Pfening

EST. 1919

Wat-a-mat

Installation Instructions
and
Service Manual

MARK II
WITH
MODEL K CONTROLLER

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REV 6-98

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GENERAL

The Pfening Mark II Water meter is the most advanced and reliable meter available on the market today. The meter itself has a rugged, precision cast bronze housing with a synthetic polymer metering chamber with only two moving parts.

Water flows through the meter's strainer and into the metering chamber where it drives the piston, which oscillates around the central hub. The piston rotates the drive dog and magnet. An electronic Hall Effect Switch detects the motion of the magnet and generates pulses which are sent to the counter. Each pulse represents a fraction of a pound of water. The micro-processor based counter keeps a running total of pounds of water and displays the total as a whole number. When the preset total is reached, the counter automatically closes the solenoid valve, stopping the flow of water.

Temperature blending is achieved with either a two-way or three-way manual blender. Each blender has a thermometer and a bypass valve so that water can be run to set the temperature before water is run through the meter to the mixer.

Accessories available include a hose, mounting brackets, a backsplash, and a stainless steel sink.

INSTALLATION

Install your new meter assembly in accordance with Figure 1, 2 or 3, whichever applies. Wire the counter and solenoid valve in accordance with Figures 4 and 5. Also, observe the following information for any of these installations:

1. Use a receptacle (120 volt single phase) of the grounding type and ground properly before using the meter.

2. Water is to flow through the meter and solenoid valve in one direction only. A cast arrow indicates flow direction. Mount the meter and solenoid valve in a horizontal line with the head of the meter and the head of the solenoid valve upright as shown in the figures.

3. A strainer with a 30 mesh (.02" screens opening) ahead of the meter is recommended. This protects the meter and solenoid valve from foreign particles.

If a three-way blender is being used, a separate strainer will not be necessary as this blender has a built-in strainer.

4. If a blender is being used, place a check valve in each of the lower pressure water lines (usually the hot water and/or ice water lines). This is to prevent water from the highest pressure line backing up into the lower pressure lines. To secure accurate blending results, all water supplies should be within 10 psi of the same pressure when the water is flowing through the meter.

Pressure regulators in each line or a booster pump on the lowest pressure line may be necessary if there is a wide pressure differential between lines. You can tell if you have balanced pressure by checking the rate of water flow from each line individually through the meter. When the rates are the same, the pressures are balanced.

5. The maximum static pressure to which the meter is to be exposed is 100 psi. The flow rate should be not less than 100 lbs. of water per minute and not more than 250 lbs. per minute (11 to 30 gals. per minute). Water temperature may be from 32 degrees to 140 degrees F.

6. It is recommended that 1" pipe lines be used before and after the meter. A larger size may be necessary if the run is long or complicated by many valves or elbows. If the pressure drop is not sufficient to restrict the flow to less than 250 lbs. of water per minute, a regulator must be placed in the line ahead of the meter. If a blender is being used, it will be necessary to have a regulator in each inlet line to the blender which can produce in excess of 250 lbs. of water per minute. A pressure drop restricting the flow to less than 100 lbs. of water per minute indicates an inadequate pipe size. See "Piping & Pressure Calculations" further on in this booklet which shows how to estimate your pressure losses and flow rates before making the installation.

SHUT OFF
VALVE

BACKSPLASH

OPTIONAL
HOSE HOOK
(GOOSENECK)

STRAINER

17 1/8"
MARK II METER &
SOLENOID VALVE

HOSE OR
PIPING TO
MIXER

FIG. 1 MARK II METER ONLY

SHUT OFF
VALVE

HOT

BACKSPLASH

HOSE OR PIPING
TO MIXER

STRAINER

COLD

8"

1" 2-WAY
BLENDER

17 1/8"
MARK II METER &
SOLENOID VALVE
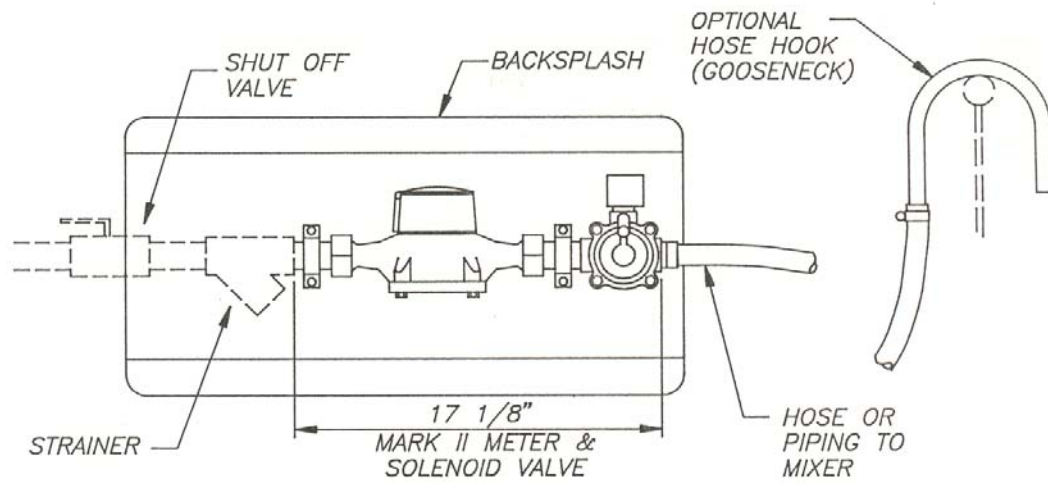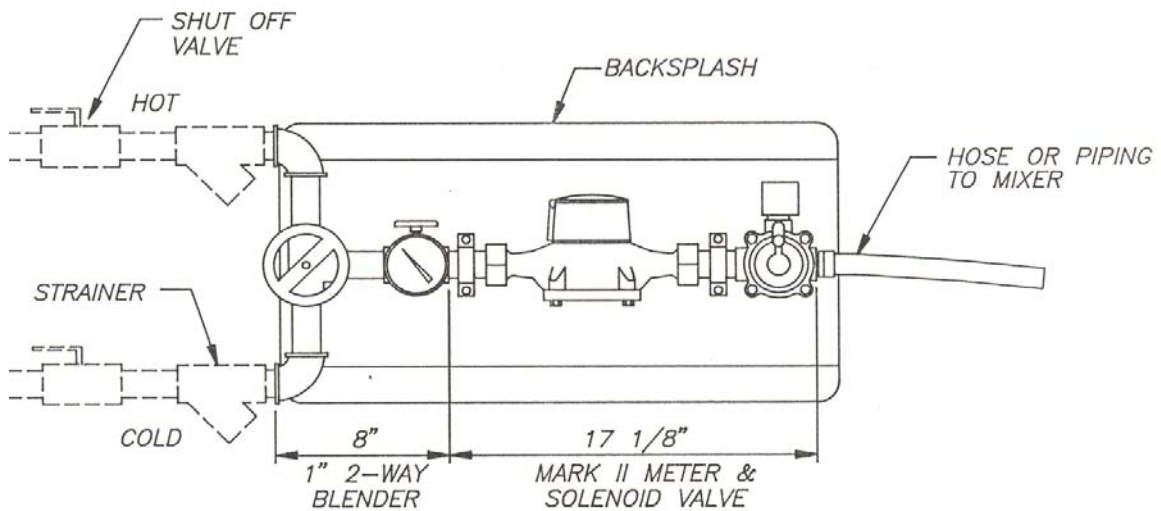
FIG. 2 MARK II METER & 2-WAY BLENDER

