TOLEDO

MODEL
XX 38
DISPLAY

TECHNICAL MANUAL AND

PARTS CATALOG

IMPORTANT PRECAUTIONS

* READ this manual before operating or servicing this
  equipment.

* ALWAYS REMOVE POWER and wait at least 30 seconds BEFORE
  connecting/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.

* FOLLOW these instructions carefully.

* 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 Toledo Scale for parts, information, and service.

WARNING: THIS EQUIPMENT GENERATES, USES, AND CAN
RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED
AND USED IN ACCORDANCE WITH THE INSTUCTIONS MANUAL,
MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS.   IT
HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS
FOR CLASS A COMPUTING DEVICE PURSUANT TO SUBPART J
OF PART 15 OF FCC RULES, WHICH ARE DESIGNED TO PROVIDE
REASONABLE PROTECTION AGAINST SUCH INTERFERENCE WHEN
OPERATED IN A COMMERCIAL ENVIRONMENT.   OPERATION OF
THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO
CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN
EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES
MAY BE REQUIRED TO CORRECT THE INTERFERENCE.

TOLEDO SCALE RESERVES THE RIGHT TO MAKE REFINEMENTS
OR CHANGES WITHOUT NOTICE.

CONTENTS

Information regarding technical training on this product may
be obtained by writing to Toledo Scale at:

**TOLEDO SCALE CORPORATION
INDUSTRIAL TRAINING
1150 DEARBORN DRIVE
WORTHINGTON, OHIO 43085**

Information regarding replacement part numbers may be obtained
by calling to Toledo Scale at:

TOLEDO SCALE CORPORATION

**AFTERMARKET PARTS
720 DEARBORN PARK LANE
WORTHINGTON, OHIO 43085**

1-(800)-848-3992

1.0 GENERAL DESCRIPTION

1.1 OVERVIEW

The Toledo Model XX38 is a AC Wall Transformer operated display. It is designed for general purpose industrial or commercial environments, with an emphasis on easy operation. The Model XX38 utilizes a microprocessor based electronics incorporated in the patented high resolution Toledo DigiTOL. Load Cell. The high resolution load cell provides maximum sensitivity and accuracy for straight weighing. The six key membrane keyboard uses graphic symbols to aid the operator.

1.2 FEATURES

-   Highly visible low power Liquid Crystal Display.

-   Keyboard setup and calibration minimizes installation time and expense.

-   Built-in RS232 data input and output allows connection to printer or host computer.

2.0 SYSTEM DESCRIPTION

2.1 INTERNAL FUNCTIONS

The Toledo Model XX38 consists of three major blocks. These are:

2.1.1   DIGITAL LOAD CELL - The digital load cell used with the Model XX38 is the patented high resolution Toledo DigiTOL. Load Cell. The digital load cell contains all the Analog to Digital circuitry and a microprocessor. The Digital Load Cell processes and transmits weight data, controls scale functions, provides output to a printer, accepts input commands from a host device, and stores softswitch settings.

2.1.2   DISPLAY PCB - The display uses a low power custom liquid crystal display (LCD). Digits are 17.5 mm in height. In addition to displaying data, the Display PCB accepts input data from the keyboard for transmission to the digital load cell, regulates the optional wall transformer input power, and contains the solid state on/off switching circuitry.

2.1.3   POWER SUPPLY - The standard power supply consists of a wall transformer.

2.2 DISPLAY

The Model XX38 utilizes a low power custom liquid crystal display (LCD), with six seven-segment digits for data display, and special symbols indicating battery power, net/gross weight, zero, etc. A layout of the display and explanation of the symbols are shown in Figure 1.
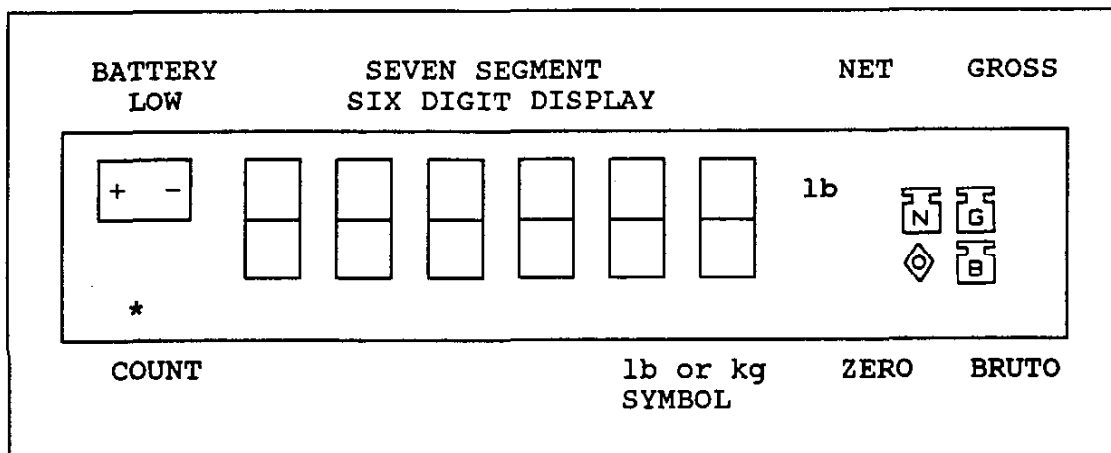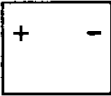

FIGURE 1

SYMBOL		DESCRIPTION
	(BATTERY) – LOW	Indicates the battery voltage is below a minimum level for sustained scale operation. (Note: This installation will not have batteries)
*	(COUNT) –	When steady, indicates calculated piece count is showing on the display. When blinking, indicates more pieces are required for sample reading.
	lb or kg –	Indicates avoirdupois or metric mode in use.
	(ZERO)	The zero legend illuminates when the weight is within +/– 0.25 increments of zero.
	(NET)	Indicates tare has been taken and the display is showing net weight.
	(GROSS)	Indicates the scale is at zero and no tare has been taken.
	(BRUTO)	International term for Gross. Used in place of the Gross symbol when Metric Mode (SSW-11), Tare Interlock (SSW-21), and Analog Verify (SSW-23) are enabled.

