AKRON FLOW/PRESSURE SYSTEMS

GPM/PSI

STYLE 9300

INSTALLATION CALIBRATION OPERATION INSTRUCTIONS

AKRON®
BRASS COMPANY

115109

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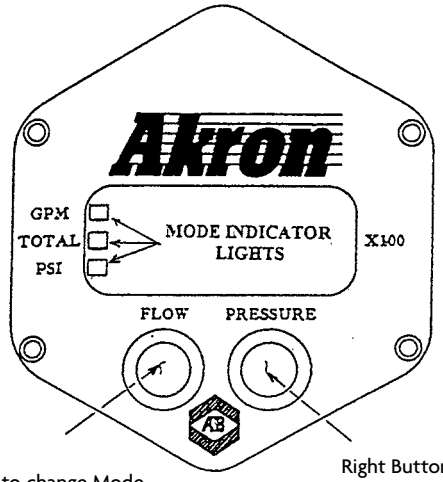
To be used with Akron 9015 Water Flow Test Kit Only

Tip Diameter
Flow - U.S. Gallons Per Minute

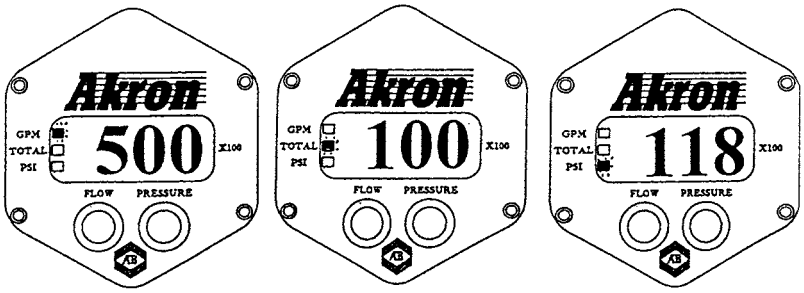
Pitot Pressure PSI	3/4"	1"	1-1/8"	1-1/2"	1-3/4"	2"	2-1/4"
10	53	94	119	212	289	377	478
12	58	103	131	233	316	413	523
14	63	112	141	251	342	446	565
16	67	119	151	268	365	477	604
18	71	127	160	285	388	506	641
20	75	133	169	300	409	534	675
22	79	140	177	315	428	560	708
24	82	146	185	329	448	585	740
26	86	152	193	342	466	608	770
28	89	158	200	355	483	631	799
30	92	163	207	368	500	654	827
32	95	169	214	380	517	675	854
34	98	174	220	391	533	696	882
36	101	178	227	403	548	716	906
38	104	184	233	414	563	736	931
40	106	187	237	422	575	752	954
42	109	192	243	132	589	770	978
44	111	196	248	442	603	788	1000
46	114	200	254	452	617	806	1021
48	116	205	259	462	630	824	1043
50	118	209	265	472	643	841	1065
52	121	213	270	481	656	857	1087
54	123	217	280	490	668	873	1108
56	125	221	285	499	680	889	1129
58	128	225	290	508	692	905	1149
60	130	229	295	517	704	920	1167
62	132	233	299	525	716	936	1187
64	134	237	304	533	727	951	1206
66	136	240	308	542	738	965	1224
68	138	244	313	550	750	980	1242
70	140	247	318	558	761	994	1260
72	142	251	322	566	771	1008	1278
74	144	254	326	574	782	1023	1296
76	146	258	330	582	792	1036	1313
78	148	261	335	589	803	1050	1330
80	150	264	339	596	813	1063	1347
82	152	268	343	604	823	1076	1364
84	154	271	345	611	833	1089	1380
86	155	274	347	618	843	1102	1396
88	157	277	351	626	853	1115	1412
90	159	280	355	633	862	1128	1429
92	161	283	359	640	872	1140	1445
94	162	286	363	647	881	1152	1460
96	164	289	367	654	890	1164	1476
98	166	292	370	660	900	1176	1491
100	168	295	374	667	909	1189	1506
105	172	303	383	683	932	1218	1542
110	176	310	392	699	954	1247	1579
115	180	317	401	715	975	1475	1615
120	183	324	410	730	996	1303	1649

TABLE I



Left Button
Press and Release to change Mode to GPM or TOTAL Press and hold to change LED intensity.

Right Button
Press and Release to change Mode to Pressure (PSI)



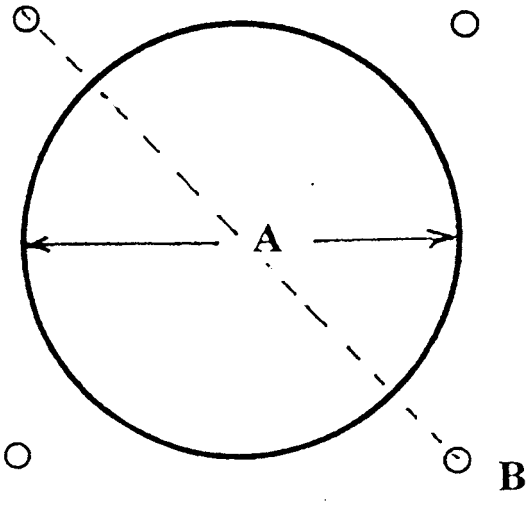
ACTUAL FLOW
500 GPM

TOTAL GALLONS FLOWED
100 X 100 = 10,000

DISCHARGE PRESSURE
118 PSI

FIGURE 5

METER INSTALLATION GUIDE



PANEL CUTOUT DIMENSIONS
A. MAIN OPENING 3-15/16"
B. MOUNTING—FOUR 7/32" HOLES ON A 4.950" BOLT CIRCLE

FIGURE 6

SECTION I
INSTALLATION INSTRUCTIONS

A. SYSTEM COMPONENTS

- Display Meter (Figure 5)
- Flow Sensor (Figure 1)
- Pressure Transducer (Figure 4)
- Interconnect Cables 5,10 or 20'
- Sensor Holder

