8420

Technical Manual
and
Parts Catalog

INTRODUCTION

This publication is provided solely as a guide for individuals who have received METTLER TOLEDO Technical Training in servicing the METTLER TOLEDO product.

Information regarding METTLER TOLEDO Technical Training may be obtained by writing to:

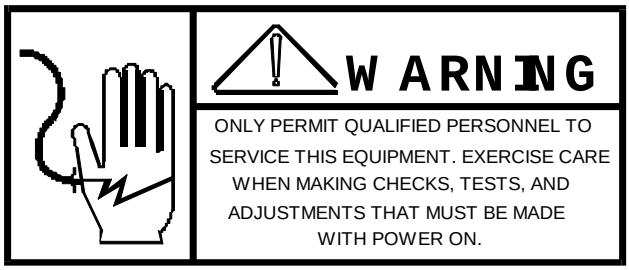
METTLER TOLEDO
Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

PRECAUTIONS

- **READ** this manual before operating or servicing this equipment.

- **ALWAYS REMOVE POWER** and wait at least 30 seconds **BEFORE** connecting or disconnecting any internal harnesses. Failure to observe these precautions may result in damage to, or destruction of the equipment.

- **ALWAYS** take proper precautions when handling static sensitive devices.



- **DO NOT** connect or disconnect a load cell scale base to the equipment with power connected or damage will result.

- **SAVE** this manual for future reference.

- **DO NOT** allow untrained personnel to operate, clean, inspect, maintain, service, or tamper with this equipment.

- **ALWAYS DISCONNECT** this equipment from the power source before servicing.

- **CALL** METTLER TOLEDO for parts, information, and service.

I. GENERAL DESCRIPTION.....1
II. SYSTEM DESCRIPTION.....1
III. SPECIFICATIONS.....1
A. ELECTRICAL AND PHYSICAL.....1
B. INTERNAL FUNCTIONS AND INTERLOCKS.....2
C. EXTERNAL CONTROLS.....4
IV. INSTALLATION INSTRUCTIONS.....5
A. SET-UP PROCEDURE.....5
B. CALIBRATION CHECKLIST.....7
C. PROGRAM SWITCH SUMMARY (See figure 2 for SW2 location).....9
D. FUNCTION VERIFICATION (SW2-1, 1,2,3 & 6 OFF; SW2-4, 5 & 7 ON).....9
V. OPERATION INSTRUCTIONS.....11
VI. PREVENTATIVE MAINTENANCE.....11
VII. PART REPLACEMENT PROCEDURE.....12
A. SERVICE “FIRST MAN” KIT OF PARTS #082114 020.....12
B. EQUIPMENT ACCESS.....12
C. LOAD CELL REPLACEMENT PROCEDURE.....13
XIII. SCHEMATIC.....16
XIV. PARTS CATALOG.....19

I. GENERAL DESCRIPTION

The Model 8420 (Sentinal III) is a Total Price Computing Retail Counter Scale intended for direct sales applications. The 8420 incorporates a die cast base, a molded plastic cover and a 10 X 13 inch stainless steel platter. It is compatible with the Toledo 301 and 306 printers.

FEATURES INCLUDE:

- 10" X 13" Stainless Steel Platter with formed corners
- 30 X 0.01 lb or 15 X 0.005 kg capacity
- 14 digit vacuum fluorescent displays, 0.35 inches high provide vendor customer displays of weight, unit price, and total price
- Weight sensor is Toledo general purpose load cell with 5 flexure platter supper system, mounted on a die case aluminum base.
- Output for use with Toledo 301 and 306 Printers is standard
- 16 position membrane type keyboard with audible indication of key closure
- 1/4 and 1/2 lb. Pricing available where legal

II. SYSTEM DESCRIPTION

The Model 8420 consists of four (4) major building blocks which follow**:**

1. Power Supply
2. Load Cell and Flexure System
3. Main PCB
4. Customer Display PCB

The Power Supply Assembly provides 22 VAC, 44 VAC and 10 VAC to the Main PCB for regulation.

The weighing mechanism consists of a general purpose Load Cell and Flexure system which converts applied weight into an analog signal. This signal varies proportionally to the weight force applied to the platter. The analog signal is then supplied to the "Main" PCB where it is converted to its digital value and also displayed. The Main PCB further accepts data from the keyboard and performs the necessary calculations to produce Total price, subtract tare, etc. The AC voltages supplied to the Main PCB are then regulated to ± 15 VDC, 48 VDC, 10 VDC and 5 VDC.

III. SPECIFICATIONS

A. ELECTRICAL AND PHYSICAL

1) Physical Construction

The scale uses an aluminum die cast base approximately 12" wide by 14" deep, with a molded plastic cover.

The platter is of stainless steel, 10 X 13 inches

2) Power Supply Specifications

Transformer taps provide selection of one of the following power line voltages, at 50 or 60 Hz.

