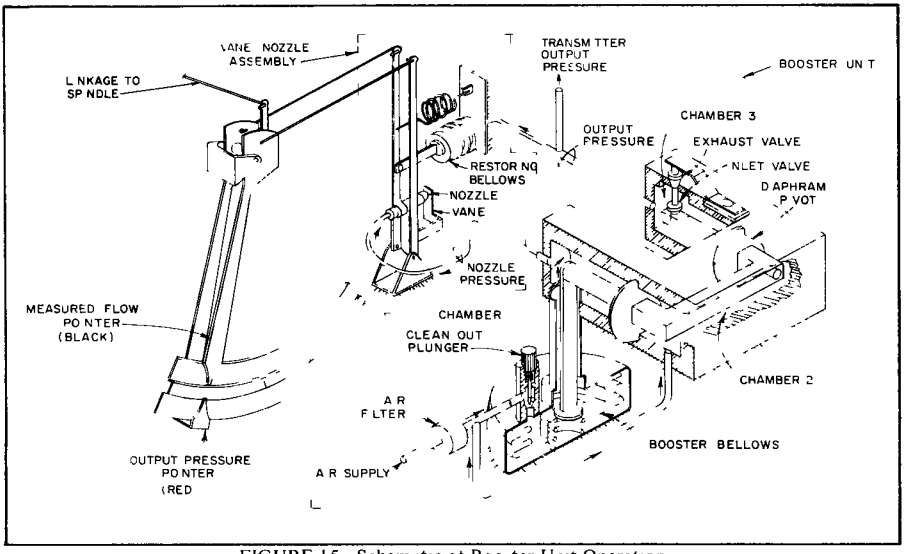

FIGURE 15 Schematic of Booster Unit Operation

balance" values, (2) the U beam returns to its horizontal position, and (3) the inlet and exhaust valves close, maintaining the Booster Unit output pressure at a new increased value

When the measured flow decreases, all movement is in the opposite direction of that described above and the Transmitter output pressure is maintained at a new decreased value proportional to the decreased measured flow

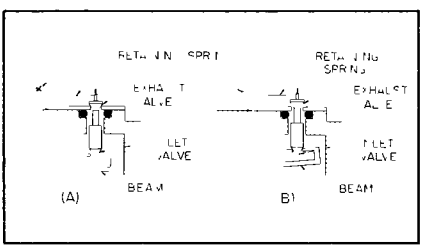

FIGURE 16 Booster Unit Inlet Exhaust Valve

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CORRECTION FACTORS

Bailey area meters operate on the principle that flow through an opening or restriction creates a differential pressure The differential pressure is established by spring tension and is maintained constant while the opening is varied as required to permit the flow to pass A measurement of opening is thus a measurement of flow rate This relationship has a linear characteristic since the differential pressure is held constant

An area meter must be calibrated for a specified fluid density, and is sensitive to changes from that specified density If design operating conditions are not maintained, a correction factor or combination of factors must be applied to meter readings to obtain corrected flow Instruction Section G99 2 provides correction factors for water and other fluids but since the area meter is used almost exclusively for fuel oil measurement, which involves some additional considerations, the subject of correction factors for fuel oil measurement is described below

SPECIFIC GRAVITY

Changes in density caused by the volumetric expansion on heating are referred to as changes in specific gravity The diagonal lines of Figure 17 represent this change in specific gravity with temperature for petroleum oils of constant composition, and of 0 75 to 1 10 base specific gravity, referred to water at 60F Figure 18 shows the correction factor for the new specific gravity at the changed temperature This specific gravity factor applies whether the flowing units are in weight or volume, since it is understood that a unit of volume is at a standard or base temperature (60F) rather than at the flowing temperature

OIL COMPOSITION

Should an oil of a different composition be used, the specific gravity at base or standard condition may change as well as at flowing condition In this case it is necessary to take this specific gravity ratio into account, and the revised correction factor becomes

$$CF \quad \sqrt{\frac{G_{fa}}{G_{fd}}} \times \frac{G_{bd}}{G_{ba}}$$

CF Multiplying factor for chart or integration

G_{fa} Specific gravity at flowing temperature, actual value

G_{fd} Specific gravity at flowing temperature, design value

G_{bd} Specific gravity at 60/60F, design value

G_{ba} Specific gravity at 60/60F actual value

The ratio G_{fa}/G_{fd} may be determined from Figure 18

VISCOSITY CORRECTION

1 inch and 2 inch area meters are sensitive to viscosity, and are flow calibrated at the specified viscosity to remove this effect Should the flowing viscosity later be changed it will be necessary to take this into account by introducing an empirically derived correction factor Fv

$$CF \quad \sqrt{\frac{G_{fa}}{G_{fd}}} \times \frac{G_{bd}}{G_{ba}} \times F_v$$

F_v Viscosity factor, for the style (port size) of the meter

Figures 19 thru 23 are flow viscosity correction curves for 1 inch and 2 inch area meters

RECALIBRATION

The use of correction factors can be eliminated by recalibrating the area meter for the new operating conditions Determine the new maximum stroke required by dividing the original maximum stroke by CF then refer to calibration procedure on page 19

