8180

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:

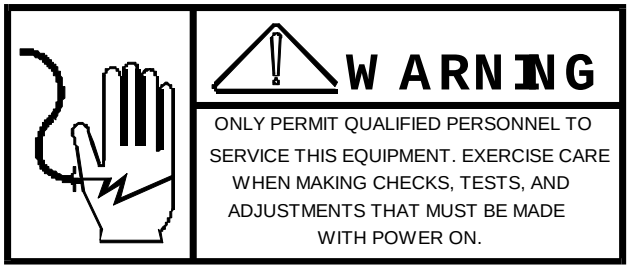
METTLER TOLEDO
Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

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.

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1. GENERAL DESCRIPTION

The Model 8180 is an Automatic Digital Parts Counting Scale, consisting of a solid state electronic control console, and strain gage load cell sample weight and gross weight and gross weight scales.

In operation, Average Piece Weight is automatically calculated from a parts sample on the Sample Scale. This information is used to instantly determine the number of parts on the Gross Weight Scale. Each calculation, Gross Weight: Tare Weight: Net Weight: Average Piece Weight and piece Count, is displayed and can be printed.

The Model 8180 Parts Counting Scale provides: count and complete weight information automatically, faster operation, digital display eliminating operator reading errors, versatile automatic operation for shipping and receiving function, a variety of printing options, and modular solid state construction for long life, reliability and ease of maintenance.

1.1 STATEMENT OF PERFORMANCE:

The performance of any count-by-weighing scale is dependent on uniformity of weight per piece, number of pieces in the sample, individual piece weight and the percent of rated load placed on the scale. In application, count accuracy is also dependent upon the ability of the operator to read and record the count information accurately.

The Model 8180 Automatic Parts Counting Scales significantly reduce count errors induced by the operator. In most applications the Toledo 8180 provides better practical accuracy than either hand counting or using mechanical techniques. Assuming minus one part is attainable in many specific cases. However, the most significant variable is uniform weight of the parts to be counted. This variable is not controllable by the scale system.

1.2 ACCURACY CONSIDERATIONS:

Counting accuracy is determined primarily by these factors:

1. Digital resolution of the Sample Weight
2. Digital resolution of the Gross Weight
3. Piece to piece weight variation

Item 3 is not under control of the Parts Counter, but is a factor which merits serious attention by user. The overall count accuracy can be no better that the piece to piece variation, and may be much lower if the sample is not representative of the average piece weight.

Item 1 is the most frequent cause of parts counting inaccuracy because of user desire to count and handle the minimum number of sample pieces. Use of more than 1% minimum sample weights will significantly improve counting accuracy.

Item 2, resolution of the Gross Weight, is normally not a problem unless the Gross Scale is used below 5% capacity.

1.3 FEATURES

-Six Digit counting capacity.

-Gross weighing capacity up to 5,000 lbs. standard higher capacities are available.

- Digital display is 6 digits 0.55" high, seven segments, gas discharge.

- Display up date time is 3 per second.

- Insufficient sample weight pilot light actuates at less than 1% of sample scale capacity.

-Zero OK lighted pushbutton (rezero range ± 200 increments).

- Available in a desk top console or a wall mount, dust tight, enclosure.

- Data output for printer.

- Automatic zero maintenance.

2. SYSTEM DESCRIPTION

The instrument provides 15 volts of excitation for strain gauge load cells. the excitation is gated sot that zero drift and temperature change can be compensated. The instrument conditions the microvolt signal and amplifies it to a maximum level of about 10 volts. It is then filtered and level of about 10 volts. It is then filtered and converted to a digital signal in the integrator.

The Initial range is adjustable from OmV to 16.5mV.

The Span range is adjustable from 8mV to 30mV full scale.

The excitation current is provided for 2 load cells.

The excitation current is provided for 2 load cells.

The Model 8180 Parts Counter consists of (8) major blocks which follow:

2.1 POWER SUPPLY

Provides various DC voltages to the other PCB's.

2.2 MOTHER PCB

This PCB distributes the power to the Logic and Analog PCB's, as well as providing intercommunication lines between the Logic PCB and Analog PCB.

2.3 I/O PCB

Contains a 5 volt and a 10 volt regulator and serial I/O parts assigned to the following tasks.

2.3.1 Keyboard
2.3.2 Display
2.3.3 Printer I/O
2.3.4 Clock

2.4 KEYBOARD

The keyboard has keys for entering tare weight, sample pieces or piece weight. It also has keys to enter functions and lights to indicate scale selected and scale zero.

2.5 DISPLAY

The display indicates weight or count and it identifies each step of the count sequence with a lighted legend.

2.6 LOGIC

The logic PCB has the CPU Ram's , Rom's and the switches that control the functions of the system.

2.7 PREAMP

The preamp PCB has two preamps -- one for the gross scale and one for the sample scale, a gated power supply for load cell excitation and the switches for span and initial calibration. It also has the auto zero circuitry.

2.8 A/D

The A/D PCB contains the analog to digital converter or integrator which takes the 0 to 10 volt analog signal voltage from the Preamp and converts it to a digital signal for use in the logic section of the instrument. This PCB also has the + and - 15 volt power supply .

3. SPECIFICATIONS

3.1 ELECTRICAL AND PHYSICAL

3.1.1 Environment

The Model 8180 is operable form 5 degrees to 40 degrees C (40º to 104º F) for the desk top and 5º to 50º C (40º to 122º F) for the wall mount, at 10-95% relative humidity.

3.1.2 Power Requirements

105-125 volts AC, 50-60 Hz., at 50 watts. Other voltages are available by changing transformer taps.

3.1.3 Dimensions

Dimensions: Desk Top, 13" wide X 14" deep X 8" high. Wall Mount, 16" wide X 8" deep X 20" high.

Weight: Desk Top, 10 lbs., Wall Mount, 50 lbs.

3.2 INTERNAL FUNCTIONS

The 8180 contains the necessary electronics (except the load cells to calculate and display weight and piece count as will as being capable of transmuting data to printer.

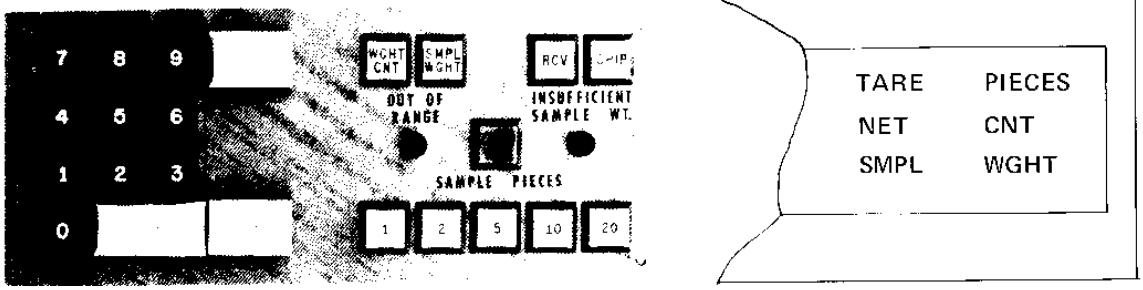
3.3 DISPLAY FORMAT

All weight and Count information is presented on a six digit display. Each step of the Count sequence is identified by a lighted legend on the right side of the display.. Weight, Tare Weight, Net Weight, Sample count, Piece Count, Sample Weight and Piece Weight.

FACTORY NO.	DESCRIPTION
8180 0002	Desk Top- Variable Sample
8180 0004	Wall Mounted- Variable Sample
8180 0007	Wall mounted With Multiple Cell Supply
8180 0008	Wall Mounted With Multiple Cell Supply 7 Display Harness

4. OPERATORS INSTRUCTIONS

4.1 VARIABLE SAMPLE CONTROL CONSOLE



4.1.1 Zero Scales

		Legend Indicates	
a).	Check Gross Scale Zero:		
b).	Push CLEAR, In WGHT CNT mode check Gross Scale zero on digital display.		
c).	To Zero Gross Scale:		
d).	Select WGHT CNT mode and push ZERO OK.		WGHT
e).	Check Sample Scale Zero:		
f).	A lighted ZERO OK push light indicates Sample Scale in on zero.		
g).	To Zero: Sample Scale:		
h).	Select SMPL WGHT mode and push ZERO OK.	SMPL	WGHT

NOTE: If ZERO OK pushlight does not zero either scale, an internal zero adjustment must be made by authorized personnel.