(3)
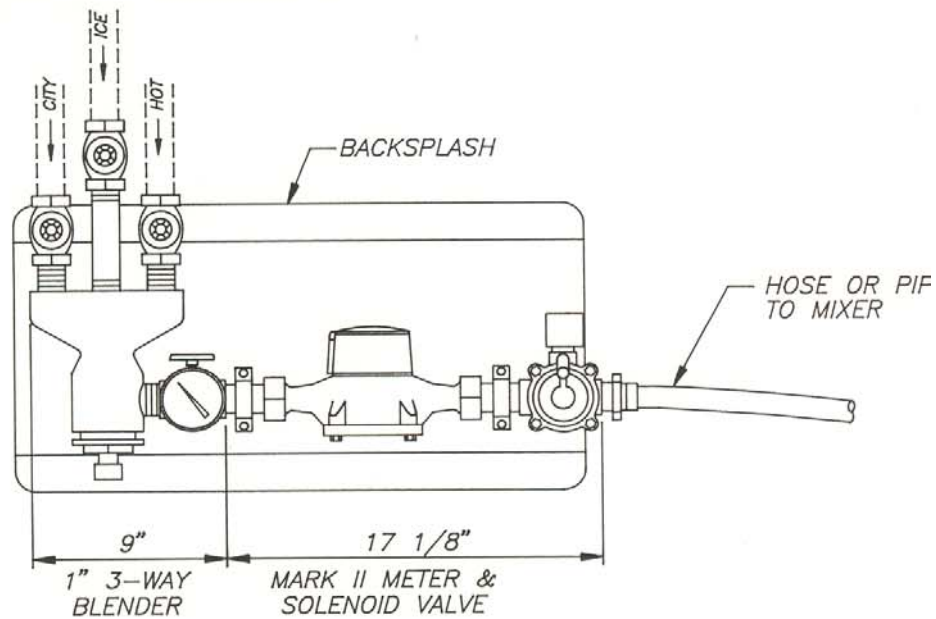
FIG. 3 MARK II WITH 3-WAY BLENDER

Labels in figure:
- CITY
- ICE
- HOT
- BACKSPLASH
- HOSE OR PIF TO MIXER
- 9"
- 17 1/8"
- 1" 3-WAY BLENDER
- MARK II METER & SOLENOID VALVE
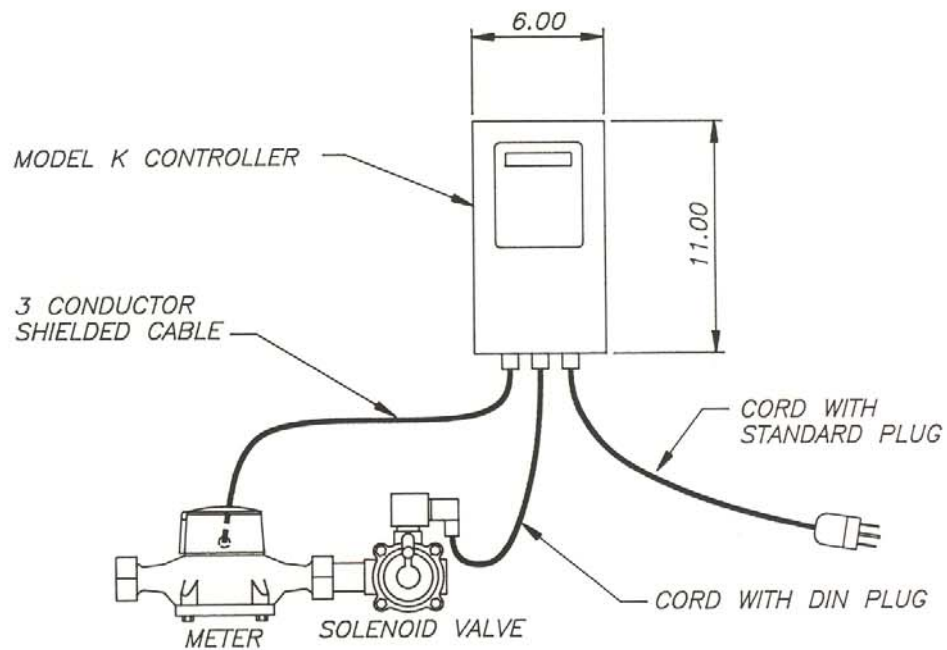
FIG. 4 CABLE IDENTIFICATION

Labels in figure:
- 6.00
- 11.00
- MODEL K CONTROLLER
- 3 CONDUCTOR SHIELDED CABLE
- CORD WITH STANDARD PLUG
- CORD WITH DIN PLUG
- METER
- SOLENOID VALVE

FIG. 5 WIRING DIAGRAM

CONNECT SHIELD PLUG TO BOARD MOUNTING STUD

2A 250V FUSE

RELAY 1
RELAY 2
RELAY 3

USE TO START PUMP WHERE NECESSARY

L1
L2
G
1
2
3
4
5 — NC
6 — NC
7 — NC
8 — +5VDC
9 — COMMON
10 — NC
11 — COUNT IN

SHIELD
SHIELD
SHIELD

BRN
BLU
YEL/GRN
YEL/GRN
BLU
BRN

TO PUMP STARTER

RED
BLK
WHT

CONNECT SHIELD AT COUNTER END ONLY

120V 60HZ 1PH

DIN PLUG

SOLENOID VALVE

METER SWITCH

ALTERNATE COLOR CODING

BLK = BRN = BLK-1
WHT = BLU = BLK-2
GRN = YEL/GRN

NOTE – EARLIER VERSIONS OF MODEL K CIRCUIT BOARDS ARE NOT PLUG-COMPATIBLE WITH VERSION 3.0 AND HIGHER

LIST OF MATERIALS

ITEM	PART NO.	QTY	DESCRIPTION
			WIRING DIAGRAM PFENING LIQUID METERS WITH MODEL K CONTROLLER VERSION 3.0 AND HIGHER

REVISIONS
C) MISC REV 6-18-98
B) REV FOR VER 3.0 6-1-98
A) REV FOR VER 2.0 2-8-95

THE FRED D. PFENING CO.