NOMINAL VOLTAGE	VOLTAGE RANGE

120	102-132
220	187-242
240	204-264

3) Level Indicator

A spirit level having a sensitivity of at least 2mm movement for 20 minute off level condition is provided, mounted with non-removable hardware to be visible to the operator without removal of the platter or scale cover.

4) Digital Displays

Displays are vacuum fluorescent with digits 0.354 inches high. Total Price is 5 digits. Unit Price is 4 digits and Weight is 4 or 5 digits depending on capacity.

5) Lighted Legends

Lighted spots adjacent to printed legends are as follows:

8420 Ram 2	8420 Ram 1
Net	Net (only)
1/4	
1/2	

B. INTERNAL FUNCTIONS AND INTERLOCKS

1. Capacities

a. Weight

The scale is available in 30 lb X 0.01 lb and 15 kg X 0.005 kg capacities.
The weight display blanks for weights greater than 5 increments over capacity.
The scale will withstand overloads of 3 times rated capacity without damage.

b. Tare

Tare is limited to 9.999 lb or 4.995 kg.

c. Pricing

Unit Price is entered via the keyboard including fractional pricing. Fractional pricing keys are included on Ram 2 8420's only. Program switch SW2-5 must also be ON for fractional pricing. Ram 1 8420's do not have fractional pricing keys and SW2-5 must be OFF to disable this function. Unit Price may be cleared by pressing the clear key.
Total Price is limited to 5 digits and Unit Price to 4 digits.
Decimal point locations are fixed as follows:

UNIT PRICE	TOTAL PRICE
$ XX.XX	$ XXX.XX

2. Display Messages or Signals

a. Weight greater than 5 increments over capacity blanks weight display and Total Price display.

b. Weight negative blanks Total Price.

c. Over Total Price blanks Total Price display.

d. Weight display blinks on Power Up until scale is zeroed.

e. Alternate actions of CLEAR button displays all 8's or all blanks.

3. Automatic Zero Compensation

The scale includes automatic zero compensation, which operates as follows: the zero display increment is divided into 9 minor increments. After the A/D conversion, the minor increments are examined and if the reading is within the major increment but not in the center minor increment, a minor increment is added to or subtracted from the reading to bring the displayed reading nearer to the center of the zero increment.
The range of this correction is limited to ± 25 increments, and the center of the range is determined by the setting of the analog zero potentiometer.

A zero compensation is made only when "no motion" condition exists. If the AZ range is exceeded the zero pot must be adjusted.

4. Push-button Zero

When the weight displayed is within the zero correction range and no motion is present, pressing the Zero push-button for at least 3 seconds with no motion present will cause the weight display to be zero.
Zero correction range is a maximum of ± 25 increments and the center of the range is determined by the analog zero pot setting. If the Push-button Zero range is exceeded, the zero pot must be adjusted.

5. Zone of Uncertainty

The weight range over which either of two adjacent weight increments may be displayed is 0.3 increments maximum.

6. Tare

a. Push-button Tare
When the Tare button is pressed, the Tare weight of an object on the scale platter is weighed to a resolution of .1 increment, stored, and the Net Weight displayed. The NET WEIGHT indicator will be turned ON. The scale must be in Gross Weight and "no motion" condition for Tare activation. If a Tare is to be taken, it must be taken before a Unit Price entry is made.
Tare weights are limited to 9.99 lb or 4.995 kg.
Tare will be cleared automatically whenever the scale has come to a "no motion" condition for NET weights greater than 10 increments, and the weight is then removed. Tare may be cleared by the 0-TR sequence when scale is empty. Program switch option enables auto-clearing of Tare only.

b. Keyboard Tare
When the Gross Weight is Zero (scale empty), Tare Data may be entered from the keyboard, followed by the Tare key. Data appears in the Unit Price display as it is being entered. The NET WEIGHT indicator turns ON when the Tare entry is accepted. Keyboard Tare may be cleared in the same manner as push-button Tare.

c. Automatic Clear (10 increments)
When the weight is stable, i.e., no motion, at a Net Weight greater than 9 increments, and the weight is then removed from the scale, Unit Price and Tare are automatically cleared.

7. Power Up Sequence

When the Power is first applied to the scale, the Weight and Total Price displays blink until the Zero button is pressed for 3 seconds or more or until the zero is automatically captured.

8. Visual Display Verification

Data displays may be visually checked for proper operation by pressing the CLEAR PUSH-BUTTON. Alternate actions of this button cause the digital and legend displays to blank or turn all display segments (8's) and all legend indicators ON.

9. Printer Output

Data Output from the scale is provided by a 20ma current loop with opto isolation, in the scale, operating in ASCII code at 4800 baud. The current is provided by the Printer.

