# 120 Plus

*Digital Weight Indicator*
*Software Version 5.00*

# Technical Manual

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PN 105914 Rev B

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# 1.0 Introduction

This manual is intended for use by service technicians responsible for installing and servicing 120 Plus digital weight indicators. This manual applies to indicators using Version 5.0 of the *120* software.

This manual can be viewed and downloaded from the Rice Lake Weighing Systems web site at **www.ricelake.com**.

## 1.1 Overview

The 120 Plus weight indicator is a precision digital weight indicator that takes portability to a new level. The feature of running on a rechargeable battery pack allows the 120 Plus to operate anywhere.

The indicator front panel consists of a backlit, six-digit, 7-segment LCD display and a set of keys. The prominent features of the 120 Plus include:

- Large 0.82", six-digit LCD display
- Powered either by an internal rechargeable battery or an external 5VDC wall adapter.
- Built in battery charging circuit
- Drives up to four 350 ohm or eight 700 ohm load cells
- Supports 4- to 6-wire load cell connections
- EDP Port; full duplex, RS-232 communications at up to 38400 bps
- Printer port for output only RS-232 and 20 mA current loop communications at up to 9600 bps
- One 500 character print ticket format
- Configurable shut-down and back light modes to prolong battery life
- Clock for print formats
- Battery level indication
- Three mode ***HOLD*** function
- ***OPTION*** setpoint and remote switch

## 1.2 Safety

### Safety Symbol Definitions

**WARNING** *Indicates a potentially hazardous situation that, if not avoided, could result in serious injury or death, and includes hazards that are exposed when guards are removed.*

**CAUTION** *Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.*

**Important** *Indicates information about procedures that, if not observed, could result in damage to equipment or corruption to and loss of data.*

### Safety Precautions

*Do not operate or work on this equipment unless you have read and understand the instructions and warnings in this manual. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Rice Lake Weighing Systems dealer for replacement manuals. Proper care is your responsibility.*

### General Safety

**WARNING**

*Failure to heed may result in serious injury or death.*

*Some procedures described in this manual require work inside the indicator enclosure. These procedures are to be performed by qualified service personnel only.*

*DO NOT allow minors (children) or inexperienced persons to operate this unit.*

*DO NOT operate without the enclosure completely assembled.*

*DO NOT use for purposes other than weight taking.*

*DO NOT place fingers into slots or possible pinch points.*

*DO NOT use this product if any of the components are cracked.*

*DO NOT exceed the rated specification of the unit.*

*DO NOT make alterations or modifications to the unit.*

*DO NOT remove or obscure warning labels.*

*DO NOT submerge.*

*Before opening the unit, ensure the power cord is disconnected from the outlet.*

## 1.3 Operating Modes

The 120 Plus supports the following modes of operation:

| Mode | Description |
|---|---|
| Normal mode | Also known as the weighing mode. The display shows measured weights in the units required. See Section 1.5 for more information. |
| Setup (configuration) mode | Configuration mode allows user to modify parameter values and calibrate the indicator. See Section 3.0 for more information. |
| Test mode | Test mode performs diagnostic functions for the indicator. See Section 4.0 for more information. |
| Panel mode | Panel mode provides access to setting the serial port, non-metrological parameters, time, date, consecutive numbering, print formats, setpoints and test items. This is all done without the need to press the setup switch. See Section 5.0 for more information. |

*Table 1-1. 120 Operating Modes*

## 1.4 Front Panel Keypad

Figure 1-1 shows the 120 Plus keypad.

See Section 3.0 on page 13 for information about using the front panel keys in configuration mode.

*Figure 1-1. 120 Front Panel*

The key functions are described in the following table:

| Number | Name | Function |
|---|---|---|
| 1 | Power/Zero | Turns indicator on or off. Secondary use, it provides zero function. |
| 2 | Tare | Acquire the weight of the scale as tare. |
| 3 | Preset Tare | Methods of use:<br>Short press = recall preset tare data<br>Long press = enter preset tare value into memory |
| 4 | Hold | Activate the hold function. |
| 5 | Gross/Net | Toggle between gross and net weight. |
| 6 | Units | Toggle user defined units. |
| 9 | Numeric Key | Used to navigate through menus, select digits within numeric values, and increment/decrement values.<br>Symbols shown on the 2, 4, 6, 8 keys (up, down, left, right) describe these key functions assigned in configuration and panel modes. |
| 8 | Clear | Clears the value except in normal weighing mode |
| 7 | Enter/Print | Press to print<br>Symbol shown on the Print key (enter) describe this key function assigned in configuration and panel modes. |

*Table 1-2. 120 Plus Key Functions*

## 1.5 LCD Annunciators

The 120 Plus display uses a set of LCD annunciators to provide additional information about the value being displayed.

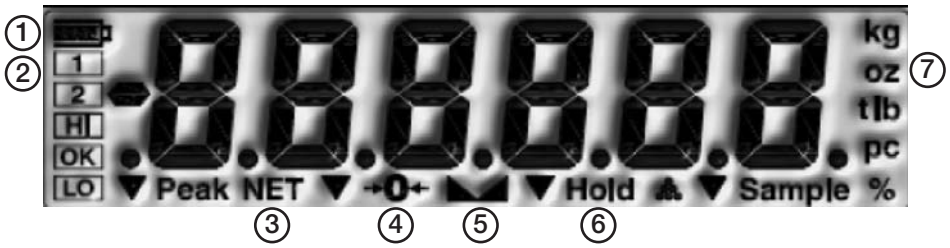



*Figure 1-2. 120 Plus LCD Annunciators*

The following table displays the functions of the LCD annunciators.

| Number | Name | Function |
|---|---|---|
| 1 | Battery Level | The icon indicates the level of the battery. |
| 2 | Setpoint 1 & 2 | The **1** and **2** icons indicate the status of set point 1 and 2. |
| 3 | Gross/Net | The ***NET*** icon is shown if the displayed weight is the NET weight. Otherwise it's a gross weight. |
| 4 | Center of Zero | The →0← icon shown if the gross weight is within 0.25 graduation of zero. |
| 5 | Standstill | The icon shows that the scale is at a standstill or within the specified motion band. Some operations including tare function and printing can be done only when the standstill symbol is displayed. |
| 6 | Hold | The ***HOLD*** icon indicates that hold is active. |
| 7 | Units | The Lb, Oz, Kg, t and g icons indicate the units of the displayed value.<br>Lb - pound<br>Oz - ounce<br>Kg - kilogram<br>g - gram<br>t - tons<br>In weighing mode, press UNITS to toggle through the units.<br>For example:<br>If the primary unit is in pounds (Lb) and the secondary unit is in kilograms (Kg), the Lb LCD is lit for primary units, Kg for secondary units.<br>If the primary unit is in kilograms (Kg) and the secondary unit is in pounds (Lb), the Kg LCD is lit for primary units, Lb for secondary units.<br>NOTE: In OIML mode, only primary unit=kg and secondary=g are allowed. |

*Table 1-3. LCD Annunicators*

## 1.6 Rear View

Figure 1-3 shows the rear view of the 120 Plus.

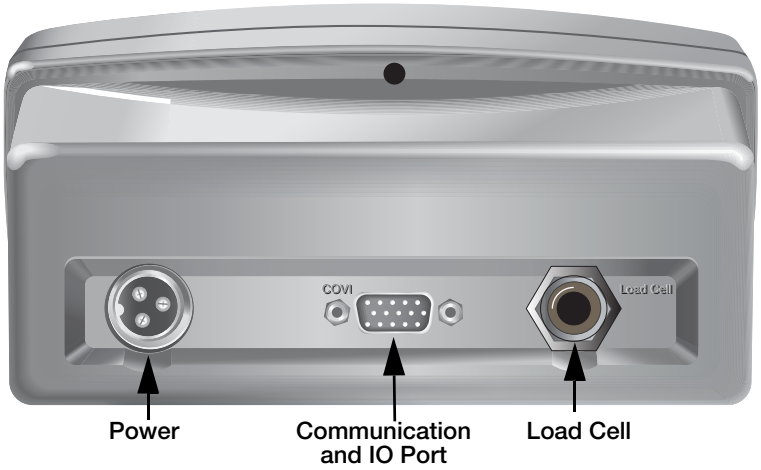



*Figure 1-3. Rear View of the 120 Plus Indicator*

## 1.7 Setup Switch

Figure 1-4 shows the location of the setup switch.

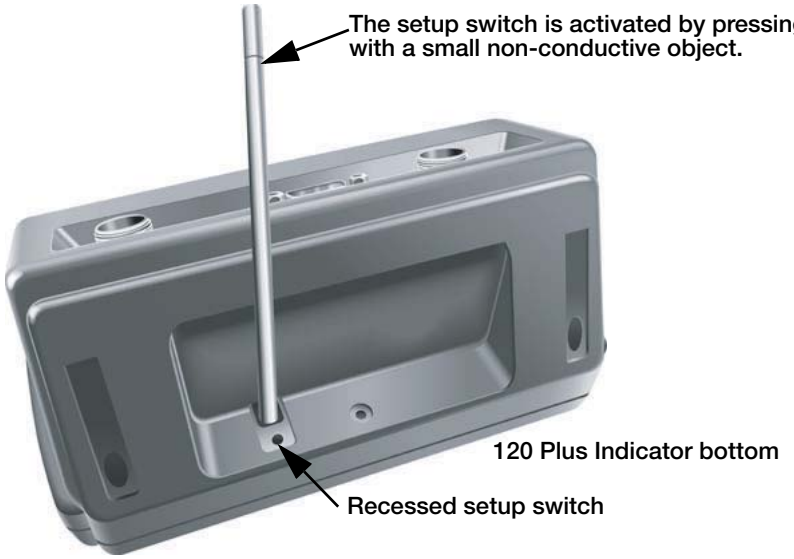



*Figure 1-4. Setup Switch Location*

The setup switch can only be activated by using a thin object to press it as shown in Figure 1-4.

The setup switch is used for entering configuration and calibration modes. In this mode, different parameters of the weight indicator can be configured and calibrated.

Note ***This operation should be performed only by a qualified technician; calibration of the indicator may be disqualified if performed by anyone else. The indicator should always be sealed after initial configuration. Sealing materials can be non-reversible lead seals or stickers.***

## 1.8 Indicator Operations

The basic operations of the 120 Plus are summarized in the following sections.

### 1.8.1 Zero Scale

1. In gross mode, remove all weight from the scale and wait for the standstill annunciator (◣ ◢).
2. Press ZERO. The center of zero (→0←) annunciator lights to indicate that the scale is zeroed.

### 1.8.2 Acquire Tare

1. Place a container on the scale and wait for the standstill annunciator (◣ ◢).
2. Press TARE to acquire the tare weight of the container. The indicator switches to net mode.

### 1.8.3 Remove Stored Tare Value

1. Remove all weight from the scale and wait for the standstill annunciator (◣ ◢).
2. Press TARE (in NTEP mode) or ZERO (in OIML mode). The indicator switches to gross mode, indicating that the tare value has been removed.

### 1.8.4 Keyed Tare

Using the numeric keypad, enter the desired tare weight in the currently displayed units and press TARE or PRINT. If entered correctly, the tare weight is stored and the display shows the net weight.