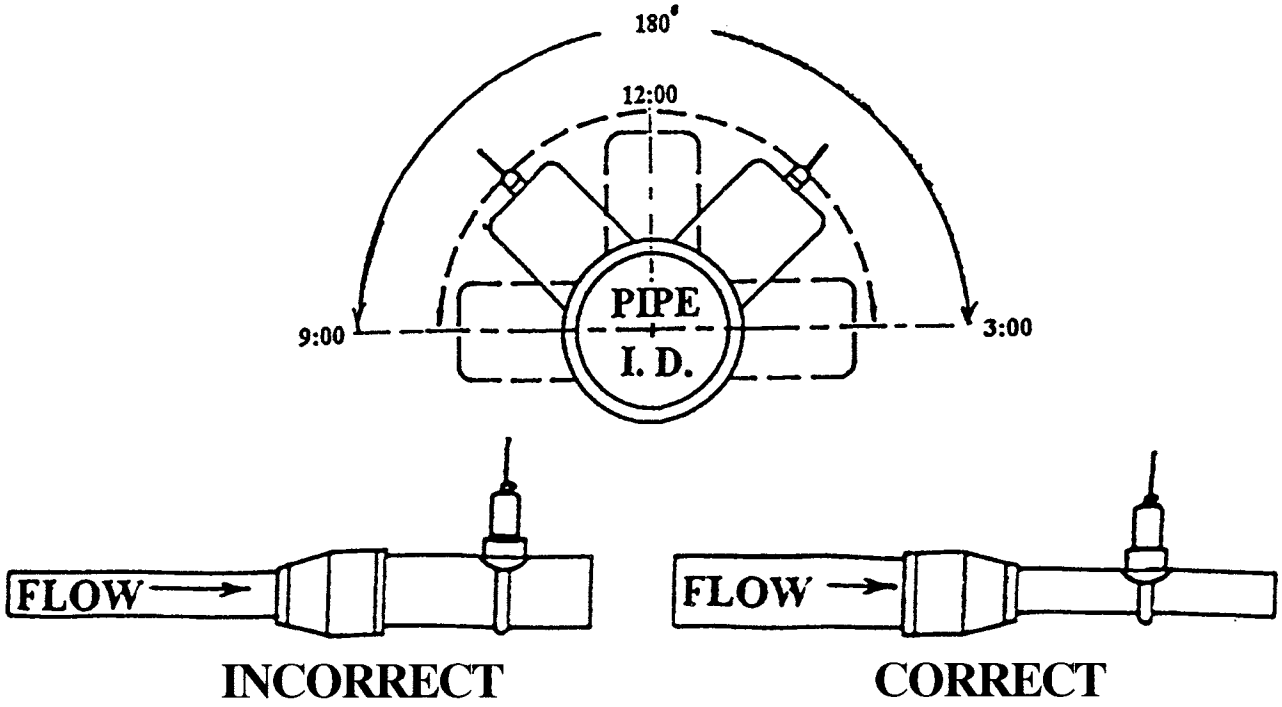
1. Valve Inlet Adapters (Figure 2A, B & C)
2. Saddles (Figure 3)

B. FLOW SENSOR LOCATION

Primary

1. Akron's specially designed inlet adapters for Swing-out Valves. Size 2" - 4".
2. Saddle Clamps. Size 2" - 5" (Schedule 40 pipe)

Note: Horizontal line installations must position the sensor port within 180° on topside (9:00 - 3:00).



Avoid

- Installations where the sensor would be located in a line where a smaller line precedes it.
- Installations where sensor would be positioned following a valve or elbow. Never install flow port valve adapter on discharge side of valve.
- Installation where sensor would directly precede bypass eductor.

Note: In tight installations where water flow is turbulent, custom calibration is required for maximum accuracy.

C. FLOW SENSOR INSTALLATION

1. Akron Valve Adapter

    a. Simply remove retainer nut or plug.
    b. Grease O-Rings on sensor with O-Ring lube or silicone grease. (Remove plastic paddlewheel protector.)
    c. Insert sensor into port and push in.
    d. Align pin "A" (Figure 1)with locator hole and push in.
    e. Replace the retainer nut or plug and tighten with a wrench.

Sensor Installation Complete

2. Saddle Clamp

   a. Determine the location on the pipe.
   b. Drill a 1-1/4" hole in the pipe with a hole saw. Horizontal piping on top side from 9:00 - 3:00.
   c. Deburr the edge of the hole and clean the area where the gasket seals.
   d. Center saddle with hole in pipe (Sensor locator hole "A" (Figure 3) may be on either side of pipe hole.)
   e. Insert strap into saddle and tighten nuts hand tight.
   f. Using a torque wrench tighten nuts alternately to 80 foot pounds.
   g. Follow steps a - e in C.1 to add sensor.

