THE MEASURE OF QUALITY.

BB 8100SS
Digital Weighing Indicator

Operator's Manual
and
Troubleshooting Guide

© Copyright 2013 B&B Scales LLC. All Rights Reserved.

FCC NOTICE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Subpart J of 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 instructions 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/her own expense.

1. CONTENTS

2. INTRODUCTION

The BB 8100 SS Digital Indicator is a general purpose, industrial grade weight indicator with advanced functionality for weighing animals and other non-stationary objects. One model is currently available, distinguishable by display type, enclosure type and power supply.

All models operate identically, can readout up to 50,000 display divisions and can supply enough current for up to 4-350 Ω load cells. All setup parameters may be entered via the front panel keys, including calibration.

If your Model BB 8100 SS Series Digital Indicator is part of a complete floor scale or Weighbeam Scale, it normally arrives fully calibrated and you may skip to the operating instructions. Prior to using the indicator, please read this chapter carefully and completely. Store the manual in a safe and convenient place so it will be available if you have questions concerning the operation of the scale.

Model: BB 8100 SS

Display: Backlit LCD

Enclosure: Stainless Steel

Power Source: 12V DC, 800mA A/C Adapter or internal 6V rechargeable battery.

3. INSTALLATION

3.1 Preparation

Any precision instrument requires a suitable environment in which to operate as intended. Please review each of the following prior to installation:

Electrical Power The BB 8100 SS indicator has been designed to operate from 10 to 12 VDC and ships with an AC adapter designed to operate from the local line voltage. To avoid electrical noise interference and/or stray AC electrical transients, try to operate the indicator from a circuit separate from any equipment containing inductive devices such as a contactor coil, solenoid, relay coil, or motor. Be sure to use shielded cables for the load cell connections (ground shield wire at indicator) and run these cables away from your AC/DC power cables if possible. In extreme cases, it may be necessary to install surge suppressors, line conditioners or even UPS (Uninterruptible Power Supplies) systems (not included).

Environment - Avoid installing the indicator in areas of direct sunlight or high humidity - Avoid sudden temperature change – if this is unavoidable allow equipment to 'soak' at a constant temperature for at least three hours before use - Ensure that steady, clean AC power is available to the unit

IMPORTANT: The installer is ultimately responsible to assure that a particular installation is safe and operable under the specific conditions encountered.

3.2 Connections

The BB 8100 SS typically comes with two five-pin round quick disconnect ports. In most installations, you will only need to use one of these. It does not matter which port you use; simply plug in the home run cable to one of the two ports and tighten the ring screw to ensure a good connection.

In some instances, one of these two ports may be wired to the internal RS-232 port to allow for the connection of a printer or to a computer. This is typically done by special request at the time that you order your scale but is a simple field modification should you desire to modify your indicator. See chapter XREF for more information on modifying indicator ports.

3.3 Connecting The Power Supply

The BB 8100 SS indicator ships standard with an external AC adapter that can be used both to operate the unit and charge the internal battery. Simply plug the AC adapter into the indicator's DC Power Jack first, and then plug into a standard wall outlet.

IMPORTANT: Make sure that the AC voltage at the wall outlet matches the input voltage marked on the AC adapter.

4. CONFIGURATION

4.1 Overview

The indicator contains two main configuration menus: The Setup ("F") menu, which configures the indicator to your weigh platform, and; The User ("A") menu, which configures the serial communication port and enables some user options. The Setup and User menus consist of several menu selections, each with its own sub-menu of selections or programming procedures. To configure the indicator you must first enter the appropriate menu mode. Once there, four of the front panel keys become directional navigators to move around in the menus, and one key is used to save or SET the selections.

4.2 Accessing The Menus

To access the Setup ("F) menu:

1. Power off the indicator.
2. Locate the slide switch on the rear cover and move it to the opposite position.

NOTE: A metal plate held on by two drilled-head screws may conceal the slide switch. (In some jurisdictions it is necessary to seal the indicator to place it "In Service." These drilled screws allow for a wire to be passed through them and sealed, thereby preventing the indicator from being reprogrammed.)

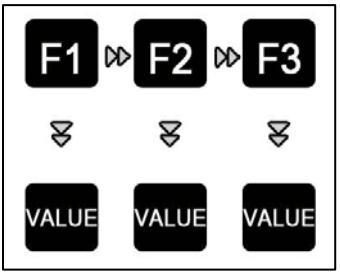
3. Power on the indicator. The display shows" F 1" to indicate that you are in Setup Menu mode.