Note *The keyed tare must be >0.*

### 1.8.5 Store Preset Tare

1. In order to program a tare value, hold PT Preset Tare for two seconds. Then the 120 Plus will display ***ProPt x***.
2. Press a numeric key. This is the memory to be programmed.
3. The 120 Plus will recall the preset tare and display it. Then enter the preset tare value and press PRINT.

Note *The format depends on the PRI.DECPNT and SEC.DECPNT definition, the entered value depends on the display units. Press* UNITS Units *to change it.*

The 120 Plus will store the new value in the memory designated.

### 1.8.6 Toggle Units

Press UNITS Units to switch between primary and secondary units.

### 1.8.7 Print Ticket

1. Wait for the standstill annunicator (◣ ◢).
2. Press PRINT to send data to the serial port.

### 1.8.8 Recall Preset Tare

1. Press PT Preset Tare, ***Pt x*** displays.
2. Enter a number. If a number is not entered within five seconds, the 120 Plus returns to normal weighing mode.
3. After entering the number, the 120 Plus will recall the preset tare, display it for two seconds, and switch to ***NET*** mode using the recalled ***PT*** value.

### 1.8.9 Hold Display

There are four modes for the hold function, see Section 3.5 on page 22.

#### Toggle Hold Mode

1. Wait for the standstill annunciator (◣◢). The wait time will depend on the setting of the motion band parameter.
2. Press HOLD Hold to freeze the display. The ***HOLD*** annunciator is lit on the display.
3. Press HOLD Hold again to return to the weighing mode.

Note *Only one print is allowed during Hold mode.*

#### Average Hold Mode (Live Weight Averaging)

1. Place an item on the scale and wait until the display has stabilized.
2. Press HOLD Hold to start average weighing. During the sample period weighing, the current average weight appears on the display and then the final weighing result is displayed with the symbol ***HOLD***. The weight indicator calculates the mean value from a hundred weighing operations within ***AVGTM*** seconds.
3. Press HOLD Hold again to go back to weighing mode, or wait until the ***HOLDTM*** minute.

Note *When HOLD Hold is pressed for the first time, the weight indicator does not wait for a stable signal. It is possible to press HOLD Hold before placing an item on the scale. Averaging will begin when the load has stabilized (via setting MOTBAND).*

#### Auto Hold Mode

1. While the net weight is within the zero band, the indicator shows the current weight. Press TARE in NTEP mode or ZERO to clear any residual weight and return the scale to the zero state.
2. Press HOLD Hold to enter the Auto Hold Mode. The current weight displays and alternately flashes ***READY*** message and the ***HOLD*** symbol, if the weight stays inside than the zero band.
3. Place the item to be weighed on the scale. Once the weight exceeds the zero band and the signal is stable, the indicator begins to calculate a long term average (selectable time, ***AVGTM***) that re-calibrates for any movement in the mass. During the selectable time the signal must be stable, if not, time starts again. The display flashes the ***HOLD*** symbol and shows the current average value. The ***HOLD*** symbol is displayed continuously when the final sample weight is shown on the display.
4. Press HOLD Hold to force the sample to be re-calculated.
5. Press any other key to go back to the weighing mode. Once the weight has returned to zero ***dead*** band, the cycle can be repeated without any pressing any key.

Note *The definition of zero band is 5DD or 5 scale divisions of center of zero.*

# 2.0 Installation

This section provides information for connecting the indicator to a loadcell, digital inputs and outputs, and serial communications cables. Battery installation is also described in this chapter in Section 2.5.

To power up the 120 Plus indicator, press the **ZERO** key on the front panel. The indicator must be installed near an easily accessible power source or can be operated on an internal battery.

The various sockets on the 120 Plus are shown in Figure 2-1.

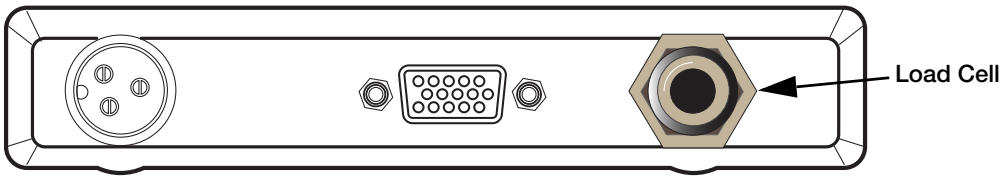
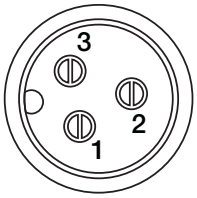



*Figure 2-1. 120 Plus Cable Connections*

## 2.1 Power Connector

The following table details the power connector pin functions.




| Pin | Designation | Function |
|---|---|---|
| 1 | DC+ | Power Source |
| 2 | DC- | Power Source |
| 3 | Earth | Power Return |

*Table 2-1. Power Connection Pin Outs*

## 2.2 Serial/Print Connector

Table 2-2 details the serial pin connector functions:

| Port | Pin | Designation | Function |
|---|---|---|---|
| EDP Port | 2 | EDP TxD | RS-232 Transmit Data |
| | 6 | EDP RxD | RS-232 Receive Data |
| | 12 | EDP GND | RS-232 Ground or -20 mA Out |
| Print Port | 1 | PR: TxD | RS-232 Transmit Data |
| | 11 | PR: TxD 20 mA | + 20 mA Out |
| | 12 | PR: -20 mA OUT | RS-232 Ground or -20 mA Out |

*Table 2-2. Serial Connector*

The RS-232 EDP port and the Printer port connections are shown in Figure 2-2. RS-232 or 20mA may be connected to a PC, printer or remote display.

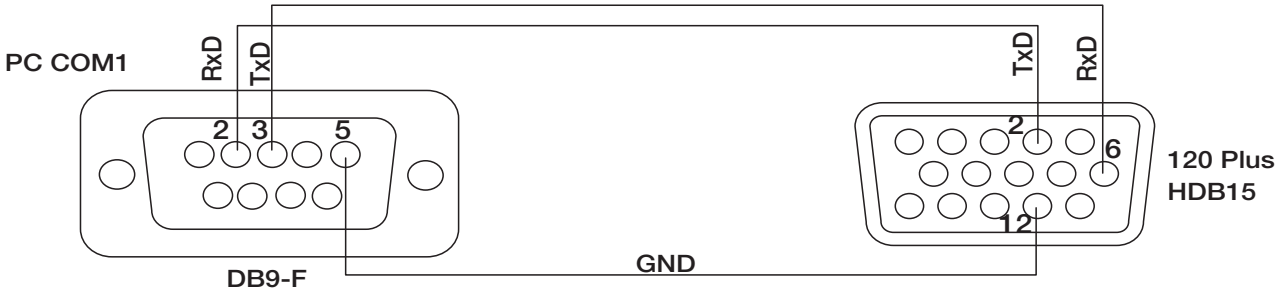



*Figure 2-2. Connect RS-232 EDP Port to PC*

### 2.2.1 Optional Digital I/O-Interface Cable (PN 106705)

An optional 15 pin digital I/O-interface cable plugs into the back of the 120 Plus indicator via the DB-15 connector.

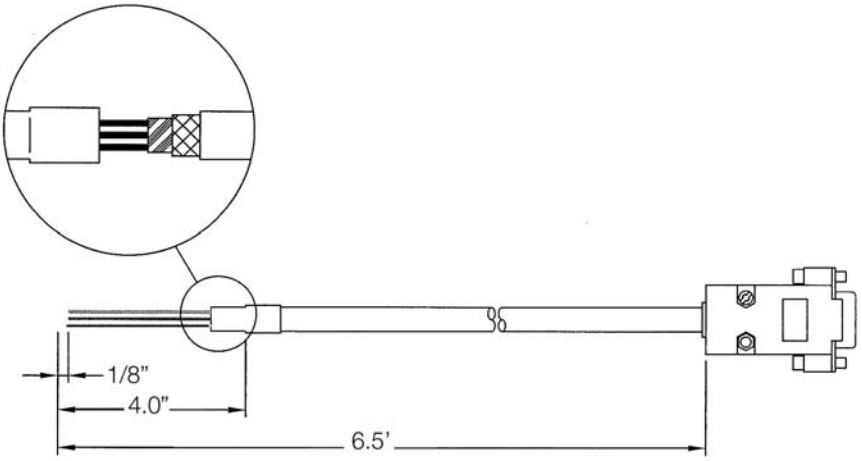



*Figure 2-3. Optional Digital I/O-Interface Connector*

The blunt end of wires are delivered with approximately four inches of exposed wire that can typically be wired into terminal strips or connectors. The following table illustrates the wiring colors.

| DB-15 Pin Outs | Wire Color | DB-15 Pin Outs | Wire Color |
|---|---|---|---|
| 1 | Black | 9 | Grey |
| 2 | Brown | 10 | White |
| 3 | Red | 11 | Pink |
| 4 | Orange | 12 | Light Blue |
| 5 | Yellow | 13 | Light Green |
| 6 | Green | 14 | Red/Black |
| 7 | Blue | 15 | White/Black |
| 8 | Purple | | |

*Table 2-3. Digital I/O-Interface Cable Colors*

## 2.3 Load Cell Connections

The following table shows the load cell connection pins to the CPU.

| J1 Pin | Load Cell Connections on the CPU Board |
|---|---|
| 1 | - Excitation |
| 2 | - Sense |
| 3 | - Signal |
| 4 | + Signal |
| 5 | + Sense |
| 6 | + Excitation |

*Table 2-4. J15Load Cell Connector*

### 6-Wire Load Cell Connection with Optional Quick Disconnect

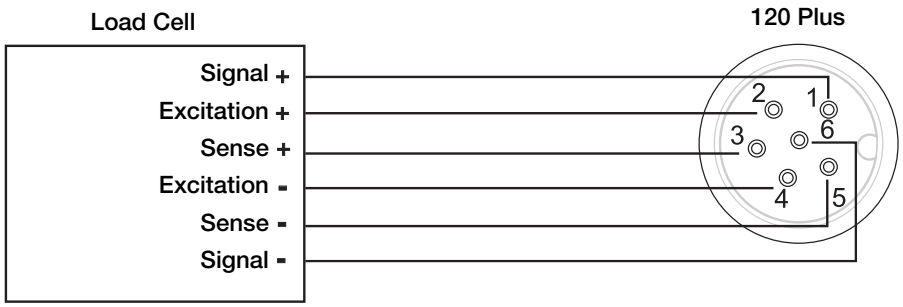



*Figure 2-4. 6-Wire Load Cell Application*

## 2.4 Optional I/O Connections

The optional I/O board provides three digital inputs and two isolation digital relay outputs.

### 2.4.1 Remote Switcher

The 120 Plus indicator has provisions to connect an external input device such as a push button switch (purchased separately) to provide a keypad function. The keypad function can be set in the SETPNT menu; the external device must provide a normally open (N.O.) momentary switch contact. The remote switch input requires a voltage free contact between RSW input and GND.