Sensor Installation Complete

D. PRESSURE TRANSDUCER INSTALLATION

The pressure Transducer (Figure 4) has a 1/4" NPT male thread.

1. Apply pipe sealant to the thread and insert into provided tapped hole in valve discharge adapter on discharge side of valve.
2. Tighten with wrench to torque used for small pipe fittings.

Pressure Transducer Installation is now Complete

E. METER INSTALLATION

⚠ **CAUTION:** Always disconnect all wiring and cables from the meter before electric arc welding at any point on apparatus. Failure to do so will result in damage to meter.

1. Select mounting location(s) for meter(s). The meter is to be mounted from the outside of the panel and will need clearance behind of 3-1 5/16" width by 2-1/2" depth.
   See Figure 6 for cutout and screw mounting dimensions.

⚠ **WARNING:** The meter is a sealed unit and the bezel should not be disassembled from the case.

2. After the cutout and mounting holes are finished, mount the meter using the provided fasteners.

3. It is now time to connect the Red power wire and, the Black ground wire, to the truck system.

⚠ **CAUTION:** Exercise caution when working with the electrical system. Disconnect cable from battery positive terminal before connecting power to meter. See truck manual for additional information on electrical system.

⚠ **CAUTION:** Do not connect meter to flow sensor or transducer cables until power hook up is verified correct and display is working. The meter has reverse polarity protection, but the transducer and flow sensor do not, since they require shielding. They will be grounded to the piping. Any mis-wiring could damage all components.

NOTE: It is essential that the connectors used be water-tight to prevent water from wicking up wires and into the meter. Always use sealed connectors or splices and the adhesive lined shrink tube provided, or other suitable connectors.

4. Using 16 or 18 AWG wire, connect the Red positive wire to the 12 or 24 VDC power supply. Connect the Black negative wire to a suitable ground.

SPECIFICATIONS:

Sensor Types

Flow Meter - Paddlewheel
Pressure Transducer - Ratio Metric, 0.5 - 4.5 VDC, 1/4" NPT, Male, 0-600 PSI.

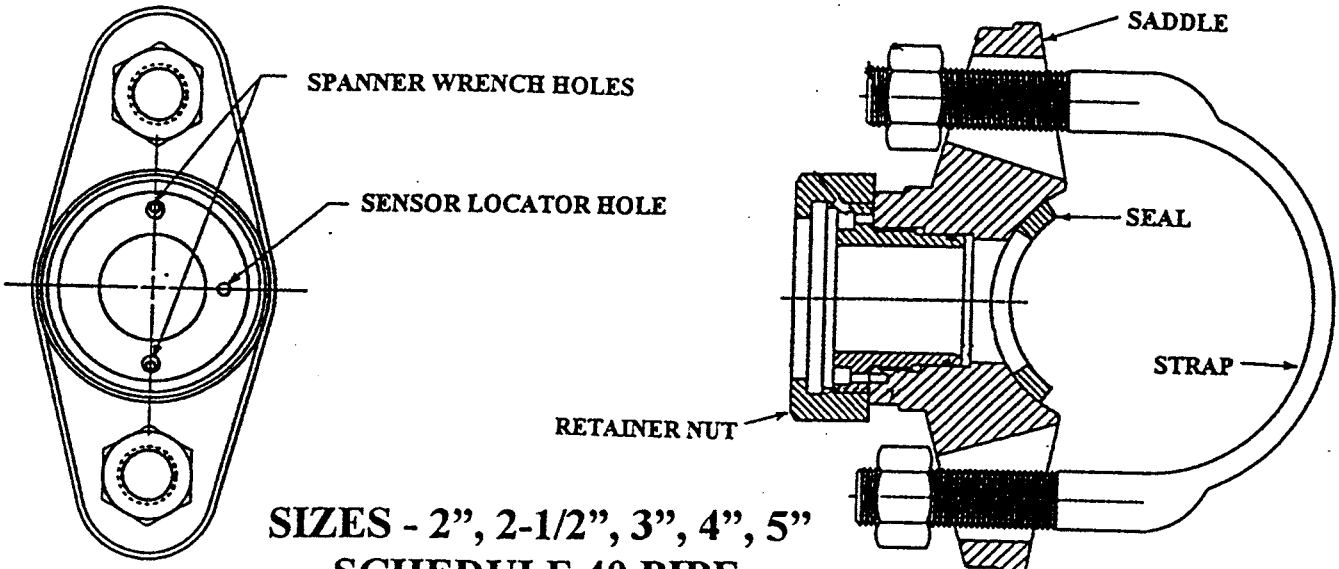
Meter

Operating Voltage 12 or 24 VDC
Minimum Operations Voltage - 9.5 VDC
Maximum Operations Voltage - 32.0 VDC
Operating Current - 150 mA
Display Type - LED
Enclosure - NEMA 4X
Operating Temperature - 40°F - 140°F

F. PSI/GPM POWER-UP OPTION

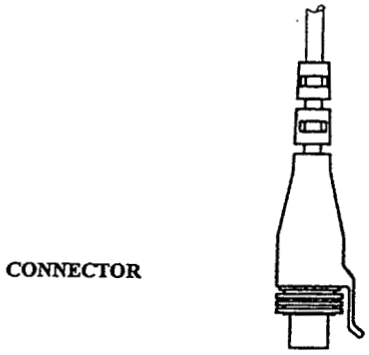
Akron Flow/Pressure Meters, equipped with the PSI or GPM selection feature, allows the user to select the display function to appear on power-up. To make this selection, use the following procedure.

