

Avery Weigh-Tronix



Model WI-152 Battery-Operated 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.

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

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WI-152 Specifications

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/ $^{\circ}\text{C}$ Span: ± 10 ppm/ $^{\circ}\text{C}$	Zero: ± 0.066 $\mu\text{V}/^{\circ}\text{C}$ (-10 to 40°C) Zero: ± 0.13 $\mu\text{V}/^{\circ}\text{C}$ (-30 to 60°C)
Linearity:	$\pm 0.005\%$ of capacity, maximum	
Repeatability:	$\pm 0.005\%$ of capacity, maximum	
Hysteresis:	0.005% of capacity, maximum	
Power:	6-volt version 5.5 to 12v @ = 18 mA 12-volt version 10 to 16v @ = 106 mA	
Weigh bar drive capacity:	Up to eight 350 ohm weigh bars. Up to twenty-two 1000 ohm weight sensors.	
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 non-volatile 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 $\pm 100\%$ 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. Push-button 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.	
Automatic Zero Tracking:	Window:	Programmable from 0 to 999999 divisions, decimal entries are accepted.
	Net Mode Tracking:	May be enabled or disabled.
	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.	

12-volt version

- FEATURES:
- +10 to +16v power supply
 - RS-232 serial I/O
 - Real time clock
 - Dual cutoffs

6-volt version

- FEATURES:
- 6 volt battery pack with replaceable D-cells
 - Long battery life—4 1/2 months (40 hours/week, 1 weigh bar, asleep 50% of the time)
 - SLEEP mode to conserve battery power

- OPTIONS:
- RS-232 serial I/O
 - Real time clock
 - Dual cutoffs

Introduction

Battery voltage level can be seen under the diagnostics menu.

The WI-152 is a full-function weight indicator. It comes in two versions. One can be powered by a 6-volt, internal pack of four 'D' size batteries and the other externally by a 12 volt DC source.

This set of instructions 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 the unit is so configured:

- pushbutton tare
- one to ten tare registers (numbered 0-9)
- identification number
- one to two cutoff registers (numbered 0-1)
- 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

There is a master ON/OFF switch on the back of the 6-volt model indicator. 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

Turns the 12 volt version off. Puts the 6-volt model indicator into an ultra-low power consumption mode called the sleep mode.

- ON

Turns the 12-volt version on. Wakes the 6-volt model from sleep mode.

- 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 when keying in values.

- 0

to

9

keypad

Enters numbers and specifies tare and cutoff registers.

- 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.

- 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

The 6-volt model comes with a master ON/OFF switch located on the back of the indicator. With the master switch on, the ON/OFF buttons on the display wake the unit up and put it to sleep. If the master switch is off, the front panel buttons will not operate. If the display reads **ASLEEP**, press the **ON** button to wake it up. The indicator will return to the same mode of operation it was in when it went to sleep.

The 12-volt model has no switch on the back of the indicator. The **ON** button will return the unit to the mode of operation it was in before power was turned off. The **OFF** button turns the unit off.

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.