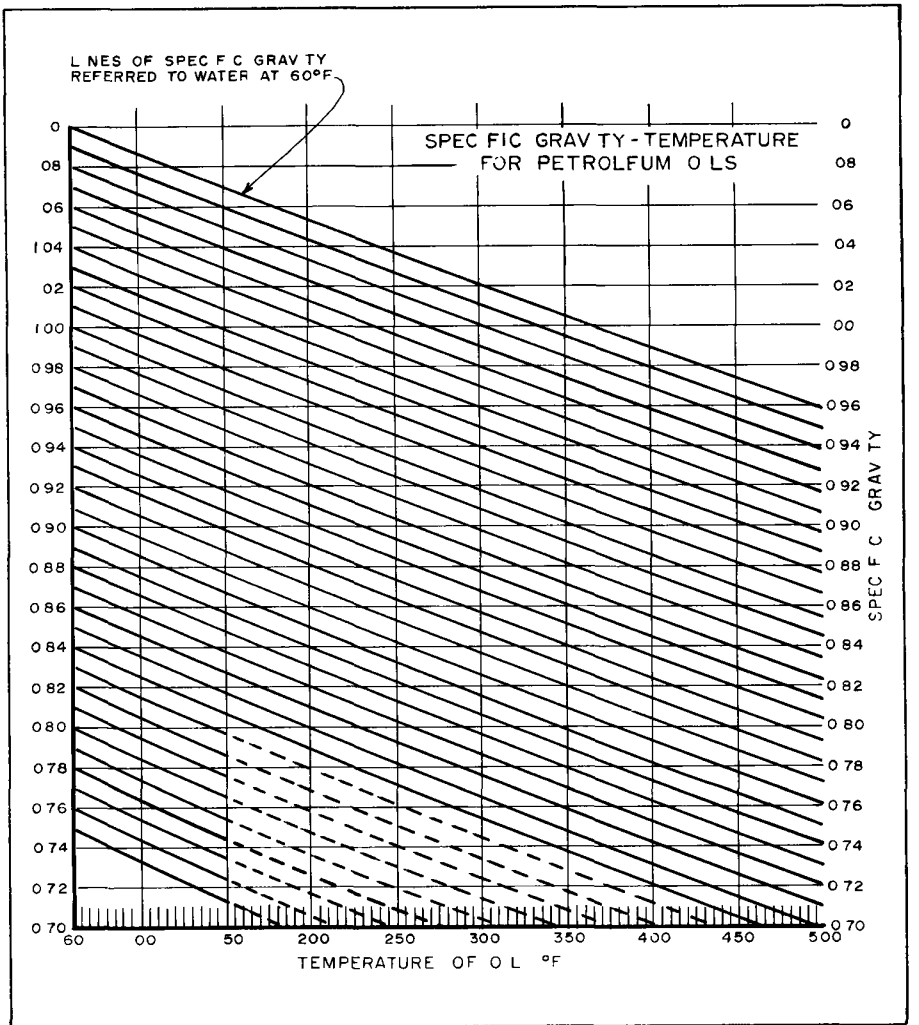


FIGURE 17 Temperature Variations for Petroleum Oils

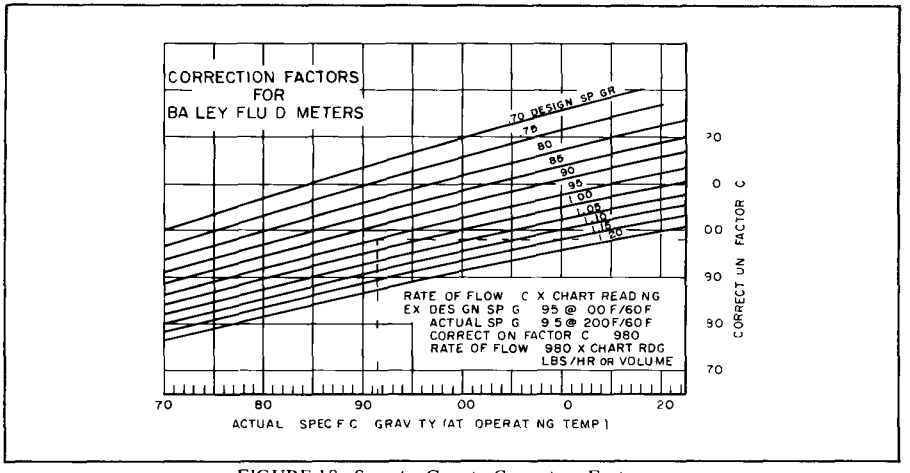


FIGURE 18 Specific Gravity Correction Factors

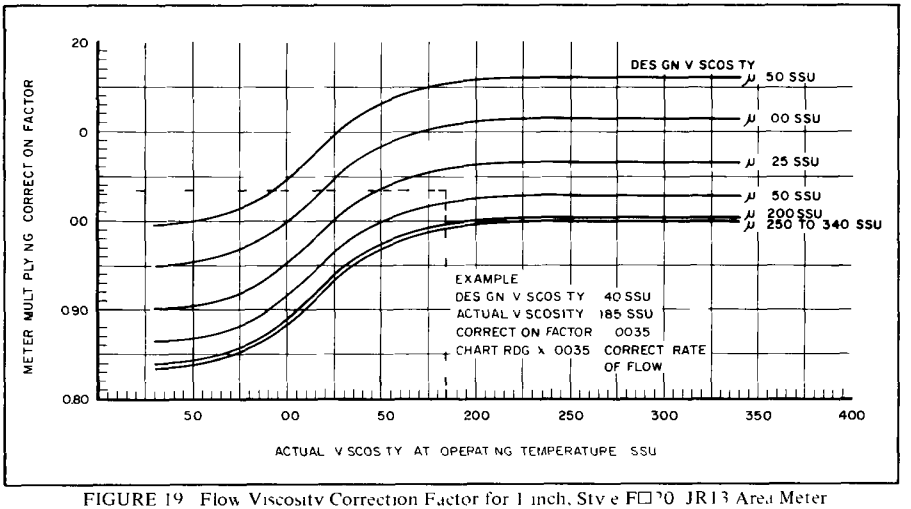


FIGURE 19 Flow Viscosity Correction Factor for 1 inch, Style F□?0 JR13 Area Meter

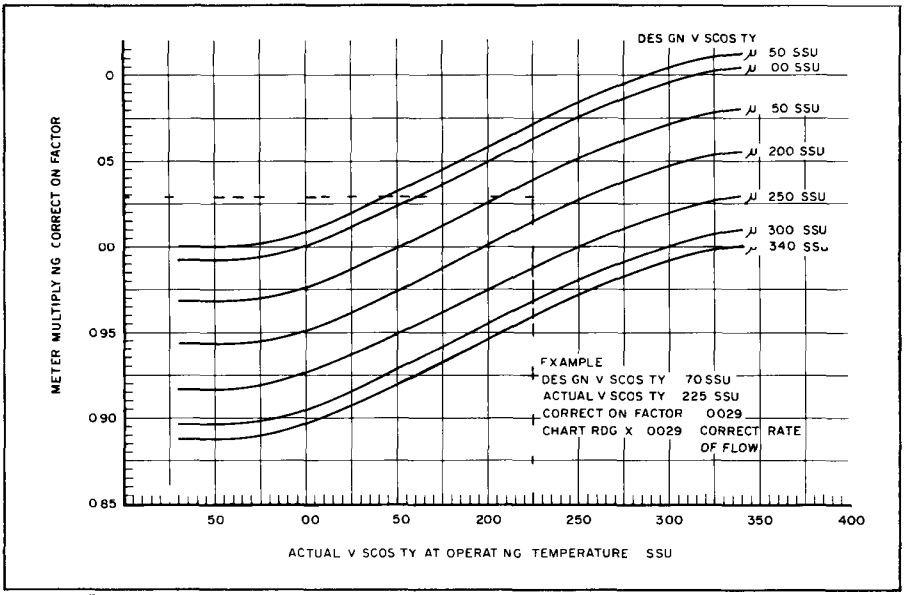


FIGURE 20 Flow Viscosity Correction Factor for 1 inch, Style F□21, JR13 Area Meter

