Avery Weigh-Tronix

WI-150 Ultra Low-Power Weight Indicator User's Manual

UNITED STATES

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CANADA

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques depassant les limites applicables aux appareils numeriques de la Class A prescrites dans le Reglement sur le brouillage radioelectrique que edicte par le ministere des Communications du Canada.

EUROPEAN COUNTRIES

WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which the user may be required to take adequate measures.

CAUTION

Risk of electrical shock. Do not remove cover. No user service-able parts inside. Refer servicing to qualified service personnel.

Weigh-Tronix reserves the right to change specifications at any time.

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Table of Contents

Introduction 7
Operations Mode 7
Keyboard 8
Indicator Operation 9
Powering Up 9
Annunciators 10
Operations Mode 10
Gross/Tare/Net Weighing Operations 11
Gross Weighing 11
Net Weighing 12
Pushbutton Tare 12
Clearing the Active Tare 12
Creating a Quick Tare 12
Entering, Retrieving and Changing Values in Tare Registers 13
Net Weighing Operation 13
Entering or Viewing an ID Number 14
Viewing and Setting Cutoffs 14
Controlling Cutoffs 16
To Access the Control Function 16
To Activate and Control the Cutoffs 16
Viewing and Setting Time 17
Viewing and Setting Date 18
Transmitting Data 18
Communication Protocol 19
Indicator Diagnostics 20
Test Mode 20
Appendix A: Battery Life 22

Pages are numbered consecutively beginning with the cover page.

WI-150 Specification

Enclosure	NEMA 4 watertight, stainless steel
Hazardous location classifications	Class I, Divisions I and II, Groups A, B, C, and D; Class II, Divisions I and II, Groups E, F, and G; and Class III, Divisions I and II
Entity parameters	Vmax = 19 V, Imax = 450 mA, Ci = 0.24 uF, Li = 0 mH
Display	7-segment LCD, 8 digits, 1.0 inch high with 10 annunciators
Display Rate	1, 2 or 5 times per second
Accuracy	Span: ±5.0 ppm/°C Zero: ±.066 uV/°C (-10 to 40°C) Span: ±10 ppm/°C Zero: ±0.13 uV/°C (-30 to 60°C)
Linearity	±0.005% of capacity, maximum
Repeatability	±0.005% of capacity, maximum
Hysteresis	0.005% of capacity, maximum
Voltage Requirements	+5.6 to 13.5 volt DC
Weigh Bar Drive Capacity	Up to eight 350 ohm weigh bars
Weigh Bar Excitation Voltage	Approximately 4 volts
Environment	-10 to 40°C (14 to 104°F) for HB-44 specs -30 to 60°C (-22 to 140°F) reduced accuracy 10 to 90% relative humidity
Calibration and Programming	All calibration and programming is done through the front panel with data stored in nonvolatile memory.
Analog Range	-0.14 to +3.5 mV/V
Scale Capacities	.00001 to 999999, programmable to any number between these limits
Scale Division Sizes	.0001 to 20000, programmable to any division size between these limits
Push Button Zero Range	0 to ±100% of capacity; programmable independent positive and negative limits; unit will not allow zeroing beyond capacity.
Tare	The unit may be configured to have pushbutton tare and/or 0 to 10 keyboard tare storage registers. May also pushbutton tare into the keyboard tare registers. Pushbutton tare and keyboard tare may tare only positive gross weights up to the capacity of the unit.

Over Range Capacity	The scale will display weights up to and including full scale capacity less any weight zeroed out by the operator.
Motion Detection Window	Programmable from 0 to 999999 divisions, decimal entries are accepted, 999999 turns motion detection off, default is 1 division.
Automatic Zero Tracking	Window: Programmable from 0 to 999999 divisions, decimal entries area accepted, default is 1 division, 0 turns AZT off Net Mode Tracking: Configurable to track in net at gross zero Rate: 0,1 division per second Starting Delay: 2 seconds
Linearity Adjustment	Second order correction provides smooth curve fit through three points.
Analog Low Pass Filter	Two section with .06 second time constant.
Software Low Pass Filter	One section with .05 second time constant; weight averaging over 1 to 10 display intervals.
Fiber Optics Cable Length	250 feet maximum
Options	Fiber Optics Interface Card with Real Time Clock

Introduction

The WI-150 is a full-function, ultra low-power weight indicator which is designed for Class I, Division I and II, Groups A, B, C, and D; Class II, Division I and II, Groups E, F, and G; and Class III, Division I and II hazardous locations. The enclosure is also rated NEMA 4. The indicator comes in two versions. One is powered by an external, rechargeable battery pack and the other is powered by an AC to DC conversion unit which operates in a safe area.

