3200

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:

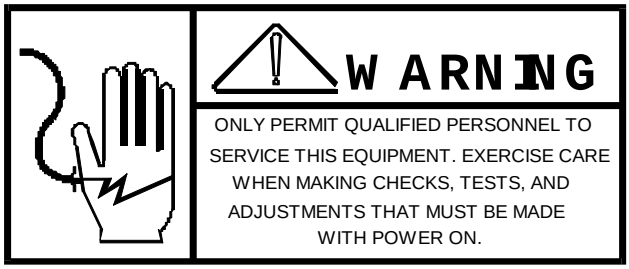
METTLER TOLEDO
Training Center
P.O. Box 1705
Columbus, Ohio 43216
(614) 438-4400

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.

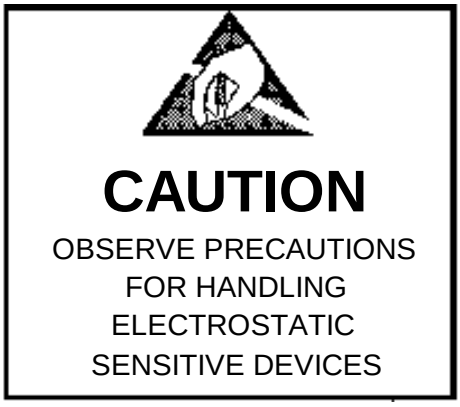
- **ALWAYS** take proper precautions when handling static sensitive devices.



- **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.

300 STRAIGHT WEIGH
FACTORY NUMBER
CONFIGURATION

FACTORY NUMBER	CAPACITY	COMMODITY EQUIPMENT
3200-0002 3200-0003 3200-0004	5 lb x 0.001 lb/2.5 kg x 0.0005 kg 10 lb x 0.002 lb/5 kg x 0.001 kg 20 lb x 0.005 lb/10 kg x 0.002 kg 30 lb x 0.01 lb/15 kg x 0.005 kg	8-1/2" x 8-1/2" Platter 8-1/2" x 8-1/2" Platter 12" x 10" Platter 12" x 10" Platter

3200 PARTS COUNTING
FACTORY NUMBER
CONFIGURATION

FACTORY NUMBER	CAPACITY	COMMODITY EQUIPMENT
3200-0005 3200-0006 3200-0007	5 lb x 0.001 lb/2.5 kg x 0.0005 kg 10 lb x 0.002 lb/5 kg x 0.001 kg 20 lb x 0.005 lb/10 kg x 0.002 kg 30 lb x 0.01 lb/15 kg x 0.005 kg	8-1/2" x 8-1/2" Platter 8-1/2" x 8-1/2 Platter 12" x 10" Platter 12" x 10" Platter

1. GENERAL DESCRIPTION

The Toledo Model 3200 is a light capacity electronic scale. The self contained industrial scale provides a visual digital readout for the operator and has 100% tare capability. Data output for printers is provided.

2. SYSTEM DESCRIPTION

Toledo Model 3200 industrial Scale uses the Toledo 5 flexure platter support system with a General Purpose load cell.

Model 3200 uses Toledo's "gated power supply" technique to provide zero stability with temperature, and a multislope, self compensating, A/D converter with precision thin film resistors to provide span stability with temperature. An active linear filter circuit reduces effects of vibration on the scale mounting surface. A/D logic counting functions are controlled by a microprocessor, which also provides additional data filtering, tare storage and net weight calculation, lb/kg, conversion, auto-zero maintenance, and weight in motion detection.

Weight display is via six digits of 7 segment vacuum fluorescent. A keyboard provides pushbutton zero, as well as pushbutton and keyboard tare entry provisions.