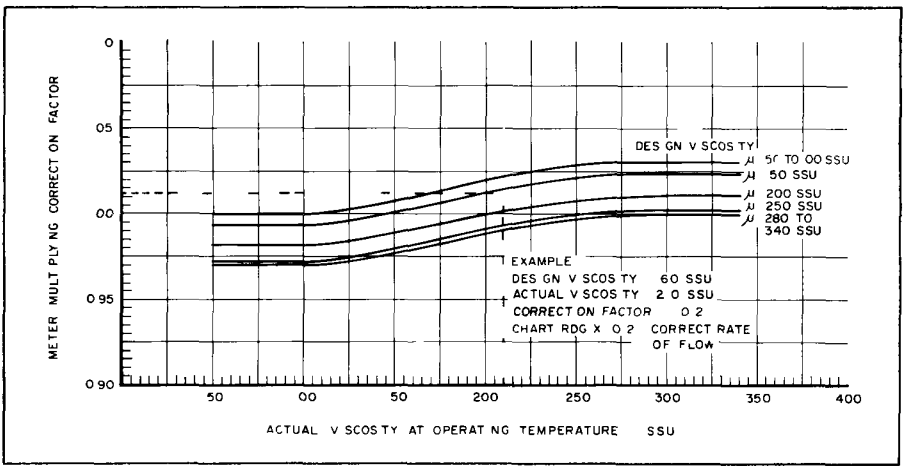


FIGURE 21 Flow Viscosity Correction Factor for 1 inch, Style F□22, JR13 Area Meter

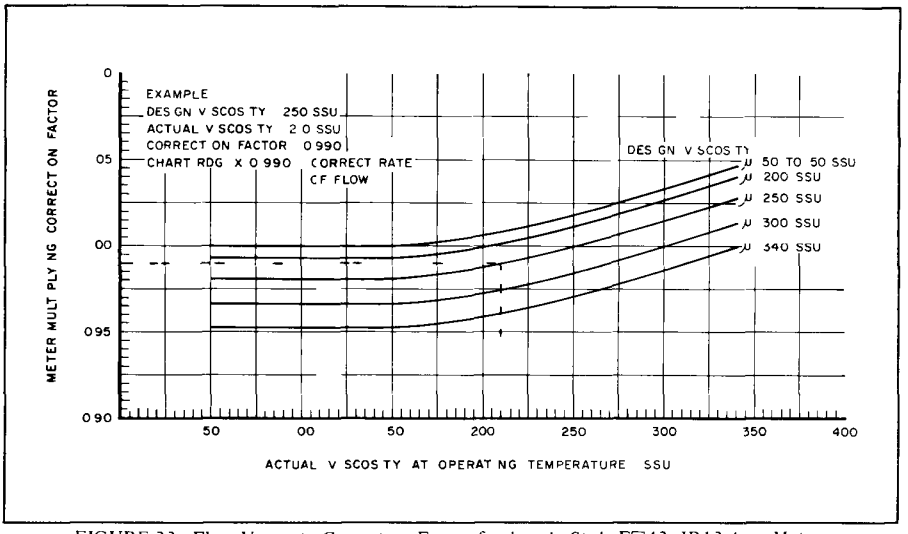


FIGURE 22 Flow Viscosity Correction Factor for 1 inch, Style F□42, JR13 Area Meter

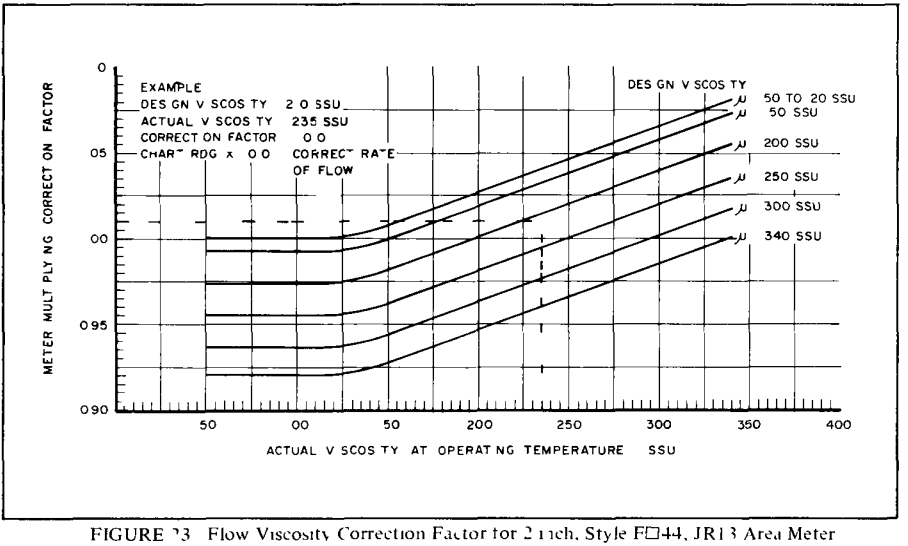
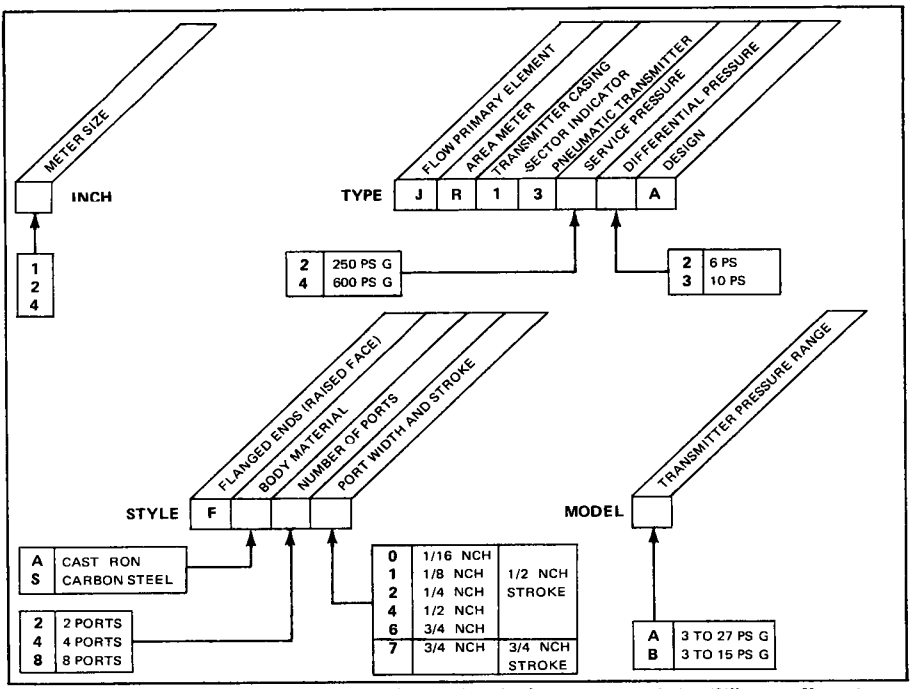