This User's Manual is divided into the following sections:

- Introduction
- Operations Mode
- Keyboard
- Indicator Operation
- Indicator Diagnostics

Operations Mode

Operations Mode contains all normal weighing operations. In this mode you can view or set any of the following parameters if your unit contains the appropriate options and is so configured:

- pushbutton tare
- one to ten tare registers (numbered 0-9)
- identification number
- one to eight cutoff registers (numbered 0-7)
- cutoff control
- time
- date

Any combination of these items can be secured behind a security code. Any items secured by the code number can be viewed but not changed unless you enter the security code.

Keyboard

The keyboard consists of 18 keys. Five keys, or buttons, provide all the basic weighing functions:

- Zero
- Tare
- Gross / Net
- Print
- Units

The other keys are used to access the menus for purposes of accessing information, testing the indicator, and configuration. The keyboard and key functions are shown in Figure 1.

Figure 1
Keyboard layout

OFF

Puts the battery powered model indicator into an ultra low-power consumption mode called the sleep mode.

ON

Wakes the battery powered model from sleep mode. Is not functional in the AC/DC powered version.

ZERO CLEAR

Zeros the scale in gross/net weigh mode. This button also clears keyed-in digits on the display before they are accepted.

UNITS •

Changes the unit of measure during operations mode and inserts a decimal point (.) when keying in values.

0 to 9 keypad

Enters numbers and specifies tare registers and cutoff values.

MENU

Used to access menus and move among choices in a menu.

PRINT SELECT

Sends a print command and is used to select menu items.

TARE +/-

Enters a pushbutton tare in gross/net operation. During data entry this key is used to toggle between positive and negative values. Used to enter a dash (-) in ID numbers.

GROSS NET

Accesses the gross/net weighing mode from any other function and toggles the unit between gross and net weights, assuming there is an active tare weight.

Indicator Operation

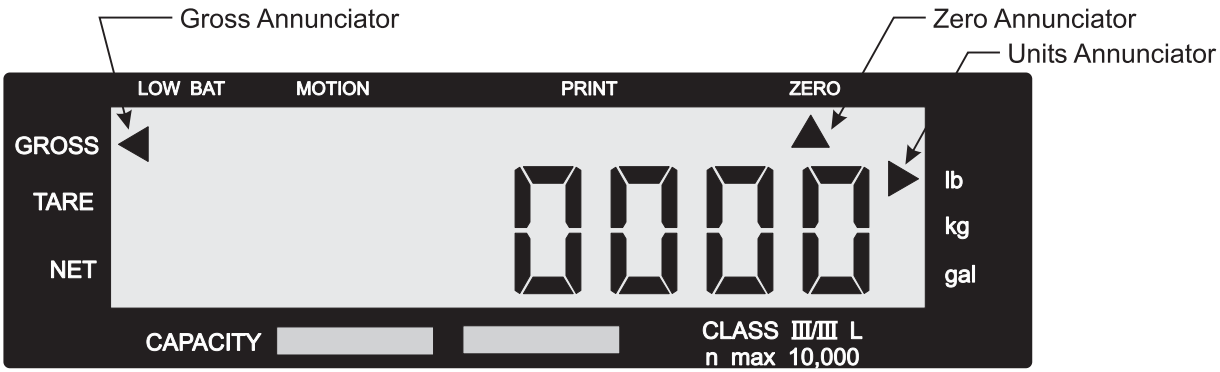
Powering Up

Upon installation and connection to a power source (either the battery pack or the AC/DC power source), your indicator is in active mode and is ready to begin weighing.

The battery powered model has a battery saving "sleep" mode which is activated after a programmable amount of time. The display reads *ASLEEP* when in this mode. To awaken the indicator, press the **ON** button. The indicator will return to the same mode of operation it was in when it went to sleep.

The AC/DC powered model is always in active weighing mode. To turn the unit off, the power source must be disconnected.