2.3 KEYBOARD

The keyboard used on the Model XX38 is a six position membrane keyboard utilizing graphic symbols. An illustration of the keyboard is shown in Figure 2. Refer to Section 4.2.4 for descriptions of keys.
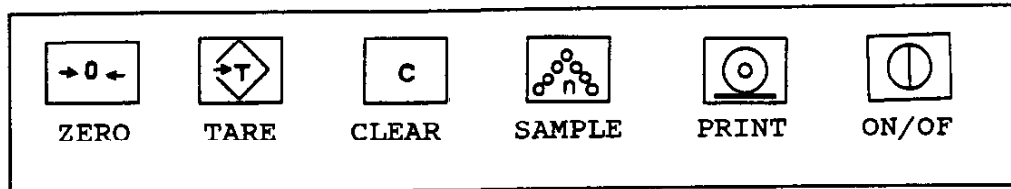
Figure 2

3.0 SPECIFICATIONS

3.1 ELECTRICAL

The Toledo Model XX38 use a wall transformer to provide power. The wall transformer converts the AC input voltage to the transformer to a nominal 12VDC output to the scale. The voltage requirement for use with the wall transformer is 120 VAC, 60 hz.

3.2 ENVIRONMENT

3.2.1 TEMPERATURE SENSITIVITY

Zero temperature coefficient is +/- 15 PPM/C
Span temperature coefficient is +/- 8 PPM/C

3.2.2 OPERATING TEMPERATURE

The Toledo Model XX38 is designed to meet NBS HB-44 5000d and 3000d OIML requirements to operate in a temperature range between:

+14deg F to 104deg F (-10deg C to +40deg C)
0 to 95% relative humidity, non-condensing.

3.2.3 APPLICATION

The Toledo Model XX38 is designed for general purpose dry indoor industrial or commercial environments.

The Model XX38 is not designed for hose-down applications. Typical examples of is-application of the scale include, but are not limited to:
- Immersions
- Hosedown
- Splashing liquids
- Corrosive Chemical Environments

3.2.4 HAZARDOUS AREAS

DO NOT USE the scale in locations classified hazardous by the National Electrical Code (NEC) Article 500.

3.3 PHYSICAL SPECIFICATIONS

3.3.1 DIMENSIONS AND SHIPPING WEIGHT
Dimensions
Shipping weight : 1 3/4 LB (approximate)

3.3.2 CONSTRUCTION

Display Enclosure : Extruded aluminum

3.3.3 RESOLUTION

Displayed Resolution: 3000 (kg mode) or 5000 (avoirdupois mode) Counting Resolution: 1 part in 200,000 internal for piece weight and total calculations. Maximum Count: 999,999 pieces

3.3.4 ZERO

POWER UP ZERO - When power is applied, zero is automatically captured if the weight is within +/-2% of scale capacity, and a no-motion condition exists.

FRONT PANEL AND REMOTE ZERO - Pressing the "ZERO" button, or inputting a remote zero command from a host, will re-zero the scale if the weight is within +/-2% of scale capacity and the scale is in a no-motion condition with a gross zero indication.

4.0 INSTALLATION INSTRUCTIONS

4.1 ASSEMBLY

No assembly required.

4.2 ACCESSING SETUP AND CALIBRATION MODE

The Model XX38 and load cell is not calibrated at the factory. The unit must be calibrated using cerified test weights. All operational changes and calibration can be performed using the scale keyboard.

ACCESSING THE SETUP MODE

4.2.1   Remove the top screw that secures the end cap on the right side of the display housing, and loosen the lower screw so the end cap can be rotated 180 degrees, allowing access to the the inside of the enclosure (Figure 9).

4.2.2   Press the white "ON/OFF" key (located on the lower right side of the display assembly) to turn the scale power ON. (Refer to Figure 2)

4.2.3   After the power-up sequence is completed, press and release the white pushbutton located on the end of the Display PCB (Figure 9). The scale will first display [10   0], indicating the start of the setup mode.

White
Pushbutton
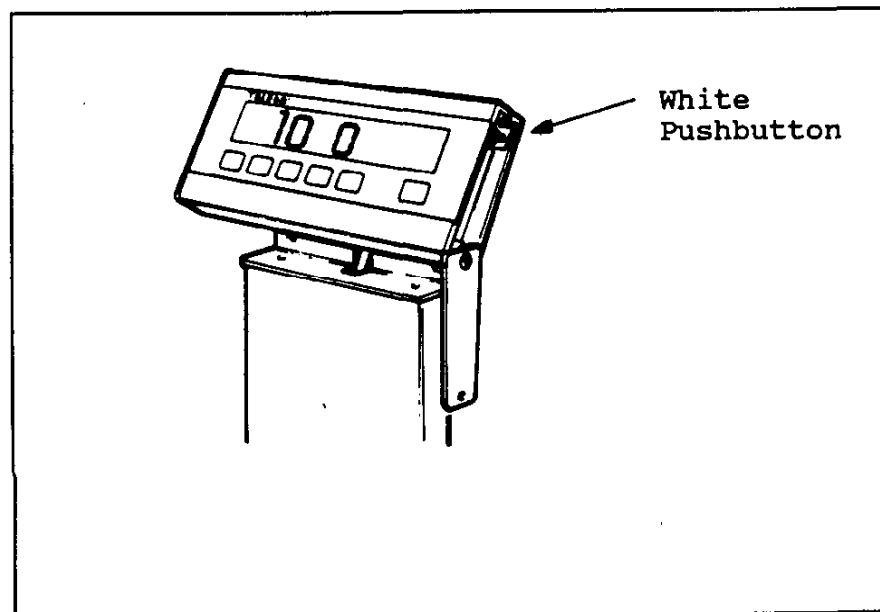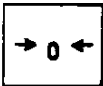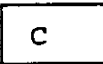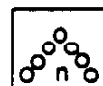
Figure 9