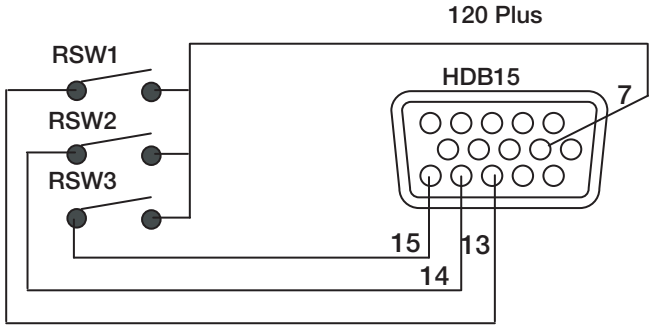



*Figure 2-5. Connect Remote Switcher Inputs to an External Input Device*

The following table displays the pins and port functions of the female HDB15.

| Pin | Port | Function |
|---|---|---|
| 4 | Out 1/2 Com | Setpoint 1 and 2 common |
| 5 | Out 2 | Setpoint 2 |
| 7 | Ground | Remote switch 1, 2, and 3 ground |
| 10 | Out 1 | Setpoint 1 |
| 13 | RSW 1 | Remote switch 1 |
| 14 | RSW 2 | Remote switch 2 |
| 15 | RSW 3 | Remote switch 3 |

*Table 2-5. Remote Switch Pin Outs*

### 2.4.2 Setpoints Output

Output drivers for the 120 Plus are isolated open emitter transistor drives that are capable of driving up to a total of 800mA. This configuration allows for the direct connection of the 120 Plus outputs to most types of PLC.

To drive external loads (e.g. relays), connect the relay coil positive supply to the output common and the output line directly to one side of the relay coil. Connect the other end of the relay coil to the negative supply. It is recommended that fly-back diodes or transient suppressors be fitted across relay coils to limit switching noise. See Figure 2-6.

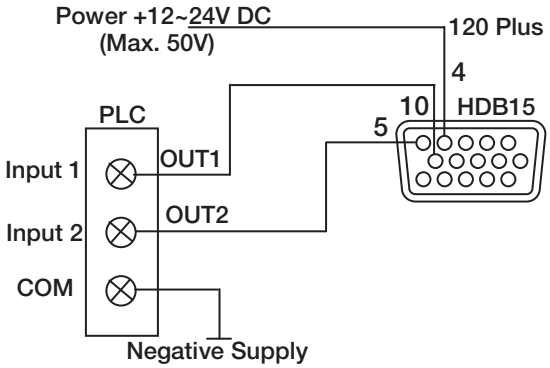



*Figure 2-6. Connect Setpoints Outputs to Drive PLC*

The voltage applied to the COM terminal appears on the output lines (i.e. OUT1 and OUT2) when the outputs are active (e.g. To connect to a PLC connect +24V to the common terminal). The outputs can then be connected directly to PLC inputs so when the outputs are active the PLC will see a 24V signal. See Figure 2-7.

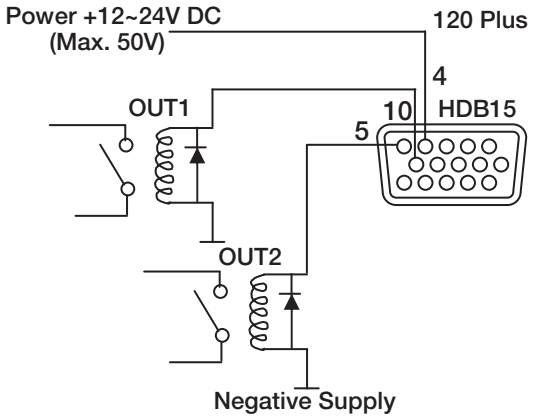



*Figure 2-7. Connect Setpoints Outputs to Drive Relay*

## 2.5 Battery Installation

To install the battery, do the following.

1. Slide the battery cover to the left to open it as shown in Figure 2-8.

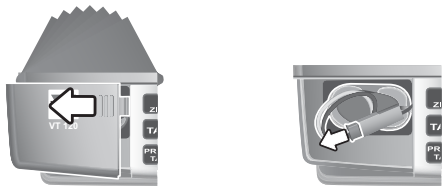


*Figure 2-8. Open Battery Cover*

2. Slightly pull out the battery wires from the housing.
3. Connect the wires with red-to-red, black-to-black.
4. Insert a rechargeable battery into the housing.
5. Close the battery cover.

### 2.5.1 Battery Tips

Battery life depends on the load, use frequency, temperature, setting, and accessories you use. Always use Rice Lake Weighing Systems original batteries (PN 103637). The warranty does not cover damage caused by using non-Rice Lake batteries and/or chargers.

- New batteries or batteries stored for a long time may take more time to charge. When charging your battery, keep it near room temperature.
- Never expose batteries to temperatures below -10ºC (14ºF) or above 45ºC (113ºF).
- It is normal for batteries to gradually wear down and require longer charging times. If you notice a change in your battery life, it is probably time to purchase a new battery.
- New batteries are shipped partially charged. Some batteries perform best after several full charge/discharge cycles. The battery may self-discharge while in storage on the shelf and require a full battery charge upon first usage. The average charge time for the battery is eight hours.
- Do not dispose of used batteries in normal trash. Follow the proper disposal or recycling requirements in accordance with local laws and regulations.
- When storing your battery, keep it uncharged in a cool, dark, dry place, such as a refrigerator.

**WARNING** ***Never dispose of batteries in a fire because they may explode. Regulations vary for different areas. Dispose of batteries in accordance to local regulations.***

# 3.0 Configuration

The following sections provide graphic representations of the indicator menu structures. The top level menu structure of the weight indicator is as follows:

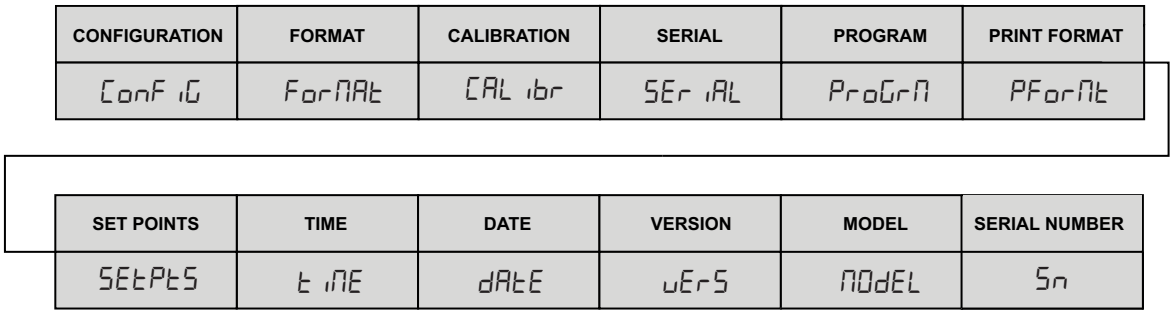



*Figure 3-1. Configuration Menu*

The following table gives a brief introduction to what each menu item does.

| Main Menu | Function |
|---|---|
| Configuration Menu | Sets parameters affecting weighing function such as:<br>• Number of full scale graduations<br>• Range within which the scale can be zeroed<br>• Change in load at which the scale will exit the stable condition<br>• Regulatory mode |
| Format Menu | Sets the format for calculation and display of various units like:<br>• Primary and secondary units<br>• Multiplier and decimal point location<br>• Rate at which the display is refreshed |
| Calibration Menu | Used for calibrating the indicator |
| Serial Menu | Configures the parameters of the serial ports |
| Program Menu | Sets the power up mode, shut down method, back light, keyboard lock, and consecutive number values |
| Print Format Menu | Sets the print format used for print tickets |
| Set Points Menu | Sets the parameters for the two setpoints, and the digital inputs |
| Time Menu | Display or set the current time |
| Date Menu | Display or set the current date |
| Version Menu | Displays the installed software version number |
| Model | Displays the model number of the indicator |
| Serial Number | Displays the serial number of the indicator |

*Table 3-1. 120 Plus Menu Structure*

The front panel keys can be used as directional keys to navigate through the menus in configuration mode. An example of navigation process is shown below in Figure 3-2.

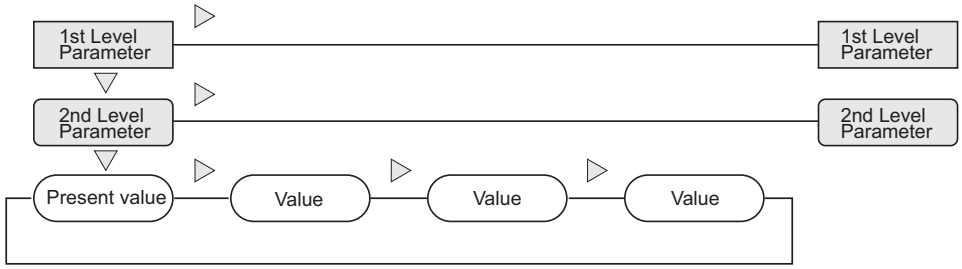



*Figure 3-2. Navigating the Setup Menu*

## 3.1 Configuration Menu

Use this mode to configure the parameters of the weighing scale. To configure items from this menu, press the setup switch. the configuration menu is shown below.

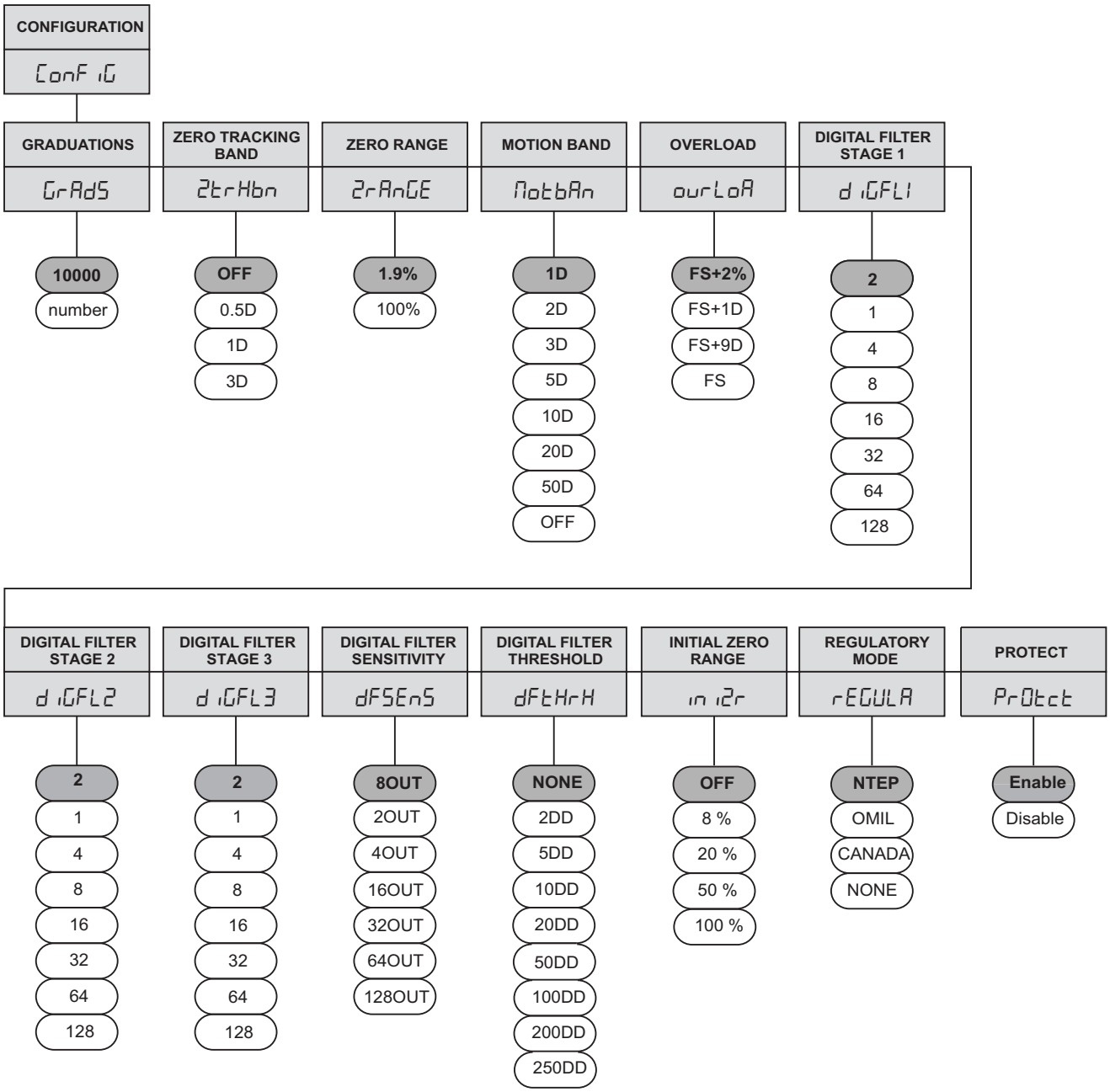



*Figure 3-3. Configuration Menu*

The following table describes the various configuration options (values in bold are the default values).