The indicator display, Figure 2, tells you the status of the indicator through the illumination of annunciators. The annunciators are small black arrows pointing to the different labels around the display face.



Annunciators

Gross - Illuminates when indicator is in gross weighing mode.

Tare - Illuminates when you are viewing tare values in the various registers.

Net - Illuminates when a tare is in effect and the indicator is in net weighing mode.

lb, kg, gal - Illuminates the active unit of measure in weighing mode.

Low Bat - Illuminates when the battery voltage is low. Battery pack should be removed from the indicator within 24 hours and recharged in a safe area.

Motion - Illuminates when indicator detects scale motion.

Print - Illuminates when the print key is pressed and while data are transmitted.

Zero - Illuminates when the scale is within ±1/4 division of zero.

Operations Mode

Your unit may contain several options and therefore be configured to display some or all of the following functions: cutoff control, pushbutton tare, one to ten keyboard tare registers, ID number, cutoffs, time, and date. These can be viewed and changed if allowed by the security code. **This manual assumes the unit is optioned and configured to allow full access to all functions**. You can disable unneeded options. Instructions are in the *Service Manual*. Below is a flowchart and general instructions for moving around the operations mode menu.

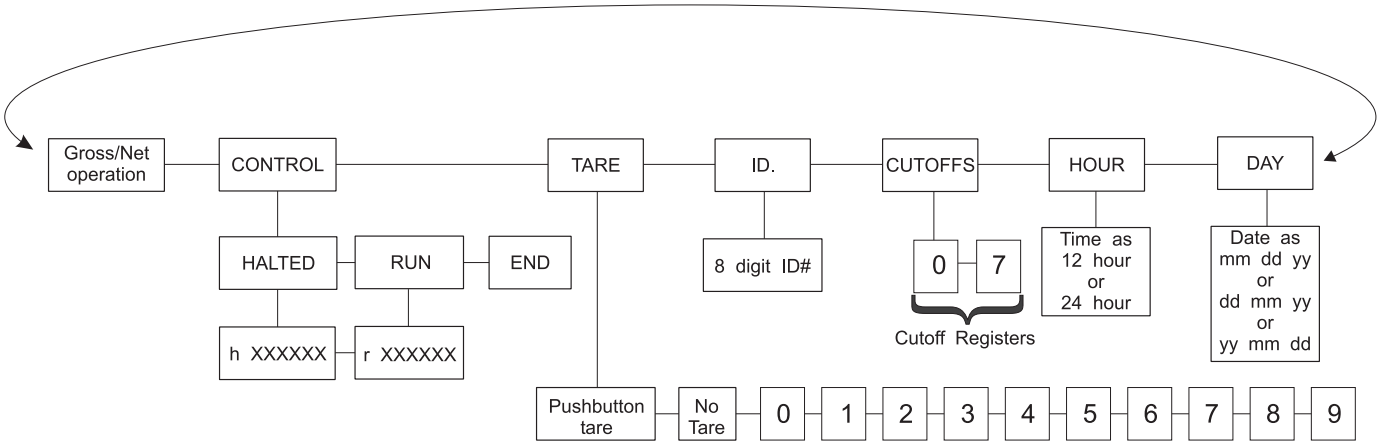


Figure 3
Operations Menu

Press **MENU** to go →

Press and hold **MENU** to go ←

Press **SELECT** to go ↑ or ↓

Press **SELECT** to select new choice

Press **GROSS/NET** at any time to return to gross/net weighing mode

Gross/Tare/Net Weighing Operations

To perform gross/net weighing operations, follow these steps:

Gross Weighing

1. Power up the indicator.	Battery powered indicator powers up in the same mode of operation as when it went to sleep. AC/DC powered indicator is constantly powered.
2. If the unit is not in gross mode, press the **GROSS/NET** button once to get to gross/net mode and again if the net annunciator is illuminated.	The annunciator illuminates next to gross. See Figure 2.
3. Zero the scale by pressing the **ZERO** button.	No weight is displayed and the zero annunciator illuminates. See Figure 2.
4. Select unit of measure by pressing the **UNITS** button.	The units annunciator will point to the chosen unit of measure.
5. Place weight on the scale.	Gross weight is displayed.

Net Weighing

For net weighing operations a tare needs to be entered. A tare can be entered by two methods: pushbutton tare or selecting a tare from the tare register (a memory bank of up to ten tares).