3. SPECIFICATIONS

3.1 ELECTRICAL & PHYSICAL

3.1.1 Physical Construction
Die cast aluminum base. Molded plastic cover. Overall 16" L x 13" W x 7" H. Weight 16 lb.

3.1.2 Power Requirements
120, 220 or 240 VAC ±10%, 50/60 Hz; single phase; 0.25 amperes.

3.1.3 Digital Display
Six digits including minus sign, seven segment vacuum fluorescent --0.55 inches high.

3.1.4 Lighted Legends
Six lighted spots adjacent to printed legend are available.

3.1.5 Level Indicator
a spirit level at the base of the scale provides a level reference.

3.2 INTERNAL FUNCTIONS

3.2.1 Display Messages or Signals

a). Weight greater than 5 increments over capacity blanks weight display.

b). Under zero display reads true negative numbers with minus sign. Blanks at about 5% under with minus sign ON.

c). Display blinks on power up until the scale is zeroed.

d). Alternate action of the 'C' key displays all segments and legends ON or all OFF.

3.2.2 Motion Detection

Zero, tare and printing functions are inhibited whenever motion is detected.

3.2.3 Automatic Zero Maintenance
Weight variations within ±0.2 increments per second are compensated to zero. compensation range is ± 2% of capacity from true zero (as calibrated) or a total of 4% capacity.

3.2.4 Resolution
Display

One Part in 5,000	5 LB/2.5 KG
One Part in 5,000	10 LB/5 KG
One Part in 4,000	20 LB/10 KG
One Part in 3.000	30 LB/15 KG

Internal
Weight is 80 minor increments for each displayed increment. weight is rounded to nearest increment. Internal calculations use minor increments.

3.2.5 Pushbutton Zero
When the weight displayed is within the zero correction range and no motion is present, pressing the 'Z' key will cause the weight display to be zero.

The range of this correction is ± 2% of scale capacity.

3.2.6 Tare
Platform tare and keyboard entered tare may be used at any time unless tare interlock is selected.

3.2.7 Data Output
Data output is via 20 ma current loop (source by scale) ASCII code, 300 baud, even parity. Data output occurs when the 'Print' key is pressed.

3.2.8 Keyboard Entry Time Out
When using the keyboard to enter tare, sample size or average piece weight the data entered will appear on display immediately. You will then have three seconds after the last numerical entry to depress the function key. If you do not enter the function in time, the data will clear from the display. To correct, just enter the data again and select the function desired within three seconds.

3.3 EXTERNAL CONTROLS

3.3.1 Display Switch
The display switch is located under the scale on the right side near the fuseholder. This switch is on a signal line to the microprocessor which is held at 5 VDC by a pull-up resistor when the switch is open. In this open position the display is OFF. Closing the display switch brings the signal to ground and the display is then turned ON.

CAUTION: WHEN THE LINE CORD IS PLUGGED INTO A POWER SOURCE, THE LINE VOLTAGE IS PRESENT AND THE SCALE IS ON. TO SERVICE THE UNIT, UNPLUG THE LINE CORD AND OBSERVE SAFETY PRECAUTIONS.

3.3.2 Keyboard Function Keys and LED's
PARTS COUNTING

a). C or Clear
Used to erase last data and reset scale to accept new information. Reverts to gross weight on display and appropriate LED is flashing to prompt next operator action.

b). Z or Zero
Used to zero the scale platform weight.

c). Calib
Used to automatically calibrate the scale. (See section 4).

d). lb/kg
Print lb/kg selection is available only at zero and is indicated by appropriate LED. Print command is active only after count has been obtained.

e). Sample /APW
Sample or Average Piece Weight mode is selectable only at ZERO and is indicated by a LED. Up scale, the key is used to enter a keyboard data. When the count is displayed, pressing the key will switch the display to APW, pressing again will switch the display to NET., pressing again will return the display to COUNT. LED's will indicate if the display is COUNT or APW or NET. It must display count to allow printing.

f). Tare
Used to enter keyboard tare or tare platform weight to ZERO. LED, when flashing, indicates that tare is the next operator function. when LED is ON steady, tare has been taken. When LED is OFF, tare is not taken and cannot be taken.