DRAWING NUMBER R53734

REVISION

DRAWN WFK
CHECKED

(PCB) H:\WW\MISC\B53734B 06/18/98 14:10

(5)

OPERATION

The meter is equipped with a Model K controller, which has been programmed and calibrated at the factory. A non-volatile memory insures that the setup instructions will not be lost if power loss interrupts a batch cycle.

The controller looks like this:
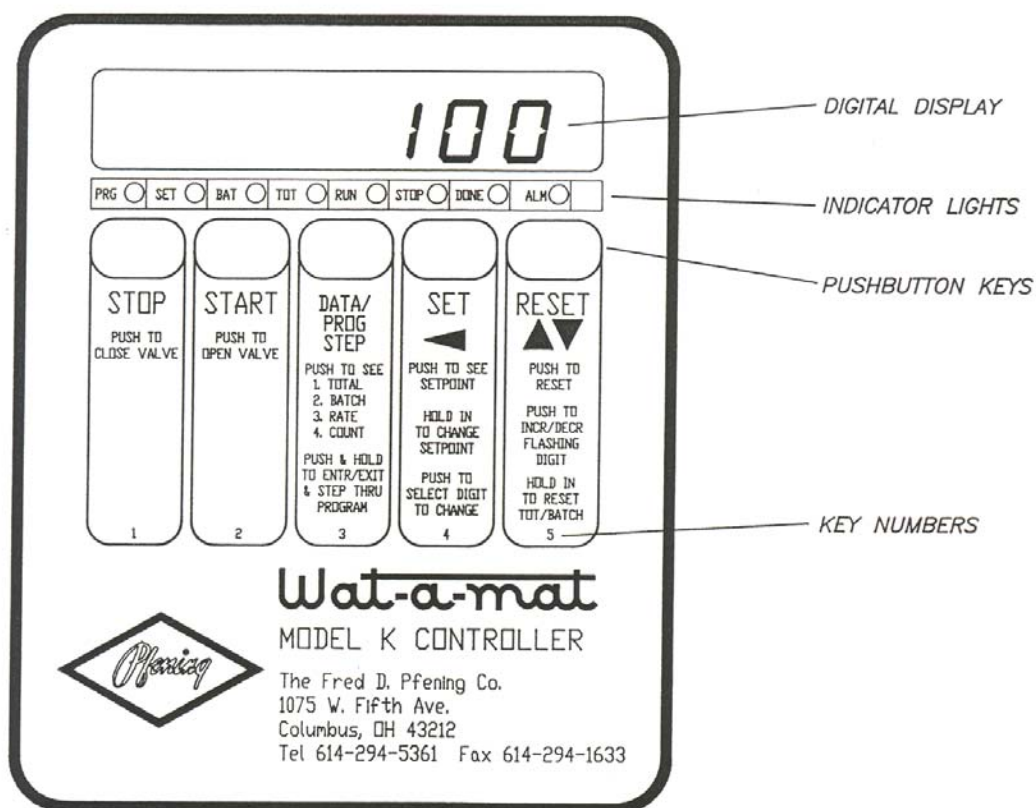
The controller programming may be changed. A passcode number must be entered to enter the program mode. See Appendix I.

The Operator can change the setpoint without use of the passcode and can view the total, batch, rate, and count display.

Running a Batch

Once the meter and counter are wired up and the controller display is illuminated, the display should look like this:

```
                    0
PRG ○  SET ○  BAT ○  TOT ○  RUN ○  STOP ●  DONE ○  ALM ○
```
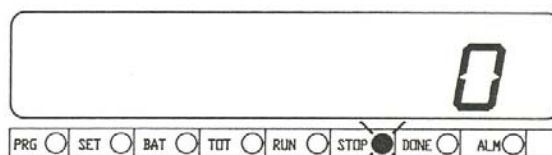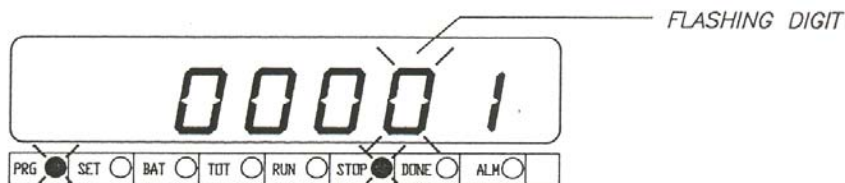
If the count is not zero, push the yellow RESET key to set it back to zero.

To enter the number of pounds of water for your batch, push the SET key and hold it in until the display flashes:

```
    ProG  SP
PRG ●  SET ○  BAT ○  TOT ○  RUN ○  STOP ●  DONE ○  ALM ○
```

Followed by:

_____ FLASHING DIGIT

```
    00001
PRG ●  SET ○  BAT ○  TOT ○  RUN ○  STOP ●  DONE ○  ALM ○
```
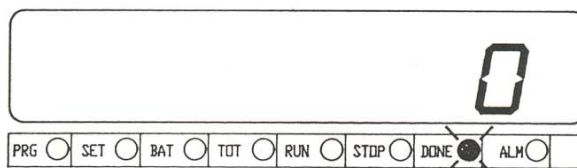
Use the RESET key to change the flashing digit. The first time you press it, the number will count up; the next time it will count down. Use the SET key to move the flashing digit. If you want 75 pounds of water, your display should look like this:

```
    00075
PRG ●  SET ○  BAT ○  TOT ○  RUN ○  STOP ●  DONE ○  ALM ○
```
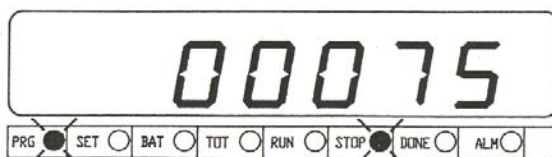
Once you have entered the desired setpoint, leave the keys alone for 5 seconds and the display will flash:

```
      SAU ING
PRG ○  SET ○  BAT ○  TOT ○  RUN ○  STOP ◉  DONE ○  ALM ○
```
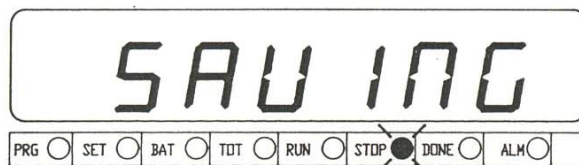
and will revert back to the original display.

```
                      0
PRG ○  SET ○  BAT ○  TOT ○  RUN ○  STOP ○  DONE ◉  ALM ○
```

To verify your setpoint, press SET momentarily. The display will flash:

```
      SEtPt
PRG ○  SET ◉  BAT ○  TOT ○  RUN ○  STOP ○  DONE ◉  ALM ○
```
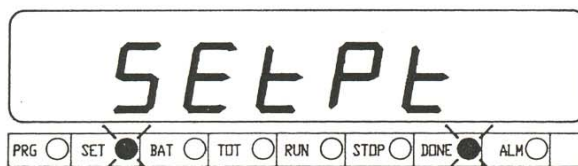
followed by (for a 75 pound setpoint):

```
                      75
PRG ○  SET ◉  BAT ○  TOT ○  RUN ○  STOP ◉  DONE ○  ALM ○
```
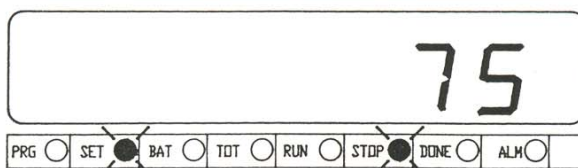
After 5 seconds it will revert to the original display.

```
                      0
PRG ○  SET ○  BAT ○  TOT ○  RUN ○  STOP ○  DONE ◉  ALM ○
```

(8)
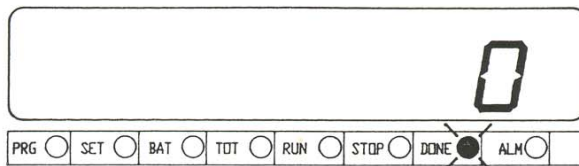
To start the batch, push START. The solenoid valve will open allowing water to run. The display will show the running count.

```
                              26        ─── DISPLAY SHOWS
                                            RUNNING COUNT
PRG ○  SET ○  BAT ○  TOT ○  RUN ●  STOP ○  DONE ○  ALM ○
```

When the setpoint is reached, the solenoid closes, stopping the water. Then the display will flash.

```
              dONE
PRG ○  SET ○  BAT ○  TOT ○  RUN ○  STOP ○  DONE ●  ALM ○
```
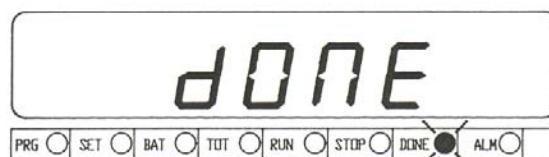
To run another batch of the same size, first press RESET. The display will flash.

```
              rESEt
PRG ○  SET ○  BAT ○  TOT ○  RUN ○  STOP ○  DONE ●  ALM ○
```

and return to zero.

```
                               0
PRG ○  SET ○  BAT ○  TOT ○  RUN ○  STOP ○  DONE ●  ALM ○
```
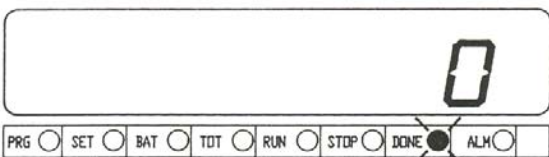
Press START to run the next batch.

Totalizer, Batch Counter, and Rate Displays

The Model K controller will also display:

1. Accumulated total
2. Number of batches completed
3. Flow rate.
4. Present count (this is the normal display).
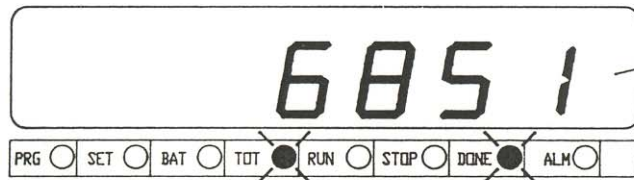
These can be viewed by use of the DATA key. Press it once and the display fla

```
 ┌─────────────────────────────┐
 │        ┼O┼AL                 │
 └─────────────────────────────┘
 PRG ○  SET ○  BAT ○  TOT ●  RUN ○  STOP ○  DONE ●  ALM ○
```

followed by:

```
 ┌─────────────────────────────┐
 │              6851           │
 └─────────────────────────────┘
 PRG ○  SET ○  BAT ○  TOT ●  RUN ○  STOP ○  DONE ●  ALM ○
```
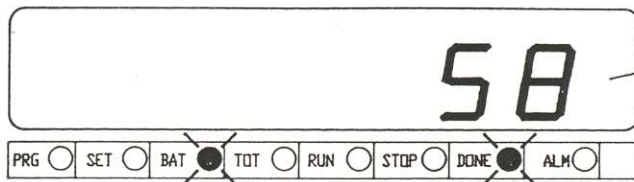
to reset the total to zero, hold in the RESET key. The display will flash "TOTA
followed by "RESET".

Press the DATA key a second time. The display will flash.

```
 ┌─────────────────────────────┐
 │        bA┼CH                │
 └─────────────────────────────┘
 PRG ○  SET ○  BAT ●  TOT ○  RUN ○  STOP ○  DONE ●  ALM ○
```

followed by:

```
 ┌─────────────────────────────┐
 │                    58       │
 └─────────────────────────────┘
 PRG ○  SET ○  BAT ●  TOT ○  RUN ○  STOP ○  DONE ●  ALM ○
```
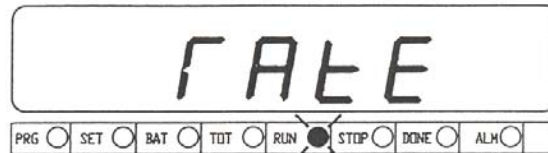
The batch count can be reset by holding in the RESET key.