4. Use the navigation keys shown in the figure below to move through the menus.

To access the User ("A) menu:
1. Enter the Setup ("F") menu as described above.
2. Use the right or left directional keys shown below to move right or left in the Setup ("F") menu until the indicator shows " A 1".

4.2.1 Menu Structure

All menus consist of a top level (heading) and a secondary level. The top level contains the name of the menus (e.g. F1, F2, F3, etc.) for the parameter to be configured. The secondary level contains the value for that menu. Use the directional keys to move around in the Menu Structure as shown below.



1. To move to a new heading, use the TARE (left) or ON/PRINT (right) key to move right or left in the Menu.
2. To view or edit the value of a specific "F" menu, press the ZERO/OFF (down) key once. The currently saved value is shown.
3. To view the other available values for the current value, use the TARE (left) or ON/PRINT (right) key to move through the selection field.
4. To save a new selection, press the ANIMAL HOLD (Set) key .To exit without saving, press the UNITS (up) key to return to the current "F" menu.
5. Repeat Steps 2 through 5 until the Menu is programmed.

4.3 Setup Menu Descriptions

This section provides more detailed descriptions of the selections found in the Setup Menu Chart. Factory-set defaults are shown bold and underlined.

IMPORTANT: Some selections are subject to local legal metrology regulations

Menu Name	Description	Possible Values
F1 Graduations	Specifies number of full-scale graduations, i.e. capacity / division. For example, to program your scale to weigh 5,000lbs you would set this value to 5000, and you would set the value of F9 to 1. To program your scale to weigh 10,000lbs at 2 pound increments, you would set this value to 5,000lbs and you would set F9 to 2. **IMPORTANT:** Value should be consistent with legal regulations and environmental limits on the useful system resolution.	500 1,000 1,500 2,000 2,500 3,000 4,000 **5,000** 6,000 8,000 10,000 12,000 20,000 30,000 40,000 50,000
F2 Sampling Rate	Selects the sampling rate of the indicator. Selections are in samples per second (Hz).	**10**, 80
F3 Zero Track Band	Selects the range within which the scale will automatically zero. Note that the scale must be in standstill to automatically zero. Selections are in displayed in divisions (d).	0 **0.5** 1 3 5
F4 Zero Range	Selects the range (expressed as a percentage of full scale capacity) within which the scale may be zeroed. Note that the indicator must be in standstill to zero the scale.	**100%** 1.9% 2% 20%
F5 Motion Band	Sets the level at which motion is detected. If motion is not detected, the scale can process a Print or Zero command. Maximum value varies depending on local regulations. Expressed as scale divisions per second (d/s).	0.25, **1**,3, 5, 10, 15, 20, 30, 40, 50
F6 Digital Filter	Averages weight readings to produce higher stability. The higher the setting, the greater the accuracy but the slower the response time. Choose the speed that works best for your application.	1, 2, 4 ,**8,** 16, 32 62, 128
F7 Overload Limit	Selects the desired formula which determines the point at which the indicator shows overload. All selections are based on the primary unit selected in F8 ("FS" = Full scale capacity)	FS **FS + 2%** FS + 1d FS + 9d
F8 Calibration Units	Selects the primary unit of measure to be used in the calibration process. This also sets the default for normal operation. You can switch between Pounds and Kilograms by pressing the UNITS key on the face of the indicator. This setting simply sets the default. "1" = primary unit is lb. "2" = primary unit is in kg.	**1 = Pounds** 2= Kilograms