| Parameter | Options | Description |
|---|---|---|
| Graduations | **10000**<br>Number | The value entered must be in the range 1 ~ 100000 and should be consistent with legal requirements and environmental limits on system resolution.<br>To calculate GRADS, use the formula:<br>***Grads = Capacity / Minimum Weight*** (or division size)<br>Minimum Weight for primary and secondary units are specified in the FORMAT menu. |
| Zero tracking band | **OFF**<br>0.5D<br>1D<br>3D | This automatically zeros the scale when the input drifts slowly within the specified range The maximum legal value is dependent on local regulations. |
| Zero range | **1.9%**<br>100% | This is the range within which the scale can be zeroed. For example, if this value is set to 1.9%, it means that the zero range is ±1.9% of capacity around the calibrated zero point, for a total range of 3.8%. The indicator must be in a stable condition to zero the scale. Use 1.9% for legal-for-trade applications. 100% indicates the scale can be zeroed at any load. |
| Motion band | **1D**<br>2D<br>3D<br>5D<br>10D<br>20D<br>50D<br>OFF | Defines the change in load at which the scale will exit a stable condition (motion condition). If motion is not detected for more than 1 second, the stability annunciator lights. The motion band value must satisfy local regulations. |
| Overload | **FS+2%**<br>FS+1D<br>FS+9D<br>FS<br>(FS=full scale) | Defines the point of overload or underload. The display indicates "------" when the point of overload is reached. The maximum or minimum legal value varies depending on legal regulations. |
| Digital filter Stage 1/2/3 | **2**<br>1<br>4<br>8<br>16<br>32<br>64<br>128 | Defines the digital filtering rate used to reduce the effects of mechanical vibration. Choices indicate the number of A/D conversions that are averaged to obtain the displayed reading. A higher number gives a more stable display by minimizing the effect of a few noisy readings, but slows down the setting rate of the indicator. |
| Digital filter cutout sensitivity | **8out**<br>2out<br>4out<br>16out<br>32out<br>64out<br>128out | Defines the number of consecutive readings that must fall outside the filter threshold (defined by DFTHRH) before digital filtering is suspended. |
| Digital filter cutout threshold | **None**<br>2DD<br>5DD<br>10DD<br>20DD<br>50DD<br>100DD<br>200DD<br>250DD | Specifies the filter threshold in display divisions. When a specified number of consecutive scale readings (DFSENS parameter) fall outside this threshold, digital filtering is suspended. If NONE is selected, the filter is always enabled. |

*Table 3-2. Configuration Menu*

| Parameter | Options | Description |
|---|---|---|
| Initial zero range | **OFF**<br>8%<br>20%<br>50%<br>100% | Defines the range within which the scale will be zerod upon application of power. Each range is a plus or minus value. For example, 8% means ± 8% around the calibrated zero point, for a total range of 16%. |
| Regulatory mode | **NTEP**<br>OIML<br>Canada<br>None | Specifies the regulatory agency having jurisdiction over the scale site. |
| Protect | **Enable**<br>Disable | Sets whether or not the indicator has to be in Config mode to allow configuration changes using serial commands through the EDP Port. Set to Enable to 'Protect', or prevent changes to configuration settings in weight mode. When set to Disable, configuration values may be changed by serial commands at any time. |

*Table 3-2. Configuration Menu*

## 3.2 Format Menu

The items in this menu are used to configure the format for calculation and display of various units. To configure items from this menu, enter configuration mode and then press the right arrow key once.

The Format menu is shown below:

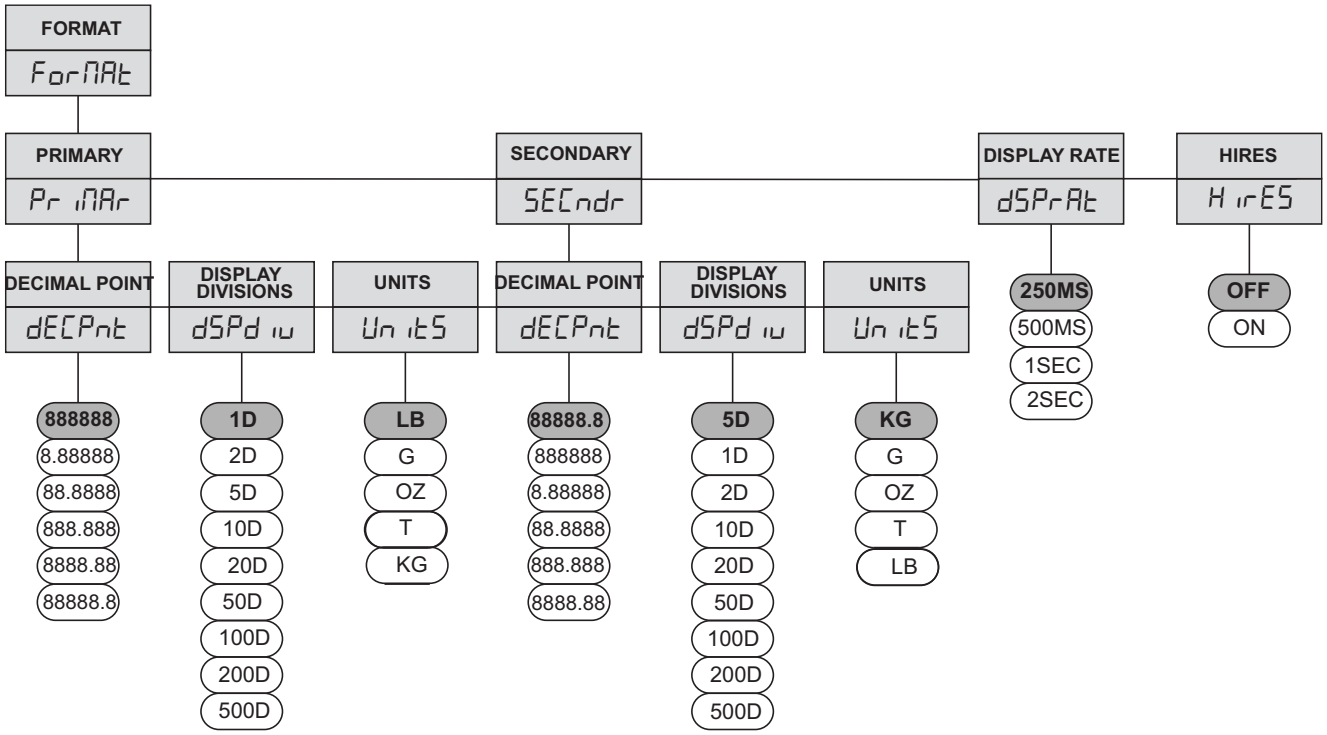



*Figure 3-4. Format Menu*

| Parameter | | Options | Description |
|---|---|---|---|
| Primary | | DECPNT<br>DSPDIV<br>UNIT | Specifies the Primary decimal position, display divisions, and units used for the primary units. |
| | Decimal point | **888888**<br>8.88888<br>88.8888<br>888.888<br>8888.88<br>88888.8 | Decimal Point defines the location of the decimal point. The value set should be consistent with local legal requirements. |
| | Display divisions | **1D**<br>2D<br>5D<br>10D<br>20D<br>50D<br>100D<br>200D<br>500D | Display Division defines the minimum division size for the weight displayed by the primary units. |
| | Units | **LB (pound)**<br>KG (kilogram)<br>OZ (ounce)<br>G (gram)<br>T (ton) | This defines the primary Units for display and printing. |
| Secondary | | DECPNT<br>DSPDIV<br>UNIT | Specifies the Secondary decimal position, display divisions, and units used for the secondary units. |
| | Decimal point | **88888.8**<br>888888<br>8.88888<br>88.8888<br>888.888<br>8888.88 | Decimal Point Location defines the location of the decimal point. The value set should be consistent with local legal requirements. |
| | Display divisions | **5D**<br>1D<br>2D<br>10D<br>20D<br>50D<br>100D<br>200D<br>500D | Display Divisions defines the minimum division size for the weight displayed by the secondary units. |
| | Units | **KG (kilogram)**<br>G (gram)<br>OZ (ounce)<br>T (ton)<br>LB (pound) | This defines the secondary Units for display and printing. |
| Display rates | | **250 M**S<br>500 MS<br>1 Sec<br>2 Sec | Display Rate - sets the update rate for displayed values. |
| Hires | | **OFF**<br>ON | High Resolution - When set to ON, the indicator displays weight at 10 times the normal resolution. This is intended for test purposes but may be used for non-trade weighing.<br>Note: Do not set this parameter to ON if PRI. DECPNT = 8.88888 or SEC. DECPNT = 8.88888.<br>On high resolution mode the display blinks. |

*Table 3-3. Format Menu*

## 3.3 Calibration

### 3.3.1 Calibration Menu

This menu is used to calibrate the indicator. To configure items from this menu, enter configuration mode and then press the right arrow key twice.