(10)

Press the DATA key a third time to show the flow rate. This only works when water is running. The display flashes:

```
  ┌ A Ł E
PRG ○ SET ○ BAT ○ TOT ○ RUN ⊗ STOP ○ DONE ○ ALM ○
```

followed by:

```
              1 ∃ 7
PRG ○ SET ○ BAT ○ TOT ○ RUN ⊗ STOP ○ DONE ○ ALM ○
```
FLOW RATE IN
UNITS PER MINU

Press the DATA key a fourth time to return to the count display (normal display). The controller will automatically revert to the count display if no key is pressed for 10 seconds.
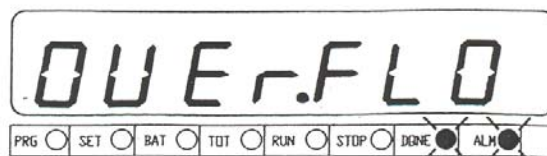
ALARMS

If the START button is pressed, but no count input is received by the controller for 7 seconds, the solenoid is automatically closed and the display shows:

```
  ∏ □     F L □
PRG ○ SET ○ BAT ○ TOT ○ RUN ○ STOP ⊗ DONE ○ ALM ⊗
```

This is intended to prevent overfilling of the mixer when the valve is open but no pulses are reaching the controller. Correct the problem before attempting to run. See the troubleshooting section on page 12.

If the liquid continues to flow after the setpoint has been reached, the display will show:

```
 □ U E ┌.F L □
PRG ○ SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ⊗ ALM ⊗
```

Press RESET to reset the alarm.

TROUBLE SHOOTING

1. Water runs, but there is no count:

a. <u>Switch is loose:</u> open the meter top cover and make sure that the pick-up switch is tightly held against the top of the meter casing by the retainer plate. Turn the retainer plate **counter** clockwise to tighten it down.

b. <u>Switch wires loose or broken:</u> Check that the wires from the controller to the switch are not broken or loose.

c. <u>Switch Defective:</u> To check for a defective switch, open the meter top and disconnect the three wires. Touch the black and white wires together rapidly. The counter should count (the count may be very erratic). This shows that the counter is still working.

Another way to check switch operation is to remove the switch by turning the retainer plate clockwise. Leave the wires hooked up. Find a small magnet and determine where the poles are (this must be a loose magnet, not one in a holder, such as a screwdriver handle). Alternately touch the North and South poles of the magnet to the bottom center of the aluminum switch housing. The counter will count one for about every 15 touches of the magnet.

If the switch appears to be defective, check the voltage between terminals 6 and 11 on the back of the controller. It should be 5 VDC. Next, check the voltage between terminal 6 and 10. It should alternate between 0 and 4.8 VDC as alternate poles of the magnet are touched to the switch bottom.

If switch is defective, install new one.

d. <u>Counter Defective:</u> If the counter does not count when the black and white wires are touched as in C above, check the voltage between the red and black wires. It should be 5.0 VDC. If not, check the wires and check that 5.0 VDC is present between terminals 6 and 11 on the back of the controller. If voltage is present, but the unit still does not count, touch a jumper wire between terminals 10 and 11 on the back of the controller. If the unit counts, the problem is in the wiring, if not, the problem is in the controller. Replace the controller board.

e. <u>Meter magnet not turning:</u> To check if the drive magnet inside the meter is turning when water is flowing, remove the switch by turning the retainer plate clockwise. Get a paper clip and cut a 1/4" long piece of wire. Place this piece of wire in the machined recess in the top of the meter housing where the switch goes. The magnet inside will pull the wire into alignment with it. Now turn on the water. If the magnet is turning, the wire will turn with it. If the magnet is not turning, open the meter and determine what is preventing rotation. Foreign matter in the meter is the most likely cause.

f. <u>Scale Factor Set at Zero:</u> If the meter has been recalibrated in the field, or if the programming has been altered, it is possible for the scale factor to be set at zero, which will not register. See Appendix I for reprogramming.

2. The Unit is plugged in and Power is on but nothing happens:

a. <u>Wiring:</u> Check that all wires on the back of the controller board are firmly connected and that the plug-in terminal board is properly installed.

b. <u>Power:</u> Check that 120 VAC power is present at terminals L1 and L 2 on the back of the controller.

c. <u>Setpoint:</u> Check that the setpoint is not zero.

d. <u>Controller:</u> If power is supplied to the controller, but the display is dark or meaningless, the controller board should be replaced.

e. <u>Solenoid Valve:</u> Check to see that the solenoid valve is receiving power when the start button is pushed. If it is getting power but doesn't open, probably the solenoid valve coil is defective.

3. Not Metering Accurately:

a. <u>Rate:</u> Check flow rate for 100 to 250 lbs./min. range.

b. <u>Erratic Count:</u> Watch the counter as a quantity of water is run. The count should be steady. An erratic count indicates a loose switch, loose wires, or partially jammed meter mechanism. Check the items as listed under "Water runs, but there is no count".

c. Scale Factor Changed: If the water amount is off proportionately the same amount each time, the scale factor may have been changed. See the "Calibration" section.

d. <u>Meter Internals Worn:</u> If the scale factor is correct, but a proportional error of more than 20% is present, the meter internal parts may be worn, broken, or improperly installed. Disassemble the meter and inspect. Reassembly should be done on a workbench.

4. Water won't shut off at setpoint:

a. <u>Solenoid Valve:</u> If the solenoid valve remains open when de-energized, it is stuck open (rapping it will sometimes make it close). Disassemble the valve and clean all the parts. If this does not fix the problem, install a new valve or rebuild the existing one.

b. <u>Controller:</u> Verify that the setpoint is properly set. If everything is in order but the unit still does not shut off, replace the controller board.

5. Broken Touchpad Membrane:

Replace a broken or loose membrane immediately: Even a tiny amount of moisture inside the controller box can ruin the controller board. Follow exactly the instructions furnished with the new membrane.

6. Controller Programming:

See Appendix I for programming.

7. Temperature setting on the Blender is too sensitive. Small setting changes cause big temperature changes:

a. This is generally the result of unbalanced water pressure in the lines. Run the unit with ice water only and check the rate in pound per minute. Run the unit with city water only and check its rate. For good blender control, these rates should be about the same. This may also be done with hot water providing it isn't more than 150 degrees F.