WARNING: For continued protection against shock hazard, connect to properly grounded outlet ONLY . DO NOT REMOVE THE GROUND PRONG.

4.1.2 Receiving Mode (Fro counting unknown quantities)

Mode Switches - CLEAR and select WGHT, CNT and RCV modes.

Check both scales for zero.

a).	Push CLEAR button.		WGHT
b).	Place empty container on Gross Scale. Container weight is displayed.		WGHT
c).	Push TARE button. Display reads zero.	NET	WGHT

d). Place all parts to be counted in container on Gross Scale. NET WGHT

NOTE: If container tare weight is known, place full container on Gross scale and enter on Gross Scale and enter tae value on 10 button keyboard and push T TARE button. TARE WGHT
NET WGHT

e). Place sample parts (1 to 999) on Sample Scale. Sample must be at least large enough to cause INSUFFICIENT SAMPLE Weight pilot light to go off. NET WGHT

f). Enter number of sample parts used, on 10 button keyboard. SMPL CNT

g). Push COUNT button. Total count displayed, including parts on Sample Scale. There is only one calculation of pieces made after the "COUNT" Pushbutton is pressed, and there Is not motion on either scale. PIECE CNT

h). Push PRINT button (if required)

4.1.3 Shipping Mode (For counting out a predetermined quantity)

Mode Switches - CLEAR and select WGHT CNT and SHIP modes.

a). Push CLEAR button. WGHT

b). Place empty container on Gross Scale. Container weight is displayed. WGHT

c). Push TARE button. Display reads zero. NET WGHT

d). Place sample parts (1 to 999) on sample scale. Sample must be at least large enough to cause INSUFFICIENT SAMPLE Weight pilot light to go off. NET WGHT

e). Enter number of sample parts used, on 10 button keyboard. NET WGHT

f). Push COUNT button. SMPL CNT

g). Add parts to counter on Gross Scale until desired count is displayed. Parts on Sample Scale are not included in count. After COUNT" pushbutton is pressed and there is no motion on sample scale, the sample weight is stored so weight changes on sample scale will not affect the calculator. PIECE CNT

h). Push PRINT button (if required).

NOTE: In ship Mode only, when counting quantities of the same part repeatedly using same parts container, Tare Weight steps through 6 need not be

repeated. Empty container, place empty container back on Gross Scale, and place empty container on Gross Scale, and repeat Steps 7 and 8.

4.1.4 To Determine Average Piece Weight

Mode Switches - CLEAR and select SMPL WGHT and RCV or SHIP modes.

a).	Place sample parts (1 to 999) on Sample Scale. Sample must be at least large enough to cause Insufficient SAMPLE WT pilot light to go off. Sample weight is displayed.	SMPL	WGHT
b).	Enter number of sample parts used, on 10 button keyboard.	SMPL	CNT
c).	Push COUNT button. Average Piece Weight is displayed	PIECE	WGHT

4.1.5 To Count Using Known Average Piece Weight

Receiving Mode (For counting unknown quantities)
Mode Switches - CLEAR and select WGHT CNT and RCV modes.

Check both scales for zero.

a).	Push CLEAR button.		WGHT
b).	Place empty container on Gross Scale. Container on Gross Scale.		WGHT
c).	Push TARE button. display reads zero.	NET	WGHT
d).	Place all parts to be counted in container on Gross Scale.	NET	WGHT
	NOTE: If container tare weight is known, place full container on Gross Scale and enter tare value on 10 button keyboard and push TARE button.	TARE NET	WGHT WGHT
e).	Enter Average Piece Weight on 10 button keyboard. Check for correct decimal place on display..	PIECE	WGHT
f).	Push AVGE WGHT button. Total count displayed, including parts on Sample Scale.	PIECE	CNT
g).	Push PRINT button (if required)	PIECE	CNT

4.1.5 Shipping Mode (For counting out a predetermined quantity)

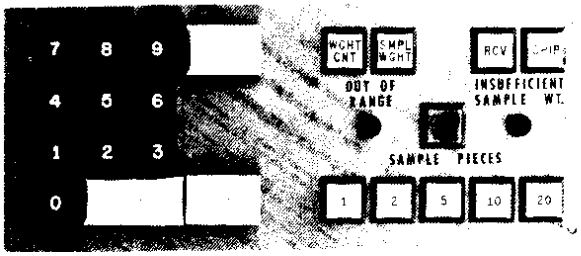
a).	Push CLEAR button.		WGHT
b).	Place empty container on Gross scale. Container weight is displayed.		WGHT
c).	Push TARE button, Display reads zero.		
d).	Enter Average Piece Weight on 10 button keyboard. Check for correct decimal place on display. Number entered is displayed.	NET PIECE	WGHT WGHT

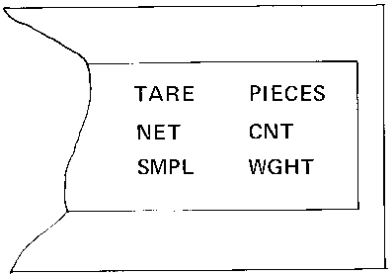
e). Push AVGE WGHT button.

f). Add parts to container on Gross scale until desired count is displayed. Parts on Sample scale are not included in count. PIECE CNT

g). Push PRINT button (if required).

4.2 FIXED SAMPLE CONTROL CONSOLE





4.2.1 Zero Scales

LEGEND INDICATES

a). Check Gross Scale zero:

b). Push CLEAR, In WGHT CNT mode check Gross Scale zero on digital display.

c). To zero Gross Scale: WGHT

d). Check SAMPLE SCALE zero:

e). A lighted ZERO OK pushlight indicates Sample Scale is on zero.

To zero SAMPLE SCALE:

f). Select SMPL WGHT mode and push ZERO OK. SMPL WGHT

g). NOTE: If ZERO OK pushlight does not zero either scale, an internal zero adjustment must be made by authorized personnel.

WARNING: For continued protection against shock hazard, connect to properly grounded outlet ONLY. DO NOT REMOVE THE GROUND PRONG.

4.2.2 Receiving Mode (For counting unknown quantities)

Mode Switches - CLEAR and select WGHT CNT and RCV modes . Check both scales for zero.

a).	Push CLEAR button.		WGHT
b).	Place empty container on Gross Scale. Container weight is displayed.		WGHT
c).	Push TARE button. display reads zero.	NET	WGHT
d).	Place all parts to be counted in container on Gross Scale.	NET	WGHT
	NOTE: If container tare weight is known, place full container on Gross Scale and enter tare value on 10 button keyboard and push TARE button.	TARE NET	WGHT WGHT
e).	Place sample parts (1-2-5-10 or 20) on Sample Scale. Sample must be at least large enough to cause INSUFFICIENT SAMPLE Weight pilot light to go off.	NET	WGHT
f).	Place sample parts (1-2-5-10 or 20) that corresponds with number of parts on Sample Scale. Total count displayed, including parts on Sample Scale.	PIECE	CNT
	NOTE: Changing weight on either scale will not change the total count displayed.		
g).	Push PRINT button (if required).		

4.2.3 Shipping Mode

(For counting out a predetermined quantity)

a).	Push CLEAR button.		WGHT
b).	Place empty container on Gross Scale. Container weight is displayed.		WGHT
c).	Push TARE button. Display reads zero.	NET	WGHT
d).	Place sample parts (1-2-5-10 or 20) on Sample Scale. Sample must be at least large enough to cause INSUFFICIENT SAMPLE WT pilot light to go off.	NET	WGHT
e).	Press SAMPLE PIECES pushlight (1-2-5-10 or 20) that corresponds with number of parts on Sample Scale.	PIECE	CNT
f).	Add parts to container on Gross Scale until desired count is displayed. Parts on Sample Scale are not included in count.		
g).	Push PRINT button (if required).		
	NOTE: In Ship Mode only, when counting quantities of the same parts container, Tare Weight steps 1 through 5 need not be repeated. Empty container, place empty container back on Gross Scale and repeat steps 6 and 7.		