***CAL*** indicates that the machine is calibrating the selected value. The Calibration menu is shown below:

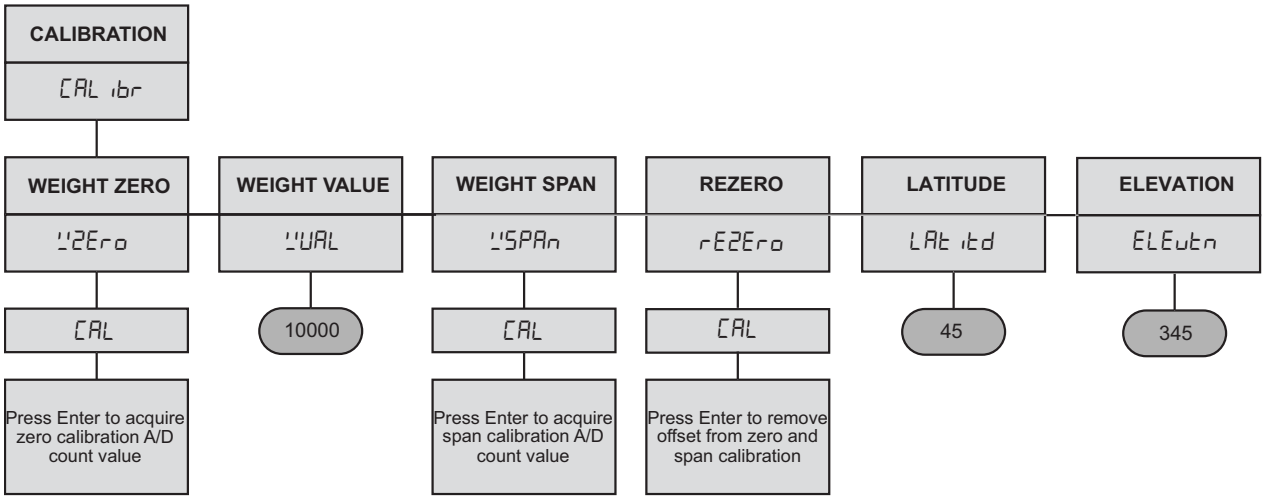



*Figure 3-5. Calibration Menu*

The following table describes the various calibration options (values in bold are default values).

| Parameter | Options | Description |
|---|---|---|
| Weight Zero | None | Pressing Enter while displaying WZERO will perform the zero calibration. Ensure the scale is empty before pressing Enter. Do not adjust this value after WSPAN has been set. |
| Weight Value | **10000**<br>0-999999 | Displays and edits the test weight value. |
| Weight Span | None | Pressing Enter while displaying WSPAN will perform the span calibration. Ensure test weight is equal to the value entered in as the Weight Value are in place on the scale before pressing Enter. |
| Rezero | None | Removes an offset value from the zero and span calibrations. Use this setting only after WZERO and WSPAN have been set. |
| Latitude | 0-90 | The latitude in degrees at the place of calibration |
| Elevation | -9999 to 9999 | The elevation in meters at the place of calibration |

*Table 3-4. Calibration Menu*

### 3.3.2 Front Panel Calibration

To calibrate the indicator using the front panel, do the following:

1. Place the indicator in configuration mode by pressing the setup switch in the back (See figure 1-3). The display reads ***CONFIG***. Remove all weight from the scale platform. If the test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Press the **6** key until the display reads ***CALIBR***. Press the **8** key to navigate to zero calibration (***WZERO***).
3. With ***WZERO*** displayed, press the **enter** key to calibrate zero. The indicator displays ***CAL*** while calibration is in progress. When complete, ***WVAL*** is displayed.
4. With ***WVAL*** displayed, place test weights on the scale and press the **8** key to show the test weight value. To edit the value, press the Enter key; the last digit of the displayed value blinks. Press the **clear** key to clear

the value, then use the numeric keys (0-9) to enter the test weight value. Press the **enter** key to save the test weight value and navigate to span calibration (***WSPAN***).

5. With ***WSPAN*** displayed, press the **enter** key to calibrate span. The indicator displays ***CAL*** while calibration is in progress. When complete, ***REZERO*** is displayed.
6. Optional: The rezero function is used to remove a calibration offset when hooks or chains are used to hang the test weights.
   - If hooks or chains were used during calibration, remove these and all test weights from the scale. Press the **enter** key to rezero the scale. This function adjusts the zero and span calibration values. When complete, ***LATITD*** is displayed.
7. Press the **two** key until the display reads ***EXIT Y***, then press **enter** key to exit configuration mode.

***When editing numeric values, press the enter key to allow the numeric entry, and then press the clear key to clear the values. Press numeric keys (0~9) to enter the value. Press the enter key to save the value entered and return to the level above.***

The calibration process is depicted in the following figure:

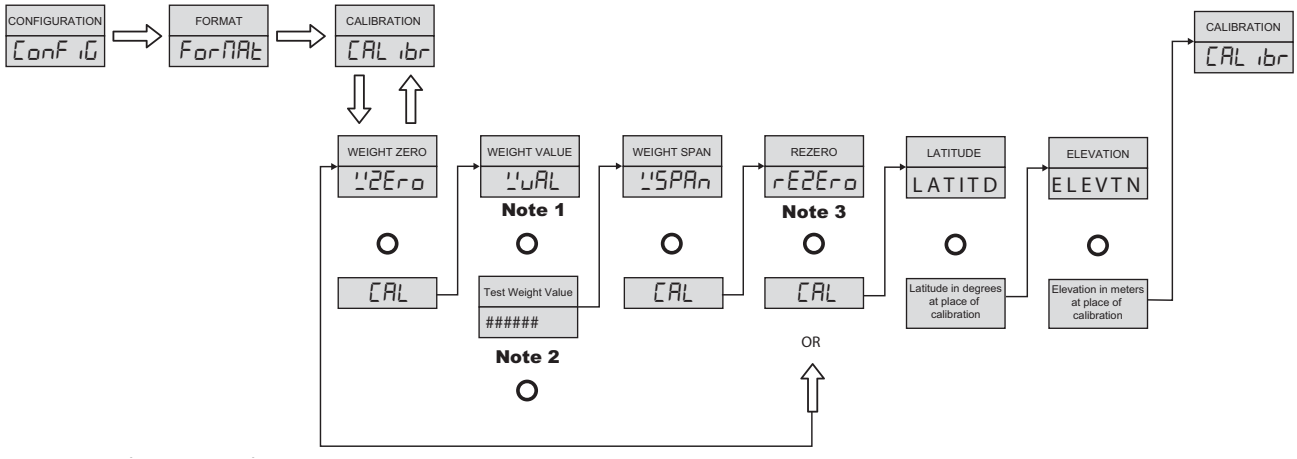



*Figure 3-6. Calibration Process*

**NOTE 1:** Place test weights.

**NOTE 2:** Use arrow keys, see Figure 3-2 on page 13 to set the maximum weight value.

**NOTE 3:** Optional - use only when hooks or chains were used during calibration. To recalibrate zero, remove these and the test weights from the scale.

### 3.3.3 EDP Command Calibration

To calibrate the indicator using EDP commands, the indicator EDP port must be connected to a terminal or personal computer. See Section 2.2 on page 7 for EDP port pin assignments; see Section 8.1 on page 36 for more information about using EDP commands. Once the indicator is connected to the sending device, do the following:

1. Place the indicator in configuration mode (the display reads ***CONFIG***) and remove all weight from the scale platform. If the test weights require hooks or chains, place the hooks or chains on the scale for zero calibration.
2. Send the ***WZERO*** command to calibrate zero. The indicator displays ****CAL**** while calibration is in progress.

***During EDP command calibration, the *CAL* message remains on the display. Once the calibration is complete, an OKAY message is sent to the terminal or personal computer.***

3. Place test weights on the scale and use the ***WVAL*** command to enter the test weight value in the following format: WVAL=nnnnnn<CR>.
4. Send the ***WSPAN*** command to calibrate span. The indicator displays ****CAL**** while calibration is in progress.
5. To remove an offset value, clear all weight from the scale, including hooks or chains used to hang test weights, and then send the ***REZERO*** command. The indicator displays ****CAL**** while the zero and span calibrations are adjusted.

## 3.4 Serial Menu

The items in this menu are used to configure the serial port used for transferring data between the indicator and a PC or printer. To configure items in this menu, press the setup switch and then the right arrow key three times.

The Serial menu is shown below:

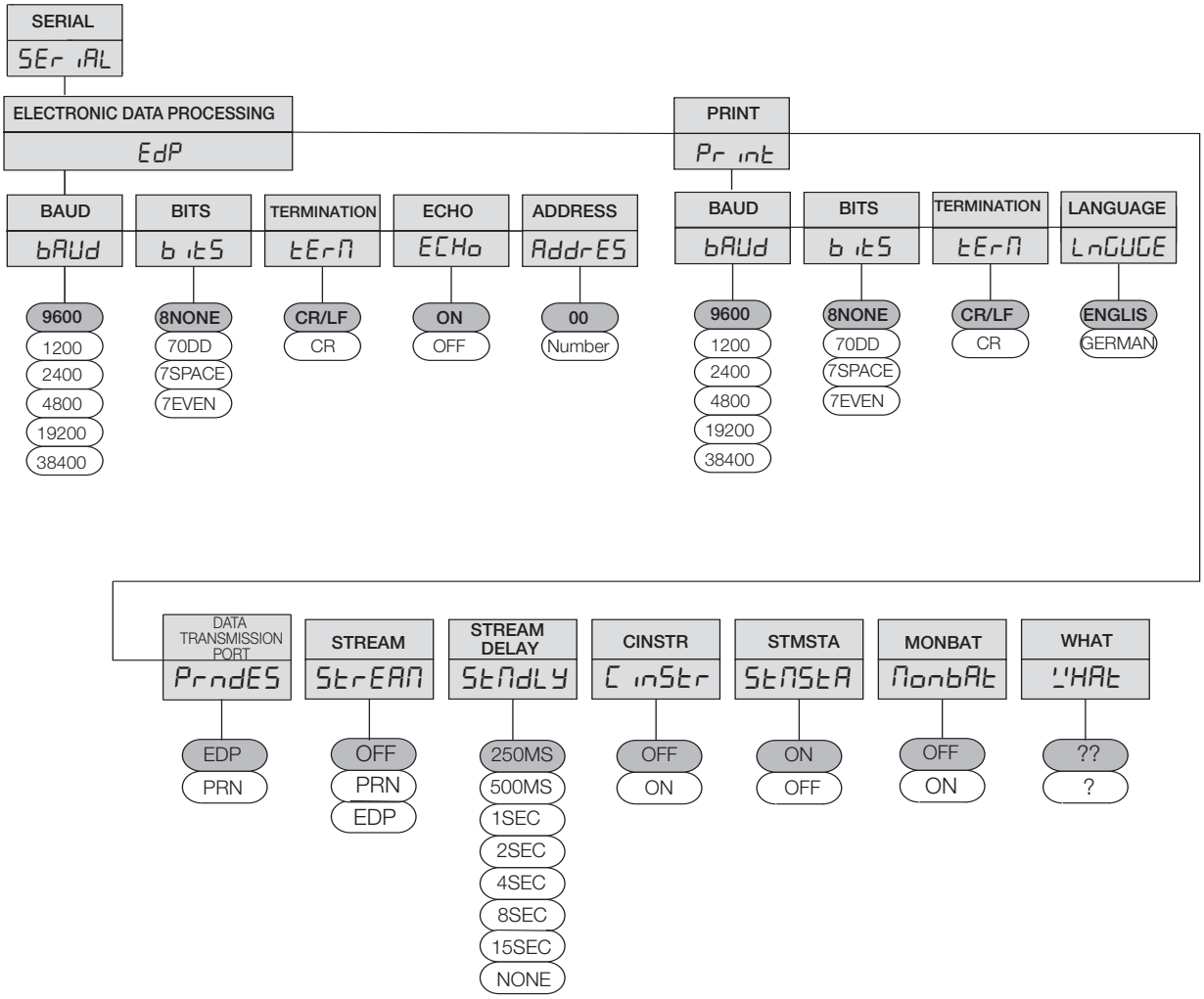



*Figure 3-7. Serial Menu*

| Parameter | Options | Description |
|---|---|---|
| Electronic Data Processing (EDP) | Baud<br>Bits<br>Term<br>Echo<br>Addres | Specifies port settings for baud rate, data bits, termination characters, and end- of-line delay used by the EDP port. |
| Baud | **9600**<br>1200<br>2400<br>4800<br>19200<br>38400 | Baud Rate. Selects the transmission speed for the EDP port. |
| Bits | **8NONE**<br>7ODD<br>7EVEN<br>7SPACE | Selects number of data bits and parity of data transmitted from the EDP port. |