Menu Name	Description	Possible Values
F9 Display Divisions	Determines the desired weight increments. Value should be consistent with legal requirements.	**1** 2 5
F10 Decimal Point Placement	Sets the decimal point, should you need to weigh in tenths, hundredths, thousandths of pounds, etc.	**0,**0.0, 0.00, 0.000, 0.0000, 00
F11 Initial Zero Setting Mechanism (IZSM)	Selects the range (expressed as a percentage of full scale capacity) within which the scale automatically zeroes upon power-up (initialization). If you need the indicator to recall how much weight is on the scale when you first turn on the scale, set this to zero. This is useful for grain carts or other scales that always have weight on them.	**100** 0 2 10 20 100
F12 SmartSense Animal Weighing	Sets the percentage change required for the indicator to reset and take a new weight. For example, if two animals accidently jump on the scale and the scale locks at 3500lbs, the scale will automatically reset itself if there is a change in weight of +/- x% of 3500lbs..	5, 10, 20, 50, 75,**100 (off).**
F16 Zero Calibration	When calibrating the scale, set this value to "1" to begin zero calibration. You usually want to make sure there is nothing on your scale before doing this.	**Press ZERO/OFF to begin calibration**
F17 Span Calibration	When calibrating the scale, set this value to "1" to begin Span Calibration. You must place your test weights on the scale prior to beginning this sequence. When the sequence begins you will have an opportunity to enter the amount of weight you are calibrating your scale with.	**Press ZERO/OFF to begin calibration.**
F18 View Calibration Settings	When you calibrate the scale at F16 and F17, the indicator translates the signal from the load cells into a numeric value. There is one numeric value for ZERO pounds, and another numeric value for the amount of weight you used to calibrate the indicator in F17. This menu allows you to view those numeric values. This is VERY useful if you ever need to recalibrate your scale in the field and you do not have test weights. See F19 and F20 for more information.	**Press ZERO/OFF to view values**
F19 Zero Calibration Override	When you calibrated the scale at ZERO pounds in F16, above, the indicator assigned a numeric value to ZERO. You can view the value at F18, above, then enter it here to mimic ZERO calibration. The scale must be calibrated first using F16 before this will work.	**Press ZERO/OFF to begin procedure**

Menu Name	Description	Possible Values
F20 Span Calibration Override	When you calibrated the scale at F17, you entered a SPAN weight (the amount of your test weights). The indicator translated that to a numeric value that you can view at F18. Enter the SPAN value here to mimic your SPAN calibration. The scale must be calibrated first using F17 for this to work. Use this procedure only in an emergency. It is always better to use certified test weights to calibrate your scale.	**Press ZERO/OFF to begin procedure**
F21 Reset Factory Settings	This completely erases all of the settings in all of your "A" and "F" Menus. **USE WITH CAUTION**.	**Press the ZERO button TWICE to activate**

4.4 User Menu Descriptions

This section provides more information about the "A" Menu (User Menu) functions. Default indicator values are shown in bold and underlined.

NOTE: To get to the "A" Menus, simply follow the instructions to enter the "F" menus and use the arrow keys to scroll left or right until you reach the "A" menus.

Menu Name	Description	Possible Values
A1 Baud Rate	Selects the baud rate for data transmission through the serial port. (The connection to the serial port is not installed by default. You must first wire a port to the internal RS-232 wire block on the mother board.)	1200 2400 4800 **9600** 19200
A2 Data Bits and Parity	Selects the number of data bits and parity of serial transmission. "8n" = 8 data bits with no parity bit and one stop bit "7O" = 7 data bits with odd parity bit and one stop bit "7E" = 7 data bits with even parity bit, one stop bit "7n" = 7 data bits with no parity bit and two stop bits	**8n** 7O 7E 7n
A3 Mode of Serial Transmission	Selects when data will be sent out of the serial port to a printer or computer: "C" = Continuous mode; send data continuously "d" = Demand mode; send data when a PRINT command is issued from the printer, computer, or indicator.	C **d**
A4 Display Check	Actuates the function that illuminates all digit segments, decimal points, and LCD annunciators in a test sequence. Pressing the **ZERO/OFF** key to scroll down one level begins the test sequence	Press **ZERO/OFF** key to begin sequence

Menu Name	Description	Possible Values
A5 Disable the LB/KG key	Allows the lb/kg key to be disabled so that an operator cannot accidentally press the key and change the displayed units. "0" = Disable the lb/kg key "1" = Enable the lb/kg key	0 **1**
A 6 Serial Port Mode	Selects the mode of the RS-232 serial port: Refer to Appendix B for more information. "0" = Full Duplex Mode "1" = Print Ticket Mode	0 **1**
A7 ID No. Enable	Allows the ID number to be disabled in the Print Ticket mode. Valid only when **A6** is set to "1". "0" = Disable the ID No. "1" = Enable the ID No.	0 **1**
A8 ID No. Entry	Actuates the function that allows entry of a new ID No. Valid only when **A6** is set to "1". Pressing the **ZERO/OFF** key to scroll down one level begins the sequence.	0 – 999999 **123456**
A9 No. of Line Feeds	Actuates the function that allows entry of the desired number of line feeds to be printed in Print Ticket Mode. Valid only when **A6** is set to "1". Pressing the **ZERO/OFF** key to scroll down one level begins the sequence.	0 - 99 **8**
A10 Auto Power Off Timer	Selects the automatic power off time in minutes that indicator must be inactive before the indicator will automatically shut off. Setting this value to "OFF " will cause the indicator to always remain on.	Off 1, 2, 3, **5** , 8 10, 15, 20, 30
A11 Animal Hold Mode	Activates automatic animal hold mode in which the weight of the object on the platform is frozen until the weight is decreased by the percentage of weight specified in F12. Selects the "Hold" mode to use. "0" = Disabled "1" = Automatic Hold, "2" = Manual Hold w/ display freeze "3" = Peak Animal Hold	**0** 1 2 3
A12 Handshake Enable	Enables hardware handshaking for Print Ticket Mode. Valid only when **A6** is set to "1". "0" = Disable Handshaking "1" = Enable Handshaking	**0** 1
A13 Print Header	Tells MP-20 printer to print the header information. Valid only when **A6** is set to "1". "0" = Do NOT Print Header "1" = Print Header	**0** 1