4.2.4   In addition to the normal mode functions of the keys, each key performs a different function when the scale is in the setup mode. The functions of the keys are as follows:

KEY		FUNCTION
Zero	Normal Mode:	ZERO - pressing this key will return the scale to a gross zero condition if the weight is within +/- 2% of the scale capacity listed on the data plate.
	Setup Mode:	Used as a "cursor" key to back-up to the previous softswitch.
Tare	Normal Mode:	TARE - Used to tare the applied weight on the scale platter.
	Setup Mode:	Used to change the status of the softswitch (on/off) or to toggle through a selection of softswitch options. When variable data is required, the Tare key advances the digit in each decade position from 0 to 9.
Clear	Normal Mode:	CLEAR - clear tare weight or exit from counting mode.
	Setup Mode:	Abort setup and go to the end of setup softswitches.
Print	Normal Mode:	PRINT - Used to initiate printing when a printer is connected to the Model XX38.
	Setup Mode:	Allows entry of the displayed softswitch status and advances to the next softswitch.
Sample	Normal Mode:	SAMPLE - Used in the counting mode.
	Setup Mode:	When entering variable data, Sample moves the control (blinking) digit from left to right, one position at a time.
On/Off	Normal Mode:	ON/OFF - Connects/disconnects power to the scale electronics.
	Setup Mode:	Not used.

4.2.5   Following is a brief listing of the softswitches (SSW) for quick reference purposes. The default SSW settings and recommended settings for Legal-for-trade applications are also listed. For complete descriptions of each SSW, refer to Section 4.3.

Quick Reference Chart
(0=OFF, 1=ON)

SSW	DESCRIPTION	INITIAL DEFAULT SETTING	SWAK II SETTING
10	SCALE SETUP SECTION		
11	Select KG or LB Mode	lb	lb
12	Capacity Select		500
13	Gravity Adjust	10000	10000
14	Filter Selection	1 (low)	1
15	Sleep Mode	1	0
16	Tare Auto-Clear	0	0
20	LEGAL-FOR-TRADE SECTION		
21	Tare Interlock	0	0
22	Display Metric Comma	0	0
23	Analog Verify Enable	0	0
24	Expanded Weight Display	0	0
25	Calibration Mode	0	0
30	COUNTING SETUP SECTION		
31	Parts Counting Mode Enable	1	0
32	Auto Clear APW	1	1
33	Minimum Sample Requirement Enable	0	0
34	Select Fixed/Variable Sample	00 (Variable)	10
40	PRINTER OUTPUT SETUP		
41	Printer Baud Rate	0 (9600)	0 (9600)
42	Checksum Enable	0	1
43	Remote Input Enable	0	1
50	PRINT FORMAT SETUP		
51	Single Line Print Enable	0	0
52	Print Gross Weight	1	1
53	Print Tare Weight	1	0
54	Print Net Weight	1	0
55	Print Double Width Net Wgt	0	0
56	Print APW	1	0
57	Print Pieces	1	0
58	Print Double Width Pieces	0	0
99	END OF SETUP MODE		

4.3 SOFTSWITCH FUNCTIONS

When the setup mode is accessed, the first series of softswitches (SSW) will be displayed as [10   0]. The "10" indicates the first series of switches (11 through 16). Pressing the "TARE" key will change the "0" (indicating an OFF condition), to a "1" (indicating an ON condition). When the "1" is displayed, press the "PRINT" key to accept the displayed setting and advance to the first softswitch selection. If the "10 Series" of softswitches is to be by-passed, leave the display showing [10   0], then just press the "PRINT" key to advance to the "20 Series" of softswitches. Pressing the "PRINT" key without making changes will advance to the next selection, and pressing the "ZERO" key will backup to the next previous selection.

There are five sections or series of softswitches in the setup mode as follows:

    10 = SCALE SETUP SOFTSWITCHES

    20 = LEGAL FOR TRADE AND CALIBRATION SETUP SOFTSWITCHES

    30 = COUNTING SETUP SOFTSWITCHES

    40 = PRINTER OUTPUT SETUP SOFTSWITCHES

    50 = PRINT FORMAT SETUP SOFTSWITCHES

Following is a list of the softswitch options and description of each softswitch:

9

SOFTSWITCH NUMBER	DESCRIPTION
10	SCALE SETUP SOFTSWITCHES 0 = Bypass Section 10 SSW 11-16. 1 = Access Section 10 SSW 11-16.
11	AVOIRDUPOIS OR METRIC MODE kg = Metric mode in use. lb = Avoirdupois mode in use.
12	CAPACITY SELECT Capacity selection - the Model XX38 is not calibrated at the factory. The capacity should be set as: Indicated in Section 4.2.5
13	GRAVITY ADJUST 0 = Bypass Gravity Adjustment Parameters 1 = Access Gravity Adjustment Parameters. (Refer to Gravity Adjustment section of this manual).
14	FILTER SELECTION Display Filtering - four selections are available (0, 1, 2, or 3). By enabling the filter, the scale is less susceptible to the effects of vibration. The scale response time is slowest when the highest filtering parameter (3) is selected. The response time is fastest when filtering is disabled (0). Press the "TARE" key to toggle through the selections, then press "PRINT" to accept the displayed setting. 0 = Filter Off 1 = Low Filter 2 = Medium Filter 3 = High Filter

15	SLEEP MODE

0 = Disable Sleep Mode.
1 = Select Sleep Mode Options. When enabled,
    power to the display and load cell will
    be disabled after the selected interval
    from the last time the scale was in use.
    The "1" setting will result in the
    longest battery life.
    Press the "PRINT" key when the "1" is
    displayed to select the following
    elapsed time intervals:

    0 = Disable Sleep Mode
    1 = Enable Sleep Mode after 1 minute
    2 = Enable Sleep Mode after 2 minutes
    5 = Enable Sleep Mode after 5 minutes

NOTE: LEGAL FOR TRADE APPLICATIONS MAY REQUIRE
      SLEEP MODE TO BE DISABLED.