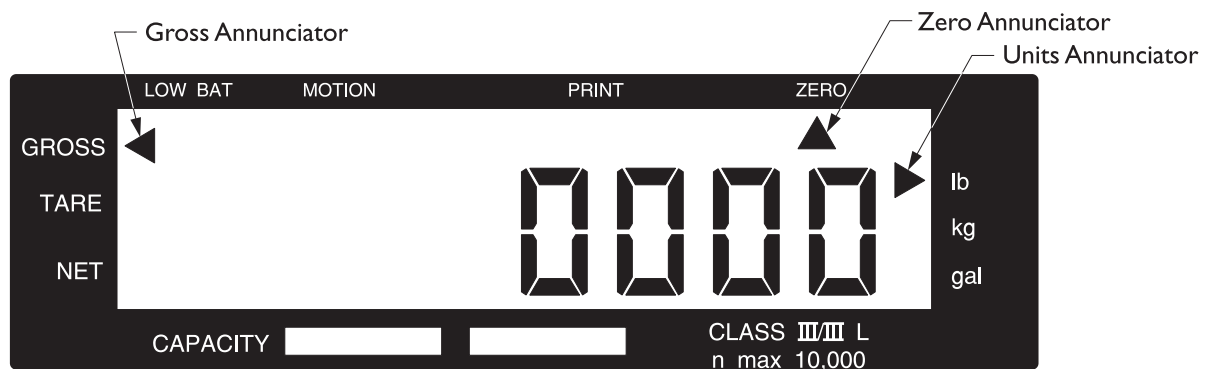


Figure 2
Indicator Display

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. "D" cells should be replaced.
Motion -	Illuminates when indicator detects scale motion.
Print -	Illuminates when the print key is pressed and while data is transmitted.
Zero -	Illuminates when the scale is within $\pm 1/4$ division of zero.

Operations Mode

Your unit is configured to display some or all of the following functions: pushbutton tare, one to ten keyboard tare registers, ID number, one to two cutoff registers, time, and date. These can be viewed and changed if allowed by the security code. **This manual assumes the unit is 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.

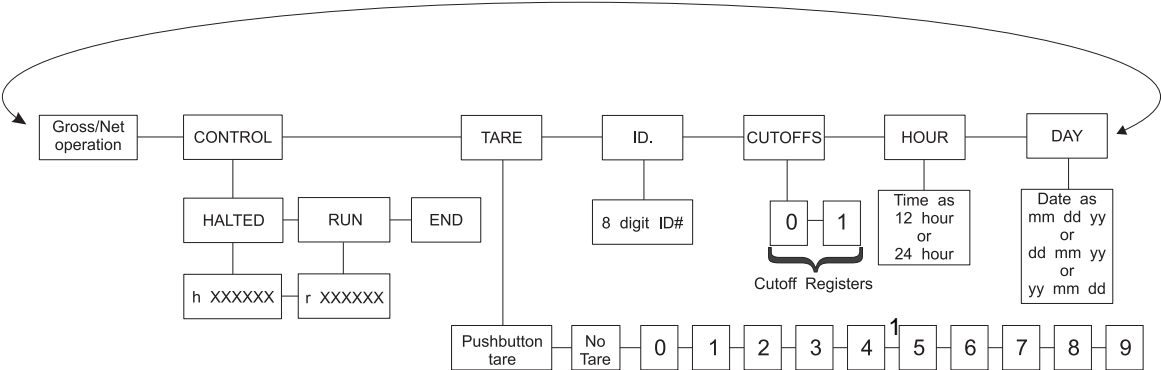


Figure 3
Operations Menu

- Press **MENU** to →
- Press and hold **MENU** to go ←
- Press **SELECT** to go ↑ or ↓
- Press **SELECT** to select new choice and go ↑
- Press **GROSS/NET** at any time to return to gross/net weighing mode

Gross / Tare / Net
Weighing Operations

Gross Weighing

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

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1. Power up the indicator. | Indicator powers up in the same mode of operation as when it was shut off or went to sleep. |
| 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 or net. 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

Pushbutton Tare

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).

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**, then press **CLEAR**.
TARE is displayed, then **NO TARE** is displayed.
 - 2 Press **GROSS/NET** key.
Gross weight is displayed. All tare registers remain intact but are deselected.

Entering, Retrieving and Changing Values in Tare Registers

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

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

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**.

B: With the desired register number displayed and the tare weight on the scale, press **TARE**.
4. Press **MENU** to proceed to next tare register.
5. Press **GROSS/NET** to return to the weighing mode.

The value is accepted and **TARE** is displayed. To set a tare register to 0, key in 0 in step 3A.

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

The gross annunciator illuminates since that is the mode you were in when you pressed the **MENU** button at the beginning of this section.

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-152. 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-152 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. In the WI-152 up to two ingredients can be controlled. 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-152: 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 **setpoint** 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.