*Table 3-5. Serial Menu*

| Parameter | Options | Description |
|---|---|---|
| Termination | **CR/LF**<br>CR | Selects the termination character for data sent from the EDP port. |
| Echo | **ON**<br>OFF | Specifies whether commands sent to the indicator are echoed. |
| Address | **00**<br>number | Specifies the node address of RS485. The value is in hex format. 00 represents that this function is disabled.<br>If ADDRESS is enabled, EDP commands became <ADDRESS> + command, where address is one byte, and auto off echo even if echo is on.<br>Note: User can connect via an external RS232 to RS485 converter. |
| Print | BAUD<br>BITS<br>TERM<br>LANGUAGE | Specifies port settings for baud rate, data bits, termination characters, and end- of-line delay used by the printer port. |
| Baud | **9600**<br>1200<br>2400<br>4800 | Baud Rate. Selects the transmission speed for the printer port. |
| Bits | **8NONE**<br>7ODD<br>7EVEN<br>7SPACE | Selects number of data bits and parity of data transmitted from the printer port. |
| Termination | **CR/ LF**<br>CR | Selects the termination character for data sent from the printer port. |
| Language | **ENGLIS**<br>GERMAN | Ticket language. Selects the language for the printer tickets.<br>English/ German Gross/ Brutto<br>Net/ Netto Tare/ Tara<br>Height/ Groesse |
| Print Destination | **EDP**<br>PRN | Print destination. Selects the port for data transmission when the **PRINT** key is pressed or the KPRINT EDP command is sent. |
| Stream | **OFF**<br>EDP<br>PRN | Selects the serial port used for continuous transmission. See " Continuous Output (Stream) Format" on page 46 for more information about the 120 Plus continuous data format. |
| Stream Delay | **250MS**<br>500MS<br>1SEC<br>2SEC<br>4SEC<br>8SEC<br>15SEC<br>OFF | Specifies the delay in seconds (SEC) or milliseconds (MS) inserted between stream frames. |
| Cinstr | **OFF**<br>ON | Selects to enable or disable the stream display for additional raw data and time. |
| STMSTA | **ON**<br>OFF | Stream addition information with status. |
| Monbat | **OFF**<br>ON | Selects to enable or disable the stream display for additional battery data. |
| WHAT | **??**<br>? | Reply ? or ??, if invalid parameter, or a valid parameter command that cannot be executed. |

*Table 3-5. Serial Menu*

## 3.5 Program Menu

Use this menu to configure various settings of this indicator. The Program menu is shown below:

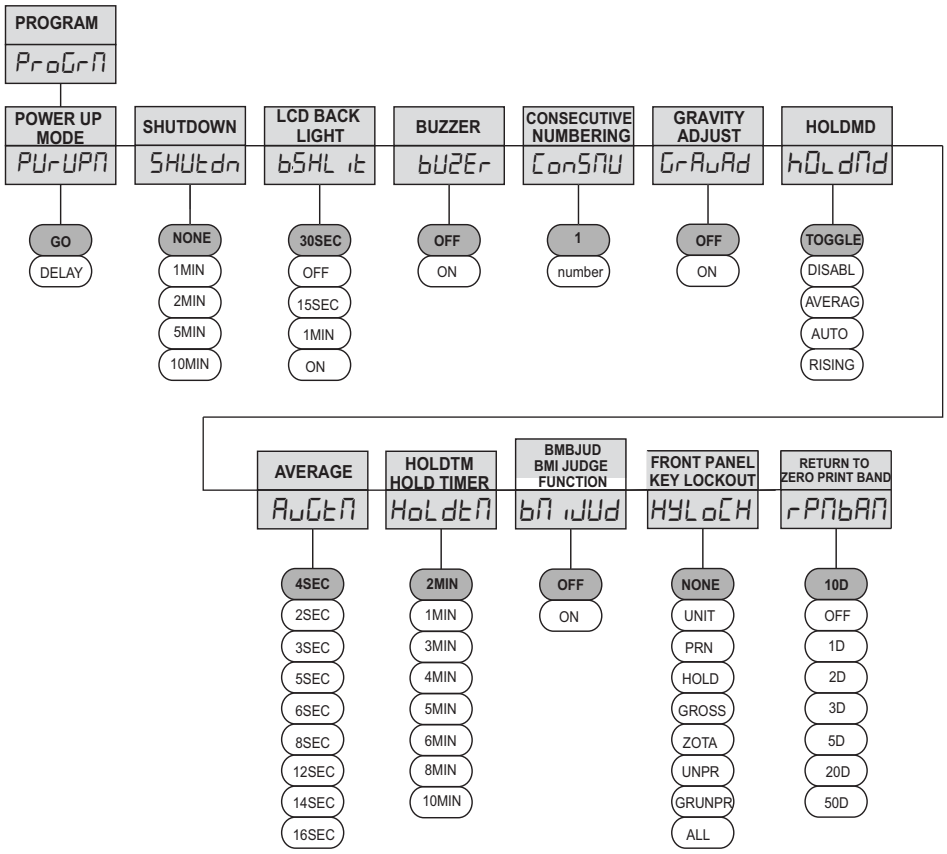



*Figure 3-8. Program Menu*

The following table describes the various program options (values in bold are default values).

| Parameter | Options | Description |
|---|---|---|
| Power Up Mode | **GO**<br>DELAY | Power up mode.<br>In GO mode, the indicator goes into operation immediately after a brief power up display test.<br>In DELAY mode, the indicator performs the power up display test and enters a 60-second warm up period. Delay mode is terminated either at the end of the warm up period or when the predefined temperature is reached. If motion is not detected during the warm up period, it goes into Normal Mode. |
| Shutdown | **NONE**<br>1MIN<br>2MIN<br>5MIN<br>10MIN | Function is to automatically turn off the indicator if it is not used for the set amount of time. |
| LCD Backlight | **30SEC**<br>OFF<br>15SEC<br>1MIN<br>ON | Function to automatically switch off the LCD back light if the indicator is not in use for the set amount of time. Setting the parameter to ON keeps the backlight always on. Setting it to OFF disables the backlight. |
| Buzzer | **OFF**<br>ON | Enables or disables the audible tones when the keys are pressed. |
| Consecutive Numbering | **1**<br>number | Consecutive Numbering allows sequential numbering for print operations. This value is increased following each print operation. |

*Table 3-6. Program Menu*

| Parameter | Options | Description |
|---|---|---|
| Gravity Adjust | **Off**<br>On | Turns the gravity correction on or off. This can be used along with the Latitude and Elevation parameters of the Calibration menu to compensate for the varience in gravitational pull from one location to another. See Section 8.6 for more information. |
| Hold MD | **Toggle**<br>Disabl<br>Averag<br>Auto<br>Rising | Hold function<br>**Toggle**: After pressing the HOLD key, the weight will be frozen if there is no motion and weight is greater than zero. Press HOLD again and the display goes back to weighing mode.<br>**Disabl:** Disables the HOLD function.<br>**Average:** If after pressing the HOLD key, the weight is greater than zero and does not increase, will start taking an average value in three seconds. During this time the weight will remain frozen. Press the HOLD key again to go back to weighing mode or it will default back after a period as set by the Hold Timer parameter.<br>**Auto:** When there is no motion and weight is greater than zero, the weight will remain frozen. Press the HOLD key to return back to weighing mode or will default back after a period as set by the Hold Timer parameter.<br>**Rising:** Only allowed for medical applications and is not legal for trade. |
| Average Timer | **4SEC**<br>2SEC<br>3SEC<br>5SEC<br>6SEC<br>8SEC<br>12SEC<br>14SEC<br>16SEC | Timer for hold function to average raw data or time limited according to the HOLDMD setting.<br>See Section 1.8.9 on page 7 for details. |
| Hold Timer | **2MIN**<br>1MIN<br>3MIN<br>4MIN<br>5MIN<br>6MIN<br>8MIN<br>10MIN | Defines how long to hold the weight on the display. See Hold function section for details. |
| BMIJUD | **OFF**<br>ON | BMI automatic judge function (works only with the BMI key) |
| Key Lockout | **NONE**<br>UNIT<br>PRN<br>HOLD<br>GROSS<br>ZOTA<br>UNPR<br>GRUNPR<br>ALL | Front Panel Key Lockout option. In some applications, it is desirable that the front panel keys cannot be accessed while operating in normal mode.<br>NONE: none of the keys are locked.<br>UNIT: **UNITS** key disabled.<br>PRN: **Print/Enter** key disabled.<br>HOLD: **HOLD** key disabled.<br>GROSS: **GROSS/NET** key disabled.<br>ZOTA: **ZERO**, **TARE**, and **PRESET TARE** keys disabled.<br>UNPR: **UNITS** and **Print/Enter** keys disabled.<br>GRUNPR: **GROSS/NET**, **UNITS** and **Print/Enter** keys disabled.<br>ALL: disable all keys.<br>Note that this option only disables the front panel keys and does not lock out the functions that these keys perform. The zero, gross/net, tare, and print command are still accessible from the remote inputs on HDB15. |
| Return to Zero Print Band | **10 DIV**<br>1D<br>2D<br>3D<br>5D<br>20D<br>50D<br>Off | This sets the number of divisions that the weight must return to around zero before the indicator will allow a print to occur. Set to off to always allow printing. |

*Table 3-6. Program Menu*

## 3.6 Print Format Menu

Use these menu options to configure the print format settings. The Print Format menu is shown below:

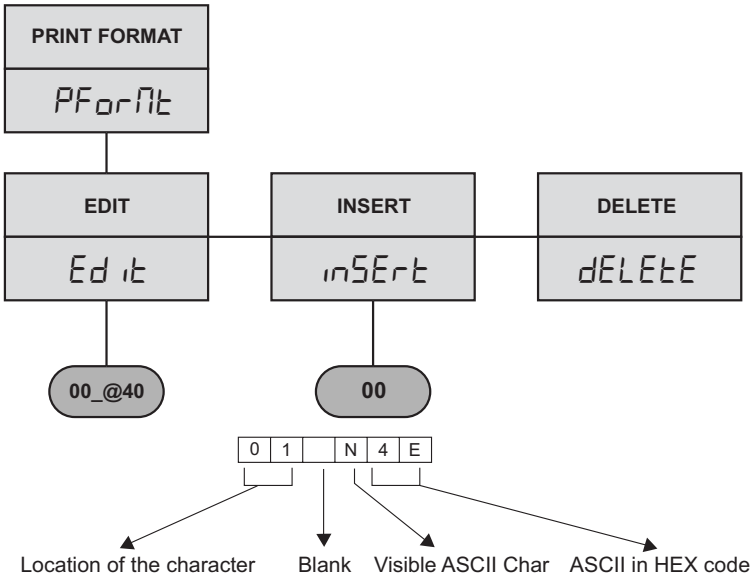



*Figure 3-9. Print Format Menu*

The following table describes the various print format options.