16	TARE AUTO-CLEAR

0 = Disable Tare Auto-Clear - Tare must be
    cleared using the "CLEAR" key.
1 = Enable Tare Auto-Clear - Tare will clear
    when the gross weight is removed.

20	LEGAL FOR TRADE SETUP SOFTSWITCHES

0 = Bypass Section 20 SSW 21-25.
1 = Access Section 20 SSW 21-25.

21	TARE INTERLOCK

0 = Disable Tare Interlock
1 = Enable Tare Interlock - TARE INTERLOCK
    MUST BE ENABLED IF THE SCALE IS TO BE
    USED FOR COMMERCIAL WEIGHING (legal
    for trade). The Tare Interlock mode
    requires all tare weight entries to be
    completed when the scale is in the
    "gross" zero mode and allows the tare
    to be manually cleared only when the
    platter is empty.

22	SELECT METRIC COMMA OR DECIMAL POINT

0 = Display decimal point.
1 = Display metric comma in place of
    decimal point.

23	ANALOG VERIFICATION
	0 = Disable Analog Verification
	1 = Enable Analog Verification. This softswitch should be normally disabled, unless specified by local authorities.

24	EXPANDED DISPLAY
	0 = Normal Display.
	1 = Expanded Display - Displays all minor increments. Used for test mode only. Set to "0" for normal use.

25	CALIBRATION MODE
	0 = Bypass Calibration Mode
	1 = Access Calibration Mode - Used to calibrate the scale with test weights. (Refer to Calibration Section of this manual).

30	COUNTING SETUP SOFTSWITCHES
	0 = Bypass Section 30 SSW 31-34.
	1 = Access Section 30 SSW 31-34.

31	PARTS COUNTING MODE
	0 = Disable Counting Mode.
	1 = Enable Counting Mode.

32	AUTO CLEAR AVERAGE PIECE WEIGHT
	0 = Disable Auto-Clear Average Piece Weight (APW). When disabled, APW will be retained in memory until manually cleared with the keyboard.
	1 = Enable Auto-Clear Average Piece Weight. If enabled, calculated APW will automatically clear from memory when the scale is emptied.

33	MINIMUM SAMPLE REQUIREMENT
	0 = No minimum sample weight requirement.
	1 = Set minimum sample weight for 0.1% of the scale's rated capacity. When sampling pieces, the scale will prompt the user to add pieces until the 0.1% minimum is applied to the scale.

34	SELECT FIXED OR VARIABLE SAMPLE QUANTITY

Select a variable or fixed sample reference quantity. Press the "TARE" key to toggle the following selections:

```
00 = Variable Sample Reference - Selecting
     00 will allow the user to set the
     sample reference quantity for 5, 10,
     20, 50, or 100 by pressing the "SAMPLE"
     key to toggle the selections.
05 = Set Fixed Sample Reference for 5.
10 = Set Fixed Sample Reference for 10.
20 = Set Fixed Sample Reference for 20.
```

40	PRINTER OUTPUT SETUP SOFTSWITCHES

```
0 = Bypass Section 40 SSW 41-43.
1 = Access Section 40 SSW 41-43.
```

41	PRINTER BAUD RATE

```
0 = 9600 Baud.
1 = 300 Baud.
```

42	CHECKSUM

```
0 = Do not send checksum
1 = Send checksum.
```

43	REMOTE INPUT

```
0 = Remote Input is disabled.
1 = Remote Input is enabled.
```

50	PRINT FORMAT SETUP SOFTSWITCHES

```
0 = Bypass Section 50 SSW 51-58
1 = Access Section 50 SSW 51-58
```

51	SINGLE OR MULTI-LINE PRINTING

```
0 = Print/send data on multiple lines.
1 = Print/send data on single lines.
```

52	PRINT GROSS WEIGHT

```
0 = Do not print/send Gross Weight data.
1 = Print/send Gross Weight data.
```

53	PRINT TARE WEIGHT

```
0 = Do not print/send Tare Weight data.
1 = Print/send Tare Weight data.
```

54	PRINT NET WEIGHT
	0 = Do not print/send Net Weight data.
	1 = Print/send Net Weight data.
55	PRINT DOUBLE WIDTH NET WEIGHT
	0 = Print Normal Width Net Weights.
	1 = Print Double Width Net Weights
56	PRINT APW
	0 = Do not print/send APW data.
	1 = Print/send APW data.
57	PRINT PIECES
	0 = Do not print/send Number of Pieces.
	1 = Print/send Number of Pieces.
58	PRINT DOUBLE WIDTH PIECES
	0 = Print Normal Width Number of Pieces.
	1 = Print Double Width Number of Pieces.
99	END OF SETUP MODE
	Press the setup pushbutton to return to normal run mode.

4.4   CALIBRATION

As the Model XX38 is used in a commercial (legal-for-trade) application, it must be calibrated to the capacity specified on the equipment data plate using certified test weights. The calibration procedure is as follows:

The capacity of the Model XX38 is selectable via softswitch #12 in the setup mode, and must be set according to the capacity listed on the equipment.