Pushbutton Tare

1. With the indicator powered up and in gross mode, zero the scale by pressing the **ZERO** button.	No weight is displayed and the zero annunciator illuminates.
2. Place the weight to be tared on the scale.	The weight of the object is displayed.
3. Press the **TARE** button on the indicator.	The weight is tared, the display reads zero and the net annunciator illuminates.
4. Add more weight to the scale.	Net weight is displayed.
5. View the gross weight by pressing the **GROSS/NET** button.	Gross weight is displayed.
6. Press **GROSS/NET** again to see net weight.	Net weight is displayed.

Clearing the Active Tare

There are two ways to remove the current or active tare weight:

A. Remove all weight from the scale and press **TARE**.	Pushbutton tare register is cleared, scale returns to gross mode and no weight is displayed.
B. 1. With the gross or net annunciator illuminated, press **MENU** until *TARE* is displayed, then press **CLEAR**.	***NO TARE*** is displayed.
2. Press **GROSS/NET** key.	Gross weight is displayed. All tare registers remain intact but are inactive.

Creating a Quick Tare

Key in the tare value you want to use and press the **TARE** key. That value becomes the active tare.

Entering, Retrieving, and Changing Values in Tare Registers

1. With the gross or net annunciator illuminated, press the **MENU** button until. . .

   TARE is displayed.

2. Key in a tare register number to view the value in the register. Numbers allowed are 0-9. For this example, tare register 5 will be used. Key in numeral 5.

   The tare annunciator illuminates and the display shows ***5 0*** , showing that register ***5*** has no value entered. Your indicator may have a value in register 5.

3. You can enter a tare value in a register in two ways:
   A: key in a tare value, or
   B: use the pushbutton tare.

   A: Key in 155 for this example, then press **PRINT/SELECT.**

   The value is accepted and ***TARE*** is displayed.

   B: With the desired register number displayed and the tare weight on the scale, press **TARE.**

   The register number and new tare weight are displayed, then the value is accepted and ***TARE*** is displayed

4. Press **MENU** to proceed to next tare register.

5. Press **GROSS/NET** to return to the weighing mode.

   The net annunciator illuminates.

To set a tare register to 0, key in 0 in step 3A.

*If register 5 has an existing value and you wish to select that register value as your tare, you can press **PRINT/SELECT** to select that value, then press **GROSS/NET** to return to weighing mode.*

*There is a one-step way to accept a keyed in value and return to gross/net weighing mode. After the value is keyed in, press **GROSS/NET**. Value is accepted and gross or net annunciator illuminates.*

If you want to review all the existing tare values, with TARE *displayed, press **PRINT/SELECT** then repeatedly press **MENU** to scroll through all tare registers and the current pushbutton tare value.*

Net Weighing Operation

1. After a tare is established, place the indicator in net mode by pressing the **GROSS/NET** button.

   Net annunciator illuminates. Zero weight will be displayed with the container on the scale.

2. Place material to be weighed in the container on the scale.

   Net weight of material is displayed.

Entering or Viewing an ID Number

An 8-digit identification number can be entered on the WI-150. The following steps tell you how to enter and view an ID number:

1. While in gross weighing mode, press **MENU** repeatedly until . . .	***ID.*** is displayed.
2. Press **PRINT/SELECT**.	The current ID number is displayed.
3. To accept this value press **PRINT/SELECT** or **GROSS/NET.** To enter a new value, key in up to 8 digits, then press **PRINT/SELECT** to accept the new value.	***ID.*** is displayed after ID number is accepted.

Viewing and Setting Cutoffs

In the weighing industry, a cutoff is a weight at which something happens. In the case of the WI-150 indicator, an internal electrical connection is broken causing an external relay to de-energize. This, in turn, causes a motor or other electrical device to shut off.

Cutoffs are used to load controlled amounts of ingredients. When connected to the appropriate Fiber-Link, the WI-150 can control up to eight ingredients. You set the weight of each ingredient and the indicator, through connections to external relays, will stop the flow of each ingredient when the proper weight of that ingredient has been added to the scale.