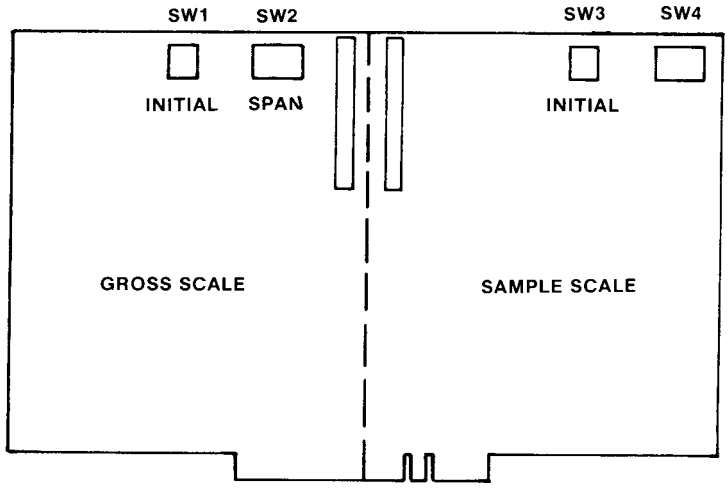
4.2.4 To Determine Average piece Weight

Mode Switches - CLEAR and select SMPL WGHT and RCV or SHIP modes.

a).	Place sample parts (1-2-5-10 or 20) on Sample Scale. Sample must be at least large enough to cause INSUFFICIENT SAMPLE WT pilot light to go off. Sample weight is displayed.	SMPL	WGHT
b).	Push SAMPLE PIECES button (1-2-5-10 or 20) that corresponds with number of sample parts on Sample Scale. Average Piece Weight displayed.	PIECE	WGHT

5. PROGRAM SWITCH SUMMARY

5.1 PREAMP PCB-EARLY DESIGN - "B" REVISION AND BEFORE



SW1 INITIAL

SW1-1 LARGEST STEP
SW1-2
SW1-3
SW1-4 SMALLEST STEP

(GROSS SCALE)

Turning ON any of SW1 initial switches will increase the initial compensation.
SW1-1 has the largest effect.
SW1-2 has 1/2 the effect as SW1.
SW1-3 has 1/2 the effect as SW1-2 and so on down

SW3 INITIAL

SW3-1 LARGEST STEP
SW3-2
SW3-3
SW3-4 SMALLEST STEP

(SAMPLE SCALE)

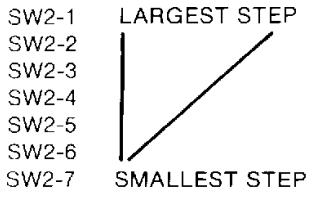
Turning ON any of SW3 initial switches will increase the initial compensation.
SW3-1 has the largest effect.
SW3-2 has 1/2 the effect as SW3-1.
SW3-3 has 1/2 the effect as SW3-2 and so on down

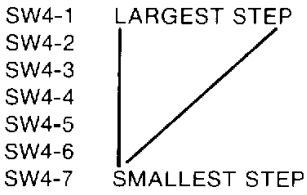
to SW1-4.

to SW3-4.

SW2 SPAN

SW4 SPAN





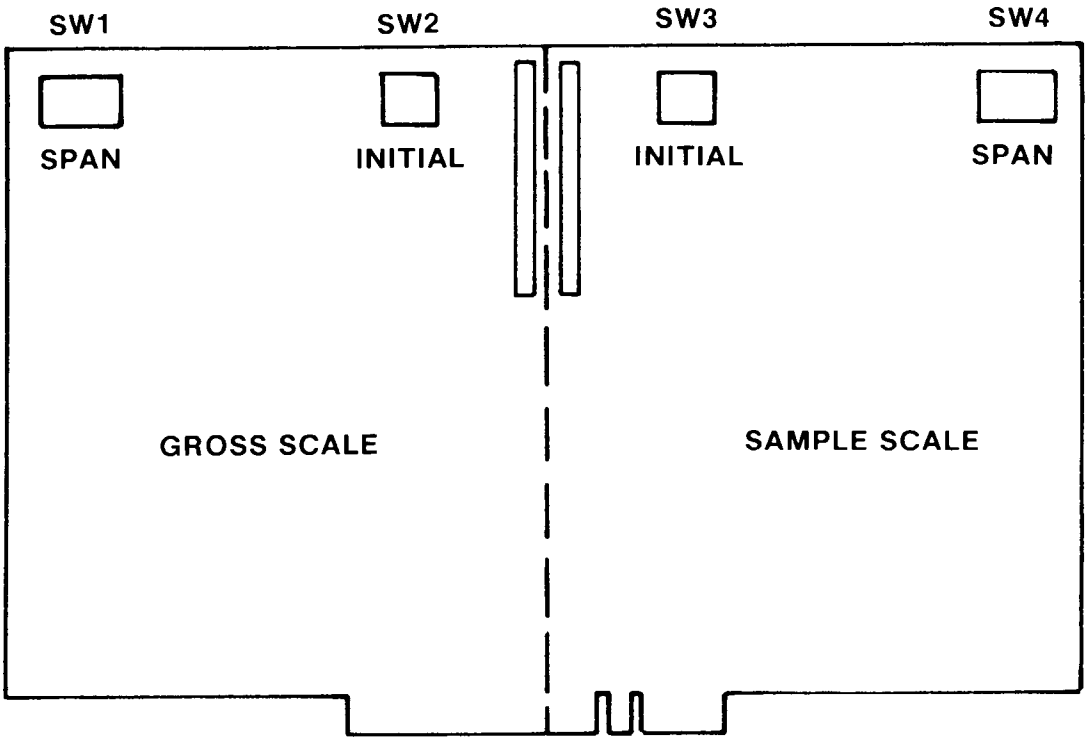
(GROSS SCALE)

Turning ON any of the Sw2 Span switches will the weight indication.
SW2-1 has the largest effect.
SW2-2 has 1/2 the effects as SW2-1.
SW2-3 has 1/2 the effect as SW2-2 and so on throught SW2-7.

(SAMPLE SCALE)

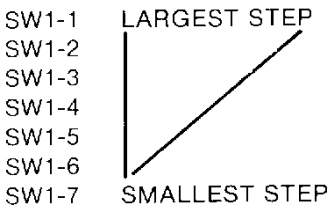
Turning ON any of the SW4 Span switches will decrease decrease the weight indication.
SW4-1 has the largest effect.
SW4-2 has 1/2 the effect as SW4-1.
SW4-3 has 1/2 the effect as SW4-2 and so on through SW4-7.

5.2 PREAMP PCB-CURRENT DESIGN-"D" REVISION AND LATER



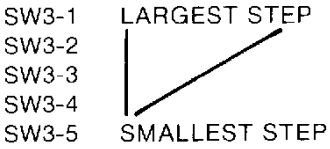
SW2 INITIAL

SW4 SPAN



(GROSS SCALE)

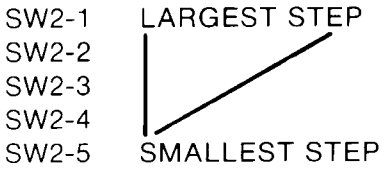
Turning ON any of the SW1 Span switches will decrease the weight indication.
SW1-1 has the largest effect.
SW1-2 has 1/2 the effect as SW1-1.
SW1-3 has 1/2 the effect and so on through SW1-7.



(SAMPLE SCALE)

Turning ON any of SW3 initial switches will increase the initial compensation.
SW3-1 has the largest effect.
SW3-1 has 1/2 the effect as SW3-1.
SW3-3 has 1/2 the effect as SW3-2 and so on down to SW3-5.

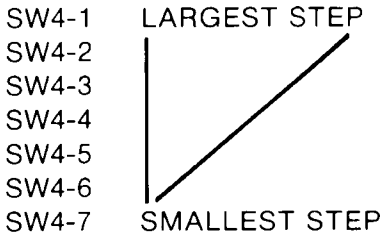
SW2 INITIAL



(GROSS SCALE)

Turning ON any of SW2 initial switches will increase the initial compensation.
SW2-1 has the largest effect.
SW2-2 has 1/2 the effect as SW5-1.
SW2-3 has 1/2 the effect as Sw2-2 and so on down to SW2-5.

SW4 SPAN



(SAMPLE SCALE)

Turning ON any of the SW4 Span switches will decrease the weight indication.
SW4-1 has the largest effect.
SW4-2 has 1/2 the effect as SW4-1.
SW4-2 has 1/2 the efrect as SW4-2 and so on through SW4-7.