SADDLE CLAMP ASSEMBLY - FIGURE 3



SIZES - 2", 2-1/2", 3", 4", 5"
SCHEDULE 40 PIPE

PRESSURE TRANSDUCER & CONNECTOR



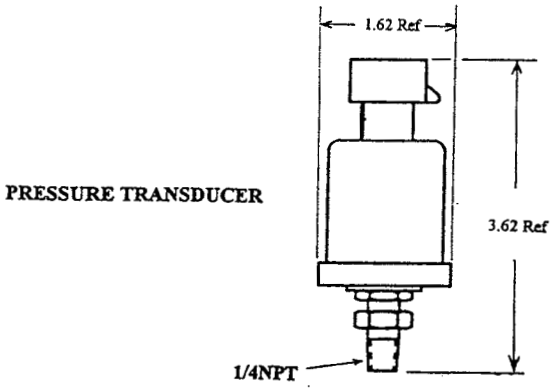


FIGURE 4

TYPICAL VALVE INSTALLATION

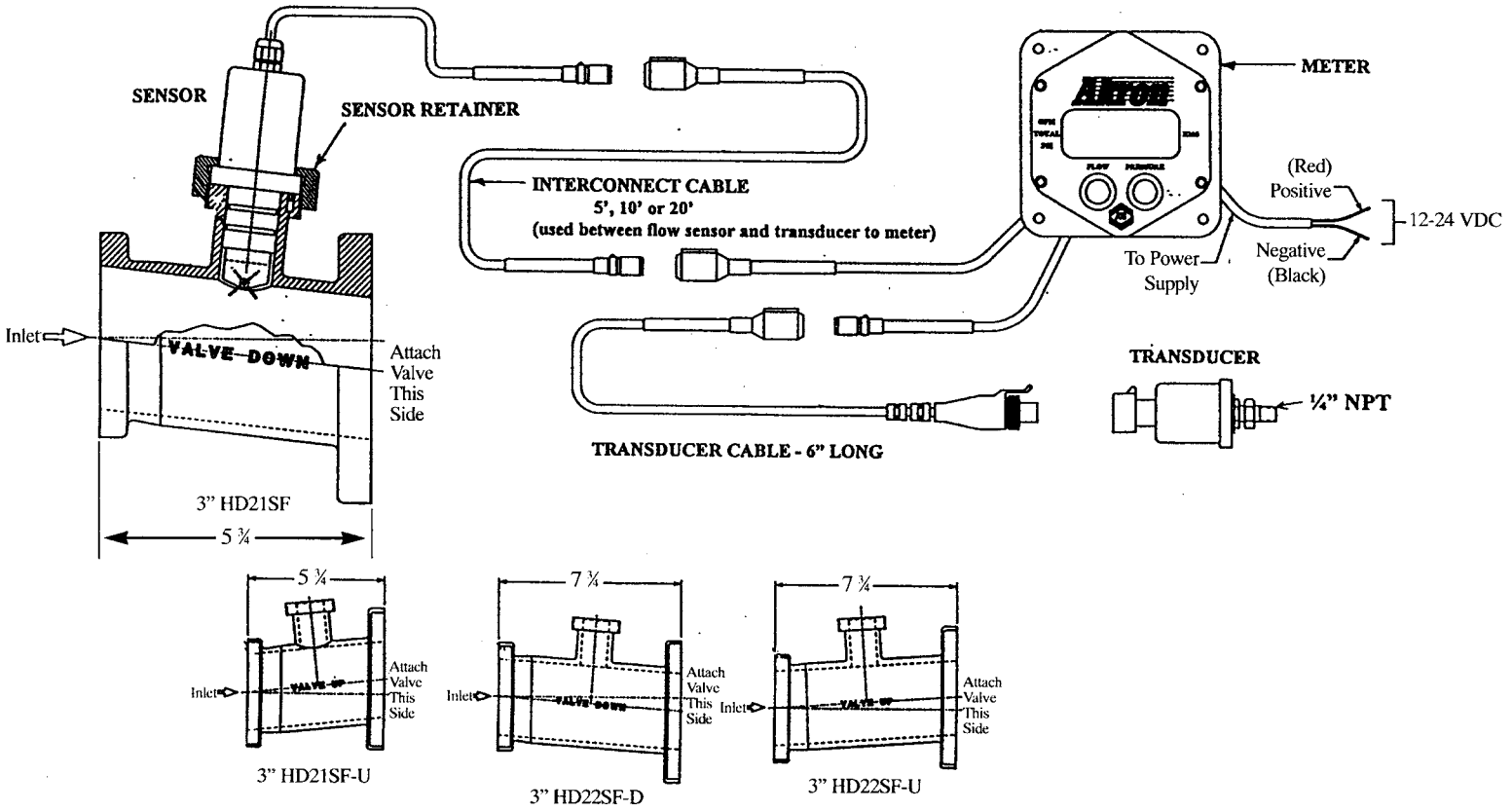


FIGURE 2C

Step 1 - Press and hold BOTH buttons simultaneously for approximately 15 seconds, until the display flashes "CAL" (calibration). Release buttons. After a few seconds "SIZE" will appear on the display and all mode lights will be illuminated.**Step 2** - Scroll the left button until "diSP" appears. (If "diSP" does not appear, the unit does not have the power-up option.)