C. EXTERNAL CONTROLS

1. Keyboard

The keyboard assembly is a flat sealed unit. An audible tone is generated to signal the closure of each key. The plastic overlay is printed on the reverse side with these legends:

KEY FUNCTION	KEY MARKING
Digits	0-9
Tare	TR
Clear-Unit Price, VFY	C
Print	P
Fraction	1/4 *****
Fraction	1/2 *****
Zero	ZERO

**NOTE: Available on Ram 2 models only*

2. Power Switch

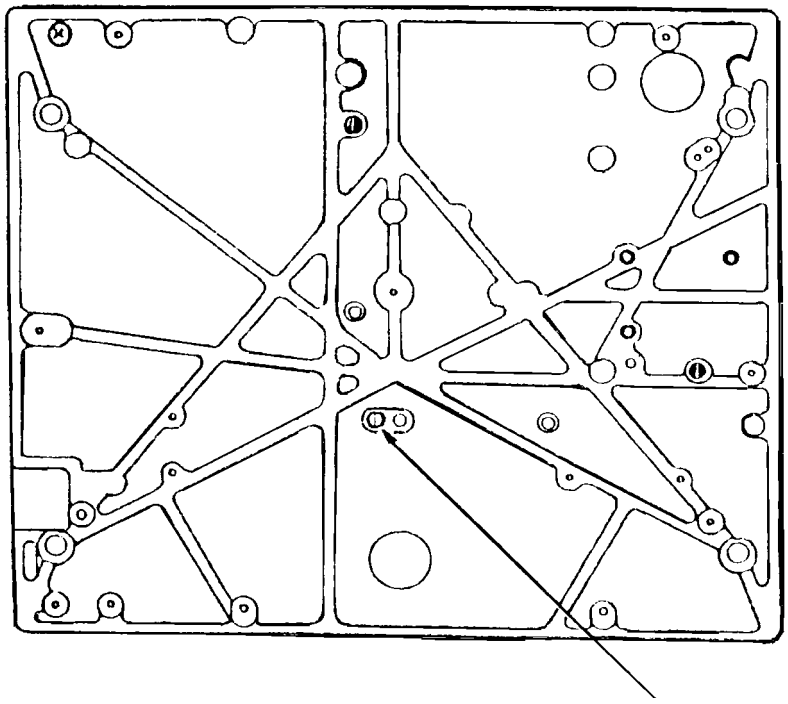
A toggle switch is mounted under the scale base to control power to the displays. Note that power remains on the unit whenever the line cord is connected to a power source, in order to maintain load cell excitation. The power switch does not remove power from the 301 or similar printer. Printing is inhibited when the switch of OFF.

IV. INSTALLATION INSTRUCTIONS

A. SET-UP PROCEDURE

1. Unpack the scale and inspect for visual damage.

2. Unlock scale by removing the lock nut and set screw shown in figure 1.



LOCKNUT AND
FIGURE 1 **SCREW**

3. Level the scale by use of the adjustable feet.

4. Install the platter and apply power.

5. The Model 8420 also provides an audible signal whenever a keyboard entry is made. If the customer wishes to have the audible signal disabled, the jumper plug (W3), must be inserted such that both pins are shorted together. See figure 2.

6. Allow one hour warm-up period. At the end of this period depress and hold the “zero” key. All displays should show zeros. Should you be unable to zero the scale, refer to the “Calibration Checklist”.

7. Three Main PCB’s are used in the 8420, Part Numbers 113699 00A and 111806 00A, and 11522000A. These PCB’s are completely interchangeable with each other. All harness connections and programming are identical between these two PCB’s. Board drawings are below in Figure 2.