There are two types of cutoffs in the WI-150: the ingredient cutoff (default) and the setpoint cutoff. With ingredient cutoffs, you tell the indicator the weight of each ingredient you want and the indicator will call for that much of each ingredient, no matter what the weight display says. If you want 100 pounds of ingredient #1 and 100 pounds of ingredient #2, you would enter 100 for cutoff #0 and 100 for cutoff #1.

With setpoint cutoffs, you tell the indicator at what weight display you want the cutoffs to activate. In other words, if you want 100 pounds of ingredient #1 and 200 pounds of ingredient #2, you would set the first setpoint cutoff at 100 and the second cutoff at 300 pounds because that is what the weight display will read when you want the actions to occur.

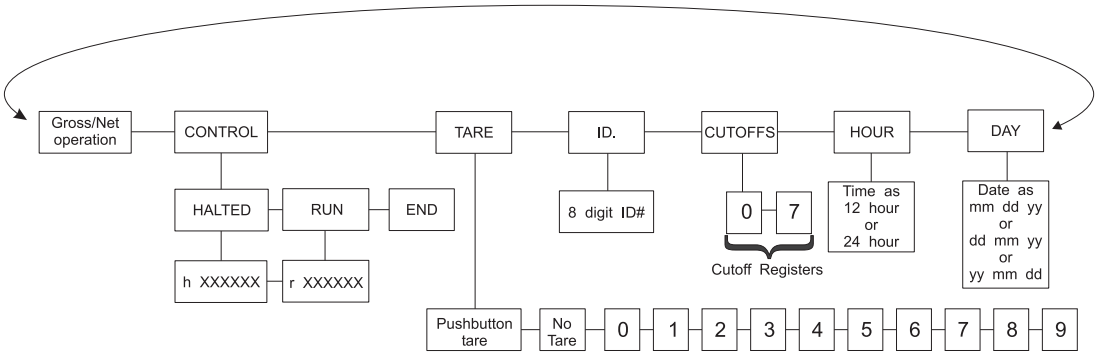
You can tell which kind has been configured in your indicator by looking at the cutoff number in the Operations Menu in Figure 3. If the cutoff number has a decimal **point** following it, the cutoff is a set**point** type. If there is no decimal, it is configured as an ingredient type.

To view or set cutoff values, follow these steps:

1. From gross/net weighing mode, press **MENU** repeatedly until	***CUTOFFS*** is displayed.
2. Press **PRINT/SELECT**.	***0. y*** will be displayed. The number *0* stands for cutoff register #0 and y is the current value in register 0. The decimal after the number *0* tells you that this is a setpoint cutoff. Without the decimal it means this cutoff is an ingredient cutoff.
3. You can **A**. enter a new value in this cutoff register or **B**. look at the next cutoff register.	
A. Key in the new value. Press **TARE/+/-** to toggle the value between positive and negative, then press **MENU** to accept the value and scroll to the next cutoff register.	The new value is accepted and ***1. y*** is displayed. The number ***1*** stands for cutoff register #1 and ***y*** is the current value in register #1.
B. Press **MENU** to scroll to the next cutoff register.	***1. y*** is displayed.
4. Key in a new value as you did in step #3. When you are finished viewing and changing values, press **PRINT/SELECT** to return to the operations mode menu.	***CUTOFFS*** is displayed.

Controlling Cutoffs

The WI-150 Indicator allows you to control the cutoff process from the front panel. Through the WI-150 you may: enable/disable the cutoff process, continue or interrupt the operation of a cutoff before its setpoint has been reached, and/or terminate the process at any time before the last cutoff has been reached.



To Access the Control Function

Cutoff values (positive or negative) must be entered before you can control them.

1. From Gross/Net Weighing Mode, press **MENU** one time. . . — ***Control*** is displayed.
2. With Control displayed, press **SELECT**. . . — ***HALtEd*** is displayed.

To Activate and Control the Cutoffs

There are two ways--Methods A or B--to activate the cutoffs. Method A activates the cutoffs immediately while displaying the changing weight on the scale, and Method B allows you to view the weight on the scale before the cutoffs are activated.

Method A:

1. With ***HALtEd*** displayed, press **MENU**. . . — ***run*** is displayed.
2. Press **SELECT**. . . — ***r xxxxxx*** is displayed. **xxxxxx** represents the weight as it changes on the scale.