If "diSP" appears, proceed to Step 3.

Step 3 - Press and release right button. "PPPP" or "rrrr" will appear. "PPPP" signifies PSI and "rrrr" signifies GPM.

Step 4 - Press and release left button to select what indication is desired at power-up. (PSI or GPM)

Step 5 - When selection is made, press and release right button to enter and lock.

System will then always return to your selection at power-up. To change modes, repeat **Steps 1 - 5.**

SECTION II
CALIBRATION INSTRUCTIONS

GENERAL - When unit is in Calibration mode, all mode lights on left side of display will be illuminated. A flashing mode light indicates what function is being calibrated.

A. PRESSURE CALIBRATION

1. Prior to calibration, the Pressure Transducer **(Figure 4**) must be installed into provided $^{1}/_{4}$" NPT pressure port. Typically in a valve discharge adapter or piping.
2. Open the valve and drain to eliminate any pressure in line.
3. Power up the meter. **(Figure 5)**
4. After the display has gone through a sequence of messages, **0** will appear on the display, or an error message may appear if in the pressure mode. Also, a mode light will appear on the left side of the display.

The unit is now ready for Pressure Calibration

Step 1 - Press and hold BOTH buttons simultaneously for approximately 15 seconds, until the display flashes **CAL** (calibration). Release buttons. After a few seconds **SIZE** will appear on display and all mode lights will be illuminated.

Step 2 - Press and release the LEFT button. **PRES** (pressure) will appear on the display.

Step 3 - Press and release RIGHT button. The word **"ZERO"** should appear and PSI mode light will flash. Note: If **"ZERO"** does not appear, the messages **dEAd, EPrL,** or **EPrH** may appear on the display. They indicate possible transmission errors between the pressure transducer and the meter. (See trouble shooting guide - Section IV to resolve)

Step 4 - With **"ZERO"** appearing on display, press and release right (pressure) button. **ZERO** will start flashing. After a moment, **0** will appear on display.

Unit is now ready to provide pressure readings for operations. This procedure need not be repeated unless the transducer or meter is replaced.
Note: On digital display, the word **"ZERO"** is displayed as "2Ero".

B. FLOW CALIBRATION - PIPE SIZE

Typically a new or refurbished apparatus will be pre-calibrated using pipe size mode. This can also be done with any field conversion installing the Akron Flow/Pressure Systems.

Note: Akron Flow/Pressure units can be installed into existing flowmeter installations if a saddle clamp installation exists. (The Akron saddle clamp will adapt to holes up to 1-$^{3}/_{4}$" diameter.) The panel meter will also fit in place of most flowmeter or pressure gage cutouts. Most standard pressure gage cutouts can also be used or easily modified.

Step 1 - Power up unit. No flow is required through system.

Step 2 - Press and hold both buttons simultaneously for 15 seconds until the display flashes CAL (calibration) release buttons. After a few seconds **SIZE** will appear on the display.

Step 3 - Press and release right button, if unit had previously been programmed with a pipe size, that size will appear. (See Note)

Step 4 - Press and release left button until desired pipe size appears.

Step 5 - With correct pipe size displayed, press and release right button, the pipe size will flash, then **0** will appear on display. Unit is now calibrated for pipe size.

NOTE: If unit was not calibrated with pipe size, **CUS** (custom) will appear. Press and release left button. **FRE** (frequency) will appear. Proceed with steps 4 & 5.

Pipe Size	Display
2”	2.0
2-½”	2.5
3”	3.0
4”	4.0
5”	5.0

Step 6 - The accuracy of the installation should be checked, due to possible variations associated with individual installations. Use of an Akron Style 9015 Water Flow Test Kit is recommended as the basis for comparison. If the Flow Meter does not agree within ffl 3% of the Style 9015, recalibrate using the custom flow setting covered in the next section.

C. FLOW CALIBRATION - CUSTOM FLOW SETTINGS (HIGH/LOW)

For maximum accuracy of each flow line, (especially with elbows in line) it maybe desirable to set each discharge line to a give high flow/low flow range rather than using pipe size mode, this can be done utilizing a water flow test kit. (A UL classified Akron Style 9015 is recommended.) Use included flow chart provided. (TABLE I)

Suggested Flow Ranges

Line Size	GPM Low Flow	GPM High Flow
2”	30	250
2-½”	60	600
3”	150	1300
4”	250	2000
5”	250	2500

To explain this procedure, a 2-½” line with a 60 GPM low flow and 600 GPM high flow will be used. See note following this procedure for other line sizes and flows.

Step 1 - Power up unit.

Step 2 - Press and hold both buttons simultaneously for approximately 15 seconds, until the display flashes **CAL** (calibration). Release buttons. After a few seconds **SIZE** will appear on the display.