Pressure unbalance generally can be corrected by running a large pipe on the low pressure line back to its source or in the case of ice water increasing the pump pressure. Regulators can also be used to reduce the higher pressure line flow rates to match the lowest pressure line but be sure that the resulting pressure doesn't reduce the flow rate to less than 75 lbs. per minute through the meter and solenoid valve.

PIPING & PRESSURE CALCULATIONS

This section will be helpful in determining the pipe size to use or the rate of water flow with a given pipe size.

The pressure drop in the line may be estimated from the following:

Rate of Water Flow		Pressure Drop-PSI						
Lbs/min.	Gals./min.	Mk II Meter	2 Way Blender	3 Way Blender	Cut-Off Sol. Valve	Per Ft. of Pipe		
						3/4"	1"	1 1/4"
100	12	1.3	1.0	2.0	2	.19	.06	.015
150	18	3.2	2.4	3.5	4	.40	.12	.032
200	24	6.3	4.5	6.0	7	.70	.20	.055
250	30	9.0	6.7	9.0	11	1.0	.30	.082

Approximate equivalent lengths in feet of pipe for various fittings:

Fitting	Pipe Size		
	3/4"	1"	1 1/4"
Ball Valve	2	2.5	3
Globe Valve	22	27	38
Elbow	2.2	2.7	3.6
Tee	4.5	5.7	7.5

Example: Determine the pressure necessary at water main to deliver 150 lbs./min. of water through the following system:

Piping from Water Main to Meter   Pressure Drop

25'	1"	Pipe	25 x .12	=	3.0
50'	3/4"	Pipe	50 x .40	=	20.0
4	3/4"	Elbow	4 x 2.2 x .40	=	3.5
1	3/4"	Ball Valve	1 x 2.0 x .40	=	0.8

Meter & Blender

1	Mark II	=	3.2
1	Mark II - 3 way blender	=	3.5
1	Mark II - Solenoid Valve	=	4.0

Piping from Meter to Destination

10'	3/4"	Pipe	10 x .40	=	4.0
2'	3/4"	Elbows	2 x 2.2 x .40	=	1.8
				Total	43.8psi

This indicates that a pressure of 43.8 psi <u>at the water main</u> will deliver through the system 150 lbs. per min. of water. This assumes that the water main is large and its pressure does not drop when 150 lbs. per min. of water is drawn from it. Repeat this procedure for ice and hot water. This procedure will tell you if the pipe size you plan to use is adequate for the water pressure available to you at the water main.

If the pressure drop is not sufficient to restrict the flow to less than 250 lbs. of water per min. a regulator must be placed in the line ahead of the meter. If a water blender is being used, it will be necessary to have a regulator in each inlet line to the blender which can produce in excess of 250 lbs. of water per minute. A pressure drop restricting the flow to less than 100 lbs. of water per minute indicates an inadequate pipe size.

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CALIBRATION

The meter is factory calibrated and should require no adjustments for many years. However, should recalibration be necessary, the following procedure may be followed:
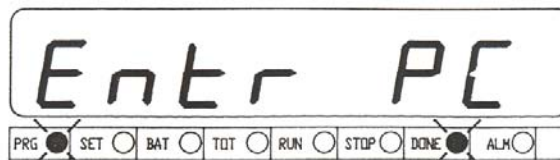
1. Obtain a scale and a container capable of holding at least 100# of water.

2. Weigh the empty container and record the weight.

3. Set the meter for 100# and run the water into the container. Allow the hose to drain.

4. Weigh the container and water, then subtract out the weight of the container.

5. Calculate an adjustment factor:

$$\frac{\text{Actual Wt. of water}}{100\#} = \text{Factor}$$

   i.e. If actual Wt. of water is 102#, then

$$\frac{102\#}{100\#} = 1.02$$

6. Press the PROG STEP button and hold it in until the display flashes.

```
 _____
|                                   |
|        Entr   PC                  |
|_____|
| PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○ |
```
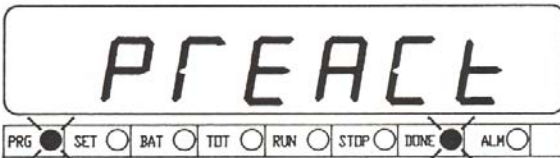
You must now enter the security passcode, which is 5354 for your controller. The button numbers are on the bottom of the white area below each button. Enter the passcode and the display will show.
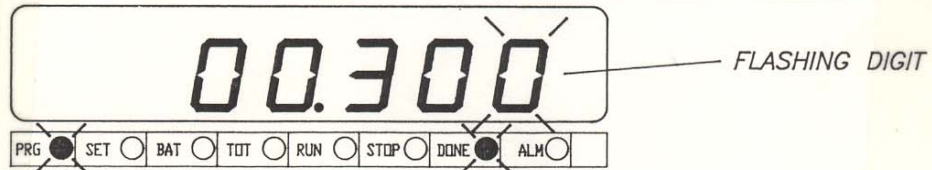
```
 _____
|                                   |
|            5354                   |
|_____|
| PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○ |
```

then:

```
 _____
|                                   |
|           SEtUP                   |
|_____|
| PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○ |
```

then:

```
 _____
|                                   |
|          PrEACt                   |
|_____|
| PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○ |
```

(16)

then:

```
00.300          —— FLASHING DIGIT
PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○
```

Press the PROG STEP key until you get:

```
SCALEr
PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○
```

followed by:

```
0.1285          NUMBER IS
                 EXAMPLE ONLY
PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○
```
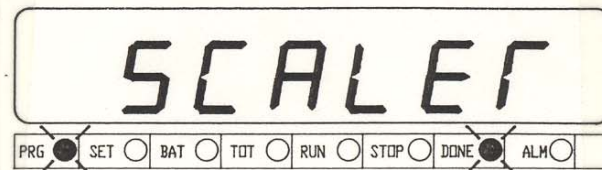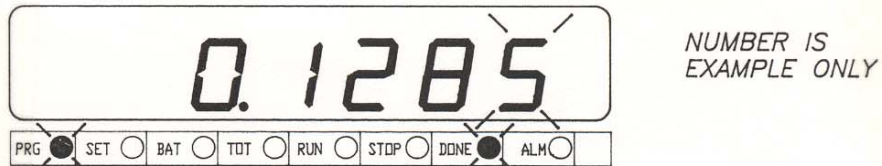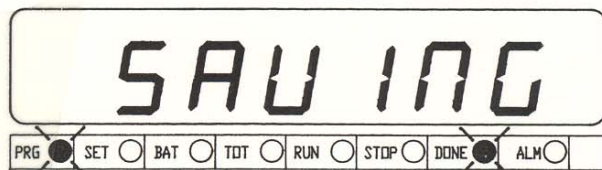
this is your present scaler.