Method B:

1. With ***HALtEd*** displayed, press **SELECT**... — ***h xxxxxx*** is displayed. **xxxxxx** represents the weight on the scale.
2. Press **MENU**.... — ***r xxxxxx*** is displayed. **xxxxxx** represents the weight as it changes on the scale.

To halt active cutoffs

You may halt an active cutoff at any time.

With *r xxxxxx* displayed, press any key. . .

h xxxxxx is displayed and cutoffs are halted.

To return to Gross/Net Weighing Mode

You may return to G/N Weighing Mode at any time during this process by pressing **GROSS/NET**...

Display returns to G/N Weighing Mode.

Viewing and Setting Time (Option)

Your indicator must have the optional Fiber Optics Interface Card and be configured to allow the following . . .

1. From gross/net weighing mode, press **MENU** repeatedly until . . . . *HOUR* is displayed.

2. Press **PRINT/SELECT**. In the 12 hour clock configuration you will see time displayed as hours, minutes and ***A*** for A.M. or ***P*** for P.M. ***(09 40 A)***. In the 24 hour clock you will see hours, minutes and seconds ***(09 40 38)***.

3. To set the 12 hour clock, key in new hours, minutes, and press **TARE/+/-** key to toggle A.M. and P.M.

   To set the 24 hour clock, key in new hours, minutes, and seconds.

   After the clock is set, press **PRINT/SELECT** to start the clock and return to operations mode menu, ***HOUR*** is displayed and the clock begins at the new time setting.

   or

   press **GROSS/NET** to return to gross/net weighing mode. Display returns to gross/net mode and the clock begins at the new time setting.

*If you enter an incorrect digit, press the **ZERO/CLEAR** key to clear the display one digit at a time.*

Viewing and Setting the Date (Option)

Your indicator must have the optional Fiber Optics Interface Card and be configured to allow the following . . .

1. From gross/net weighing mode, press **MENU** repeatedly until . . . ***DAY*** is displayed.

   Depending on the configuration of your indicator you will see the date displayed in one of three ways:
   - month-day-year, or
   - day-month-year,
   - year-month-day.

2. Press **PRINT/SELECT**.

3. To change the date, key in the new data.

   *If you enter an incorrect digit, press the **ZERO/CLEAR** key to clear the display one digit at a time.*

4. Press **PRINT/SELECT** to return to the operations mode menu — The date is accepted and ***DAY*** is displayed.

   or

   press **GROSS/NET** to return to gross/net weighing mode. — The date is accepted and the display returns to gross/net mode.

Transmitting Data

Your indicator is capable of sending and receiving serial data via an optional Fiber Optics Interface Card to an optional Fiber-Link fiber optics converter.

If your indicator contains this option and is configured to allow printing, from the gross/net weighing mode press the **PRINT**/**SELECT** key. — The **PRINT** annunciator (See Figure 2) will illuminate while data is transmitted and the data configured to be printed will be output to the printer. See Figure 4 for a sample printout.

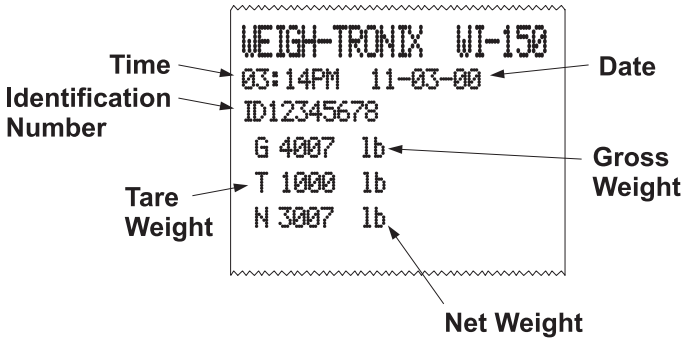
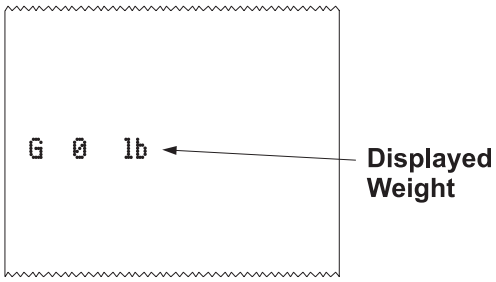


Figure 4
Sample WI-150 Printout

Communication Protocol

A new WI-150 indicator attached to an empty scale and a compatible printer will print the following:



An enquire code can be sent to the AC/DC powered version of the WI-150. This will prompt the indicator to send a standard printout. The default enquire code number is an ASCII decimal 005. This number can be changed in configuration.