Menu Name	Description	Possible Values
A14 Minimum Hold Weight	When automatic hold mode (A11) is enabled, sets the minimum weight that can be held; expressed in scale divisions ("d").	1, 2, **5** , 10, 20 50, 100, 200, 500, 1000

4.5 Exiting The Menus

Exit the configuration menus by moving the slide switch on the rear of the indicator to its original position. The display will go through a digit check, and then settle into Normal Operating mode. All front panel keys will now return to their normal mode of operation.

5. CALIBRATION

5.1 Calibration Overview

IMPORTANT: If your indicator was shipped as a complete scale, then calibration is not necessary. Please check with your installer or supplier if you are unsure.

NOTE: B and B Scales recommends having your weighing equipment checked by a qualified scale technician at least once a year depending on its intended use and working environment.

5.1.1 Before You Begin

Digital indicators work on internal counts. They do not inherently know anything about pounds, kilograms, etc. When you calibrate a digital indicator, you are telling the indicator how many internal counts are equal to zero pounds and how many internal counts are equal to 500 pounds (or however much test weight you use). After you "define" 0lbs and 500lbs, the internal logic is able to convert counts to pounds across the entire capacity of the scale. It is a good practice to try to calibrate the indicator with an amount of weight that is close to what you will actually be weighing. If you are weighing cattle, for example, you will get more accurate readings if you use at least 1200lbs of test weights.

5.1.2 Test Weights

Certified scale companies are required to use test weights that are inspected and certified annually by their local Department of Weights and Measures (usually part of the State Dept. of Agriculture). If you are planning to sell / trade / auction / barter any commodity (including animals) based on its weight, you are required to have your scale certified and "Placed in Service" by a certified scale company or by your local Dept. of Agriculture in almost all jurisdictions.

If you do not require your scale to be "Legal for Trade," here are some ideas for some common items that are routinely sold by weight. You can use these to calibrate your scale provided that you know what they weigh:

- Salt Blocks (typically 50lbs)
- Sacks of Feed (typically 50lbs)
- Sacks of Concrete (typically 50lbs or 80lbs)
- Exercise Weights (as marked)

The indicator requires two types of calibration: zero and span. Zero calibration (F16) requires the scale to be empty (nothing on scale) and the span calibration (F17) requires known test weights. After a successful calibration, you should record all calibration values using the F18 View Calibration procedure. In the unlikely event that any calibration value is lost, the setup menu makes provisions for re-entering these values via F19 and F20; thus eliminating the need for re-calibration with test weights.

NOTE: This section assumes that the indicator is in Setup ("F") Menu mode. If the indicator is not in Setup Menu mode, refer to previous section for instructions.

5.2 Zero Calibration (F16)

1. While in the Setup mode, scroll to "**F 16**", then scroll down once using the ZERO/OFF key to enter zero calibration menu. The display will momentarily show "**C 0**" followed by a value. This value is the internal A/D count and can prove useful when trying to troubleshoot setup problems.

2. After making sure that there are no test weights on the platform, press the ZERO key to zero out the displayed value. The indicator should be stable at 0 and should not jump around. If you cannot zero the indicator at F16, check your load cell connections and try again. This is usually a load cell issue.

3. Press the ANIMAL HOLD key to save the zero point value. The display will show "**EndC0**" momentarily, and then revert back up to F16. At this time, proceed to the F17 span calibration to complete indicator calibration.

5.3 Span Calibration (F17)

1. While in the Setup mode, scroll to "**F 17**", then scroll down once using the ZERO/OFF key to enter span calibration menu. The display will momentarily show "**C 1**" for the span calibration point, followed by a value with one flashing digit. This value will be zero with the Decimal Point parameter selected in F10.