5.3 PCB: A/D CONVERTER

PART NO.: E099326 00A

EXCEPT RAM 0008

Switches SW3 and SW4 are for decimal point selection and increment size. See the charts below for proper selection.

GROSS SCALE DECIMAL POINT	SW3-1	SW3-2
XX.XXX	OFF	ON
XXX.XX	ON	OFF
XXXX.XX	OFF	OFF

SAMPLE SCALE DECIMAL POINT	SW4-1	SW4-2
X.XXXX	ON	ON
XX.XXX	OFF	ON
XXX.XX	ON	OFF

GROSS SCALE INCREMENT	SW3-3	SW3-4
Counting by 2's	OFF	ON
Counting by 5's	ON	OFF
Counting by 1's	OFF	OFF

SAMPLE SCALE INCREMENT	SW4-3	SW4-4
Counting by 2's	OFF	ON
Counting by 5's	ON	OFF
Counting by 1's	OFF	OFF

NOTE: The above listed settings are capacities form 2 X .000x lb or kg to 5000 X .5lb or kg. For capacities above 5000 on the Gross scale, see the next charts.

5.4 PCB: A/D CONVERTER PART NO.: E099326 00A

Ram 0008 and others with harness #102072 00A (Desk) OR 102073 00A (Wall).

Switches SW3 and SW4 are for decimal point selection and increment size. See the charts bellow for proper selection. These settings are for 10,000 X z lb or kg - 20,000 X 2 lb or kg -- and 50,000 X 5 lb or kg.

NOTE: SW1 and SW2 will always be In the ON position (the slider towards the center of the PCB).

GROSS SCALE DECIMAL POINT	SW3-1	SW3-2
XXX.XX	OFF	ON
XXXX.X	ON	OFF
XXXXX	OFF	OFF

SAMPLE SCALE DECIMAL POINT	SW4-1	SW4-2
XX.XXX	ON	ON

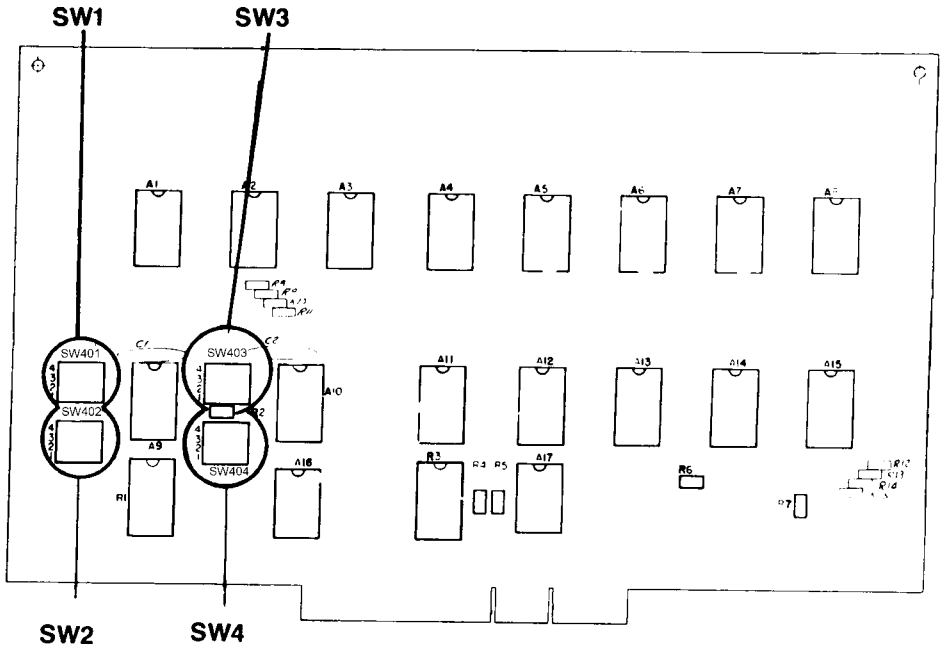
XXX.XX	OFF	ON
XXXX.X	ON	OFF

GROSS SCALE INCREMENT	SW3-3	SW3-4
Counting by 2's	OFF	ON
Counting by 5's	ON	OFF
Counting by 1's	OFF	OFF

SAMPLE SCALE INCREMENT	SW4-3	SW4-4
Counting by 2's	OFF	ON
Counting by 5's	ON	ON
Counting by 1's	OFF	OFF

5.5 PCB: ROM 80

PART NO.: 099328 00A



SW1-1- INSUFFICIENT SAMPLE

ON- A parts count calculation will be displayed even when the Insufficient Sample Weight lamp is ON.

OFF- No parts count calculation will be displayed when the Insufficient Sample Weight lamp is ON.

SW1-2- AUTO PRINT

ON- The print button must be depressed to start a print cycle.

OFF- A print cycle will automatically start after a count has been calculated.

SW1-3- ADD BACK (RECEIVE)

ON- With the 8180 in the RECEIVE mode, the count will NOT include the number of parts on the sample scale.

OFF- With the 8180 in the RECEIVE mode, the count WILL include the number of parts on the sample scale.

SW1-4- PRINTER

ON- 500 Printer

OFF- 510 or 8805.

SW2-1-KEYBOARD

ON- Fixed sample keyboard.

OFF- Variable sample keyboard.

SW2-2- ADD BACK (SHIP)

ON- The 8180 in the SHIP mode, the count will NOT include the number of parts on the sample scale.

OFF- The 8180 in the SHIP mode, the count WILL include the number of parts on the sample scale.

SW2-3- TARE

ON- The TARE key is not active and has no effect.

OFF- The TARE key is active and it must be used before a calculation can be made.

SW2-4- TARE CLEAR

ON- TARE weight and AVERAGE PIECE Weight will be retained for repeated countings of identical parts. This is only used when the 8180 is in Ship mode.

OFF- Only AVERAGE PIECE Weight will be retained. TARE will be cleared when weight is removed.

SW3-1- PRINTER

ON- When using the “029” card punch or a source record punch.

OFF- When using Models 135, 500, 510, and 8805.

SW3-2- PRINT TARE

ON- TARE weight will be printed by the printer.

OFF- TARE weight will NOT be printed.

SW3-3- PRINT NET

ON- NET weight will be printed by the printer.

OFF- NET weight will NOT be printed.

SW3-4- PRINT AVERAGE PIECE WEIGHT

ON - AVERAGE PIECE weight will be printed by the printer.

OFF - AVERAGE PIECE weight will not be printed.

SW4-1- ONE FIELD

ON- The print button must be depressed for each line of data to be printed.

OFF- Pressing the print button once will cause all selected data to be printed.

SW4-2- CAPACITY SAMPLE

ON- Maximum capacity of the Sample Scale is 10,000 increments.

OFF- The maximum capacity is 8,000 increments, as used with the 80 lb. X .01 scale.

SW4-3- CAPACITY GROSS

ON- Maximum capacity of the Gross Scale is 10,000 increments.

OFF- The maximum capacity is 8,000 increments, as used with the 80 lb. X .01 scale.

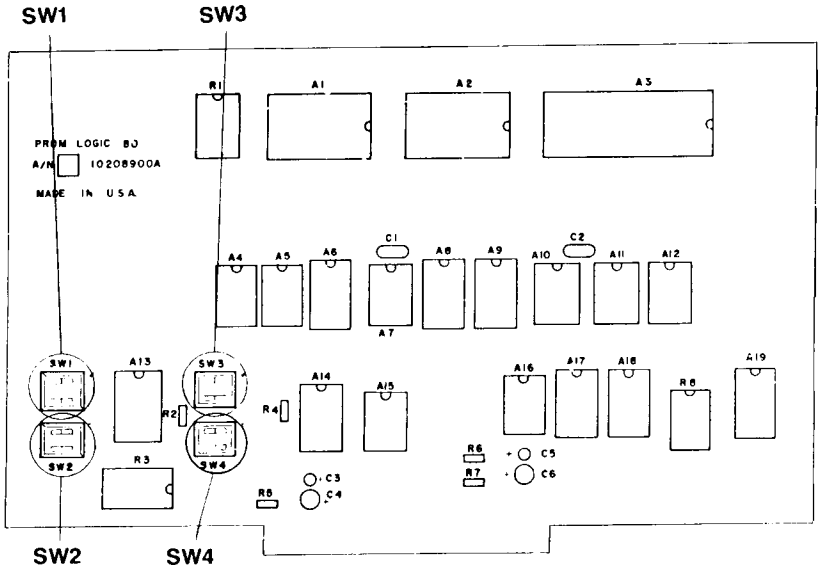
SW4-4- PRINT GROSS

ON- GROSS weight will be printed by the printer.