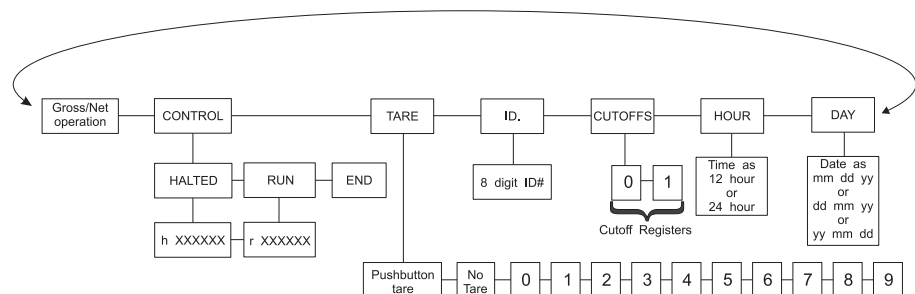
4. Key in a new value as you did in step #3.

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-152 Indicator allows you to control the cutoff process from the front panel. Through the WI-152 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. . .
2. With Control displayed, press **SELECT**. . .

Control is displayed.

HALtEd is displayed.

Key Functions During Cutoff Control

Please note that when a cutoff has been halted, all the keys function as they normally do. (For example, the zero key zeroes the scale, the print key prints, etc.) However, when a cutoff is running, pressing any key will automatically halt the process. This works as an emergency stop. Please note, however, that pressing the **G/N** key not only halts the process but also returns the indicator to normal weigh mode.

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.

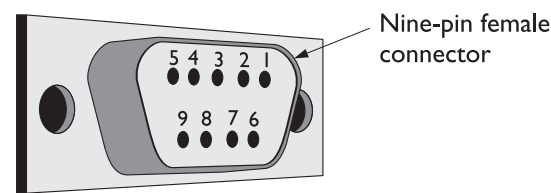
To Return to Gross/Net Weighing Mode

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

Cutoffs are halted and display returns to G/N Weighing Mode.

Cutoff Connections

The cutoff connector located on the bottom of the indicator is a female, 9-pin connector. See Figure 4 for the pin assignments.



Signal Name	Pin Number
+12v (on 12v units)	#9
+ Relay Voltage	#6
Cutoff 1	#1
Cutoff 2	#2
Logic Ground	#5
Shield	Shell

Figure 4
Cutoff connection pin assignments

Viewing and Setting Time

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

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.

Viewing and Setting the Date

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

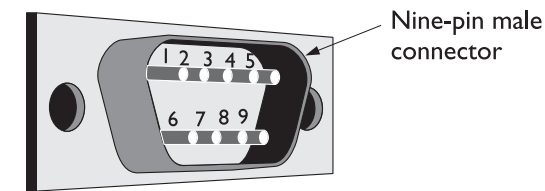
1. From gross/net weighing mode, press **MENU** repeatedly until. . . **DAY** is displayed.
2. Press **PRINT/SELECT**.
Depending on the configuration of your indicator you will see the date displayed in one of three ways:
 - month-day-year, or
 - day-month-year,
 - year-month-day.
3. To change the date, key in the new data.
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 provides an RS-232 output for data transmission. The RS-232 connector is located on the bottom of the indicator and is a male 9-pin connector. Connect a printer following the pin assignments listed in Figure 5.



Signal Name	Pin Number
Transmit to printer	#3
Receive from printer	#2
CTS (BUSY) from printer	#8
DTR (READY) to printer	#4
Logic Ground	#5
Shield	Shell

Figure 5
RS-232 Connector pin assignments

If your indicator 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 6 for a sample printout.

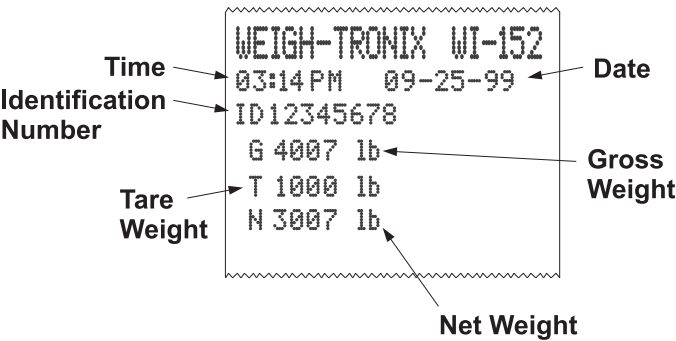
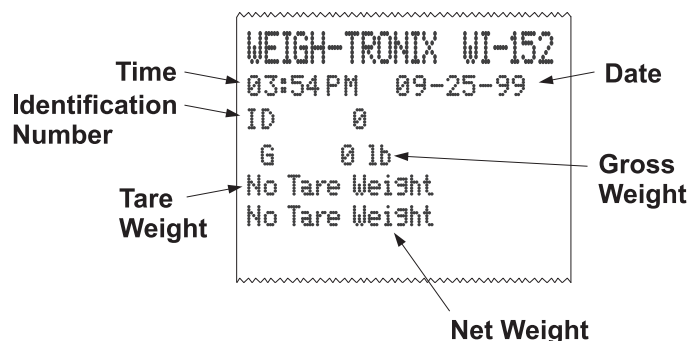