2. Place the test weights in the center of the weighing platform.

3. Use the four directional keys to change the displayed value to the actual test weight value. Increase the flashing digit by pressing the UNITS key. Decrease the flashing digit by pressing the ZERO/OFF key. Pressing the TARE key or the ON/PRINT key will change the position of the flashing digit.

4. After entering the exact value, press the ANIMAL HOLD key to save the value. If the calibration was successful, the display will show "**EndC1**" momentarily, and then revert back up to F17

5. At this time it is suggested that the calibration values be recorded for future use (see next section).

5.3.1 Calibration Troubleshooting

If the calibration was *not* successful, one of the error messages below will appear. Take the indicated action to correct the problem, then perform a new calibration.

"**Err0**" - The calibration test weight or the keyed-in weight is larger than the full capacity of the scale. Change the calibration test weight or check the input data.

"**Err1**" - The calibration test weight or the keyed-in weight is smaller than 1% of the full capacity of the scale. Change the calibration test weight or check the input data. Remember, the more weight you can use to calibrate your scale, the more accurate it will be.

"**Err2**" – There is not enough signal from the load cells to establish a proper calibration. Most common causes include incorrect load cell wiring, a mechanical obstruction or a faulty (damaged) load cell or junction box.

- Check to make sure that the arrows on the load cells are all pointing the same direction (it does not matter if they are pointing up or down as long as they are all the same.)
- Check the connections in your junction box.
- Try switching the white and green wire on the cable that connects the junction box to the indicator. This is a frequent cause of this error.
- Check that the feet on the load cells are not preventing the load cell from deflecting.
- Rarely, a wire will come loose inside the indicator. Remove the back panel of the indicator and make sure that the quick disconnect ports are properly wired into the wire block on the motherboard.

5.4 View Calibration Values (F18)

Note: The values displayed in this procedure are valid only after a successful calibration has been performed using F16 and F17

1. While in the Setup mode, scroll to "**F 18**", then scroll down once using the ZERO/OFF key to enter View calibration menu.

2. The display will show the information listed on your calibration certificate at the back of this manual. The code will display briefly followed by the value. Press any key to continue down the list. At the completion of the list, the indicator reverts back up to F18.

5.4.1 Key-In Zero Calibration Value (F19)

Note: This procedure is intended for emergency use only in the case of non-volatile memory loss.
A valid zero calibration value, obtained from a successful F16 calibration procedure, must be used. 1. While in the Setup mode, scroll to "**F 19**", then scroll down once using

the ZERO/OFF key. The display will momentarily show "**CAL 0**", followed by a value of zero 2. Use the four directional keys to enter in the actual zero calibration value. 3. After entering the exact value, press the NET/GROSS key to save the value. The display will show "**E CAL 0**" momentarily, and then revert back up to F19.

5.4.2 Key-In Span Calibration Value (F20)

Note: This procedure is intended for emergency use only in the case of non-volatile memory loss. Valid span calibration values, obtained from a successful F17 calibration procedure, must be used.

1. While in the Setup mode, scroll to "**F 20**", and then scroll down once using the ZERO/OFF key. The indicator will prompt you to enter the span calibration data from the Calibration Certificate at the back of this manual.

2. Use the four directional keys to enter in the actual calibration value

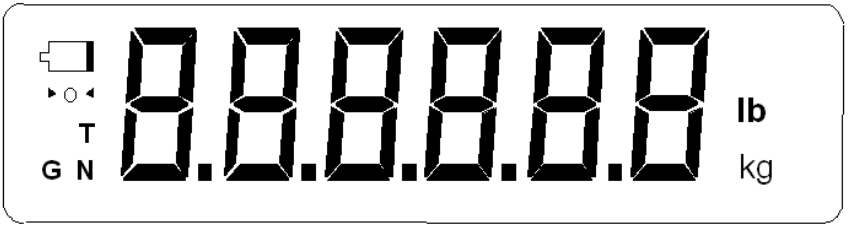
3. After setting the exact value, press the NET/GROSS key to save the value.

4. If the entered values are entered successfully, the display will show "**E CAL 1**" momentarily before reverting back up to F20.

6. FRONT PANEL CONTROLS

6.1 Display

This model utilizes a 6-digit LCD (Liquid Crystal Display). The table below summarizes the display annunciators.



Symbol	Meaning
→0←	True zero, within the tolerances that are set for zero.
T	Tare weight is displayed
N	Net Weight is displayed
G	Gross Weight is displayed
Lb, kg	Displayed weight is measured in Pounds or Kilograms
	Battery requires recharging
	The scale is at rest (stable).

6.2 Keypad

The keypad is composed of fourteen function keys shown below.