4.4.1   Press the setup mode pushbutton at the end of the Display Pcb, as shown in Figure 9. The display will show [10   0]. Press the "PRINT" key to advance to the SSW Section 20 [20   0]. Press the "TARE" key to change the "0" to "1", then press the "PRINT" key again. The display will show the first SSW in section 20, [21 0]. Press "PRINT" to advance to SSW 25, [25 0]. Press the "TARE" key to change the "0" to "1", then press "PRINT" to enable the calibration mode. The display will show dashes [------], prompting the user to empty the scale conveyor. Press the "PRINT" key. The display will count down from 15 to 00 while it waits for the filtered weight to settle.

4.4.2   When zero has been established, the display will show [0000lb] if in the avoirdupois mode, or [0000kg] if in the metric mode. The most significant digit will be blinking, prompting for the entry of the value of the test weight that will be used to calibrate the span. The test weight should be an amount close to the capacity of the scale. The minimum recommended test weight is 2/3 of scale capacity.

The value is be entered from left to right. If the first blinking decade position is to be zero, press the "SAMPLE" key to toggle to the next decade. If a value other than zero is to be entered in this position, press the "TARE" key to toggle the selection of digits 1-9. When the required digit is displayed, press the "SAMPLE" key to move to the next decade position. When the complete variable test weight value is on the display, press the "PRINT" key to accept the displayed value (example: [0050lb]).

4.4.3   The display will then show [|- |- |- |- |- |- xx], with xx = lb or kg depending on the weighing mode in use. Place the test weight(s) on the scale conveyor, then press the "PRINT" key. The display will count down from 15 while the scale waits for the filtered weight to settle.

15

4.4   CALIBRATION (continued)

4.4.4   When the span has been determined, the display will again show dashes [------]. Remove the test weight(s) from the scale conveyor and press the "PRINT" key. The display will count down from 15. When calibration has been completed, the display will advance to the next softswitch section [30   0]. Press the "CLEAR" key to advance to the end of the setup mode, or continue in the setup mode in sections 30-50. When [99] is displayed, indicating the end of the setup mode, press the white pushbutton at the end of the Display Pcb to return to normal run mode.

4.4.5   Rotate the end cap back in position and replace the screw.

4.5   GRAVITY ADJUSTMENT LINE FEED

The Toledo Model XX38 needs calibrated at the final location due to the effect of gravity factors. The Gravity Factor is determined by geography (latitude) and distance above sea level (altitude).

NOTE: THE UNIT MUST BE CALIBRATED USING TEST WEIGHTS AT THE INSTALLATION SITE.

5.0 OPERATING INSTRUCTIONS

5.1 POWER-UP SEQUENCE

When power is first applied to the Model XX38 (by pressing the ON/OFF key on the right side of the keyboard), all of the display segments will be visible momentarily for display verification before displaying weight data. If the weight is less than +/-2% of the capacity, zero is captured. If the weight is outside of +/-2% of zero, and tare interlock (SSW-21) is off, the weight is displayed with the zero cursor blinking. If tare interlock (SSW-21) is on, and the weight display is blanked while the zero cursor is blinking, recalibration may be required.

6.0 RS232 SERIAL INPUT/OUTPUT

The Model XX38 RS232 Serial Port is a bidirectional port that is capable of receiving certain ASCII characters as well as transmitting scale weight/count data. The EIA specifications for maximum data cable length using RS232 communications is 50 feet.

6.1 DATA OUTPUT

Data output for the Model XX38 is at the TxD RS232 data line on pin 3, and pin 5 (ground), on the 9 pin D-sub connector. The character format is one start bit, seven data bits, one even parity bit, and one stop bit. The data bits are in the ASCII format. The transmission rate is selectable to either 300 or 9600 baud.

Data output occurs when the scale is in a no-motion condition and the "PRINT" key is pressed. During setup mode, the format is selectable as either single or multiple line printing.

The Model XX38 can transmit any or all of its fields on a single line, which can be selected in the setup mode. The data will always be sent in the following order for a single line format:

Gross - Tare - Net - APW - Pieces

When the multiple line format is selected, the data will always be sent in the following order:

Gross
Tare
Net
APW
Pieces

18

Using the single line format, the transmitted data will be sent as follows:

STX	<GROSS>	SP	<TARE>	SPSO	<NET>	-

SI	<APW>	SO	<COUNT>	SI	CR	CKSM	LF

Using the multiple line format, the transmitted data will be sent as follows:

STX	<GROSS>	CR	CKSM

LF	<TARE>	CR	CKSM

LF	SO	<NET>	SI	CR	CKSM

LF	<APW>	CR	CKSM

LF	SO	<COUNT>	SI	CR	CKSM	LF

The brackets <> are printed around the data fields when tare interlock, analog verify, and metric mode is enabled. The descriptions for the abbreviations used are as follows:

STX   Start of Text Character
SP   Space Character
<GROSS>   If Gross Weight print is enabled, the six
           digit (including decimal point) gross weight
           is printed followed by "lb" or "kg".
<TARE>   If tare print is enabled, the six digit
           (including decimal point) tare weight is
           printed, followed by "kg" or "lb" and "TR".
<NET>   If net weight print is enabled, the six digit
           (including decimal point) net weight is
           printed, followed by "lb" or "kg" and "NET".
<APW>   If APW print is enabled, the eight digit
           (including decimal point) APW is printed,
           followed by "kg" or "lb" and "APW".
<COUNT>   If count print is enabled, a one to six digit
           count is printed, followed by "PCS".
CR   Carriage Return Character.
CKSM   Optional Checksum Character.

LF	Line Feed Character.
SO	Optional Shift Out Character for expanded print.
SI	Optional Shift In Character to end expanded print.
SP	Space Character.

6.2 DATA INPUT

The Model XX38 is capable of receiving remote commands for Print (P), zero scale (Z), Tare (T), and clear scale (C). The commands are input to the scale via the RxD data line on pin 2 of the 9 pin Dsub connector. The only command to which the Model XX38 will return a response to is the "P" print command.