STRAIGHT WEIGH

a). C or Clear
Used to erase last data and reset scale to accept new information. Returns scale to gross weight on display.

b). Z or Zero
Used to zero the scale platform weight.

c). Calib
Used to automatically calibrate the scale. (See Section 4).

d). Print
Will initiate the print command.

e). lb/kg
Will select lb/kg as indicated by LED at any time when SW2-4 is ON.

f). Tare
Will enter keyboard or platform tare. See also SW2-5, Section 4.4. During keyboard entry, the tare LED will be on. When tare is entered, the net LED will remain on while a tare is in use.

4. INSTALLATION INSTRUCTIONS

4.1 SET UP PROCEDURE

4.1.1 Unpack the scale and inspect for visual damage.

4.1.2 Lower the red shipping screw located beneath the scale, and install the platter.

4.1.3 Level the scale.

4.1.4 Apply power.

4.2 CALIBRATION

4.2.1 Auto Calibration

This feature is used to allow calibration of the scale without removing the top cover and is mostly for the convenience of the customer. This feature will operate on power up only. (NOTE: In order to use this function, SW1-4 must be OFF for a parts counter or ON for a straight weigh scale.)

a). Having applied power to the 3200, depress the 'Z" key, the display should read zero.

b). Press the 'Calib' key.

c). The display should read '--CALI--'.

d). Place a 5 lb test weight (2 kg for metric configurations) on the center of the platter.

e). Press the 'Calib' key and the indication should read 5.000 lb.

f). Remove test weight and scale is ready for use.

g). Set program switches as needed for customer application (see Program Switch Summary section for information).

NOTE: The correction range of this feature is limited to ±.2% of the test load (±.01 lb or ±4 grams).

4.2.2 Manual Calibration

a). Remove the platter, remove the sealing clip and screw at the center top the bezel keyboard assembly. The bottom edge is held by two clips. Grasp the top of the bezel and lift one half inch toward you, then slide the bezel up toward the top of the scale to disengage the clips. Replace the platter.

b). Check setting of capacity switches on SW2.

c). Adjust zero with the initial potentiometer (R-19) until display stops blinking and reads zero.

d). Place test weights up to full capacity on center of platter.

e). Adjust span potentiometer (R-20) until display shows the amount of test weight applied.

f). Remove the test weights, the display should read close to zero. Repeat steps c thru e until no further adjustments are required.

NOTE: If the display does not return to zero, do not use the zero pushbutton to obtain the zero, use the zero potentiometer (R-19).

g). Set program switches as needed for customer application (see Program Switch Summary section for information).

h). Remove the platter, replace the bezel and keyboard assembly and re-install the platter. scale should now be calibrated.

4.2.3 Shift Test

Place weight equal to half the capacity of the scale in the center of the platter and note the indication. Place half capacity at A, B, C, and D in turn. (Figure 1). The indications should not vary more than one increment from each other in the normal mode of operation.

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

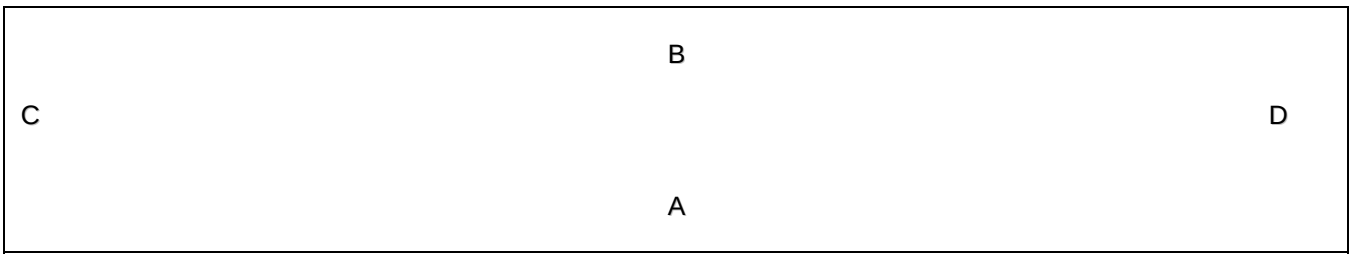


FIG. 1

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 setting switch SW1-1 to the 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 (within 80 minor increments), by fine adjustment of differential Screws "A" and "B" on adjustment bars, after loosening lock nuts, Figure 2.