6.2.1 Primary Function Keys

Units – This key toggles the indicator among the available weight units if enabled in the User ("A") menu. Available weight units include lb and kg.

Zero/Off - This key sets the indicator to display zero provided the following conditions are met:

1. The indicator is displaying Gross weight.
2. The displayed weight is within the zero reset range that is programmed in F4 of the Setup ("F") Menu.
3. The scale is not in motion.
4. The scale is not in overload (see Appendix D for error codes). When held for five seconds, shuts the unit off.

Animal Hold - This key toggles turns on and off the manual Animal Hold provided that the Animal Hold function is programmed in manual mode (A11).

Tare - This key is used to establish a Tare provided the following conditions are met:

1. The indicator is not at or below Gross zero.
2. The scale is not in motion.
3. The scale is not in overload (see Appendix D for error codes).

On/Print – When the unit is off, turns the unit on. When the unit is on, this key is used to send weight information out to the serial port provided the following conditions are met:

1. The scale is not in motion.
2. The scale is not in overload (see **Appendix D** for error codes).

7. GENERAL SCALE OPERATION

7.1 Weighing An Item

1. Select the desired weighing unit by pressing the UNITS key until that unit is indicated on the display.

2. If necessary, press the ZERO/OFF key to obtain a weight reading of zero.

3. If weighing an item in a container, place the empty container on the scale's platter and, after allowing the weight indication to stabilize, press the TARE key. The display shows zero weight and turns the NET annunciator on

4. Place the object to be weighed on the scale's platter and allow the weight indication to stabilize. If the item weight exceeds the scale's weight capacity, it displays "oooooo".

5. Read the weight shown on the display. If you have established a tare, you may toggle between the gross weight and the net weight by pressing the NET/GROSS key

WEIGHING ANIMALS Here are some tips when using the automatic hold function (A11) to weigh animals:

- Use a setting of "8" or lower for F6 (Digital Filter). Using higher settings will likely cause the indicator to lock onto the wrong weight prematurely.
- Use the Motion Band setting (F5) to adjust for the motion of the loads. If the setting is too low, then the indicator may never lock onto a weight. If the setting is too high, the indicator may not lock the weight accurately.
- Another approach is to completely disable automatic hold (A11) and use a large setting for Digital Filter (F6).

8. RECHARGEABLE BATTERY INFORMATION

8.1 Overview

IMPORTANT: Your scale contains an internal lead-acid rechargeable battery. Before using the indicator for the first time, please charge the battery overnight.

The indicator's battery should operate for about 40 hours if connected to a four load cell platform and left on continuously. Greater usage times can be achieved by selecting an appropriate Auto Power Off Period under **A10** of the User Menu.

The battery can be charged while ON or OFF and the indicator can be operated while it's charging unless the state of charge is very low.

8.2 When To Charge The Internal Battery

The best time to charge the sealed lead-acid type battery is any time the indicator is not in use. You need not wait for the Low Battery Indication – in fact it's best that you don't. Charging the battery when not in use keeps the battery "fresh" and is the recommended way to manage it. When the battery needs to be charged, the Low Battery Indicator will slowly flash in the upper left hand corner of the display. The indicator may be used for an additional 10 minutes without damage to the internal battery. Halfway thru this time, the Low Battery Indicator will start to flash quickly. Eventually, the indicator will display "bAtt" for 2-3 seconds and then automatically power down. ***It is imperative that you charge the battery at this time to avoid damage.***

8.3 How To Charge The Internal Battery

1. Connect the charger (AC Adapter 12 VDC, 800mA) to the scale, and then plug the charger into an AC outlet. ***Make sure that the AC voltage appearing at the wall outlet matches the input voltage marked on the AC adapter.***

2. After the charging period expires, unplug the charger from the AC outlet, then from the scale. The scale is now ready for use under its own battery power. **NOTE:** The charger may be left connected to the scale indefinitely without damage to the internal battery.

8.4 How Long To Charge The Internal Battery

In general, the battery should be allowed to charge a minimum of 1.5 hours for every hour of use. If you discharge the battery below 50% and do not allow the proper time for charging, you may start to notice a decline in the usage period. This is normal and eventually the battery must be replaced.

8.5 Replacing The Battery

The recommended practice when removing the battery is to disconnect the ground connection (black) first, then the red terminal. This ensures that a short circuit will not occur from a battery lead or fuse lead touching the grounded housing while disconnecting the other terminal. Similarly, the ground should be connected last when installing a new battery.