| Parameter | Options | Description |
|---|---|---|
| EDIT | NONE | Edits the print format. |
| INSERT | NONE | Inserts a new character initialized to 00, at the end of the value edited using the previous EDIT option. This shifts all data after it to the right by one position. After insertion, the user can edit the value. |
| DELETE | NONE | Deletes the last character of the value edited by the previous EDIT option. This shifts all data after it to the left by one position. |

*Table 3-7. Print Format Options*

## 3.7 Set Points Menu

Use this menu to configure set points settings. The Set Points menu is shown below:

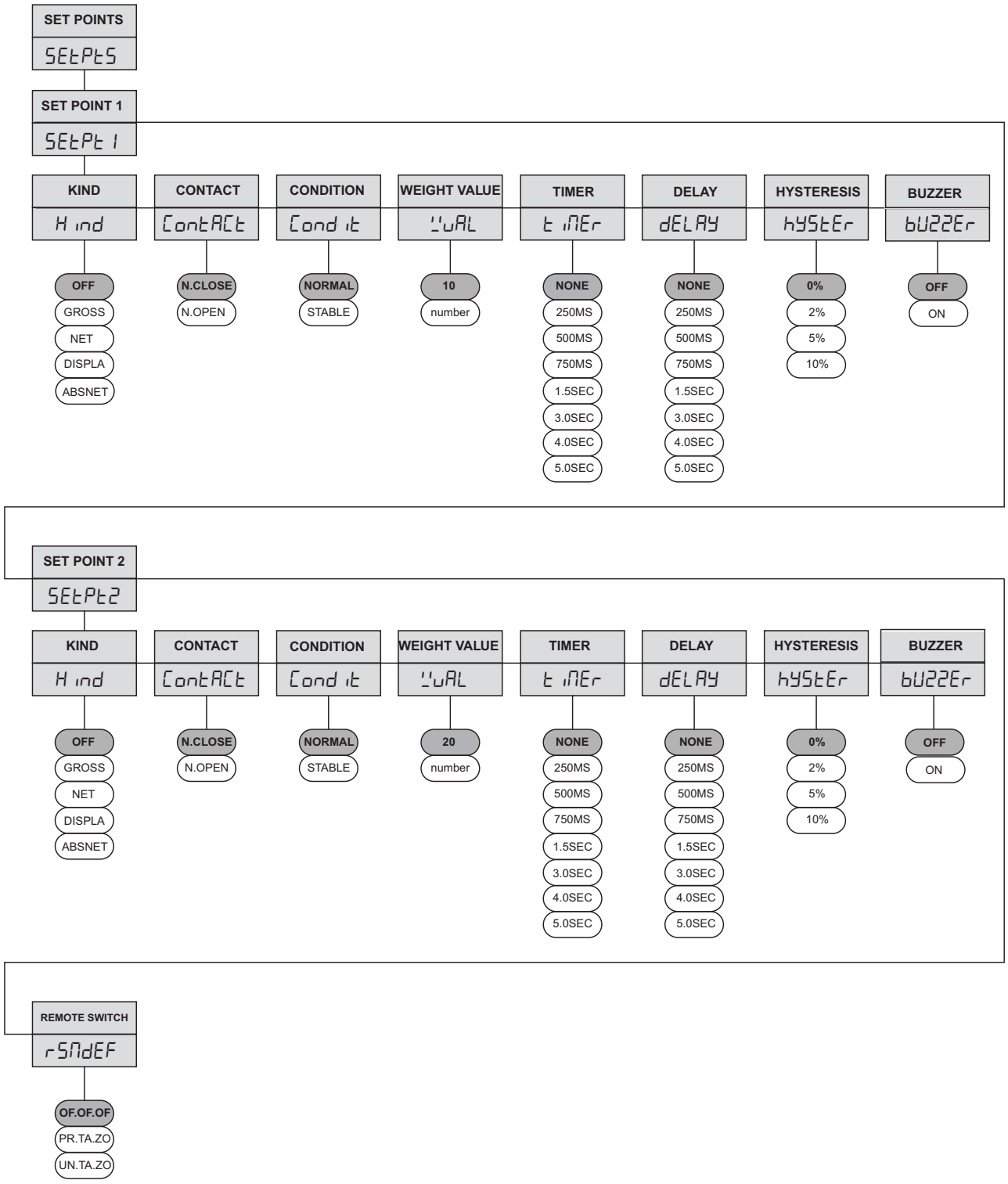



*Figure 3-10. Set Points Menu*

The following table describes the various set points options (values in bold are default values).

| Parameter | Options | Description |
|---|---|---|
| Set Point 1 | **OFF**<br>KIND<br>CONTACT<br>CONDIT<br>WVAL<br>TIMER<br>DELAY<br>HYSTER<br>BUZZER | Specifies settings for mode, contact type, condition, weight valve, timer, delay, and hysteresis used by the set point 1. |
| Kind | **OFF**<br>GROSS<br>NET<br>DISPLA<br>ABSNET | Specifies the mode of operation, or the source of the weight value.<br>Gross Weight Data<br>Net Weight Data<br>Display Weight Data<br>Absolute Value of Net Weight Data |
| Contact Type | **N.CLOSE**<br>N.OPEN | Contact type. Contact status below the set point value, Comparator output to be normal open or normal close. |
| Condition | **NORMAL**<br>STABLE | The output is enabled either as soon as the weight exceeds the setpoint value (NORMAL) or only after the weight exceeds the setpoint value AND has become stable (STABLE). |
| Weight Value | **10 or 20**<br>0-999999 | Sets weight thresholds for set point.<br>Output active if load over this weight. (load >= wval) |
| Timer | **NONE**<br>250MS<br>500MS<br>750MS<br>1.5SEC<br>3.0SEC<br>4.0SEC<br>5.0SEC | Disables output after a specified time. |
| Delay | **NONE**<br>250MS<br>500MS<br>750MS<br>1.5SEC<br>3.0SEC<br>4.0SEC<br>5.0SEC | Time delay before the output is enabled. |
| Hysteresis | **0%**<br>2%<br>5%<br>10% | Specifies the Hysteresis value for the setpoint. Hysteresis means that once the output is enabled, the wieght must drop below a value defined as the setpoint value minus the hysteresis setting before it is disabled. (output disabled if weight < setpoint value - (setpoint value x hysteresis)).<br>Set to 0% for no Hysteresis. |
| Buzzer | **OFF**<br>ON | Enable or disable beep from indicator when set point tripped |
| Set Point 2 | **OFF**<br>KIND<br>CONTACT<br>CONDIT<br>WVAL<br>TIMER<br>DELAY<br>HYSTER<br>BUZZER | Specifies settings for mode, contact type, condition, weight valve, timer, delay, and hysteresis used by the set point 2. |

*Table 3-8. Setpoints Menu*

| Parameter | Options | Description |
|---|---|---|
| Remote Switch | **OF.OF.OF**<br>PR.TA.ZO<br>UN.TA.ZO<br>{ { {<br>3 2 1 | Specifies the function activated by remote switch inputs 1, 2 and 3.<br>OF.OF.OF disable all remote switches<br>PR.TA.ZO provides the same functions as the front panel keys.<br>Remote switch 1 be **ZERO** key<br>Remote switch 2 be **TARE** key<br>Remote switch 3 be **Print/Enter** key<br>UN.TA.ZO provides the same functions as the front panel keys.<br>Remote switch 1 be **ZERO** key<br>Remote switch 2 be **TARE** key<br>Remote switch 3 be **UNITS** key |

*Table 3-8. Setpoints Menu*

## 3.8 Time Menu

Use these menu options to configure time settings. The Time menu is shown below:

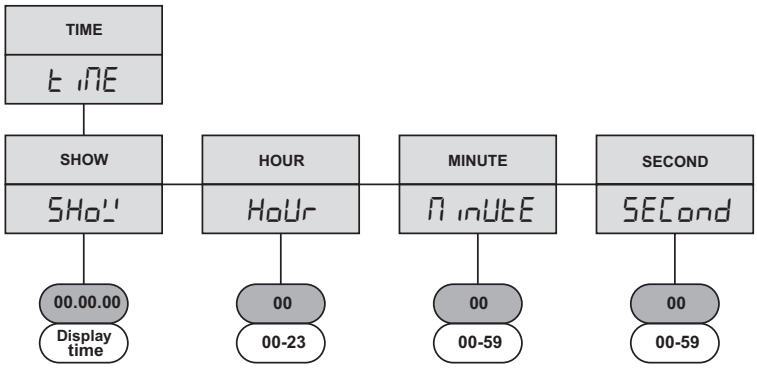



*Figure 3-11. Time Menu*

The following table describes the various time options.

| Parameter | Options | Description |
|---|---|---|
| Show | HH.MM.SS | Displays current time in HH.MM.SS format |
| Hour | hour (HH) | Sets hour using 24-hour format |
| Minute | minute (MM) | Sets minute |
| Second | second (SS) | Sets second |

*Table 3-9. Time Menu*

## 3.9 Date Menu

Use these menu options to configure date settings. The Date menu is shown below:

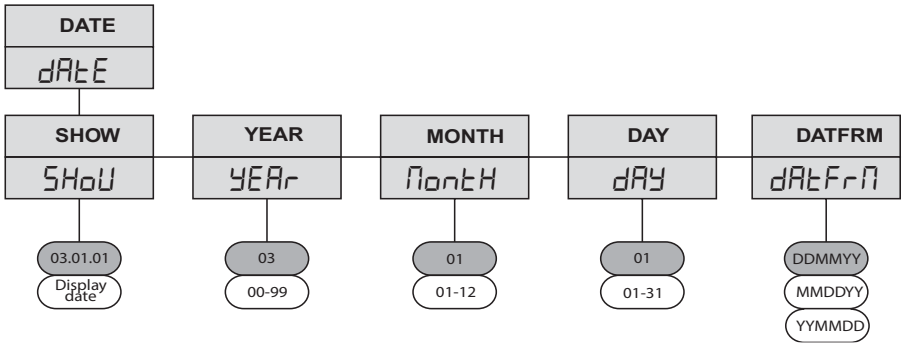



*Figure 3-12. Date Menu*

The following table describes the various date options.

| Parameter | Options | Description |
|---|---|---|
| SHOW | | Displays current date in YY.MM.DD, DD.MM.YY or MM.DD.YY format |
| YEAR | year (YY) | Set year (two digits 00-99) |
| MONTH | month (MM) | Set month (MM) |
| DAY | day (DD) | day (DD) |
| DATFRM | **DDMMYY**<br>MMDDYY<br>YYMMDD | Specifies the date format.<br>DDMMYY: day, month, year<br>MMDDYY: month, day, year<br>YYMMDD: year, month, day |

*Table 3-10. Date Menu*

## 3.10 Version Menu

The VERS menu is used to check the software version, model name and serial number installed in the indicator. There are no parameters associated with the Version menu; when selected, the indicator displays the installed.

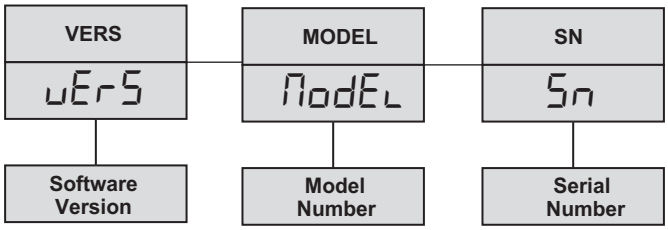



*Figure 3-13. Version Menu*

# 4.0 Test Mode Operations

Use this mode to test the parameters of the weight indicator.