7. Multiply the present scaler by the adjustment factor calculated in #5 above.

i.e.   .1285   x   1.02   =   .1311

8. Now use the SET and RESET keys to enter the new scaler.

9. Press the PROG STEP key and hold it in until the display flashes:

```
SAUING
PRG ● | SET ○ | BAT ○ | TOT ○ | RUN ○ | STOP ○ | DONE ● | ALM ○
```

(If you do not do step 9, the controller will automatically save after 30 seconds)

10. Return the unit to service.

(17)

PARTS LISTS

<u>B-3664 3- Way Blender   (1")</u>
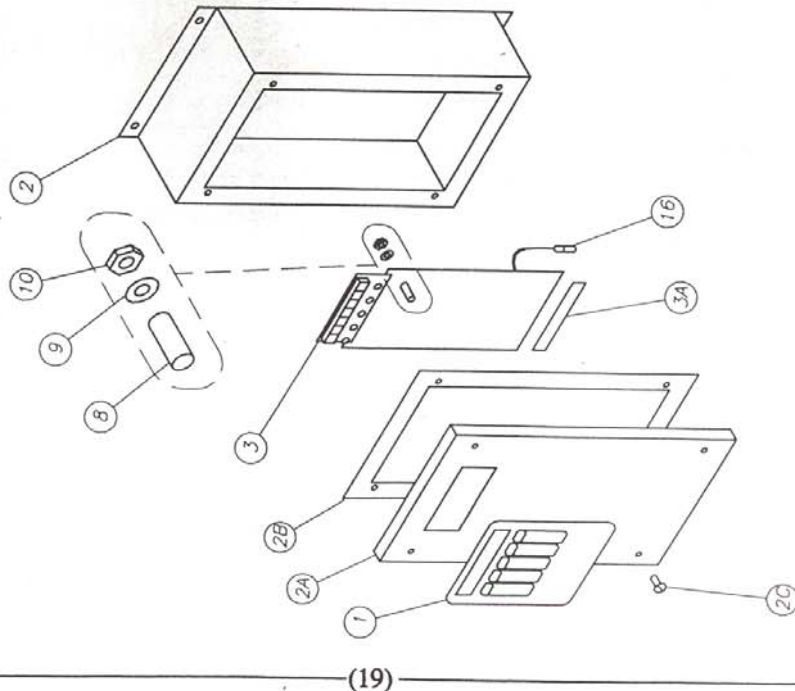
       Thermometer Cross Assembly
       MB 4 Angle Valve
       BV-17 Coupling Nut 1 1/4
       Spud A-30202
       BV 16 Coupling Washer

<u>B-50350 2- Way Blender   (1")</u>

1   Blending Valve
2   Handle
3   Thermometer
4   Bypass Valve

NOTES
1. CABLE SHIELD WIRES MUST BE GROUNDED AT
   ENCLOSURE END ONLY USING ITEM 16 PLUG.
2. KEEP EXTRA CABLE IN ENCLOSURE TO A MINIMUM.

LIST OF MATERIALS

ITEM	PART NO.	QTY	DESCRIPTION
16	C53710-16	1	TIP PLUG ASS'Y
15	A56996	1	TERMINAL NUMBER STICKER
10	C53710-10	5	#6-32NC HEX NUT PER A53567 304SS
9	C53710-9	4	NYLON FLAT WASHER FOR #6 SCREW
8	C53710-8	4	NYLON SPACER .25 OD X .15 ID X .47 LG
7	C53710-7	6'	3 CONDUCTOR SHIELDED WIRE
6	C53710-6	1	SOLENOID CORD W/DIN PLUG
5	C53710-5	1	POWER CORD W/PLUG
4	C53710-4	3	CORD FITTING
3A	STOCK	1	CONNECTOR
3	C53710-3	1	CONTROLLER BOARD LESS CONNECTOR
2C	D52404-5	4	COVER SCREW
2B	D52404-6	1	GASKET
2A	D52404-3	1	COVER
2	D52404-1	1	ENCLOSURE LESS COVER
1	B53415	1	TOUCHPAD OVERLAY

REVISIONS

A) REV FOR VERS 3.0 6-2-98

DRAWN	WFK		CHECKED		REVISION	A
DATE	8-5-93		SCALE N.T.S.			

THE FRED D. PFENING CO.

ASSEMBLY
MODEL K CONTROLLER
VERSION 3.0 AND HIGHER

DRAWING NUMBER C53710

[PCB] H:\WWW\WFK-\C53710B 06/02/98 09:56

ITEM	PART NO.	QTY.	DESCRIPTION
1	C50231-1	1	Cover
2	B50230-2	1	Hinge Pin
3	B50230-3	1	Bonnet
4	B50230-4	1	Bonnet Screw
5	A50139	1	Switch Retainer Plate
6	A50229	1	Pfening Hall Effect Switch
7	B50230-7	1	Nylon Retaining Ring
8	B50314-8	1	Maincase
9	B50314-9	2	Connection Gasket – 1"
10	B50314-10	2	Connection Nut – 1"
11	B50314-11	2	Connector – 1"
12	C50231- 2	1	Cover Screw
13	B50314-13	1	Strainer
14	B50314-14	1	Metering Chamber complete (includes Item 14 thru 20)
15	B50314-15	1	Metering Chamber Top Assy. with Drive Dog & Magnet
16	B50314-16	1	Piston
17	B50314-17	1	Division Plate
18	B50314-18	1	Control Roller
19	B50314-19	1	Metering Chamber Bottom with Pin
20	B50314-20	1	Metering Chamber Outlet gasket
21	B50314-21	1	Bottom Plate Gasket
22	B50314-22	1	Bottom Plate Liner
23	B50314-23	1	Bottom Plate
24	B50314-24	1	Bottom Plate Screw
ITEM	PART No.	QTY	DESCRIPTION

LIST OF MATERIALS

PFENING
MARK II WAT-A-MAT
ASSEMBLY & PARTS LIST

FRED D. PFENING CO.
1075 WEST FIFTH AVENUE.
COLUMBUS, OHIO 43212-2691

DRAWING NUMBER: B50314

REVISION

REVISIONS

DRAWN M.D.O.
DATE 7-24-89
CHECKED LPAC
SCALE NONE

BRUNING 40-530 68551

APPENDIX I: COUNTER REPROGRAMMING

GENERAL

The Model K Controller is factory programmed for your meter and should not require reprogramming, unless the program has been altered or lost due to an electronic "accident" (lightning strike, etc). Do not reprogram the counter until all other possible problems have been eliminated.