IMPORTANT: The US government has classified the internal battery as hazardous waste. Do not discard battery in a landfill. An automotive store or a local waste agency may accept the batteries for recycling. Contact the manufacturer for more information.

9. LEGAL FOR TRADE SEALING

This indicator can be sealed for commercial (Legal for Trade) applications as follows.
1. Power off the indicator.
2. On the back of the indicator, locate the setup/calibration switch cover.
3. Thread a wire security seal through both drilled head screws securing the calibration switch cover as well as the single drilled head screw holding on the rear panel.

10. SPECIFICATIONS

ANALOG SPECIFICATIONS
Full Scale Input Signal ±3.125 mV/V
Minimum Sensitivity - Non trade 0.3 V / grad
Minimum Sensitivity - H-44 0.6 V / grad
Input Impedance 30M , typical
Internal Resolution Approximately 280,000 counts @ 2mV/V input
Display Resolution 50,000 display division max
Measurement Rate 10 Hz/80 Hz selectable
System Linearity Within 0.02% of FS
Calibration Method Software Calibration, with long term storage in EEPROM
Excitation Voltage +4.7 VDC, 4 x 350 load cells

DIGITAL SPECIFICATIONS
Microcontrollers Winbond W78E516
Program Memory 64K x 8, internal to C
SRAM: 512 x 8, internal to C
EEPROM: 256 x 8, external to C
Digital Filtering Software selectable

SERIAL COMMUNICATIONS
Serial Port Full Duplex, selectable Baud rate
8 data bits, no parity, 1 stop bit
7 data bits, odd parity, 1 stop bit
7 data bits, even parity, 1 stop bit
7 data bits, no parity, 2 stop bits

OPERATOR INTERFACE
Display 0.8" (20 mm) 7-segment, LCD, 6 Digit
Additional Symbols Net, Gross, Stable, Tare, lb, kg, Zero, Low battery
Keyboard 5-key flat membrane panel

POWER
AC Adapter 12 VDC, 800 mA
Rechargeable Battery 6 V, 3Ah lead-acid
DC Power Consumption 70mA + 13mA/350 Load Cell

ENVIRONMENTAL
Operating Temperature –10° to +40 C
Storage Temperature -25° to +70 C

MECHANICAL
Overall Dimensions (L x W x H) 9.0" x 5.5" x 2.9" (231mm x 140mm x 72mm)

APPROVALS
NTEP COC # 94-080A2

11. SERIAL PORT INFORMATION

11.1 Serial Port Modes

11.1.1 Demand Duplex Mode

The Demand Duplex Mode (A3 = 'd', A6 = '0') provides a two way serial transmission mode In this mode, the output information is transmitted on demand; either by pressing the PRINT key on the indicator's front panel or upon receiving a recognized command from a host device (i.e. computer). **NOTE**: Ensure that your cabling contains the proper handshaking.

11.1.2 Continuous Duplex Mode

The Continuous Duplex Mode (A3 = 'C', A6 = '0') provides a two-way serial transmission mode. In this mode, the output information is transmitted continuously making it a popular choice for remote displays and other remote devices requiring a constant data stream. The transmission automatically occurs at the end of each display update. The indicator will react upon receiving a recognized command from a host device.

11.1.3 Recognized Host Commands

These commands apply to both demand and continuous duplex modes.
"P" - This command is sent to the indicator to print the indicated display. The indicator will not respond if the scale is in motion, positive overload or negative overload.
"Z" - This command is sent to the indicator to zero the scale. The indicator will not respond if the scale is in motion, positive overload or negative overload. The indicator will also not respond if it is not in gross mode or within the zero range specified in F4 of the Setup Menu.
"T" - This command is sent to the indicator to tare the scale. The indicator will not respond if the scale is in motion, positive overload or negative overload. The indicator will also not respond if it displaying a negative gross value.
"G" - This command is sent to the indicator to switch to gross mode. The indicator will not respond if the scale is in motion, positive overload or negative overload.
"N" - This command is sent to the indicator to revert to net. The indicator will not respond if the scale is in motion, positive overload or negative overload. The indicator will also not respond if a tare has yet to be established.
"C" - This command is sent to the indicator to toggle among the configured units of measure.