The baud rate of the data input must be the same as what has been selected for the data output in the setup mode, and the Remote Input Enable Softswitch 43 must be set to ON (1). The format of the input data must be one start bit, 7 data bits, one even parity bit, and one stop bit.

The commands that can be remotely input are as follows:

COMMAND	DESCRIPTION
<Z>	Zero the scale if within +/- 2% of capacity from zero, when scale is in a no-motion condition and at gross zero.
<T>	Tare the scale to net zero.
<P>	Print command. Sends displayed data back to host.
<C>	Clear the scale. Functions the same as ressing the "CLEAR" key on the scale keyboard.

NOTE:<CR> IS NOT REQUIRED AFTER THE INPUT COMMAND FOR THE MODEL 6 XX38, BUT MAY BE USED IF NEEDED.

6.3 PIN CONNECTIONS FOR RS232 PORT

The pin connections for the 9 pin D-sub female connector used for the RS232 port are as follows:

                    2 - RxD Receive
                    3 - TxD Transmit
                    5 - Signal Ground

7.0 CARE AND MAINTENANCE

Periodically, clean the keyboard and covers with a soft clean cloth that has been dampened with a mild window type cleaner or detergent. DO NOT USE ANY TYPE OF INDUSTRIAL SOLVENT OR CHEMICALS. DO NOT SPRAY CLEANER DIRECTLY ONTO THE UNIT. DO NOT HOSE DOWN.

8.0 TROUBLESHOOTING

> CAUTION! BEFORE CONNECTING/DISCONNECTING ANY INTERNAL ELECTRONIC. COMPONENTS OR INTERCONNECTING WIRING BETWEEN ELECTRONIC EQUIPMENT. ALWAYS REMOVE POWER AND WAIT AT LEAST THIRTY (30) SECONDS BEFORE ANY CONNECTIONS OR DISCONNECTIONS ARE MADE. FAILURE TO OBSERVE THESE PRECAUTIONS COULD RESULT IN DAMAGE TO, OR DESTRUCTION OF, THE EQUIPMENT.

! CAUTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTRO STATIC SENSITIVE DEVCES

8.1 PROCEDURES

- If operational difficulties are encountered, first obtain as much information as possible regarding the problem. Failures and malfunctions often may be traced to simple causes such as loose connections, low battery power, improper setup, etc.

- If simple causes cannot be found, additional troubleshooting is best performed by substitution. A printed circuit board (PCB) or Digital Load Cell believed to be defective may be checked by replacing the suspect part with a known good part and then observing whether the problem is corrected.

- To verify the problem was in the removed part, reinstall the original part and observe whether the problem returns. By doing this simple verification test, you will eliminate the possibility of having replaced a good part because of a loose or poor connection.

- Consult Section 4.3 of this manual for proper programming. Do not automatically program a replacement PCB like the suspected faulty PCB. The original problem may have been caused by a programming error.

8.2 ERROR CODES

ERROR CODE	DESCRIPTION	CORRECTIVE MEASURES
E1	ROM ERROR	1. Remove power/wait 15 sec/retry 2. Check battery (or wall transformer) voltage/replace batteries/retry operation. 3. Replace Digital Load Cell.
E2	APPLICATION PROGRAM EEPROM ERROR	1. Remove power/wait 15 sec./retry 2. Check battery (or wall transformer) voltage/replace batteries/retry operation. 3. Replace Digital Load Cell.
E3	DLC NOVROM ERROR	1. Remove power/wait 15 sec./retry 2. Check battery (or wall transformer) voltage/replace batteries/retry operation. 3. Perform Setup again. 4. Replace Digital Load Cell.
E8	DLC OUT OF RANGE	1. Check battery (or wall transformer) voltage/replace batteries/retry operation. 2. Check voltage to Load Cell. 3. Check For Mechanical Overload. 4. Replace Digital Load Cell.
E13	DLC EEPROM ERROR	1. Remove power/wait 15 sec./retry 2. Check battery (or wall transformer) voltage/replace batteries/retry operation. 3. Replace Digital Load Cell.

E32	CALIBRATION ERROR or BUILD ERROR	1. Recalibrate/Reconfigure SSW. 2. Replace Digital Load Cell.
AAAAAA ANALOG VERIFY		Analog verify is on and active.
BLANK BLANK DISPLAY		1. Check batteries/transformer. 2. If voltages are good, suspect faulty Display PCB.

8.3 VOLTAGE CHECKS

8.3.1 BATTERY VOLTAGE

Batteries are not required when using the wall transformer.

8.3.2   WALL TRANSFORMER VOLTAGE

The wall transformer for the Model XX38 converts standard 120 VAC/60 hz input voltage to a nominal 12 VDC, at 500 ma, output to the scale. An internal switching circuit on the Display PCB automatically switches to the transformer when it is connected to the jack on the bottom of the scale base.

Although the wall transformer output depends directly upon the AC line voltage it is connected to, typical output voltage to the scale will be between +12 VDC to +16 VDC. This voltage can be checked at the transformer jack on the scale base, or on the transformer output plug.

8.3.3   DISPLAY PCB VOLTAGES

Various input and output voltages can be checked at the Display PCB on PJ-1, located at the end of the PCB. Access to PJ-1 is gained by removing the top screw on the side of the display housing. The end cap can then be swiveled down, as shown in Figure 9. A diagram of connector J-1 on the Display PCB is shown in Figure 10.