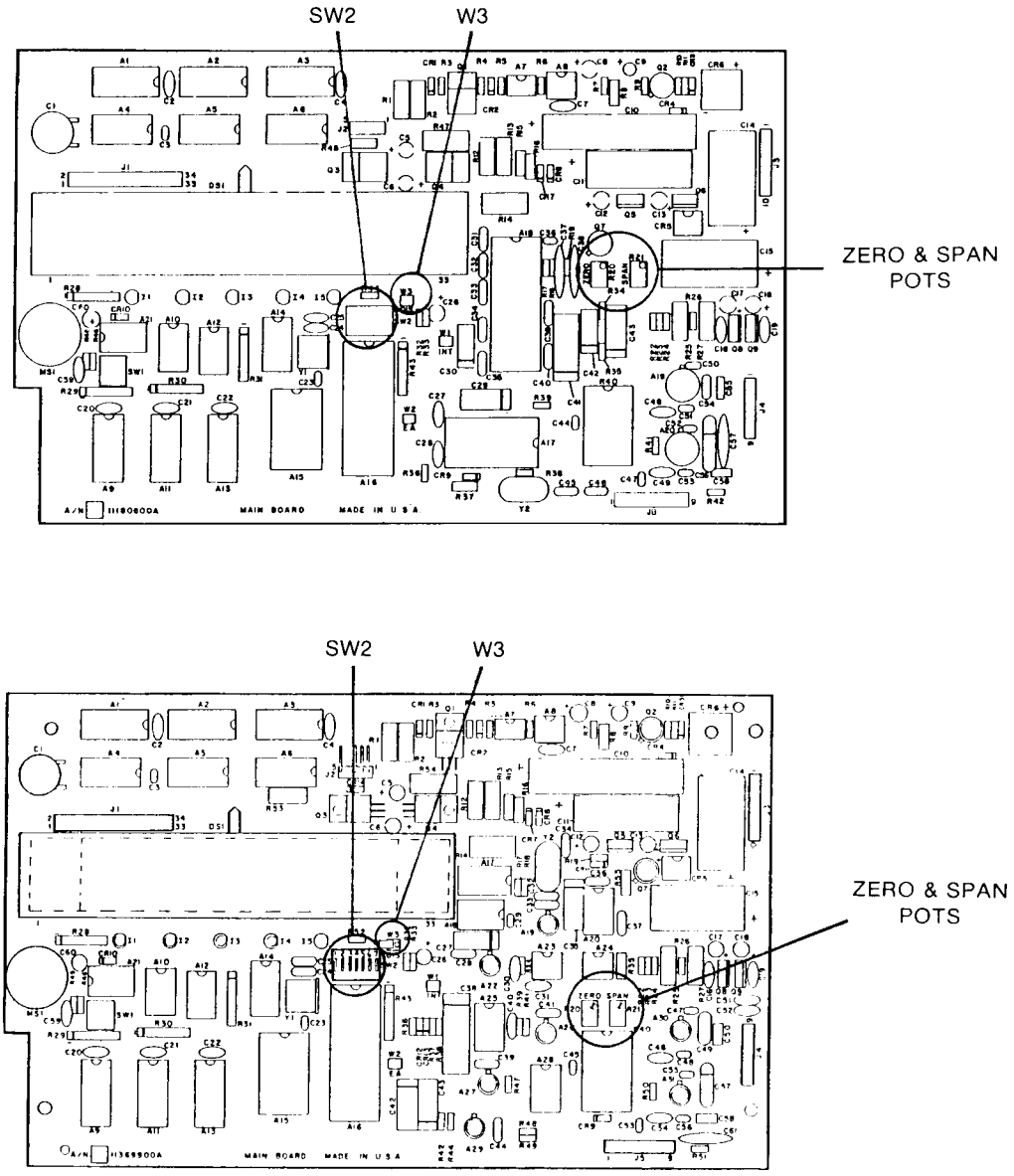


FIGURE 2

B. CALIBRATION CHECKLIST

1. Weighing Accuracy

a. Place SW2-3 to its "ON" position, this will expand the displayed reading X 10.
b. Adjust zero with the zero potentiometer located on the Main Board.
c. Apply a full test load to the center of the platter.
d. Adjust the SPAN potentiometer on the Main Board for the correct weight reading.
e. Repeat these adjustments until no further adjustment is required.
f. Place SW2-3 to its "OFF" position.

2. Weighing Tolerances

The weight indication will be within the tolerances specified, under the following conditions:

a. A weight of 1/4 of scale capacity placed anywhere on the platter.
b. A weight of 1/3 of scale capacity centered on any edge of the platter.
c. A weight of 1/2 of scale capacity placed 1/2 the distance from the center to any edge of the platter.

TEST WEIGHT	TOLERANCE
0-5 lbs.	± .005 lbs.
5-20	± .010 lbs.
20-30	± .015 lbs

3. Shift Test

Shift is acceptable if 1/2 capacity placed at any of the four points diagrammed in figure 3 on an otherwise empty platter of a sealed scale operating the Expand mode yields a digital indication which does not differ from the digital indication which does not differ from the digital indication obtained at any of the other three points by more than 10 minor increments.

NOTE: The diagrammed points are 1/2 the distance from the center of the platter to the edge of the platter.

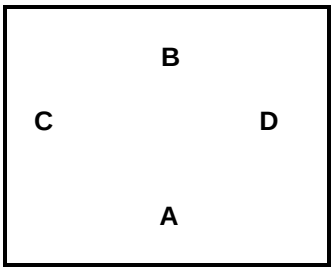


FIGURE 3

NOTE: Scale has been carefully adjusted at the factory. DO NOT make shift adjustments unless absolutely necessary.

a. Set the scale to operate in the Expand Mode by placing SW2-3 to its "ON" position.
b. Place test weights equal to one-half capacity on the test platter at "A" and note the indication. Move test weights to location "B" and note the indication.
c. Equalize readings, as close as possible, by fine adjustment of Differential screws "A" and "B" on adjustment bars, after loosening lock nuts. See figure 4.