Step 3 - Press and release left button until **FLO** (flow) appears on the display.

Step 4 - Press and release right button. **HIFL** (highflow) will appear on the display.

Step 5 - Start up pump and commence discharge through selected discharge line with water flow test kit connected according toinstructions provided for its use.

Step 6 - Bring flow up to 600 GPM and maintain a steady flow. Use the Pressure/Flow Conversion Sheet provided with the water flow test kit, or the sheet provided in this procedure. (Table II)

Step 7 - Press and release right button. The meter will begin to count pulses up to 1000. It will then stop and **HEND** (high end) will appear on display. If steady flow is not maintained during pulse counting, press and release left button. **HIFL** will appear on the display. Press and release right button to recollect 1000 pulses.)

Step 8 - After ensuring that a steady reading has been maintained through the count sequence, press and release right button to accept pulse data. **0000** will appear on the display, with far left 0 flashing.

Step 9 - Since the display will show four characters and the high flow is 600, the flashing **0** must remain in position.

Step 10 -Press and release right button. The second **0** from left will begin flashing.

Step 11 - Press and release the left button until **6** appears.

Step 12 -Press and release right button. The third **0** from left will begin flashing. Display should read **060**.

Step 13 -Press and release right button. The right **0** will begin flashing. The display should read **0600**.

Step 14 -Press and release right button. **0600** will flash.

If other than 600 is desired, use the left button to change numbers and right button to change fields, as steps 9-13 explain.

Step 15 -If value is correct, press and release right button. **LOFL** (low flow) will now appear on the display.

Using the Pressure/Flow Conversion Sheet provided with the water flow test kit, hold flow at 60 GPM and maintain steady flow

TYPICAL VALVE INSTALLATION

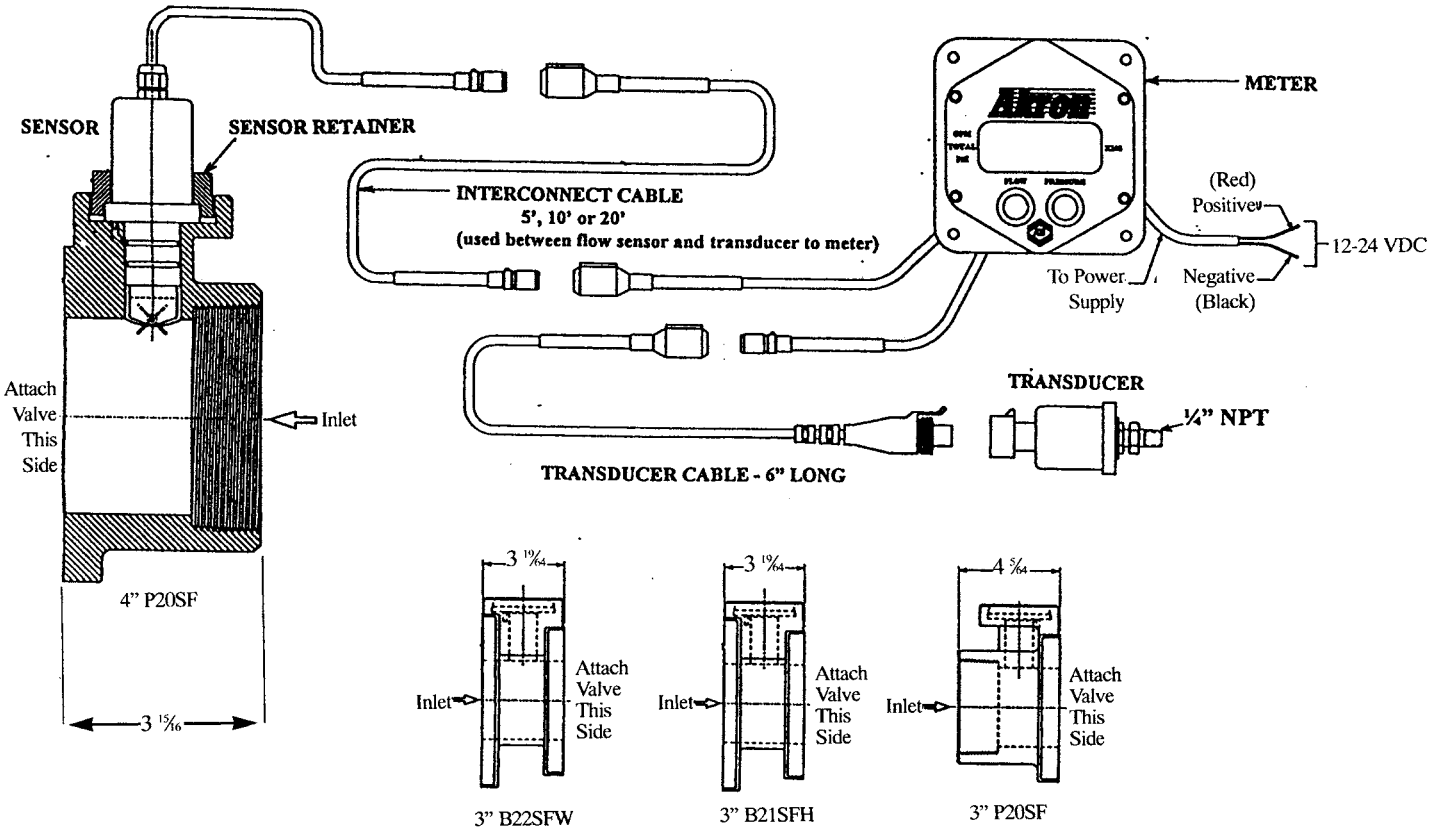
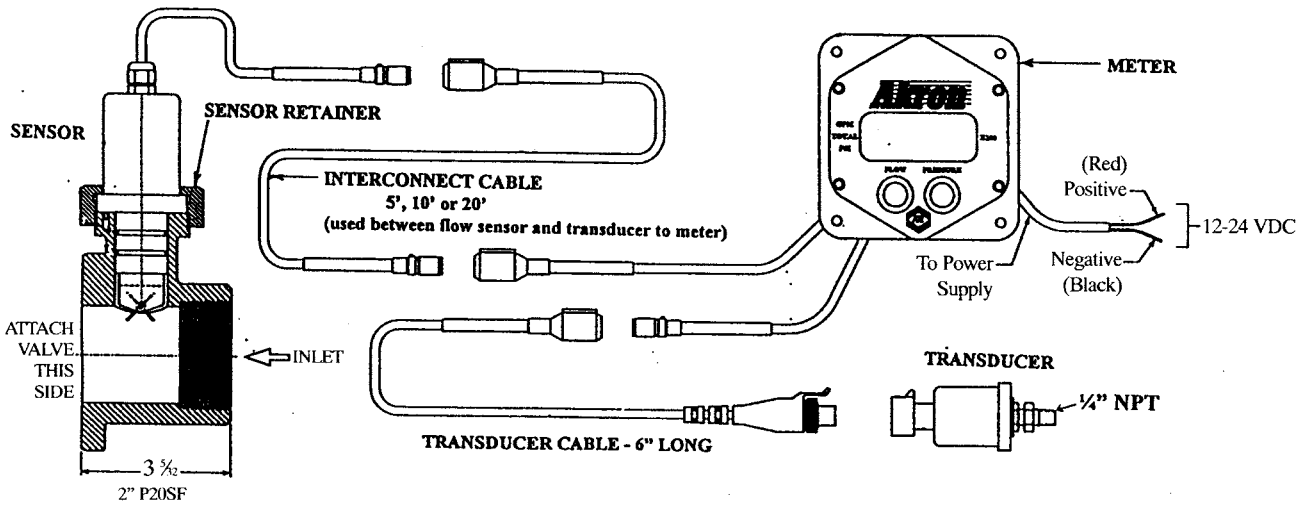