AUTOMATIC REPROGRAMMING

The Model K has factory programs for Pfening Mark I, Mark II and Mark V water meters stored in its permanent memory. To reprogram the control, it is necessary to hold in a key while plugging the control in. Find the key for your meter:

Mark I	DATA/PROG STEP key
Mark II	SET key
Mark V	RESET key

To reprogram the control for a Mark I meter, unplug the control for 10 seconds. Now hold in the yellow DATA/PROG STEP key while plugging it back in. The display will show:

```
ProG       1
PRG● SET○ BAT○ TOT○ RUN○ STOP○ DONE○ ALM○
```

Followed by:

```
EntErEd
PRG● SET○ BAT○ TOT○ RUN○ STOP○ DONE○ ALM○
```

Release the button and it will show:

```
SAU InG
PRG● SET○ BAT○ TOT○ RUN○ STOP○ DONE○ ALM○
```

Reprogramming is now complete. The procedure is similar for other meters; unplug the meter, then hold in the appropiate key while plugging it back in.

## DESCRIPTION OF PROGRAM OPTIONS

It may be necessary to change the factory programmed values. there are three user-programmable items: Preact, Scaler, and Alarm.

1. Preact - The solenoid valve takes time to close, and some water passes through it after the coil is de-energized. To avoid running over, the controller actually shuts the valve off a pre-determined amount before the setpoint is reached. This is **preact**.

2. Scaler - The meter generates pulses as liquid flows through it. Each pulse represents a certain amount of liquid. The scaler tells the controller how much each pulse represents.

3. Alarm - The controller has a no flow alarm. If the solenoid valve is open, but no pulses are reaching the controller, the controller automatically shuts off the solenoid valve. This will prevent overfilling a mixer in the event of a problem with the meter or wiring. The alarm may be On or Off.

MANUAL REPROGRAMMING

To manually change the preact decimal point, scaler, or alarm, follow this procedure:
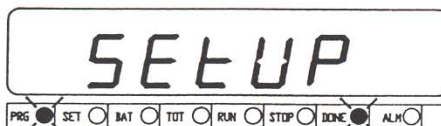
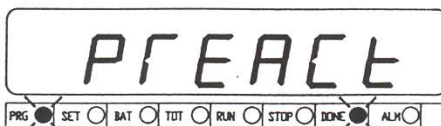1. Press the DATA/PROG STEP button and hold it in until the display flashes.
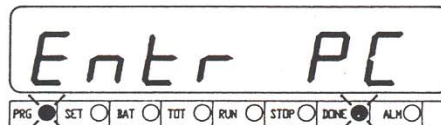
```
 Entr PC
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ● ALM ○
```

2. You must now enter the security passcode, which is <u>5354</u> for your controller. The button numbers are on the bottom of the white area below each button. Enter the passcode and the display will show:
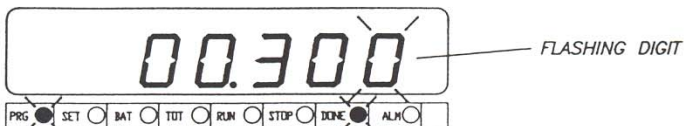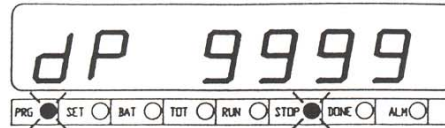
```
 5354
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ● ALM ○
```

then:

```
 SEtUP
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ● ALM ○
```

then:

```
 PrEACt
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ● ALM ○
```

then:

```
 00.300  ——— FLASHING DIGIT
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ● ALM ○
```

3. Now use the SET and RESET keys to enter the new preact.

4. Use the PROG STEP key to step to the decimal point. The display will show:

```
dP  9999
```
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ● DONE ○ ALM ○

5. Use the RESET key to move the decimal point to the desired location. (Meaningful resolution on Pfening meters is: Mark I = 0.1 lb.; Mark II = 0.2 lb.; Mark V = 1.0 lb.)

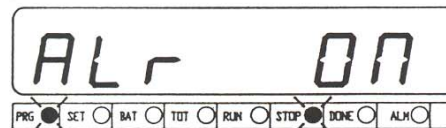6. Use the PROG STEP key to step to the scaler. The display will flash;

```
SCALEr
```
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ● ALM ○

followed by:

```
0.0724
```
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ● ALM ○

NUMBER IS
EXAMPLE ONLY

this is your present scaler.

7. Now use the SET and RESET keys to enter the new scaler.

8. Use the PROG STEP key to step to the alarm. The display will show:

```
ALr    On
```
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ● DONE ○ ALM ○

9. Use the RESET key to toggle the alarm On or Off.

10. To go back to the beginning of the setup menu, press START.

11. To exit the setup menu, press PROG STEP one more time and the display will flash;

```
SAU InG
```
PRG ● SET ○ BAT ○ TOT ○ RUN ○ STOP ○ DONE ○ ALM ○

(If you do not do step 11, the controller will automatically save after 30 seconds)

12. Return the unit to service.

FACTORY PROGRAM VALUES

The following values are contained in the factory programs stored in the controller:

	PROG 1 (Mark I)	PROG 2 (Mark II)	PROG 5 (Mark V)
Preact	0.300	0.520	0.600
Decimal Point	None	None	None
Scaler	0.0724	.1289	0.5000
Alarm	On	On	On

(These values subject to change without notice.)

SCALERS FOR LIQUIDS OTHER THAN WATER

The specific gravity of water is 1.000. Other liquids will normally have a different specific gravity, such as:

Soybean Oil	0.9000
Liquid Sugar (HFCS)	1.3300

You can compute the required scale by multiplying the water scaler by the specific gravity. Also see the calibration section of this manual.

NOTE: Pfening Mark I and Mark II meters are intended for water only service. The stainless steel Mark V meter may be used on other liquids.