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 C is less than D, turn screw "B" clockwise.

If position C is more than D, turn screw "B" counterclockwise.

d). If shift has been adjusted, recalibration is necessary. Repeat Section 4-2.

4.3 PROGRAM SWITCH SUMMARY -- PARTS COUNTING

4.3.1 SW 1-1 Expand
When this switch is ON. the display will expand each displayed increment eighty times. Therefore, the full scale readings would be as follows:

Full Load Normal Display	Full Load Expanded display
5 lb	400,000
10 lb	400,000
20 lb	320,000
30 lb	240,000

This is used only for manual calibration purposes. In normal use this switch must be OFF>

4.3.2 SW1-2 Initial
If the large platter (12" x 10") is used, then the switch is ON. If the small platter (8-1/2" x 8 1/2") or scoop is used, then the switch is OFF.

4.3.3 SW1-3 Sample Size
When this switch is ON, the minimum sample weight required is one-half (0.5) increment. When OFF< the sample must be ten (10) increments.

4.3.4 SW1-4 Calibrate Disable
When this switch is ON, the 'Calib' key will not operate. When this switch is OFF, the 'Calib' key will work only at initial power up.

4.3.5 SW2-1 Not Used

4.3.6 SW2-2 Capacity Select

4.3.7 SW2-3 Capacity Select

Fac. No.	SW1-1	SW2-3	RESULT
5	ON	ON	5 lb x 0.001 or 2.5 kg x 0.0005
6	OFF	ON	10 lb x 0.002 or 5 kg x 0.001
7	ON	OFF	20 LB X 0.005 OR 10 KG X 0.002
	OFF	OFF	30 LB X 0.01 OR 15 KG X 0.005

4.3.8 SW2-4 lb/kg
When this switch is ON, lb/kg switching may be done by keyboard entry when the scale is at zero. When this switch is OFF, only kg can be used.

4.3.9 SW2-5 Tare Inhibit
When this switch is ON, no tare may be taken.
When this switch is OFF, tare is required.

4.3.10 SW2-6 Auto Clear Enable
When this switch is ON, the scale will clear all data when the platform returns to zero. When this switch is OFF, the data is kept for further use and the 'C' key must be used before entering new sample or average piece weight.

4.3.11 SW2-7 Print Format

4.3.12 SW2-8 Print Format

SW2-7	SW2-8	RESULT
OFF	OFF	Single Width Count
ON	OFF	Double Width Count
OFF	ON	1 line, WT -APW - COUNT
ON	ON	3 lines, WT - APW - COUNT

4.3.13 SW2-9 Not Used

4.3.14 Comma
A jumper at this position will provide a comma in the display instead of a decimal point. It does not change the printed data.

4.4 PROGRAM SWITCH SUMMARY --STRAIGHT WEIGH

4.4.1 SW1-1 Expand
When this switch is ON, the count is by ten times. This is used only for manual calibration purposes. In normal use this switch must be OFF.

4.4.2 SW1-2 Initial
If the large platter (12" x 10") is used, then the switch is ON. If the small platter (8-1/2" x 8-1/2") or scoop is used, then the switch is OFF.

4.4.3 SW1-3 Averaging Enable
When this switch is ON, eight successive readings will be added; then divided by eight and scale will update to new data.

4.4.4 SW1-4 Calibrate Enable
When this switch is ON, the 'Calib' key will work only at initial power up and calibrate. When this switch is OFF< the 'Calib' key will not function.