Tightening the lock nuts may slightly offset the shift adjustment. With practice, the fine adjustment and tightening the lock nuts can be accomplished using two wrenches.

If position A is less than B, turn screw "A" clockwise.

If position A is more than B, turn screw “A” counterclockwise

If position D is less than C, turn screw “B” clockwise

If position D is more than C, turn screw “B” counterclockwise

d. If shift has been adjusted, re-calibration is necessary. Repeat Section IV, Weighing Accuracy.

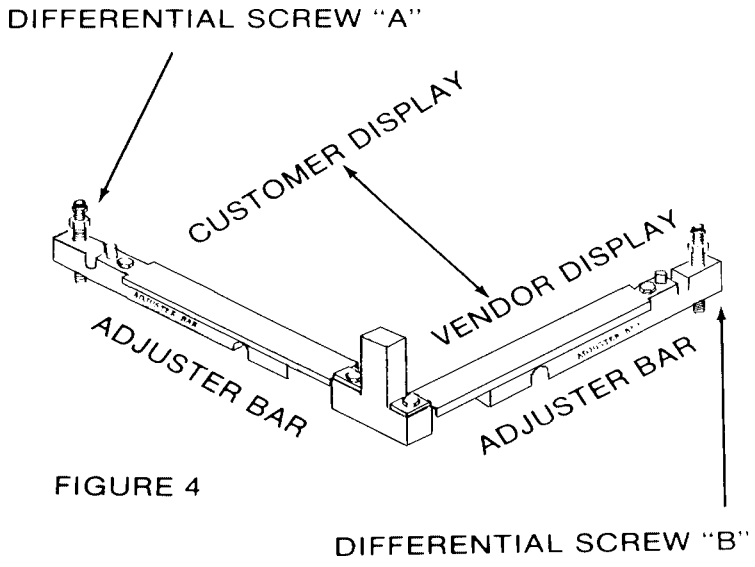


FIGURE 4

FIGURE 4

C. 8420 PROGRAM SWITCH SUMMARY (See figure 2 for SW2 location)

Main PCB's 11180600A/11366900A

SW2-1IS NOT USED AND MUST BE OFF

SW2-2INITIAL (This switch must be OFF for platter support plate)
- ON - Will allow the scale to zero using a cast aluminum platter support
- OFF - Will allow the scale to zero with the platter support currently in use

SW2-3 X 10 ENABLE
- ON - The displayed weight reading will be expanded X 10 for calibration
- OFF - Weight will be displayed normally

SW2-4MOTION TRACK INHIBIT
- ON - Weight display will continuously update as weight is applied/ removed from platter.
- OFF - The weight display will lock up on the current reading when motion exists on the platter. When motion stops, the weight display will then update to the proper indication.

SW2-5FRACTIONAL PRICING
- ON - Price per 1/4 or 1/2 lb. may be entered and displayed
- OFF - Price per 1/4 or 1/2 lb. can NOT be entered

SW2-6TARE CLEAR FUNCTION
- ON - TARE clears automatically when a Net weight of 10 inc. is weighed and then removed.
- OFF - TARE is also cleared by pressing the **O**key followed by pressing "TR" key.

SW2-7LB/KG MODE
- ON - Weight will be displayed in lbs.
- OFF - Weight will be displayed in kg.

Main PCB 11522000A

SW1-1KEYBOARD TONE - ON=enable, OFF=disable.

SW1-2INITIAL (This switch must be OFF for platter support plate)
- ON - Will allow the scale to zero using a cast aluminum platter support
- OFF - Will allow the scale to zero with the platter support currently in use

SW1-3 X 10 ENABLE
- ON - The displayed weight reading will be expanded X 10 for calibration
- OFF - Weight will be displayed normally

SW1-4MOTION TRACK INHIBIT
- ON - Weight display will continuously update as weight is applied/ removed from platter.
- OFF - The weight display will lock up on the current reading when motion exists on the platter. When motion stops, the weight display will then update to the proper indication.

SW1-5FRACTIONAL PRICING
- ON - Price per 1/4 or 1/2 lb. may be entered and displayed
- OFF - Price per 1/4 or 1/2 lb. can NOT be entered

SW1-6TARE CLEAR FUNCTION
- ON - TARE clears automatically when a Net weight of 10 inc. is weighed and then removed.
- OFF - TARE is also cleared by pressing the **O**key followed by pressing "TR" key.

SW1-7LB/KG MODE (ON= Weight in lbs., OFF= Weight in kg).

D. FUNCTION VERIFICATION (SW2-1, 1,2,3 & 6 OFF; SW2-4, 5 & 7 ON)

1. Place a 1 lb. weight on the platter and press the "TR" key. The weight display should read 00.00

and the NET lamp should be illuminated.

2. Remove the 1 lb. weight. The display should now read - 01.00. Press the ")" key and then press the "TR" key. The "NET" light should extinguish and the weight indication should read 00.00.