FIGURE 2B

TYPICAL VALVE INSTALLATION



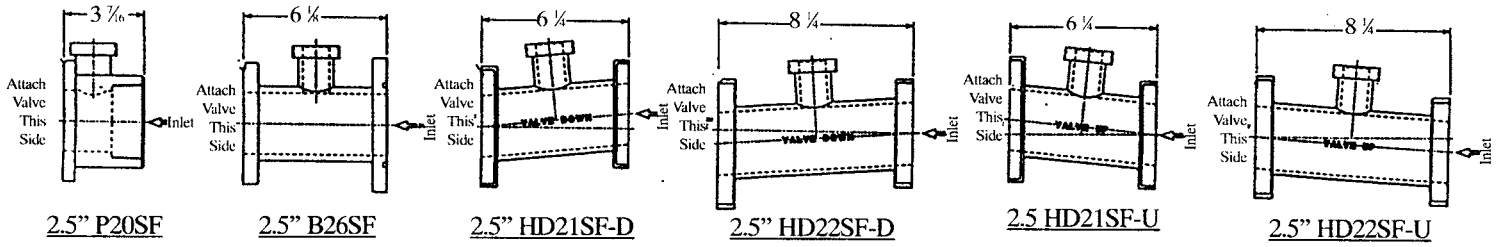


FIGURE 2A

Step 16 -Press and release right button. The meter will begin to count pulses to 1000. Note: The Low flow pulse collection will take longer than high flow due to lower velocity.

Step 17 -When 1000 pulses have been reached, the counting will stop. **LEND** (low end) will appear on display.

Step 18 -Press and release right button. **0000** will appear on the display. Proceed as you did in steps 9-13, display should show 0060 after step 12 using **0060** instead of **0600**.

Step 19 -Press and release right button. **0060** will flash.

Step 20 -Press and release right button. **CAL** (calibration) will flash momentarily, indicating that the meter is calibrated. Display will then show **0** with a mode indicator light.

Step 21 -Verify Flow Meter calibration by comparing flows to the Akron Style 9015 Water Flow Test Kit.

Unit is now ready for use

NOTE: The high flow settings should be 7 - 10 times the low flow settings.

SECTION III
OPERATION INSTRUCTIONS

A. GENERAL

These instructions describe features and operational steps for general service after the system is set up and calibrated. (See installation and calibration sections I & II if this has not been done.)

The meter consists of the display screen and two operation buttons located directly beneath the display. (See Figure 5)

When unit is powered, there are three red LED mode lights on the left side of display. Each of these lights align with particular function marked on the bezel face. (See Figure 5) They will only be illuminated individually, except during power up sequence and calibration.