FIGURE 23 Flow Viscosity Correction Factor for 2 inch, Style F□44, JR13 Area Meter

EXPLANATION OF NOMENCLATURE



An "X" in any Nomenclature position indicates that the feature is special An "X" as a suffix indicates that the unit includes some special feature not covered by Nomenclature

REPLACEMENT PARTS

SPARE PARTS KITS

The Spare Parts Kits shown in Figures 25 thru 29 should be carried in stock Specify the Spare Parts Kit part number to order a complete kit

ORDERING INDIVIDUAL PARTS

Figures 24 and 25 are Parts Drawings for the Indicating and Transmitting mechanism Figures 26 thru 29 are Parts Drawings for the Type JR13 Area Meter Normally, these drawings apply to the instruments furnished However, there may be individual differences in specific meters because of

1 Design changes made since the printing of this Instruction Section

2 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

a The complete Nomenclature and all information stamped on nameplate (Type, Style, Model, Loading Range, Head, Stroke, etc) of instrument for which parts are desired

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

TEM	PART NO	NAME
	5311409 2	COVER SCREW 2 REQD
2	98173 16	RETA N NG R NG 2 REQD
3	68854 1	COVER ASSY NCLUDES TEMS 3A THRU 9
3A	68855 1	COVER
4	1962400 1	STYLE PLATE
5	68522	GASKET
6	68 169 1	W NDOW
7	51 184 3	CLAMP 2 REQD
8	NO 2X3 8	PAN HD HD FRMG SCR TYPE B AS REQD
9	5316543 1	SEAL NG STR P
10	SEE TABLE	DR VE ARM
	SEE TABLE	SECTOR PLATE
12	SEE TABLE	ADJUSTABLE ARM
13	SEE TABLE	PAN HD MACH SRC AS REQD
14	NO 2	REG SPR NG LKWASH AS REQD
15	668837 1	L NK ASSY
16	6b6969 1	LOCAT NG SCREW
17	6 32X5 6	F LL HD STN STL MACH SCR
18	681 23	PO NTER MECH ASSY NCLUDES TEMS 19 THRU 2
19	4 40X5 8	PAN HD MACH SCR AS REQD
20	4-40X1/4	PAN HD MACH SCR AS REQD
21	NO 4	SPR NG LKWASH AS REQD
22	SEE TABLE	PAN HD STN STL SEMS EXT AS REQD
23	68842 1	L NK 2 REQD
24	68822 1	ADJUSTABLE ARM 2 REQD
25	68825	SPEC AL NUT
26	68507 1	WASHER 4 REQD
27	49126	SCREW 4 REQD
28	68931 2	SCALE
29	SEE TABLE	PAN HD SEMS NT AS REQD
30	SEE TABLE	TYPE A PLA N R WASHER AS REQD
31	537612 28	SUPPLY CONNECTOR
32	537612 27	LOAD NG CONNECTOR
33	6 32X5 16	PAN HD MACH SCR AS REQD
34	SEE TABLE	SHKPRF LKWASH AS REQD
35	6 32	HEX NUT AS REQD
36	68845	SUPPLY A R L NE
37	68846 1	LOAD NG A R L NE
38	19517 4	TEE
39	6 32X 4	PAN HD SEMS EXT AS REQD
40	68839 1	CAP LLARY CL P
41		BELLOWS AND VANE MECHAN SM ASSY (NCL TEMS 42 THRU 63
	68813 1	(3 27 PS
	688 3 2	3 15 PS)
42	SEE NOTE A	CODE LABEL
43	197 20 3	ELAST C STOP NOT
44	4-40X1 4	HEX HD STN STL CAP SCR
45	68805 1	SUPPORT BRAC KET
46	68824 1	TAPPED PADS 3 REQD
47	3 48X 4	PAN HD STN STL SEMS EXT AS REQD
48	68820	BELLOWS BEAM H NGE
49	8 32	STN STL HEX NUT AS REQD
50	1608 00	STN STL SHKPF LKWASH AS REQD
51	681870 1	SPR NG ASSY 3 27 PS
	6897	SPR NG ASSY 3 15 PS
52	4-40X5/16	PAN HD STN STL SEMS EXT AS REQD
53	68796 1	BELLOWS AND P P NG ASSY
54	6 32	STN STL HEX NUT
55	606 00	STN STL SHKPRF LKWASH
56	4 40X1 2	STN STL MACH SCR
57	688C4 1	SPR NG ADJ JSTMENT ARM
58	6841	P VOT PRESS F T
59	688 3	BELLOWS BEAM ASSY
60	688 7	VANE & OPERAT NG LEVER ASSY
61	68834	CLAMP BLOCK
62	4 40X5 16	PAN HD STN STL MACH SCR AS REQD
63	NO 4 SAE	STN STL LKWASH AS REQD
64	68 b6 1	NOZZLE A R L NE
65	951054 5	MALE CONNECTOR
66	68841	OVERTRAVEL STOP
67	5316500	BOOSTER RELAY* (3 27 PS)
	5316500 2	BOOSTER RELAY* 3 15 PS
68	10 32X 2	HEX HD STN STL SEMS EXT AS REQD
69	681654	MECHAN SM SUPPORT BRACKET
70	0 32X3 8	PAN HD MACH SCR SEE NOTE B
71		WARN NG TAG SEE NOTE B
72	19934 32	SPACER SEE NOTE B
73	68 022	COVER PLATE
74	8 32X5 6	PAN HD MACH SCR AS REQD
75	SEE TABLE	SHKPRF LKWASH AS REQD
76	8 32	HEX NUT AS REQD
77	19981 6	PLUG BUTTON
78	68806 3	HOUS NG
79	666968	GASKET
80	197934 1	HOSE CLAMP
8	19734 1	WASHER 4 REQD
82	6 32x3 8	PAN HD SEMS EXT AS REQD