3. Press the "2" key, the "5" key and the "TR" key. The weight display should show - 00.25 and the "NET" light should be illuminated.

4. Press the "0" key and the "TR" key. The "NET" light should extinguish and the weight display should show 00.00.

5. Enter a tare as in Paragraph 3. Enter a Unit Price of $1.00 per 1/4 lb. and place a one pound weight on the platter. The Weight display should show 00.75, the Unit Price display should show $1.00 and the Total Price display should show 03.00. Further, the "NET" and "1/4" lights should be illuminated.

6. Remove the 1 lb. weight. All displays should show zeros. The "NET" and "1/4" lights should be extinguished.

V. OPERATION INSTRUCTIONS

1. Turn on the power switch.

2. If the display is flashing or not at zero, depress and hold the “ZERO” key for approximately 3 seconds.

3. If tare is desired, enter tare by either of two methods:
   a. Place the empty container on the platter and press the “TR” button.
   b. Enter the weight of the container on the digit keys followed by pressing the “TR” button.

4. Enter the Unit Price on the digit keys of the keyboard.

5. Place the package on the platter.

6. Record the Total Price displayed.

7. Remove the package from the platter. The tare, Unit Price and Total Price will be automatically cleared.*

8. Repeat Steps 3 through 8 for each package to be weighed and priced.

* *Package must have a net weight of .10 lb. or greater.*

VI. PREVENTATIVE MAINTENANCE

1. Customer or Daily Maintenance -- Wipe the exterior surface clean with a damp cloth. Avoid rough usage and clean up spills immediately.

2. Call Service Maintenance -- Check all functions as listed in Section IV, Function Verification. Check that the scale is still level and then check calibration. Clean the equipment where it is necessary.

3. Scheduled Maintenance -- Check the calibration and operation as in Section IV. Check for loose or missing parts (lenses, etc.). Clean where required.

VII. PART REPLACEMENT PROCEDURE

A. SERVICE "FIRST MAN" KIT OF PARTS #082114 020

The "First Man" Kit of Parts consists of the following items:

QTY.	PART NUMBER	DESCRIPTION
5	P00570 020	Fuse .3 Amp Slo-Blo
5	095920 00A	Fuse 1/4 Amp Slo-Blo
1	113699 00A	Main PCB
1	111808 00A	Customer Display PCB
1	113772 00A	Keyboard (Without Fractional Pricing)
1	113768 00A	Keyboard (With Fractional Pricing)

B. EQUIPMENT ACCESS

NOTE: Before gaining access to any internal parts of the scale, remove power from the scale by unplugging it.

1. Front Bezel

Lift off the platter. Remove the platter support plate, which is secured by two (2) screws. This allows access to the three (3) screw that retain the bezel (1 screw in each top corner, 1 in the center clip). After removing the screws, slide bezel up the cover about 1/2" then lift up. Remove the keyboard ribbon connector from J5 on the main PCB.

2. Program Switches and Keyboard

Removing the platter support plate and the Front Bezel allows access to the program switches on the Main PCB. The keyboard is secured to the bezel by four (4) studs and their respective nuts and washers.

3. Main PCB and Load Cell Flexure System

The platter support plate, Front Bezel and the scale cover must be removed. The scale cover is held in place by four (4) screws. See figure 5 for screw locations. Lift the cover in a forward direction. To remove the Main PCB, disconnect all harness connections and the four (4) screws (one in each corner).