4.4.5 SW2-1 Not Used

4.4.6 SW2-2 Capacity Select

4.4.7 SW2-3 Capacity Select

4.4.8 W2-4 lb/kg
When this switch in ON, lb/kg switching may be done by keyboard entry at any time. When this switch is OFF, only kg will function.

4.4.9 SW2-5 Tare Interlock Enable
When this switch is ON, tare can be taken once only and to enter a different tare requires a CLEAR either from the keyboard or auto clear. Tare may either platform or keyboard tare. When this switch is OFF, tare may be taken at any time.

4.4.10 SW2-6 Auto Clear Enable
When this switch is ON, the scale will clear all data when the platform returns to zero providing that 10 or more weight increments above zero have been on the scale. When this switch is OFF, auto clear does not function.

4.4.11 SW2-7 Print Format

4.4.12 SW2-8 Print Format

SW2-7	SW2-8	RESULT
OFF	OFF	Single Width Display Print
ON	OFF	Double Width Display Print
OFF	ON	1 Line, Gross - Tare - Net
ON	ON	3 Lines, Gross - Tare - Net

4.4.13 SW2-9 Motion Track Enable
When this switch is ON, the display will continuously update. When OFF, the display will update with no motion signal (must be OFF when SW1-3 is ON).

4.5 PRINTER CONFIGURATIONS

The 3200 scale will interface to the Toledo 301, 307, 8805, 8806, 8810/20/30 and 8855 Printers. Refer to SW2-7 and SW2-8 for desired print configuration.

NOTE: SW2-7 ON and SW2-8 ON are not applicable with the 301, 307, 8810/20/30 printers as ONLY weight will be printed.

4.6 OPERATION INSTRUCTIONS

4.6.1 Parts Counting
Usual operation to count parts added to the scale or count up.

a). Zero the scale.

b). Take tare, if required.

c). Add sample to scale and enter sample count or average piece weight as needed.

d). Add balance of parts and count is displayed. Print if desired.

4.6.2 Operation to count parts removed from the scale or count down.

a). Zero the scale.

b). Place parts on the scale (with or without container).

c). Tare platform to zero.

d). Remove pieces until the display stops flashing and enter this count.

OR

Enter known average piece weight.

e). Remove number of pieces desired.

f). Tare may be taken after each batch is removed to allow count for next batch.

4.6.2 Straight Weigh

Usual weighing mode of operation is typical of Toledo weighing systems. Averaging mode of operation is peculiar to this scale. With SW 1-3 ON (Averaging Enable) the scale will take eight readings, average them, and update.

a). With SW2-9 ON (Motion Track Enable) and SW2-5 OFF (Tare Interlock Enable), the scale will wait for motion to cease, then start eight readings, average, and then update.

5. BATTERY OPTION

5.1 GENERAL DESCRIPTION

Three Model 3200 Battery Power Accessories are as follows:

5.1.1 Battery Power Pack.

5.1.2 Battery Power K.O.P. consisting of:

a). Battery Power Pack.

b). Battery Pack Mounting Assembly.

c). Internal Charger/Power Supply K.O.P.

5.1.3 Remote Battery Charger

After the addition of the service installed Battery Power K.O.P., scale operation, starting with a fully charged battery, can continue for a minimum of 8 hours. The input of 120, 220, or 240 VAC to the scale will operate the scale and/ or internally recharge the battery to 80% of full charge in 8 hours and to a full (100%) charge in 14-16 hours. The battery pack can also be removed from the scale and recharged with the remote battery charger accessory in the same time frame.

5.2 SPECIFICATIONS

5.2.1 Battery Power Pack (116176 00A)
Components/ Construction

The power pack assembly consists of a 12 VDC battery which is secured to a formed steel chassis and enclosed by a vacuum formed cover in which (2) LED battery status indicators are located. A quick disconnect scale connector is free hanging from the assembly.