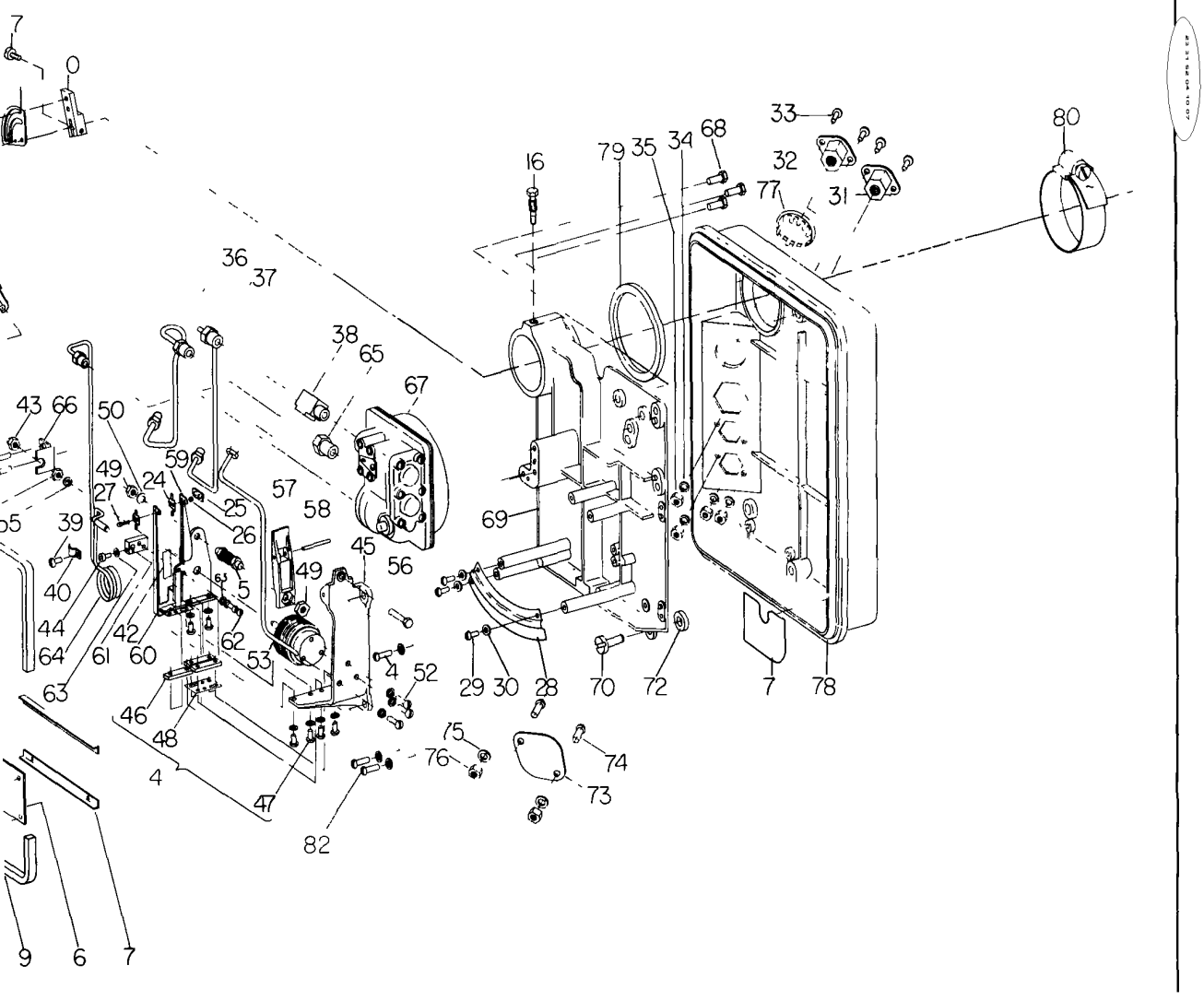
NOTE A SPEC FY NUMBER ON CODE LABEL WHEN ORDER NG PARTS
NOTE B USED FOR SH PP NG ONLY
* SEE PARTS DWG P22 37 FOR BOOSTER RELAY DETA LS

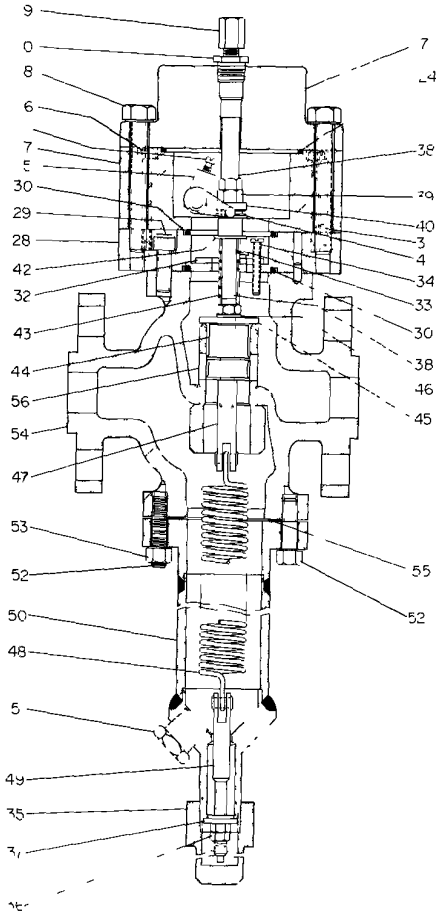
TABLE A

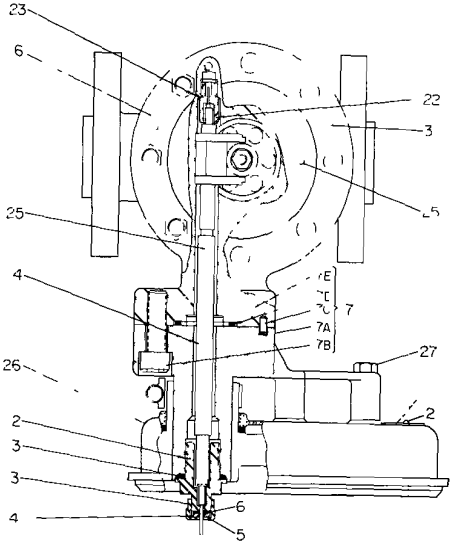
STYLE	TRANSM TTER ASSEMBLY	TEM 10	TEM 11	TEM 12	TEM 13	TEM 22	TEM 29
ALL EXCEPT FS87	681120	631116 1	68 117 1	681118 1	2 56x3 6	6 32x5/8	3-48x5/ 6
FS87	681773	631772 1	681771 1	68 774 1	2 56x1 8	6 32x1/2	3-48x1 4