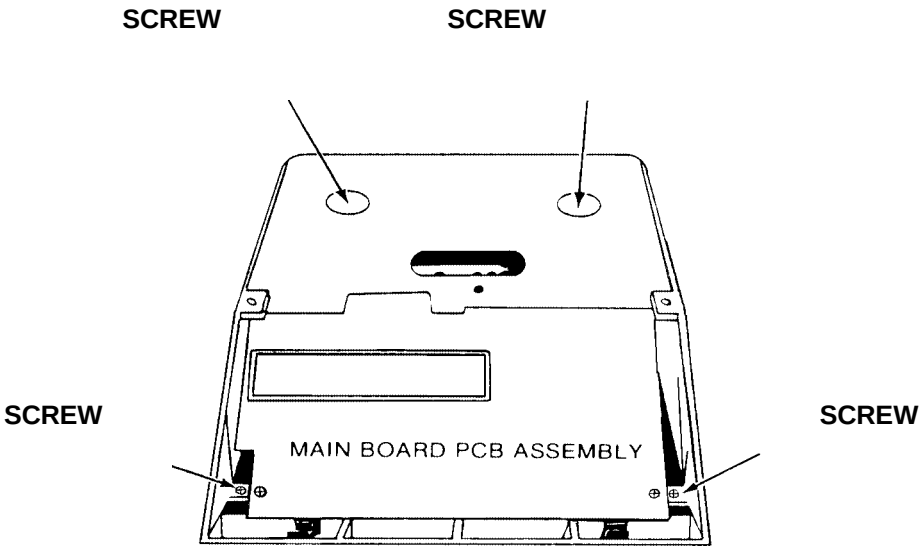


FIGURE 5

4. Power Supply Removal

Remove the platter, platter support, front bezel, scale cover and the main PCB (as previously described). This will allow access to the power supply mounting bracket. Remove the two (2) screws that retain the plug receptacle. Unplug the spade lug terminals that connect wiring to the fuse holder and the "ON", "OFF" switch. Release the printer output jack from its mounting. Remove the four (4) screws (one in each corner) which retain the assembly.

5. Customer Display

The customer display (Housing) is secured to the back of the scale cover, from the inside by six screws and electrically connected by a Ribbon Harness. Unplug this harness from the Main PCB (at J1). Also pull this harness free from the carpet tape that secures it to the back of the cover. Removing the six screws retaining the housing to the cover will reveal the PCB which is held is place by four (4) screws. Remove these 4 screws and replace customer display in a reverse order.

C. LOAD CELL REPLACEMENT PROCEDURE

1. Remove platter support, front bezel and the scale cover.

2. Loosen the locknut on the backstroke screw. See figure 6.

3. Loosen the backstroke screw an amount sufficient to allow removal of the load cell strut. See Figure 7.

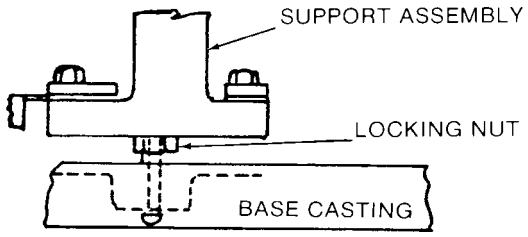


FIGURE 6

BACK STROKE SCREW

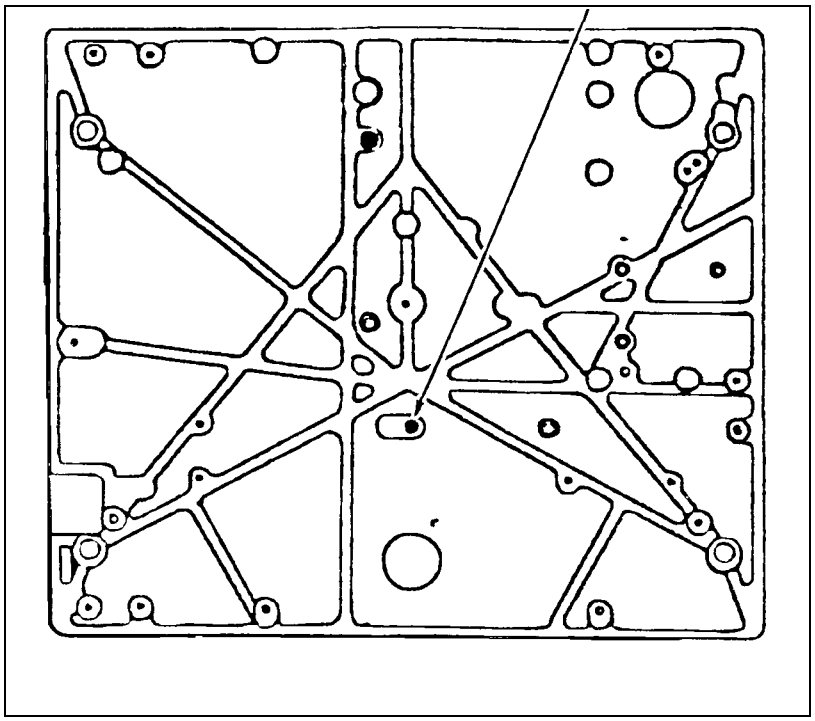


FIGURE 7

4. Remove the load cell harness from the load cell.

5. Remove the two allen head cap screws attaching the load cell to the base casting and remove the defective load cell.

6. Install the replacement cell.

7. Install the load cell harness.

8. Install the load cell strut making certain that it is plumb.

9. Adjust the backstroke screw until the upward travel of the platter support plate is .020 to .040 inches. Tighten the locking nut. This is to insure the strut is retained properly.

10. Install the platter support plate and the platter.

11. Apply power and turn ON switch SW2-3 (X 10 Expand) and allow scale to warm for 1 hour.

12. Adjust the scale, by use of the initial potentiometer, for a reading of 00000.

13. Place 30 lbs. on the platter and adjust the Span potentiometer for a reading of 30000.

14. Repeat Steps 12 & 13 until no further adjustment is required.

15. Place 34 lbs. on the platter and adjust the overload stop screw until the reading just begins to decrease. Tighten the locknut (figure 8).