J1 on the display PCB

+10VDC with power on	1	2	ground
+5 vdc	3	4	all transformer volt in
TxD RS232	5	6	CLK
TxD to DLC	7	8	Data out
+5 vdc LE	9	10	RxD to DLC
Battery in	11	12	key
Data in	13	14	Ground
Ground	15	16	RxD RS232

9.0 PARTS REPLACEMENT AND ADJUSTMENTS

9.1 KEYBOARD REPLACEMENT

The six position switch membrane keyboard is positioned in a slot on the front of the display housing, and is held in place by an adhesive backed overlay. First remove power to the unit by disconnecting the the AC wall transformer if used.

To remove the keyboard and overlay, first disconnect the keyboard connector on the Display PCB. Peel the overlay from the display housing. The switch membrane can then be removed. Clean off any remaining adhesive on the housing by rubbing the adhesive into a "ball" with your finger. It can then be pulled off from the housing.

To install the new keyboard components, first position the switch membrane in the slot, and feed the tail through the hole at the end of the slot. Carefully position the overlay on the housing. When positioned correctly, apply pressure on the overlay with your fingers, especially on the edges to secure it to the housing. Do not use excessive pressure on the key positions.

9.2 DISPLAY PCB REPLACEMENT

The Display PCB is retained in slots on the top and bottom of the display housing. To remove the Display PCB, first remove power to the unit by disconnecting the battery connector at the end of the battery holder, and/or unplugging the wall transformer if used.

After power to the unit has been disconnected, remove both end caps from the display housing. Next unplug the Load Cell Harness at J1, the keyboard connector, and the Ground connector on the Display PCB. The Display PCB may now be slid out of the housing to the left (looking at the Display from the front). Reverse the previous steps to install the new Display PCB.
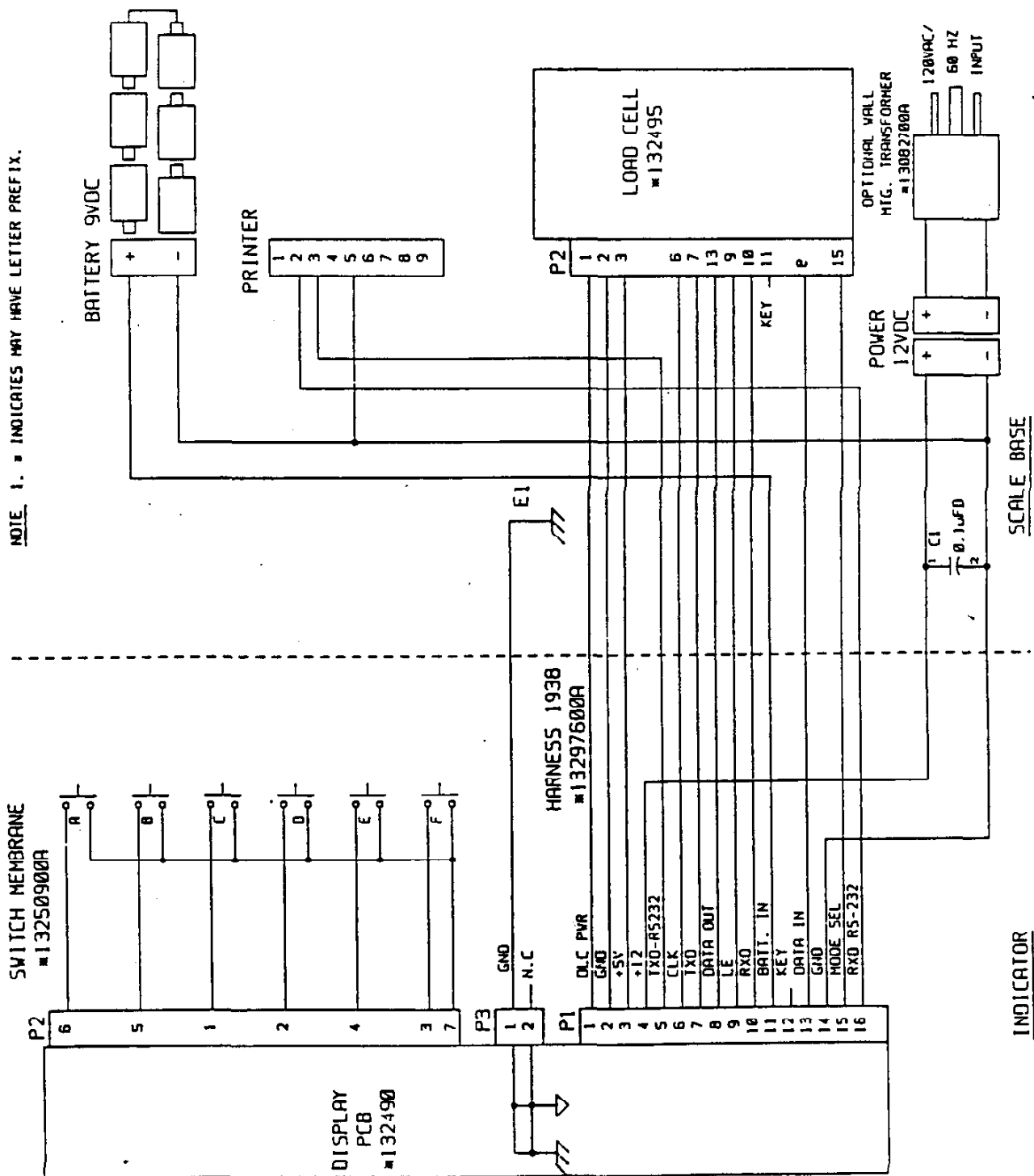
9.2 DIGITAL LOAD CELL REPLACEMENT