OFF- GROSS weight will NOT be printed.

5.6 PCB: E-PROM 80

PART NO.: 102089 00A



SW1-1- PRINT GROSS

ON- GROSS weight will be printed by the printer.

OFF- GROSS weight will NOT be printed.

SW1-2- CAPACITY SAMPLE

ON- Maximum capacity of the Sample Scale is 10,000 increments.

OFF- The maximum capacity is 8,000 increments as used with the 80 lb. X .01 scale.

SW1-3- CAPACITY GROSS

ON- Maximum capacity of the Gross Scale is 10,000 increments.

OFF- The maximum capacity is 8,000 increments as use switch the 80 lb. X .01 scale.

SW1-4- ONE FIELD

ON- when using printers without paper advance and when using these models the print button must be depressed for each line of data to printed.

OFF- For models with paper advancement and when using these models pressing the print button once will cause all selected data to be printed.

SW2-1 KEYBOARD

ON- Fixed sample keyboard.

OFF- Variable sample keyboard.

SW2-2- TARE

ON- The TARE key is not active and has no effect.

OFF- The TARE key is active and it must be used before a calculation can be made.

SW2-3- ADD BACK (SHIP)

ON- The 8180 is in the Ship mode, the count will NOT include the number of parts on the sample scale.

OFF- The 8180 is in the Ship mode, the count WILL include the number of parts on the sample scale.

SW2-4- AUTO CLEAR

ON- TARE weight and AVERAGE PIECE Weight will be retained for repeated countings of identical parts. This is only used when the 8180 is in Ship mode.

OFF- Only AVERAGE PIECE Weight will be retained, TARE will be cleared when weight is removed.

SW3-1- PRINTER

ON- When using the “029” card punch or a source record punch.

OFF- When using Models 135, 500, 510 and 8805.

SW3-2 PRINT NET

ON- NET weight WILL be printed by the printer.

OFF- NET weight will NOT be printed.

SW3-3- PRINT TARE

ON- TARE weight WILL be printer by the printer.

OFF- TARE weight will NOT be printed.

SW3-4- PRINT AVERAGE PIECE WEIGHT

ON- AVERAGE PIECE Weight WILL be printed by the printer.

OFF- AVERAGE PIECE Weight will NOT be printed.

SW4-1- PRINTER

ON- 500 Printer.

OFF- 510 or 8805 Printer.

SW4-2- AUTO PRINT

ON- The print button must be depressed to start a print cycle.

OFF- A print cycle will automatically start after a count has been calculated.

SW4-3- ADD BACK (RECEIVE)

ON- The 8189 is in the RECEIVE mode the count will NOT include the number of parts on the sample scale.

OFF- The 8189 is in the RECEIVE mode the count WILL include the number of parts on the sample scale.

SW4-4 INSUFFICIENT SAMPLE

ON- A parts count calculation will be displayed even when the Insufficient Sample Weight lamp is ON.

OFF- No parts count calculation will be displayed when the Insufficient Sample weight lamp is ON.

6. INSTALLATION INSTRUCTIONS

6.1 PRELIMINARY CALCULATIONS

Before any work is done, it should be determined if the load cell (s) are of a size that will work correctly with the instrument and platform. If it is a standard build, go ahead and install the scale. However, if it is a special build or if it is a conversion of an existing mechanical scale, it should be checked out.

Figure out the microvolts per increment, then check it with the chart to make sure the proposed load cell (s) are the correct size.

HOW TO FIND MICRO VOLTS PER INCREMENTS

FIRST FIND:

1. Scale capacity
2. Increment size*
3. Number of load cells or total lever ration
4. Size of load cell (s)*
5. Cell output rating in MV/V- millivolts per volt of excitation.

* In LBS or KG depending on how the scale is to be calibrated and used.

THEN:

1. Divide the scale capacity by the increment size to get the number of increments.

2. Multiply the cell size by the number of cells or the lever ration (depending on they type of scale). This will be the overall scale capacity (disregarding initial at this time).

3. Divide the overall scale cap by the increment size. This will be the overall number of increments.

4. Multiply the cell output rating * by 15 volts . (15 volts is the 8189 excitation voltage). This will be the output of the cell(s) in millivolts at full load.

5. Multiply cell output in millivolts by 1,000 to get cell output in microvolts.

6. Divide cell output in microvolts by the overall number of increments to get microvolts per increment.

NOTE: * Load cells built by Toledo are 2MV/V. Load cells built by others are usually 2 MV/V or 3 MV/V.

MICROVOLTS PER INCREMENT

NUMBER OF INCREMENT	MIN.	MAX.
10,000	0.8	3
8,000	1.0	3.75

EXAMPLE # 1

Model 2184

Scale Capacity in LBS.....500 LBS
Increment Size in LBS.....05 LBS
Lever Ratio.....8.1 to 1
Size of Cell in LBS.....100 LBS
Cell Output Rating.....2MV/V

STEP 1 - 500 LBS scale capaity - .05 LBS increments
500 ÷ .05 = 10,000 increments

STEP 2- 8.1 lever ratio - 100 LB load cell
8.1 X 100 = 810 LBS overall scale capacity.

STEP 3- 810 LBS ovary scale capacity -.05 LB increments
810 ÷ .05 = 16,200 overall number of increments

STEP 4- 2MV/V cell output rating
2MV/V X 15 = 30 millivolts cell output at full capacity

STEP 5- 30 MV/V X 1,000 = 30,000 millivolts at full capacity

STEP 6- 30,000 ÷16,2000 = 300 ÷162 = 1.87 microvolts per increment

1.87 is between .8 and 3 uV therefore, it will be a satisfactory build.

EXAMPLE # 2

Model 3185
Scale Capacity.....50 LBS
Increment Size.....005
Number of Cells.....1
Size of Cells.....100 LBS
Cell Output.....2MV/V

STEP 1- 50 LBS scale capacity - .005
increments 50 ÷.005 = 10,000 increments
]
STEP 2- 1 load cell - 100 LB load ell
1 X 100 = 100 LBS overall scale capacity.

STEP 3- 100 LBS overall scale capacity -.005 LBS increments 100 ÷.005 = 20,000 overall number of increments.

STEP 4- 2MV cell output rating
2MV/V X 15 - 30 millivolts cell output at full capacity

STEP 5- 30 MVP X 1,000 = 30,000 microvolts at full capacity

STEP 6- 30,000 ÷ 20,000 = 1.5 Uv/ increment

1.5 between .8 and 3 uV therefore, it will be a satisfactory build.

6.2 SET-UP PROCEDURE

6.2.1 Before any work is stared, determine what scale capacity, graduation size and printer options were purchased by the customer. The sales contract should be referred to for this information.

6.2.2 Program decimal point and increment size on A/D PCB.

6.2.3 Select scale capacity, operator options, and printer options on the ROM PCB. (SW1 and SW2 must be ON).

6.2.4 Set all switches on the Pre-Amp PCB to the OFF position.

6.2.5 Set the Auto Zero switch on the power supply panel, to the OFF position.

6.2.6 Connect the scales to the load cell connectors, J1 for the gross scale, and J2 for the sample scale.

6.2.7 If a printer is used connect it to J3 connector.

6.2.8 Apply power.

6.2.9 Press the pushbutton marked "WGHT CNT" to select the GROSS scale. The button will light indicating the gross scale has been selected.

6.2.10 Adjust the GROSS scale to zero with switches SW2-1 through Sw2-5.
With all switches OFF, try turning them ON, one at a time, beginning with SW2-1. If it takes the indication below zero, turn it OFF and go to the next switch. Try turning SW2-2 through SW2-5 ON, one at a time, only leaving the switches ON that do not take the indication below zero. Make the final initial adjustment with the fine initial potentiometer. Scale # 1 Zero.

6.2.11 Press the pushbutton marked "SMPL WGHT" to select the sample scale. The button will light indicating the sample scale has been selected.