16. Apply power. Allow 1/2 hour warm-up time and recheck calibration and shift. Adjust if necessary. Remove Power from scale. (Place SW2-3 to its OFF position).

17. Remove the platter and platter support plate. Reinstall the cover, front bezel, platter support and

reinstall the platter.

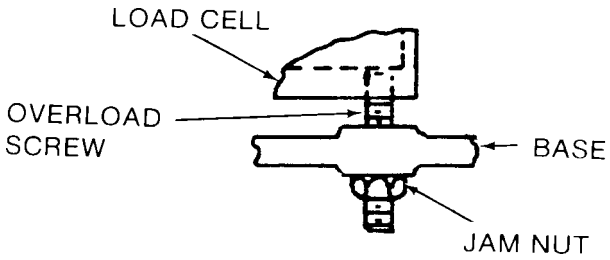
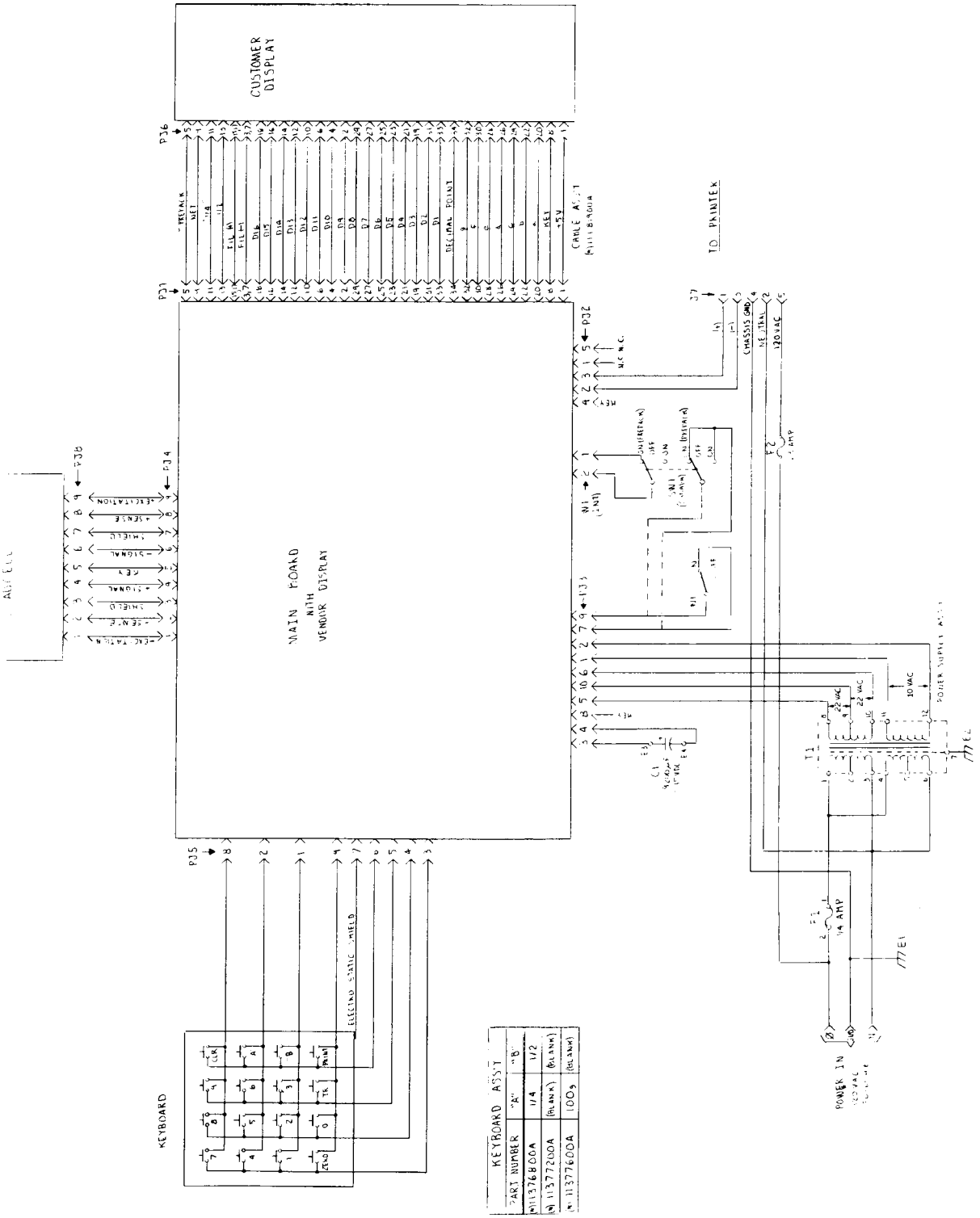


FIGURE 8

XIII. SCHEMATIC



FOR YOUR NOTES

FOR YOUR NOTES