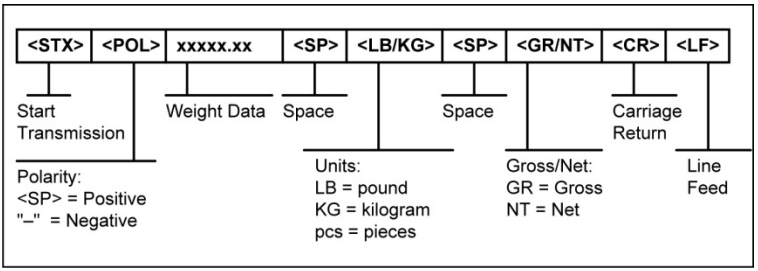
11.2 OUTPUT STRINGS

11.2.1 Text Print Ticket

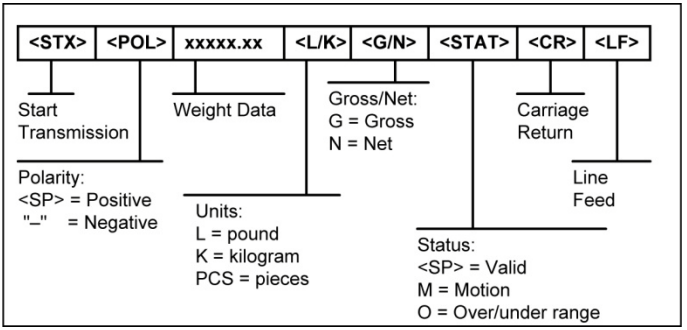
The Text Print Ticket is designed specifically for a serial printer. Ensure that A6 is set to '1'. For printers with limited buffers, this mode supports DTR pin handshaking. The DTR pin from the serial printer is wired to the indicator's RXD pin which then functions as a CTS pin. Refer to the printer's user manual to confirm which pin is the DTR pin.

```
ID. NO.    123456
GROSS       25.00 LB
TARE         1.48 LB
NET         23.52 LB
```

NOTES:
1. The TARE and NET fields are not printed unless a tare has been established in the system.
2. The ID number field is not printed if it is disabled in A7 of the User Menu.
STRING FORMAT 1 (Condec Demand String) String Format 1 is designed for two-way communication. Ensure that A3 is set to 'd' and A6 is set to '0'.



STRING FORMAT 2 (Condec Continuous String)
String Format 1 is designed for one-way communication. Ensure that A3 is set to 'C' and A6 is set to "0."



12. ERROR CODES

CODE	MODE	MEANING / POSSIBLE SOLUTION
❒❒❒❒❒	Normal Operating Mode	Gross Overload. A weight greater than the rated capacity has been applied to the scale. Remove the weight from the platter or try re-calibrating the scale. Otherwise, check for a bad load cell connection or possible load cell damage due to overloading.
Err 0	Span Calibration Mode (F17)	Keyed-in weight value is larger than full-scale capacity. Use a smaller test weight or check keyed-in value.
Err 1	Span Calibration Mode (F17)	Keyed-in weight value is less than 1% of full-scale capacity. Use a larger test weight or check keyed-in value.
Err 2	Span Calibration Mode (F17)	There is not enough load cell signal to produce the internal counts necessary to properly calibrate the scale. First check all load connections. Use F16 mode to view internal counts.
Err 3	All Modes	Non-volatile memory read error. One or more setup parameters have been lost.
Err 4	All Modes	Non-volatile memory write error. Indicator needs service.
Err 5	Key-in Span Calibration Mode (F20)	You have attempted to enter a zero value for C1. Enter a known calibration value greater than zero.
Err 7	Initialization	No reading from A/D converter. Check load cell connections. Check for faulty load cell.
Err 9	Normal Operating Mode	Span calibration value has been lost. Re-calibrate the scale.
	Normal Operating Mode	When blinking slowly, indicates that battery life has reached its useful end and needs to be recharged soon. When blinking quickly, indicates that the unit will soon power down indeterminately
Flashes "bAtt"	Normal Operating Mode	Indicates that the unit must power down automatically within 2-3 seconds in order to help prevent damage to the internal rechargeable battery

13. Certificate of Calibration

This scale was programmed and calibrated prior to delivery by

B&B Scales LLC
5386 Santa Teresita Dr.
Santa Teresa, NM 88008
New Mexico Department of Agriculture License No. 00546

As follows:

☐ Scale was pre-programmed but not calibrated because the indicator was sold as part of a Build Your Own Scale Kit or a standalone indicator.

☐ Scale was calibrated as follows:

Type of Scale_____
Calibrated Capacity _____
Resolution _____
NIST Class F Cert. Test Weights used during cal: _____
Emergency F19 (zero) Calibration Value: _____
Emergency F20 (span) Calibration Value: _____

Certified by:

_____ _____
Certified Scale Technician Date

B & B Scales LLC
www.bbscales.com
sales@bbscales.com
575-332-4111