6.2.12 Adjust the sample scale to zero with switches SW3-1 through SW3-5.

With all switches OFF, try turning them ON, one at a time, beginning with SW3-1. If it takes the indication below zero, turn it OFF and go to the next switch. try turning SW3-2 through SW3-5 ON, one at a time, only leaving the switches ON that do not take the

indication below zero. Make the final initial adjustment with the fine initial potentiometer. Scale # 2 Zero.

6.2.13 Press the “WGHT CNT” pushbutton to select the GROSS scale.

6.2.14 Adjust the GROSS scale span using SW1 and Scale # 1 Span.

Start with all of SW1 switches in the OFF position and the indication reading zero. Place test weights on the platform or set simulator to the desired step, about 10% of scale capacity. Try turning SW1-1 ON. If the indication is less than the correct weight, turn that switch OFF and go to the next switch. Turning ON this switch will have 1/2 the effect of the previous switch. Continue turning ON the switches one at a time, leaving the switches ON that do not make the indication read less than the correct amount. Make the final span adjustment with span switches and Scale #1 span potentiometer using test weights as the ultimate reference.

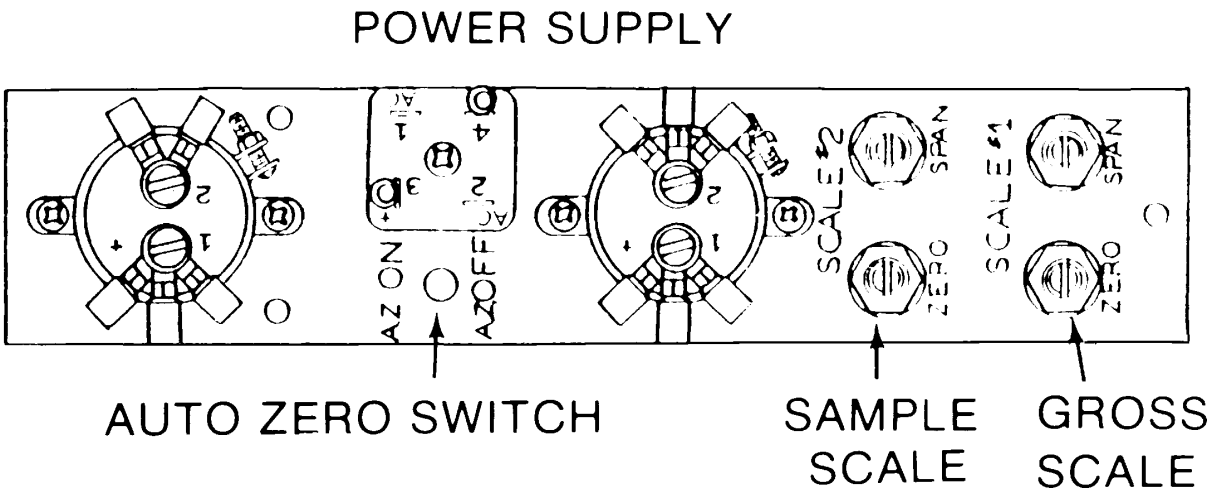
6.2.15 Press the “SAMPLE WGHT” pushbutton to select the sample scale.

6.2.16 Adjust the sample scale span suing SW4 and Scale #2 span.

Start with all of SW4 switches in the OFF position and the indication reading zero. Place test weights on the platform or set simulator to the desired step, about 10% of scale capacity. Try turning SW4-1 ON. If the indication is less than the correct weight, turn that switch OFF and go to the next switch. turning ON this switch will have 1/2 the effect of the previous switch. Continue turning ON the switches one at a time, leaving the switches ON that do not make the indication read less than the correct amount. Make the final span adjustment with span switches an Scale # 2 span potentiometer using test weights as the ultimate reference.

The set-up procedure is written for the pre-amp of the second design. The procedure for the original pre-amp design is the same except SW1 and SW2 are reversed and the initial switches on the original pre-amp were made-up with four (4) steps and the newer design has five (5). The newer pre-amps have a greater range of initial adjustment and may work where the older units would not.

NOTE: The operation of the span pots is not always linear and in some case may have an opposite effect near the center of travel of the control



7. CONNECTOR TABLES

All signals are TTL logic level (0 + 5 volts), "+true" means signal is at +5 volts when "on" or "true", "-true" means signal is at 0 volts when "on" or "true".

7.1 OUTPUT CONNECTOR- J3

Connector & Pin	Signal Name	True (+ or -)	Description
J3-1	ROM 0-2,	+	Input Control for PROM unit
J3-2	RAM 0-15,	+	Address digit 3, Addo -X-500
J3-4	D-3	+	5 VDC Power Supply
J3-5	B-4	+	Address digit 4 - SRP & 029
J3-6	Print Ack.	-	Acknowledges Print Command
J3-8	+5		5 VDC Power Supply
J3-9	ROM 0-4 RAM 0-15	+	Input Control for PROM unit
J3-10	Logic Common		Ground Return

J3-11	Print Command	-	Print Command
J3-12	Sync	-	Ready to Print
J3-13	D-4	+	Address digit 4, Addo-X-500
J3-15	Printer Connected	-	Printer Accessory
J3-16	B-8	+	Address digit 8 SRP -029
J3-17	Hold	-	Acknowledges Sync Received
J3-18	Printer Clock	-	Advance digit counter - 500 Printer
J3-19	External Reset	-	Reset digit counter - 500 Printer
J3-26	Data 8	+	Data output 8 bit
J3-27	Data 4	+	Data output 4 bit
J3-28	D-1	+	Address digit 1, Addo-X-500
J3-29	D-5	+	Address digit 5, Addo-X-500
J3-31	B-1	+	Address digit 1, SRP - 029
J3-32	B-16	+	Address digit, 16, SRP - 029
J3-33	Data 2	+	Data output 2 bit
J3-34	Data 1	+	Data output 1 bit
J3-37	ROM 0-1 RAM 0-15	+	Input Control PROM unit
J3-38	ODD Parity	+	Data Output Parity Bit

Connector & Pin	Signal Name	True (+ or -)	Description
J3-39	D-2	+	Address digit 2, Addo-X-500
J3-40	D-6	+	Address digit 6, Addo-X-500
J3-42	B-2	+	Address digit 2 SRP - 029
J3-43	Print Complete	-	Input-Print Complete Signal

7.2 CONNECTOR (GROSS SCALE)

	Signal
J1-A	+Load Cell Output
J1-B	- Load Cell Output

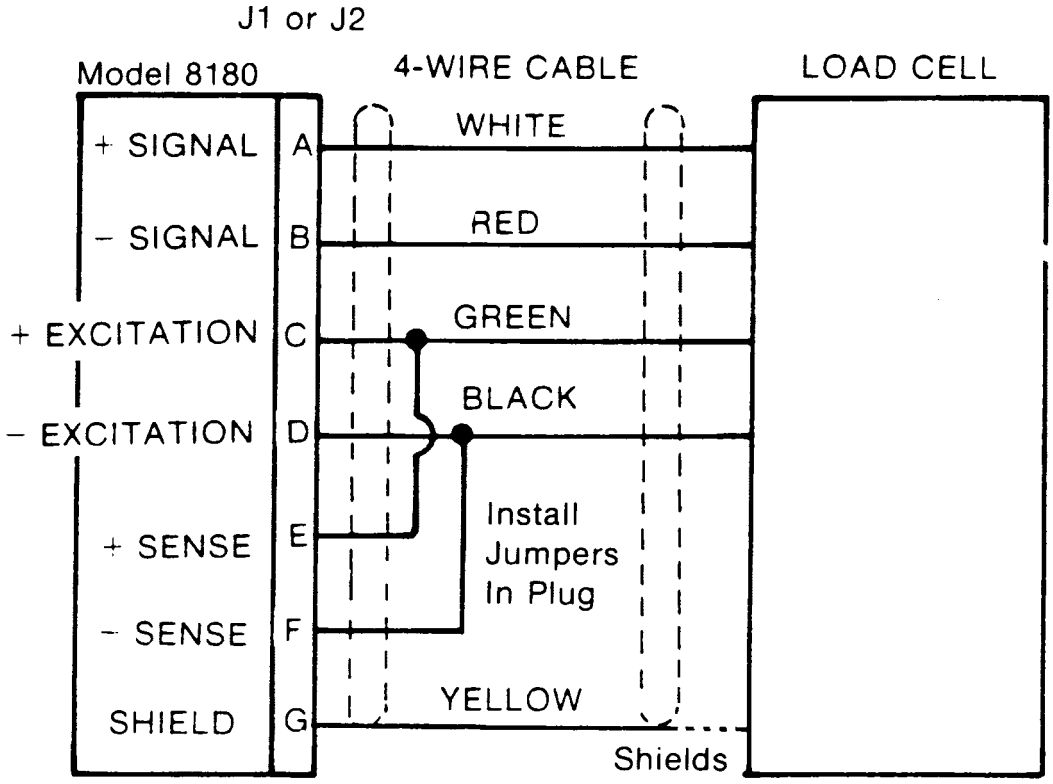
J1-C	+ Gated Power Supply
J1-D	--Gated Power Supply
J1-E	+Remote Sense
J1-F	-Remote Sense
J1-G	Shield Gnd