CAUTION: BEFORE CONNECTING OR DISCONNECTING THE LOAD CELL HARNESS REMOVE POWER AND WAIT A MINIMUM OF 30 SECONDS. FAILURE TO OBSERVE THIS PRECAUTION MAY RESULT IN DAMAGE TO THE LOAD CELL.
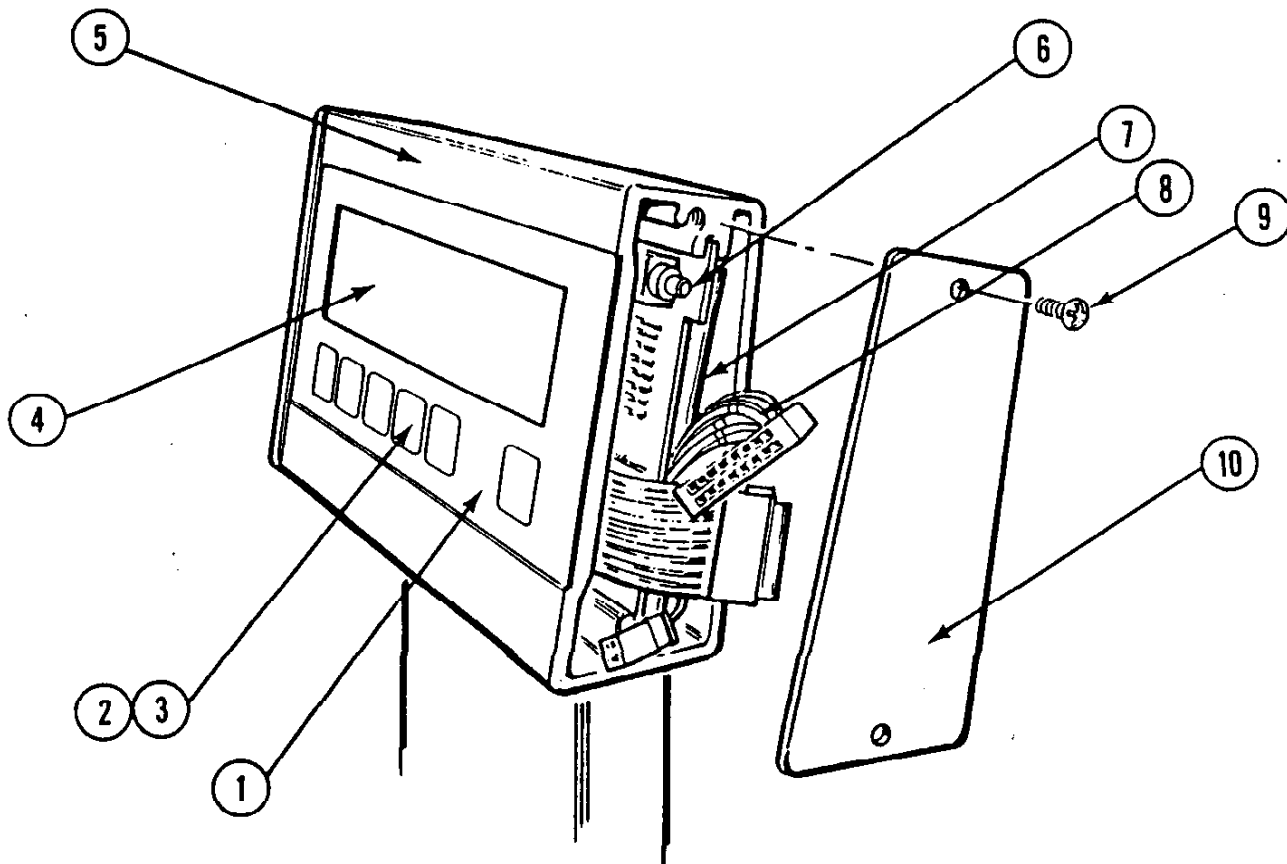
! CAUTION
OBSERVE PRECAUTIONS FOR HANDLING ELECTRO STATIC SENSITIVE DEVICES

10.0 SCHEMATIC DIAGRAM

NOTE 1. ∗ INDICATES MAY HAVE LETTER PREFIX.

BATTERY 9VDC
+ —

PRINTER
1 2 3 4 5 6 7 8 9

LOAD CELL
∗132495

P2
1 2 3 6 7 13 9 10 11 e 15
KEY

OPTIONAL WALL MTG. TRANSFORMER ∗130827000

120VAC/ 60 HZ INPUT

POWER 12VDC
+ — + —

SCALE BASE

C1 0.1µFD
1 2

E1

HARNESS 1938 ∗1329760000

SWITCH MEMBRANE ∗132509000A
A B C D E F

P2
6 5 1 2 4 3 7

P3
1 2
GND
N.C

P1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
DLC PWR
GND
+5V
+12
TXD-RS232
CLK
TXD
DATA OUT
LE
RXD
BATT. IN
KEY
DATA IN
GND
MODE SEL
RXD RS-232

DISPLAY PCB ∗132490

INDICATOR

26

11.0 REPLACEMENT PARTS

DISPLAY HOUSING

REF.	P/N	DESCRIPTION	QUAN
1	13250800A	KEYBOARD OVERLAY	1
2 N.S.	A13250900A	KEYBOARD SWITCH MEMBRANE, 1 x 6	1
3 N.S.	13298400A	SPACER, SWITCH MEMBRANE LAYER	1
4	13250700A	LENS, DISPLAY	1
5	13250000A	HOUSING, DISPLAY	1
6	13249000A	PCB ASSEMBLY, DISPLAY	1
7	13368100A	INSULATOR, PCB	1
8	B13297600A	HARNESS ASSEMBLY, INTERCONNECT	1
9	R0387200A	SCREW, 8-32 x 3/8" TRUSS	4
10	13250400A	END CAP	2
11 N.S.	13271700A	CONNECTOR JACK, WALL TRANSFORMER	1
12 N.S.	11867000A	CONNECTOR, 9 POSITION Dsub FEMALE	1
13 N.S.	13082700A	WALL TRANSFORMER, 120VAC/12VDC	1

N.S. = NOT SHOWN

27