Battery

a). Type - rechargeable, sealed, gelled electrolytic, lead dioxide battery.

b). Nom. output - 12 VDC.

c). Nom. capacity - 6.0 amp.-hr. (20 hr. rate at .3A to 10.5 VDC).

d). Service rating - frequent cycle.

e). Operating temperature range.
-60 C to + 60 C discharge
-20 C to 50 C charge

Battery Status Indicators
(2) LED's mounted on top of the vacuum formed cover are functional when power pack is attached to the scale or external charger.

a). Green LED - RUN
Lamp ON indicates battery has charged to 80% of capacity and scale can operate for minimum of 6 hours.

b). Red LED - Low Battery
Lamp ON indicates battery has insufficient terminal voltage to operate the scale with guaranteed display accuracy (display also blanks).

Attachment/Connections

a). A slide pad which is attached to the chassis bottom is retained by plastic guides and a spring clip on the battery pack mounting assembly.

b). A free hanging harness attached to the battery pack connects to the scale thru a harness included in the mounting assembly. The harness carries scale supply or battery charging voltages and the LED indicator voltages.

5.2.2 Battery Pack Mounting Assembly

a). Components/ Constructions
This assembly consists of (2) overlapping steel channels to which plastic extruded slide guides, a spring retainer and a wire harness are assembled for retaining the battery power pack and transmitting power supply voltages to and from each scale.

b). Attachment/Connections
This assembly mounts on the bottom and at the rear of the scale base using mounting bosses and hardware included in the scale build. The harness in the mounting assembly attaches to the internal scale harness at a chassis mounted connector in the base.

5.2.3 Internal Charger/ Power Supply PCB (114584 00A)

Components/Operation

This K.O.P. consists of a PCB, a bridge rectifier harness and a power supply harness. When these components are inserted in the existing power supply arrangement, 120,220, or 240 VAC line voltage input and /or 12 VDC battery voltage input will charge the attached battery. An attached battery pack's output voltage to the scale or input current from the charger is monitored on the PCB and appropriate "battery status" LED's on the power pack are turned on or off.

Input/Output for Charger/Power Supply

a). Transformer input to Charger/Power PCB - 10 VAC.

b). Charger/Power PCB output to display PCB - 12 VDC nominal.

c). Battery pack input to Charger/Power PCB - 12 VDC nominal.

d). Charger/Power PCB output to battery pack; 14 VDC max. w/full charge, 10.5 VDC min. to operate scale; 5 VDC to "low battery" LED when battery input is less than 10.5 VDC. 5 VDC to "Run" LED when battery current draw is 300 mA max. (line voltage must be supplied);

14.1 VDC and .1-1.2A to battery terminals.

5.2.4 Remote Battery Charger
The remote charger consists of the cover and chassis, the transformer power cord, battery connector and the charging/ power supply PCB.

Remote PCB is 116191 00A.
May use A114584 00A replacement.

5.3 INSTALLATION INSTRUCTIONS

Refer to figures 3.4, and 5.

5.3.1 With the scale mechanism in the "Locked Mode" and without a platter, invert the unit and install top battery mounting bracket & harness assembly A Securely and squarely to the scale sub plate or die casting with (4) 8-32 screws B.

5.3.2 Plug harness C into existing plug at D after routing the cable through the clamp E.

5.3.3 Adjust the leveling foot F to extend 1-1/8 in. form the inside surface of assembly A and tighten the jam nut securely (CAUTION: After step No. 4, foot must extend past bottom cover.).

5.3.4 Assemble bottom battery bracket cover (not shown) together with (4) 8-32 side mounting screws into the slots of A and tighten securely.