7.3 CONNECTOR (SAMPLE SCALE)

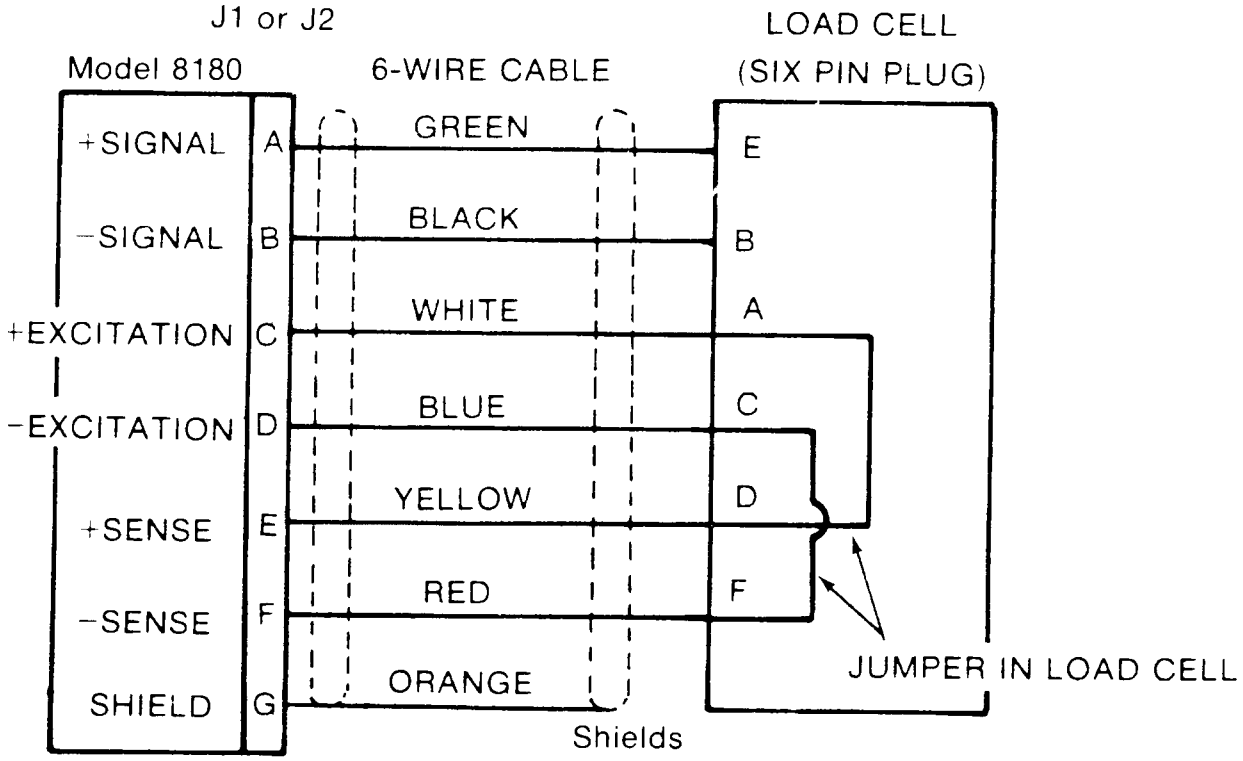
	Signal
J2-A	+Load Cell Output
J2-B	-Load Cell Output
J2-C	+Gated Power Supply
J2-D	-Gated Power Supply
J2-E	+Remote Sense
J2-F	-Remote Sense
J2-G	Shield Gnd

7.4 TYPICAL LOAD CELL WIRING CONNECTIONS

This Arrangement is Typical for a Single Load Cell System Connected Directly To The Model 8180 (No Junction Box).



1) SINGLE 4 WIRE CELL CONNECTED DIRECTLY TO INSTRUMENT



2) SINGLE 6 WIRE CELL CONNECTED DIRECTLY TO INSTRUMENT.

NOTE: For junction box wiring connections for scales with multiple load cells, see the Technical Manual for that scale model.

8. PARTS REPLACEMENT

8.2 TROUBLESHOOTING

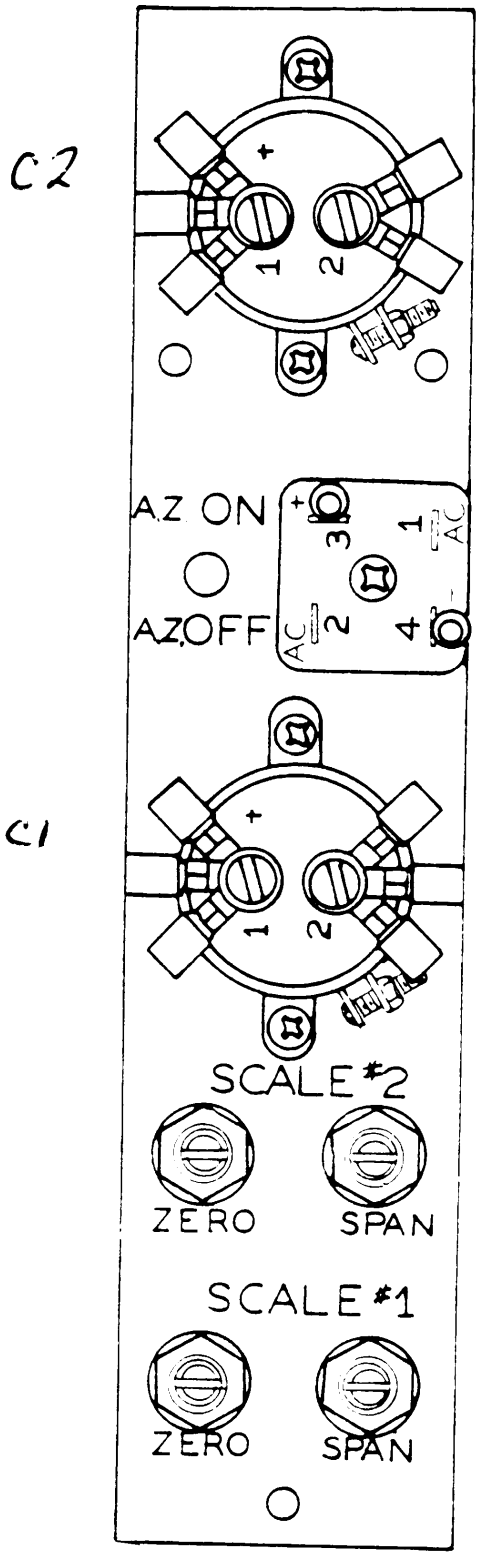
If operational difficulties are being encountered,, obtain as much information as possible regarding the particular trouble being experienced with the equipment, possibly eliminating a lengthy, detailed checkout procedure.

Check fuses, primary power line for external circuit elements and related wiring for possible defects. Failures and malfunctions often can be traced to simple causes such as loose or improper circuit or supply load connections or fuse failure.

Use the electrical diagrams as an aid to locating trouble causes. These diagrams contain various circuit voltages that are the average for normal operation. Measure these voltages using the diagrams. Use measuring instrument probes carefully to avoid causing short circuits and damaging circuit components.

Due to the complexity of the instrument, malfunctions in the 8180 are best located by substitution. A printed circuit board or subassembly believed to be defective, may be checked by replacing it with a like item, known to be good, and then observing whether the problem is corrected. To be doubly sure, the suspected part can be re-installed in the instrument and if the problem now re-appears, it is certain the assembly is at fault.