The default settings for serial output are:

Baud	1200
Parity	Clear
Stops	1

Test Mode

The test mode is used to test various functions of the WI-150. The test menu is shown in Figure 5. Instructions for using the test menu are found below.

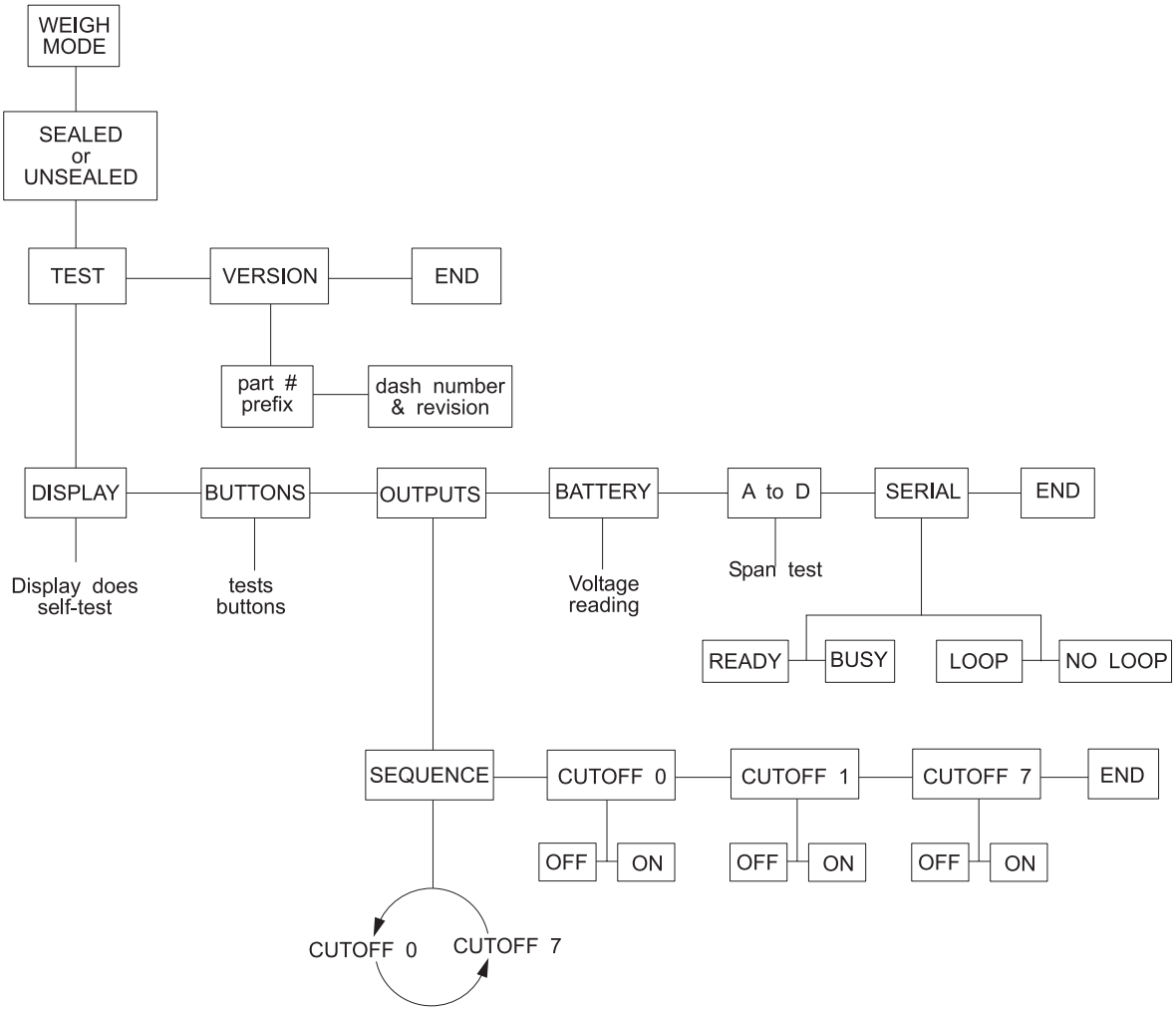


Figure 5
Test Menu

1. Enter the test mode from gross/net operation by pressing and holding the **MENU** key until *TEST* is displayed. *SEALED* or *UNSEALED* is displayed briefly while you hold the key.
2. Move to the right through the menu selections by pressing **MENU** briefly. Move to the left through the menu selections by pressing **MENU** for 1 second or hold down for continuous scrolling.