TABLE A Cont)

ITEM 30	TEM 34	ITEM 75	ITEM 82
1603 00	606 00	708 00	6 32 x 7/16
NO 3	1106 00	1208 00	6 32 x 3/8


7
0
16
79
35
34
68
33
32
31
77
80
36
37
38
65
67
43
66
50
49
27
24
59
25
26
57
58
39
40
44
64
61
60
42
63
62
53
5
49
45
56
69
4
52
46
48
4
47
82
29
30
28
70
72
7
78
75
76
74
73
9
6
7





ITEM	PART NO	NAME
		NAMEPLATE
2	0 3 6	PAN HD THD FPMG SCR TYPE U AS REQD
3	41D76	PRESS T GHT BRG CAP
4	31 669 1	FOLLOWER & WASHER ASSY
5	311607 1	P T B FOLLOWER
6	311651 1	P T B WASHER
7	683203 1	COVER
8	7 16 14 x 3 1/4	HEX HD CAP SCR AS REQD
9	196D25	DRA N VALVE ASSY
10	95467 5	REDUCER BUSH NG
11	311 0?	FORYED LEVER SCR
12	681881 1	PRESS T GHT BRG BODY
13	195856 2	O R NG
14	681325 2	PRESS T GHT BRG SP NDLE ASSY
15	681330 1	DR VE LEVER ASSY
16	4 20 x 2 1 4	F L HD MACH SCR AS REQD
17	681424	HOUS NG & ADAPTER PLATE ASSY NCL TEMS 7A THRU 17E
17A	681328 1	ADAPTER PLATE
17B	1 ? 13 x 1 1/2	HEX HD CAP CR 4 REQD
17C	3 16 x 3 8	GROOV P N TYPE 4 ? REQD
17D	195825 3	O R NG

NOTE FOR DETA LS OF PNEUMAT C TRANSM
FOR DETA LS OF ELECTR C TRANSM TT
MODELS K P S & T SEE PARTS DV
MODELS VA & VB SEE PARTS DWC

TABLE		
STYLE	PRESSURE	VALV TE
FA20	250 PS	66
FS?0	b00 PS	66
FA2	?50 PS	66
FS2	600 PS	66
FA2?	250 PS	66
FS2?	600 PS	66
FA42	?50 PS	66
FS42	600 PS	66

ITEM	PART NO	NAME
1		NAMEPLATE
2	0 3/16	THD FRMG SCR TYPE U AS REQD
3	41D26	PRESS T GHT BRG CAP
4	311669 1	FOLLOWER & WASHER ASSY
5	311607 1	P T B FOLLOWER
6	311651 1	P T B WASHER
7	683203 1	COVER
8	7/16-14x3 1/4	HEX HD CAP SCR 8 REQD FOR 250 PS
	7/16 14x4	M LLED STUD 8 REQD FOR 600 PS
9	7/16 14	HEAVY HEX FULL NUT 16 REQD FOR 600 PS
10	196D25	DRA N VALVE ASSY
1	195467 6	REDUCER BUSH NG
12	311702 1	FORKED LEVER SCR
3	681881 1	PRESS T GHT BRG BODY
14	195825 2	O R NG
15	681325 2	PRESS T GHT BRG SP NDLE ASSY
16	681330 1	DR VER LEVER ASSY
17	1/4 20x2 1/4	F L HD MACH SCR AS REQD
18	681361 1	HOUS NG & ADAPTER TEMS 18A THRU 8E) TEMS 16 THRU 20)
18A	681328 1	ADAPTER PLATE
18B	1/2 13x1 1/2	H
18C	3/16x3/8	
18D	195825 3	
18E	681372 1	
23	341784 1	
24	316089 1 316089 2	
25	195825 6	
26	681373 1	
27	197218 2	
28	10 32x1/4	
29	3/16x3 8	
30	681120	
31	5/16 18x1 7/8	
32	662956 1	
33	5/16 24	
34	662955 1	
36	683235	

NOTE FOR DETA LS OF PNEUMAT C TRANSM TTER SEE PTS DWG P22
FOR DETA LS OF ELECTR C TRANSM TTER
MODELS K P S & T SEE PTS DWG E22 63
MODELS VA & VB SEE PTS DWG E22 5

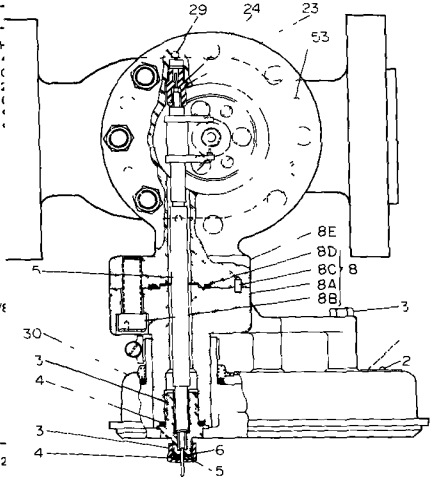


FIGURE 26 Parts Drawing P22-42 2 Inch
JR13 Area Meter (250 and 600 PSI)