Exchange PCB's, or sub-assemblies are available from the factory. These assemblies are repaired and tested at the factory where the instrument was built.

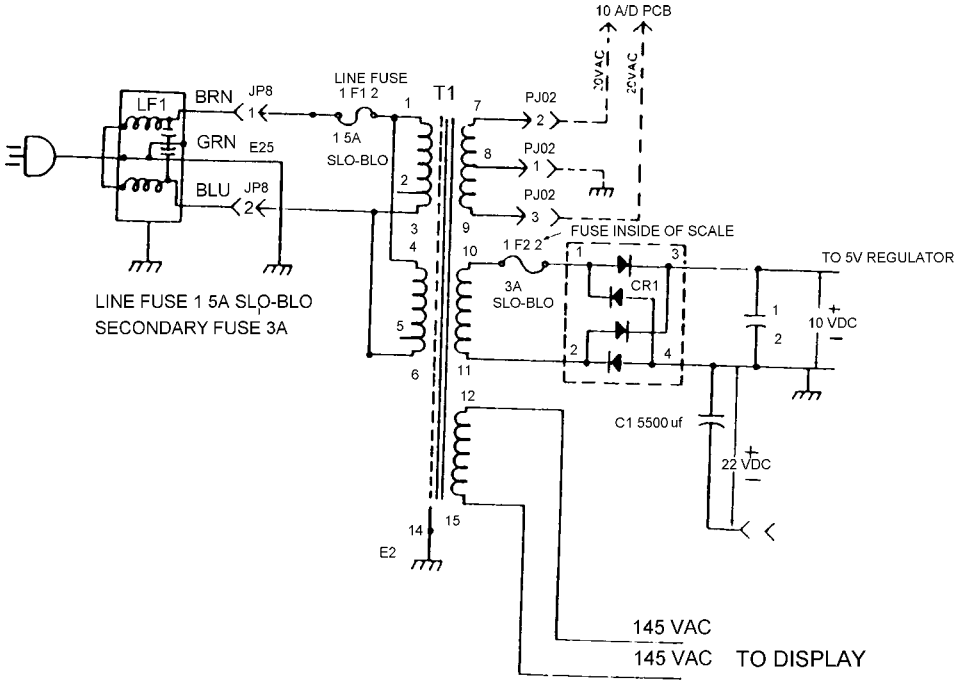


10 VOLTS DC

22 VOLTS DC

Observe polarity markings on capacitors.

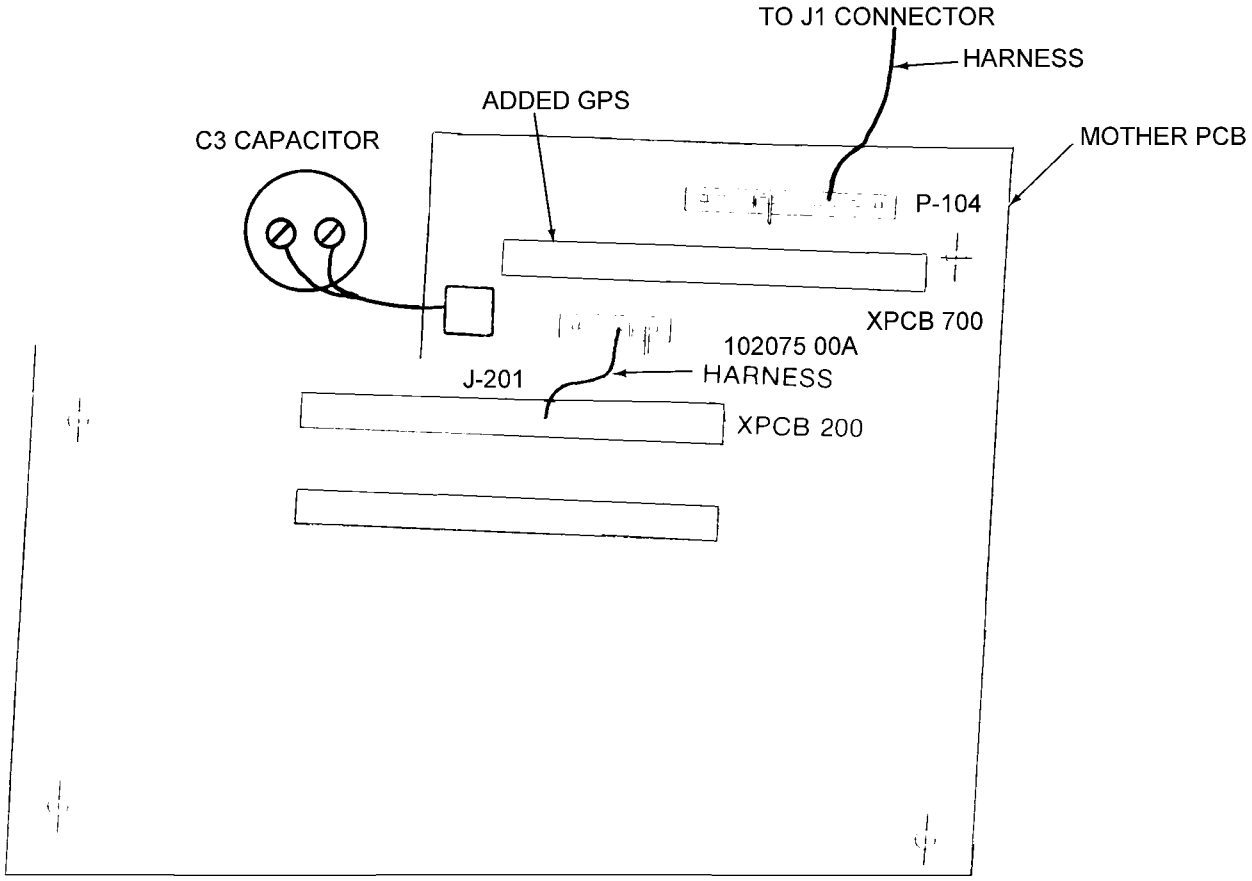
Voltages are for a line voltage of 120 VAC.



8.2 MULTIPLE LOAD CELL CIRCUITRY

When the 8180 wall mount Ram 7 or Ram 8 is connected to a scale platform, with 4 load cells, the instrument will be equipped with an added on gated power supply and a 5500 ufd filter capacitor. This is done because of the greater load of the added load cells.

The gated power supply on the preamp PCB can not supply enough current for more than 2 load cells.



HOW TO ADD GATED POWER SUPPLY TO 8180 WALL MOUNT.

1. Install (1) gated power supply board, E 102355 00A, to 44 pin connector located on mother board. 44 pin connector is designated as XPCB700.

2. Install (1) retainer 098837 00A, using (1) PH, washer HD screw #8-32 x 3/8 R01750 130 to hex stud mounted on mother board to hold down G.P.S.

3. Remove PJ201 from XPCB 200 and install at P104 of mother board.

4. Install P105 (Load Cell Output Harness) 102075 00A; from mother board to J201 (Preamp 80 PCB).

8.3 RECOMMENDED LIST OF SPARE PARTS

QTY.	DESCRIPTION	PART NUMBER
1	Preamp PCB	099324 00A
1	A/D 80 PCB	A099326 00A
1	Logic 80 Rom PCB	099328 00A
1	I/O 80 PCB	099332 00A
1	Display PCB	099334 00A
1	Transistor	097521 00A
1	Lamp	095096 00A
1	Keyboard Assembly:	
	Fixed Sample	099349 00A

	Variable Sample	099350 00A
1	Power Supply:	
	Desk Top Model	099346 00A
	Wall Mount Model	099391 00A
5	Fuse, 3A	095957 00A
1	Simulator, Load Cell - Tool	085547 00A
5	Fuse, 1.5A S.B.	P00330 020
As Req.	6 Conductor Load Cell Cable (Specify Length)	086987 00A

8.4 EXTERNAL MATING CONNECTORS

QTY.	DESCRIPTION	PART NUMBER
1	Load Cell Connector	094048 00A
1	Load Cell Connector Clamp	094049 00A
1	Output Connector - 50 Pin (Printer)	P00719 020

In addition to these items, it is also recommended that a parts catalog also be ordered so that items not listed above may be properly identified for correct and prompt delivery.

The Parts catalog number is PC 008180 I01.