Figure 6
Sample WI-152 Printout

Communication Protocol

A new 12-volt WI-152 indicator attached to an empty scale and a compatible printer will print the following default printout:



An enquire code can be sent to the 12-volt version of the WI-152. 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:

Busy	Disabled
Baud	1200
Parity	Clear
Stops	1

Indicator Diagnostics

Test Mode

The test mode is used to test various functions of the WI-152. The test menu is shown in Figure 7. Instructions for using the test menu are found below.

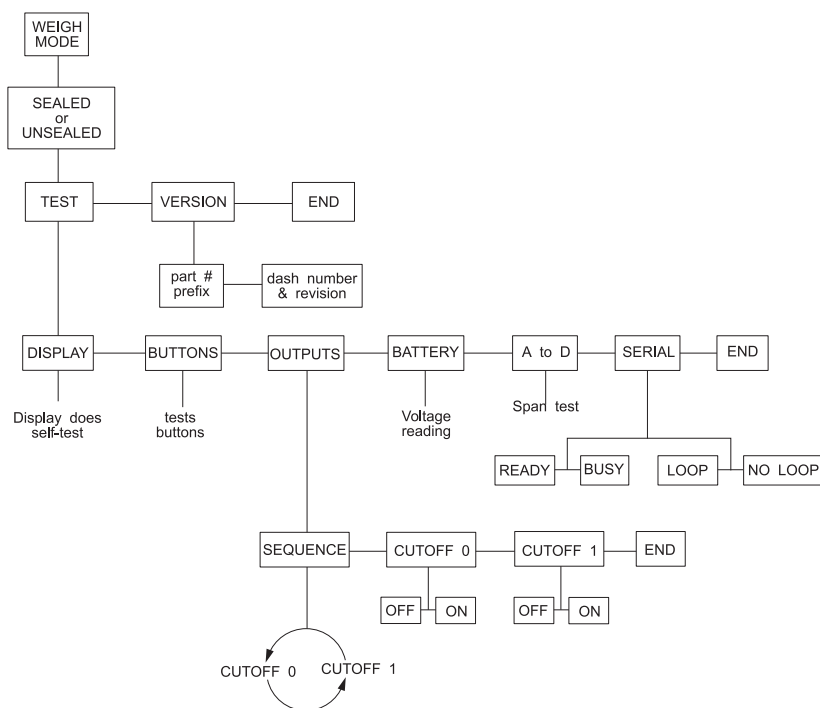


Figure 7
Test Menu

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 machine. Weigh-Tronix part numbers are divided into two parts: the prefix and the dash number.
- 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.
- OUTPUTS** — These tests allow you to turn the cutoffs on and off automatically in sequence, under *SEQUENCE*, or individually, under *CUTOFF 0* and *CUTOFF 1*. When you exit the outputs test, the cutoffs revert to their proper condition according to the weight on the scale.
- BATTERY** — Battery voltage is displayed in tenths of a volt. In the 6-volt version, the LOW BAT annunciator comes on when the voltage reaches approximately 5.6 volts. In the 12-volt version, the annunciator comes on when the voltage reaches approximately 11 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 —	Tells you if the serial output is ready or busy. A jumper connecting pins 4 and 8 of the serial port will cause <i>READY</i> to be displayed. Pressing the MENU key puts <i>LOOP</i> or <i>NO LOOP</i> on the display. With pins 2 and 3 connected, <i>LOOP</i> is displayed. With them disconnected, <i>NO LOOP</i> is displayed.

Avery Weigh-Tronix



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