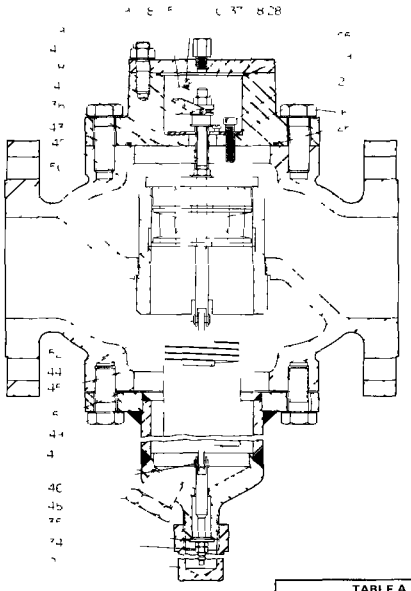
ITEM	PART NO	NAME
1		NAMEPLATE
2	0 3 16	PAN HD THD FRMG SCR TYPE U AS REQD
3	41D26	*PRESS T GHT BRG CAP*
4	31 669 1	FOLLOWER & WASHER ASSY NCL TEMS 5 & 6
5	311607 1	P T B FOLLOWER
6	311651 1	P T B WASHER
7	681377 1	COVER
8	1/2 3	SEM F N SHED HEAVY HEX NUT AS REQD
9	196D25	1 8 N DRA N VALVE
10		FORKED LEVER SCR
	311102 1	*ALL EXCEPT FS87*
	315686 1	FS87 ONLY
11	681881 1	PRESS T GHT BRG BODY
12	195825 2	O R NG
13	68 325 1	PRESS T GHT BRG SP NDLE ASSY
14		DR VE LEVER ASSY
	681330 1	ALL EXCEPT FS87
	681768 1	FS87 ONLY
15	3 4 10	SEM F N SHED HEAVY HEX NUT 8 REQD
16	681360	HOUS NG & ADAPTER PLATE ASSY (NCL TEMS 16A THRU 6E
16A	68 328 1	ADAPTER PLATE
16B	1/2 3x1 1 2	HEX HD CAP SCR AS REQD
16C	3 16x3 8	*GROOV P N TYPE 4* 2 REQD
6D	195825 3	O R NG
16E	681304	SP NDLE HOUS NG NCL TEM 2
21	97283 1	FULL THREADED STUD 8 REQD
22	341784 1	SP NDLE BEAR NG
23	316089 1	005 SH M AS REQD
	316089 2	010 SH M AS REQD
24	*195825 6*	*O RING*
25	195825 5	O R NG
26	681318 1	LOCKPLATE
27	10 32x1 4	PAN HD STN STL MACH SCR AS REQD
28	197218 1	F L HD STN STL MACH SCR 3 REQD
29	3/16x3/8	GROOV P N TYPE 4 2 REQD
30		TRANS SEE NOTE
	681120	ALL EXCEPT FS87
	681773	FS87 ONLY
3	5/16 18x1 7/8	HEX HD CAP SCR
32	662478	SEAL NG CAP
33	5/16 24	SEM F N SHED REG HEX FULL NUT AS REQD
34	662955 1	WASHER
35		METER NG PLUG STEM
	681378 2	ALL EXCEPT FS87
	682970 1	FS87 ONLY
36	197214 3	LOCK NUT
37	681323 1	*UPPER BEAR NG*
38	682405 1	LOWER BEAR NG
39	38 317 1	WASHER
40	681319 1	SPR NG
41		METER NG PLUG
	664117	ALL EXCEPT FS87
	6619526 1	FS87 ONLY
42	720 00	STN STL SHKPRF LKWASH
43	682408 3	SPR NG HANGER & P N ASSY
44	664 54 1	LOAD NG SPR NG
45	664173	ADJ SCR & P N ASSY
46	3/4 10	SEM F N SHED HEAVY HEX FULL NUT 6 REQD
47	664150 1	HOUS NG ASSY NCL TEM 46
48	195148 5	P PE PLUG
49	681334 1	VALVE BODY NCL TEMS 50 51 & 52)
50	3/4 10x3 1 4	FULL THREADED STUD 6 REQD
5	3/4 10x6	FULL THREADED STUD 2 REQD
52	3 4 10x3 1/2	FULL THREADED STUD 8 REQD
53	664174 1	*FLANGE GASKET*
54	SEE TABLE A	VALVE CAGE
55	1/4x1/2	GROOV P N TYPE 4 2 REQD

NOTE FOR DETA LS OF PNEUMAT C TRANSM TTER SEE PTS DWG P22 39 or P22 40

TABLE A			
STYLE	TEM 54	USE	STROKE
FS46	664118 1	4 PORTS	/2 N
FS86	664208 1	8 PORTS	
FS87	867399 1	8 PORTS	3/4 N

SPARE PARTS K T PT NO 256057 2			
TEM	QTY	PT NO	NAME
5	1	311607 1	P T B FOLLOWER
6	2	31 65 1	P T B WASHER
2	1	195825 2	O R NG
19	1	195825 3	O R NG
24	1	195825 6	O R NG
25	1	195825 5	O R NG
53	1	664174 1	*FLANGE GASKET*

FIGURE 17 Parts Drawing P22-44, 4 Inch JR13 Area Meter (600 PSI)



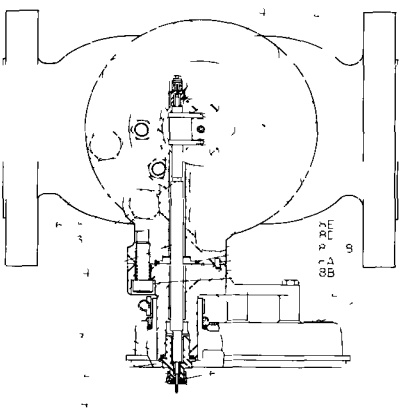


TABLE A		
STYLE	TEM 52	USE
FA46	664118 1	4 PORTS
FA86	664208 1	8 PORTS

SPARE PARTS K T PT NO 265057 1			
TEM	QTY	PT NO	NAME
5	1	311607 1	P T B FOLLOWER
6	2	3 8511	P T B WASHER
13	1	95825 2	O R NG
21		195825 3	O R NG
25	1	195825 6	O R NG
26	1	195825 5	O R NG
51	1	664622 1	FLANGE GASKET