5.3.5 Turn scale up-right and remove front bezel & display PCB as shown.

5.3.6 Install charging/power supply PCB G by pressing onto (4) plastic standoffs mounted on the power supply chassis.

5.3.7 Install bridge rectifier assembly H onto threaded stud in above chassis and tighten securely with nut provided.

5.3.8 Uncoil (6 pin) battery connector harness I and (3 pin) on/off harness K from clamp J.

5.3.9 Attach single connector (48V) harness L, power supply harness M and harnesses H, I, K, to PCB G.

5.3.10 Transformer harness N now plugs into PCB G, 9 pin harness M takes N's place on the re-installed display PCB (not shown) and the keyboard GND P , printer harness R, & load cell harness S are reinstalled as usual.

5.3.11 Replace 1/4 AMP linefuse with 1/2 AMP fuse provided.

Suggestion: If you plan to remove the charger/inverter PCB, turn the mounting studs so that the locking tabs are to the front to the unit.

6. PREVENTIVE MAINTENANCE

The Model 3200 is designed to require a minimum of maintenance and service. This section provides instructions and procedures for the maintenance of this unit, as well as a troubleshooting guide to aid in problem analysis.

6.1 REQUIRED TOOLS AND SUPPLIES

The following items are recommended for maintenance and repair of the unit. Common hand tools are also required.

--Volt - Ohm Meter
--Load Cell simulator (P/N 100865 00A)
--Cleaning Cloth
--Static Control Bags
--Static Control Wrist Strap
--Static Control Work Station

6.2 MAINTENANCE SCHEDULE

The normal frequency at which maintenance (cleaning and inspection) should be performed is twice a year.

6.3 CLEANING

Clean the keyboard and cover with a soft, clean cloth that has been dampened with a mild window type cleaner. DO NOT USE ANY TYPE OF INDUSTRIAL SOLVENT. DOT NOT SPRAY CLEANER DIRECTLY ONTO THE UNIT.

6.4 TROUBLESHOOTING

The Model 3200 is designed to be serviced by identifying and replacing defective modules. The modules are the Keyboard Assembly, Main PCB, Prom PCB, Power Supply Assembly and the Load Cell.

Referring to Figure 6 for the location of the connections on the Main PCB, then use the information on Figure 7 to determine which module should be replaced.

CAUTION: Remove PROM PCB BEFORE either removing or replacing cover.

6.4.1 If operational difficulties are encountered, obtain as much information as possible regarding the particular problem as this may eliminate a lengthy, detailed checkout procedure.

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

6.4.3 Use the electrical interconnecting diagram as an aid in locating trouble causes. The diagram contains various voltage measurements that are average for normal operation. Use instrument probes carefully to avoid causing short circuits and damaging circuit components.

6.4.4 A printed circuit board believed to be defective may be checked by replacing it with a known good PCB and observing whether the problem is corrected. WHEN

HANDLING A PRINTED CIRCUIT BOARD, BE CERTAIN TO WEAR A STATIC CONTROL WRIST-STRAP AS WELL AS USING A STATIC CONTROL BAG FOR BOTH THE NEW AND DEFECTIVE BOARDS. When replacing a suspected faulty

PCB, do not program the replacement PCB form the original as the problem may be caused by a programming error. Use the proper Technical Manual to determine necessary switch jumper position.

6.4.5 To be certain that the problem is contained in the removed PCB, re-install the board and retest. This simple test will eliminate the possibility of having replaced a good PCB because of a loose or poor connection.

6.5 TESTING

6.5.1 LOAD CELL EXCITATION

This excitation voltage is gated on and off and therefore cannot be measured accurately with a voltmeter as they generally measure average voltage.