3. To move down a level in the hierarchy, press **PRINT/SELECT**. Anytime you wish to get to the next higher level in the hierarchy, press and hold **PRINT/SELECT** for approximately 1.5 seconds or press **PRINT/SELECT** whenever *END* is displayed.
4. Press **MENU** to toggle between choices.
5. Press **GROSS/NET** to return to gross/net operation at any time.

Below are the specific directions and explanations for the items you see in the test menu:

VERSION — Under version are the Weigh-Tronix part number and revision number for the software found in your indicator. Weigh-Tronix part numbers are divided into two parts: the prefix and the dash number with revision letter(s).

DISPLAY — With *DISPLAY* displayed, press **PRINT/SELECT** and the top row of annunciators turns on. Press **PRINT/SELECT** again and a dynamic test is run. Press **MENU** to stop the dynamic test or consecutively press **MENU** to step through the display test routine. Press **PRINT/SELECT** when the dynamic test is active to return the unit to *DISPLAY*.

BUTTONS — With *BUTTONS* displayed, press **PRINT/SELECT** and an underscore will appear on the screen. Press any key, except **MENU**, **ON**, or **OFF** keys, to check for proper key functioning. After testing the buttons, press **MENU** to return to the *BUTTONS* display.

BATTERY — Battery voltage is displayed in tenths of a volt. In the battery pack version, the LOW BAT annunciator comes on when the voltage reaches approximately 7.3 volts.

A to D — Displays the analog to digital counts. The span is normally 20000 counts per millivolt per volt. With a calibrator at zero millivolts per volt, the displayed value should be between -200 and +200.

SERIAL — Allows you to test the serial port. *READY* will be displayed. Pressing the **MENU** key puts *LOOP* or *NO LOOP* on the display. With pins 2 and 3 connected on the interface box, *LOOP* is displayed. With them disconnected, *NO LOOP* is displayed. The fiber optics cables from the indicator may be butted together and *LOOP* will be displayed.

Appendix A: Battery Life

Number of Weight Sensors

Percent of Time On	1	2	3	4	6	8
0	2600	2600	2600	2600	2600	2600
5	2019	1962	1912	1871	1787	1730
10	1651	1576	1512	1461	1361	1297
20	1209	1130	1066	1016	922	864
30	954	881	823	778	697	648
40	788	722	670	631	560	518
50	671	612	565	531	468	432
60	584	531	489	458	402	370
70	517	468	430	402	353	324
80	464	419	385	359	314	287
90	421	380	348	324	283	259
100	385	347	317	295	257	235

Battery Life in Hours for WI-150 without SC-150

Number of Weight Sensors

Percent of Time On	1	2	3	4	6	8
0	2600	2600	2600	2600	2600	2600
5	1440	1411	1385	1363	1318	1287
10	996	968	944	924	883	855
20	616	595	576	562	532	512
30	446	429	415	403	384	365
40	349	336	324	315	296	284
50	287	276	266	258	242	232
60	244	234	225	219	205	196
70	219	203	196	190	178	170
80	187	180	173	168	157	150
90	168	161	155	150	141	134
100	152	146	140	136	127	121

Battery Life in Hours for WI-150 with SC-150

Avery Weigh-Tronix

Declaration of Conformance to SMA Standard
Year of Declaration 2002
Production Meets Type

® *

We the manufacturer of

Model	Type	Certificate and Number	Issued by
WI-150	Electronic Indicator	NTEP CC 92-206	NCWM

Declare in our responsibility the conformance of the above listed models and types to the mentioned certificates and the requirements of the SMA standard.

This declaration becomes valid when the SMA Conformance Logo, having our name or trademark is applied to the device or its accompanying documentation.

* SMA PRODUCTION MEETS TYPE DEVICE MANUFACTURER Conformance Logo and Design are a registered trademark of the Scale Manufacturers Association

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