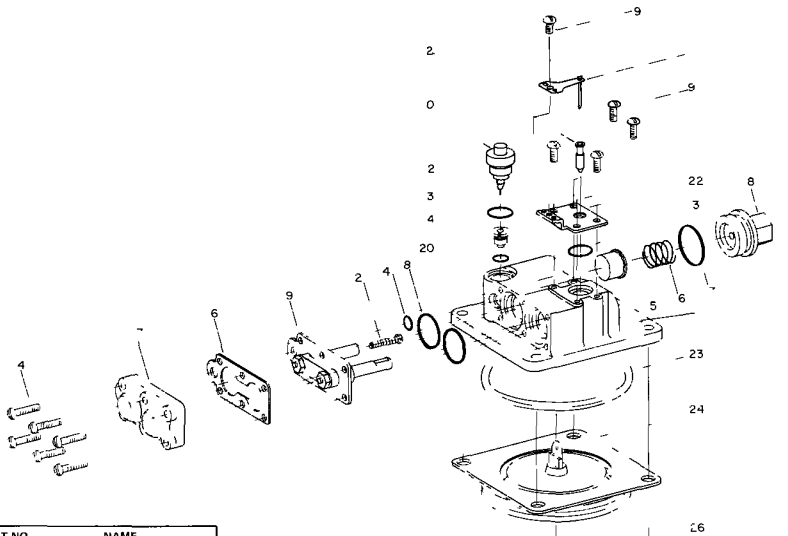
TEM	PART NO	NAME
1		NAMEPLATE
2	0 3 16	PAN HD THD FRM E SCR TYPE U AS REQD
3	41D26	PRESS T GHT BRG CAP
4	31 669 1	FOLLOWER & WASHER ASSY NCL TEMS 5 & 6
5	311607 1	P T B FOLLOWER
6	31165	P T B WASHER
7	681327 1	COVER
8	197283	FULL THREADED STUDS 8 REQD
9	1/2 13	SEM F N SHED HEAVY HEX FULL NUT AS REQD
10	196D25	1 8 N DRA N VALVE
11	311102 1	FORKED LEVER SCREW
12	681881 1	PRESS T GHT BRG BODY
13	195875 2	O R NG
14	681325 1	PRESS T GHT BRG SP NDLE ASSY
15	68 330	DR VE LEVER ASSY
16	3 4 0x2	HEX HD CAP SCR 6 REQD
17	3 4 10x3 3 4	HEX HD CAPSCR 2 REQD
18	681360 1	HSG & ADAPTER PLATE ASSY NCL TEMS 18A THRU 18E

ITEM	PART NO	NAME
18A	68 328 1	ADAPTER PLATE
18B	1 2 13x1 1/2	HEX HD CAP SCR
18C	3/ 6x3/8	GROOV P N TYPE 4 2 REQD
18D	195825 3	O R NG
18E	681304 1	SP NDLE HOUS NG
23	34 784 1	SP NDLE BEAR NG
24	316089	005 SH MS AS REQD
	3 6089 2	010 SH MS AS REQD
25	195825 6	O R NG
26	195825 5	O R NG
27	681318 1	LOCKPLATE
28	10 32x1 4	PAN HD MACH SCR AS REQD
29	1972 8 1	F L HD STN STL SCR 3 REQD
30	3 16x3 8	GROOV P N TYPE 4 2 REQD
31	681120	TRANSM TTER SEE NOTE
32	5/16 18x1 7 8	HEX HD CAP SCR 3 REQD
33	664278 1	SEAL NG CAP
34	5/16 24	SEM F N SHED REG HEX FULL NUT AS REQD
35	662955 1	WASHER

ITEM	PART NO	NAME
36	681378 2	METER NG PLUG STEM
37	1972 4 3	LOCKNUT
38	681323 1	UPPER BEAR NG
39	682405 1	LOWER BEAR NG
40	681317 1	WASHER
41	681319 1	SPR NG
42	664 17	METER NG PLUG
43	1720 00	STN STL SHKPRF LKWASH
44	682408 3	SPR NG HANGER & P N ASSY
45	664154 1	LOAD NG SPR NG
46	664 73 1	ADJ SCR & P N ASSY
47	664624 1	HOUS NG ASSY
48	195148 5	P PE PLUG
49	3/4 10x1 3 4	HEX HD CAP SCR AS REQD
50	664589 1	VALVE BODY
51	664622 1	FLANGE GASKET
52	SEE TABLE A	VALVE CAGE
53	1 4x 2	GROOV P N TYPE 4 2 REQD

NOTE FOR DETA LS OF PNEUMAT C TRANSM TTER SEE PTS DWG P22 39

FIGURE 28 Parts Drawing P22-43, 4 Inch JR13 Area Meter (250 PSI)



ITEM	PART NO	NAME
1	SEE NOTE	CODE LABEL
2	5311428 11	O R NG
3	5316464 1	OR F CE ASSY
4	5311428 2	O R NG 2 REQD
5	68368	F LTER ASSY
6	5311427	F LTER SPR NG
7	53 1428 1	O R NG
8	5316501 1	F LTER CAP
9	3 48×3 6	PAN HD STN STL SEMS EXT 5 REQD
10	53 6478	OR F CE CLEANOUT
	5316497 1	VALVE RETA N NG SPR NG
12	53 6339	VALVE
3	5311428 17	O R NG
4	6 3" 5 8	PAN HD STN STL SEMS EXT 6 REQD
6	53 633b 1	COVER GASKET
7	5316338 1	COVER
18	5311428 19	O R NG 2 REQD
9	53 6335	D APHRAGM & ROD ASSY
20	53 b340	RELAY HO JS NG
2	4 40×1 2	PAN HD STN STL SEMS EXT
23	53 646 1	JPPER VALVE SEAT
23	5311428 8	O R NG
24	53164b7 1	BELLOWS ASSY
25	5316337	LOWER HOUS NG ASSY
26	5316491 1	BELL WS STOP PLATE
27	53 648[illegible]	STOP SCREW
28	5316490	SPR NG ST JP
29	5316487	ADJ SCREW
30	53 6488	F LCR NSERT
31	53 6492 1	SPR NG
32	4 20 7 16	PAN HD STN STL SEMS EXT 4 REQD
33	196 086	PT NO LABEL 3 27 PS BOOSTER UN T 53 6500
	96 086 2	PT NO LABEL 5 PS BOOSTER UN T 53 6500 2

SPARE PARTS K T PART NO 256000 *	
REQD	ITEMS
1	2 5 6 7 10 11 12 13 19 23 24 30 3
2	4 18

NOTE WHEN ORDER NG PARTS SPEC FY NUMBER ON CODE LABEL ITEM

FIGURE 29 Parts Drawing P22 37 Booster Unit Pt No 5316500 □

Product Warranty

Bailey Meter Company warrants the products manufactured by t 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 v tally 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 tra ned 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 ma ntenance 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 sh pment within 48 hours on a speed-order basis

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