The voltage, when measured with a voltmeter, will be:

MAIN PCB

J-2 Pin 9 to Pin 7 =+3.7 VDC
J-2 Pin 1 to Pin 7 = - 3.7 VDC
J-2 Pin 1 to Pin 9 = +7.5 VDC

The raw supply voltages can be measured at the filter capacitors mounted on the Main PCB. These capacitors are labeled C54 and C53 and will read + VDC and -VDC respectively. The input voltage for these capacitors can be measured at P7 on the Main PCB if there is no battery option used or on P3 of the Charger- Inverter PCB if the battery option is used. The measured voltages are as follows:

P3/P7 Pin 7 to Pin 9 = 11 VAC
P3/P7 Pin 8 to Pin 9 = 11 VAC
P3/P7 Pin 7 to Pin 8 = 22 VAC

6.5.2 LOGIC SUPPLY VOLTAGES

A-C SUPPLY VOLTAGE	A-C VOLTAGE	REC. BRIDGE	FILTER CAPACITOR	REGULATOR	D-C VOLTAGE	TEST POINT	MAX. RIPPLE
J-3 Pin 2 & 3	10 VAC	CR4	C55	Q8	+5 VDC	C58	.1 VAC
J-3 Pin 7 &3	22 VAC	CR9	C54	Q6	+15 VDC	C49	.2 VAC
J-3 Pin 2 & 3	22 VAC	CR9	C53	Q5	-15 VDC	C48	.2 VAC
J-3 Pin 2 & 3	22 VAC	CR5 & 9	C57	--	+48 VDC	TP1	.4 VAC

6.53 TESTING THE 20 MILLIAMP CURRENT LOOP

The test must be performed at the printer end of the interconnecting cable with the cable connected to the 3200 but removed from the printer. Set the volt-ohm meter to read DC milliamps.

After determining which printer is being used, refer to the following chart by printer model number to determine where to connect the meter leads. After connecting meter leads to the proper cable pins, the meter should show from 18.0 to 40.0 milliamps. Depress the 'Print' key on the 3200 keyboard, and observe the meter reading. The reading should fluctuate to approximately half the original meter reading, then return to the original meter reading. This fluctuation indicates that information is being transmitted.

Printer Model Number	Place Red Lead On Pin No. (20 mA Receive =)	Place Black Lead On Pin No. (20 mA receive -)
301, 307 8805 8806/804 8855	1 26 16 3	7 28 18 22

NOTE: This test can not be done if a Model 8810, 8820, or 8830 printer is being used.

6.6 INPUT/OUTPUT CONNECTIONS

SERIAL OUTPUT INTERCONNECTING CABLES		
PRINTER	LENGTH	PART NUMBER
301/307 301/307	6' 20'	113951 00A 113962 00A
8805 8805	6' 20'	113961 00A 113952 00A
8806/8804 8806/8804	6' 20'	115180 00A 115181 00A
8855 8855	6' 20'	A114284 00A A114407 00A

SERIAL OUTPUT CONNECTIONS						
SIGNAL NAME	3200 J-6	301/307 J-9	8805 J-1	8806/8804 J-7	8810/20/30 J-25	8855 J-1

+20 mA	1	7	28		18	22
-20 mA COM	3 ┐			16	19	
Logic GND	4 ┘			18	NC	
Chassis GND	5	Shield	Shield	Shield	Shield	
+Supply	6	6	26		NC	3
					16 ┐	
					17 ┘	
		FIG, 8	FIG. 8	FIG. 9	FIG. 10	FIG. 8
				1 ┐		
				6 ┘		

' Jumper is in 3200 end of cable.
"Jumper is in printer end of cable.

6.7 SPARE PARTS LISTING

PART NUMBER	DESCRIPTION	QTY.
G111778 00A	Main PCB	1
C113954 00A	Power Supply Assy.	1
B117002 00A	Prom PCB (Fac. Nos. 5,6, 7)	1
A113690 00A	Keyboard (Fac. Nos. 5,6,7)	1
D113679 00A	Prom PCB (Fac. Nos. 2 ,3,4)	1
A113665 00A	Keyboard (Fac. Nos. 2,3,4)	1
A114584 00A	Charger Inverter P.C.B.	1
095920 00A	Fuse .25A Slo Blo	5
112145 00A	Fuse .5A Slo Blo	5