The unit has four operation functions:

1. Flow **GPM** - Actual Gallons per minute flowing. (Will read in single gallon increments to 300. Above 300, 10 gallon increments will appear.)

2. Flow **TOTAL** - Total gallons flowed since unit was powered up. (Figure displayed must be multiplied X 100 to get total)

3. Pressure **PSI** - Actual pounds per square inch pressure.

4. LED INTENSITY - Brightness of display.

B. OPERATION (See Figure 5)

At the time of power up, all three mode lights will appear with four ZEROS. In sequence a number value will appear, followed by **GAL**, **PSI**, **CUS** or **PIPE** and finally **0**. This will be complete in a few seconds.

The unit is now ready for operation

TO READ:

GPM - Press and release left (flow) button to place mode light on **GPM**. Actual GPM will appear on display.

TOTAL FLOW - Press and release left (flow) button to place mode light on **TOTAL**. The figures displayed must be multiplied by 100 to give gallons flowed.

PSI - Press and release right (pressure) button to place mode light on **PSI**. Actual pressure will appear on display.

LED INTENSITY - To brighten or dim **LED**, press and hold left button until desired brightness is displayed.

Refer to Section IV, Troubleshooting guide if problems occur.

SECTION IV
TROUBLESHOOTING GUIDE

PROBLEM	CHECK	ACTION
Display does not illuminate	1. Power Connection 2. Power Source	If problems exist with power check, correct them. Replace Meter if power check is ok.
GPM shows 0-water is flowing	1. Cable Connections 2. Shut down pump - remove sensor - spin paddlewheel 3. Remove sensor from cable connect direct to meter spin paddlewheel	If display shows reading, replace cable. If not, replace sensor.
dEAD, EprL, EprH* Appears on display	1. Check pressure transducer connections 2. Shutdown pump remove transducer and connect directly to meter	If display clears, replace cable. If it does not, replace transducer. * See below
LED Dim	Hold left button down for 5 seconds. Should brighten.	
LENS Foggy	Should dissipate shortly after use with LED's lighted.	Will cause no harm. This will happen if meter is not assembled in a humidity free area.

* dEAd - Hardware problem. Probably meter.
EprL - 1. Short to ground. Check cable.
2. Not ZEROED at 0 PSI
3. Check for vacuum in line
EprH - 1. Transducer not installed.
2. Short to power. Check cable.
3. Not ZEROED to 0 PSI.

NOTE: Eddy currents in discharge manifold systems may cause flow sensor paddlewheels to move and send a signal to the meter display. This could register a flow reading when the valve is actually closed. To eliminate this false reading, we have initiated a program for our flowmeters that will not display a reading until a minimum flow is attained. Based on discharge line size, the minimums have been established based on logical flows for each size line.

LINE SIZE	*DISPLAY WILL READ ABOVE
2"	20 GPM
2 1/2"	25 GPM
3"	30 GPM
4"	80 GPM
5"	90 GPM

*Applicable to flowmeters manufactured sometime during the Year 2000 and after.

⚠ **CAUTION:** Consequently, you can be flowing at the minimum flows tabulated above without the pump operator aware that flow has been initiated.

SECTION V
REPLACEMENT PARTS

Item	Part Number
5' Cable	93000013
10' Cable	93000002
20' Cable	93000014
50' Cable	93000015
Transducer Cable (6")	93000003
Transducer	773283
Meter	93000012
Sensor (Flow)	93000004
2" Saddle	93000006
2 1/2" Saddle	93000007
3" Saddle	93000008
4" Saddle	93000011
5" Saddle	93000016

FLOW SENSOR

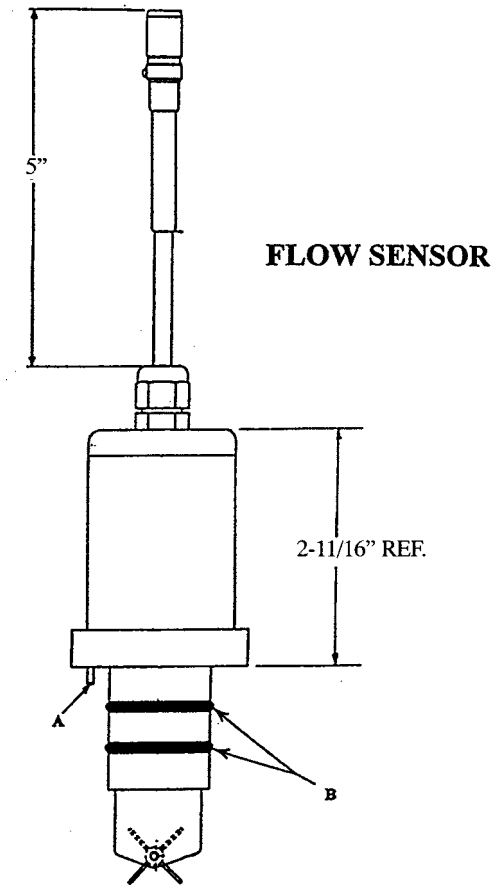


FIGURE 1

AKRON BRASS COMPANY

Tested. Proven. Trusted.

ISO 9001 REGISTERED COMPANY

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