**Note** ***This procedure should only be performed by a certified technician.***

To enter test mode, press the ***setup switch*** for three seconds. The display will change from ***CONFIG to A/DTST.***

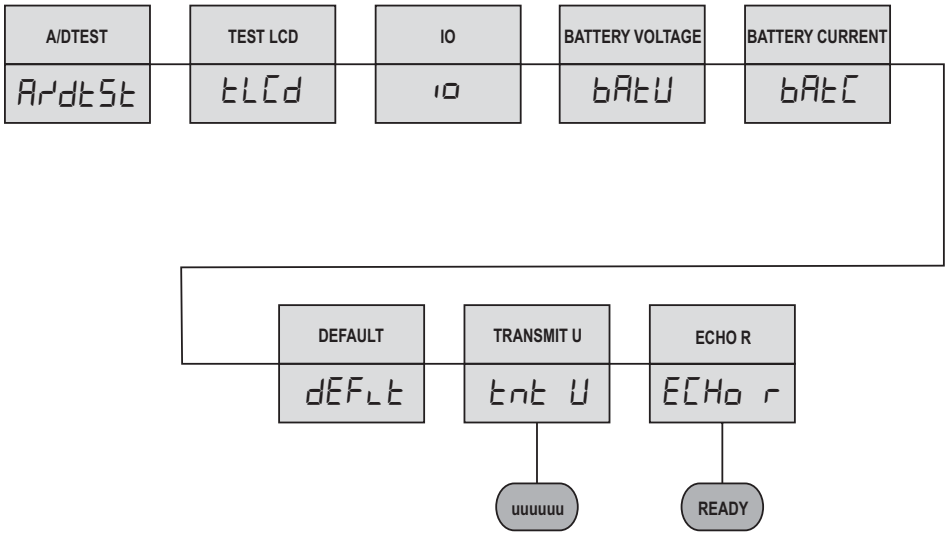



*Figure 4-1. Test Mode Operation Menu*

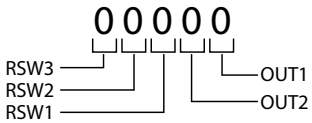
| Parameter | Description |
|---|---|
| A/D TEST | Displays A/D Test. Press the **ENTER** key to display the raw count value from A/D converter. |
| TEST LCD | Press ENTER to light all the segments on the LCD display. |
| I/O | Display digital input (Remote Switch) and output (Set Point) status.<br>  |
| BATTERY VOLTAGE | Display battery voltage in V. |
| BATTERY CURRENT | Display battery charging current in A. |
| DEFAULT | Default parameters. Press the **ENTER** key to reset configuration and calibration parameters to factory default values.<br>NOTE: Not available in panel mode operation |
| TRANSMIT U | Transmits "U". Press the **ENTER** key to send the U character [ASCII: 85 decimal, 55 hex] to test the serial line quality and integrity. |

*Table 4-1. Test Mode Option Parameters*

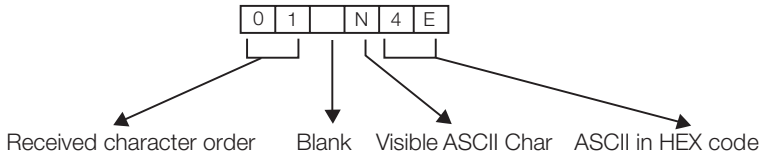
| Parameter | Description |
|---|---|
| ECHO R | This displays the character received from the serial port to test the serial line quality. Press the down arrow once until the indicator displays "READY". Then, press the **ENTER** key on the front panel. This displays the value received from serial port on the front panel.<br>The format of the data displayed by the ECHO R command is shown as shown:<br>  <br> |

*Table 4-1. Test Mode Option Parameters*

# 5.0 Panel Mode Operations

Panel Mode provides access to setting the serial port, non-meteorological parameters, time, date, consecutive number, print format, set points, and test items without the need to press the ***Setup Switch***.

To enter Panel Mode, press and hold the **CLEAR** key under normal mode until the ***FILTER*** menu is displayed. Use the navigation keys to move around the menu; to change a value, use the navigation keys to select the digit and increase or decrease its value. Press the **ENTER** key to set the value and return to the menu level above. The pictorial representation of the panel menu is as follows:

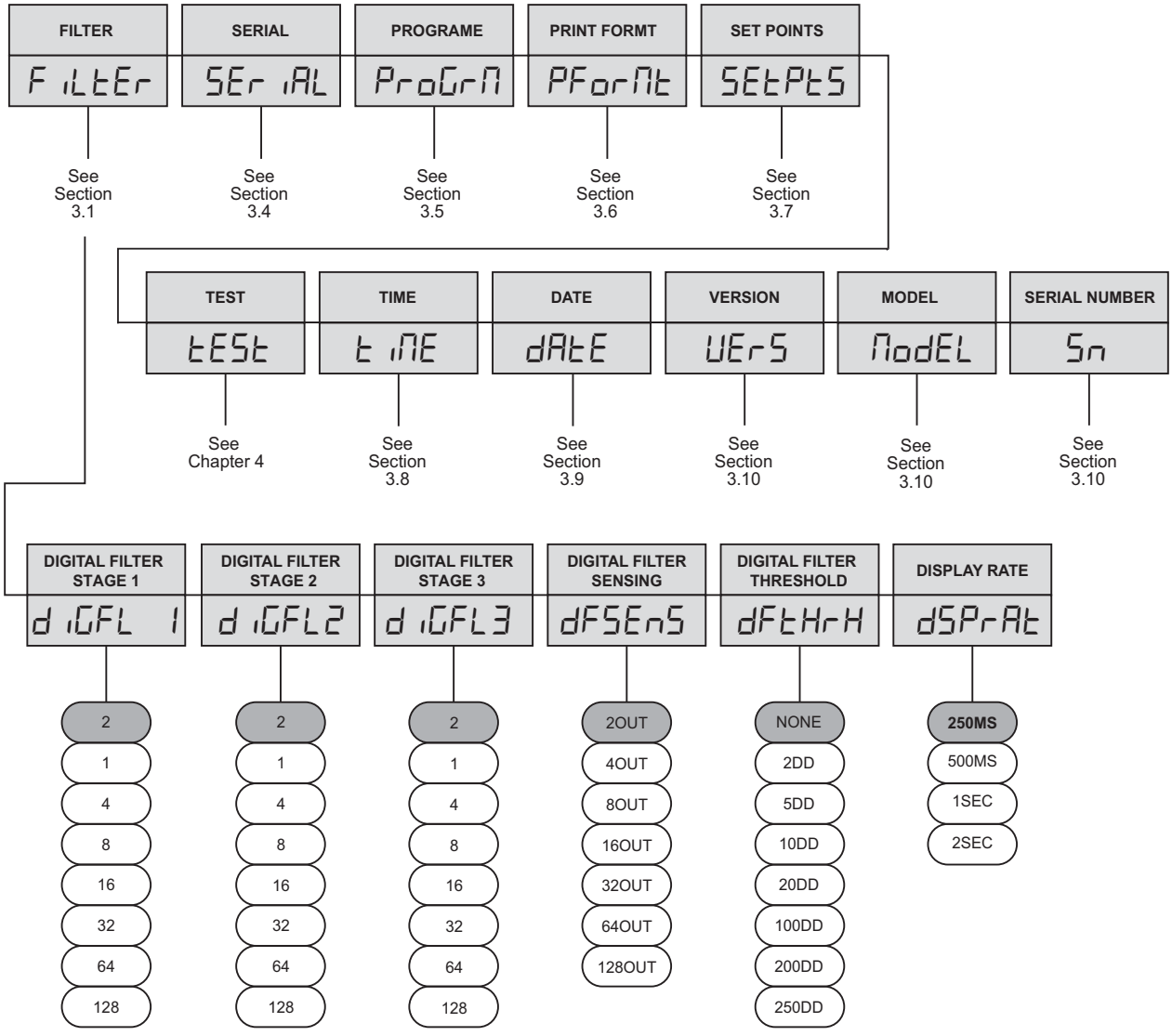



*Figure 5-1. Panel Mode Operation Menu*

| Parameter | Options | Description |
|---|---|---|
| FILTER | DIGFL1 DIGFL2<br>DIGFL3<br>DFSENS<br>DFTHRH<br>DSPRAT | Sets the filter rate, filter cutout sensitivity, and filter cutout threshold. See Section 3.1 on page 14 for more information. |
| SERIAL | EDP PRINT<br>PRNDES<br>STREAM<br>STMDLY<br>CINSTR<br>MONBAT<br>WHAT | Enters the Serial menu. See Section 3.4 on page 20 for more information. |
| PROGRAM | RPNBAN<br>SHUTDN<br>BAKLIT<br>BUZZER<br>HOLDMD<br>KYLOCK<br>CONSNU | Enters the Program menu. See Section 3.5 on page 22 for more information. |
| PRINT FORMAT | EDIT<br>INSERT<br>DELETE | Enters the Print Format menu. See Section 3.6 on page 24 for more information. |
| SET POINTS | SETPT1<br>SETPT2<br>RSWDEF | Enters the Set Point menu. See Section 3.7 on page 25 for more information. |
| TEST | | Enters the Test mode. See Section 4.0 on page 29 for more information. |
| TIME | SHOW<br>HOUR<br>MINUTE<br>SECOND | Sets the time. See Section 3.8 on page 27 for more information. |
| DATE | SHOW<br>YEAR<br>MONTH<br>DAY<br>DATFRM | Sets the date. See Section 3.9 on page 28 for more information. |
| VERSION | | Displays the installed software version. |
| MODEL | | Displays the model number. |
| SERIAL NUMBER | | Displays the serial number of the unit. |

*Table 5-1. Panel Mode Description*

# 6.0 Print Formatting

## 6.1 Print Format Commands

The following table gives the possible indicator parameters and command values that may be printed.

| Command | Description |
|---|---|
| @G | Gross weight in displayed units. This also displays the weight units used. |
| @T | Tare weight in displayed units. |
| @N | Net weight in displayed units. |
| @C | Print consecutive number. |
| @Ln | New line, n specifies termination number. |
| @t | Time |
| @d | Date |
| @Sn | Space, n specifies the number of spaces. |
| @M | Use in pairs to quote Tare and Net data. If Tare is present, then the Tare and Net data will be printed on the ticket. |
| ID and consecutive number (CN) fields are 1-6 characters in length, as required.<br>Gross, Net and Tare weights are 9 digits in length, including sign (10 digits with decimal point), followed by a space and a two-digit units identifier. The total field length with units identifier is 12 (or 13) characters. | |

*Table 6-1. Print Format Commands*

This section describes setting the print formats for the indicator, using the serial port or the front panel. There are two methods to edit the print format.

## 6.2 Using Any Editor Through EDP

Write the print format data in pure text format. The following samples are for an Eltron LP 2742 printer.

```
Wwpf = 0
N
A0,0,0,3,1,2,N,"Rice Lake Weighing Systems. @d @t @C" A8,50,0,5,1,1,N,"@G"  @MA8,120,0,5,1,1,N,"@T"
A8,190,0,5,1,1,N,"@N"@M  B8,260,0,3,3,7,100,B,"@G"
P1
```

First, place a "WWPF=0" in the first line to indicate that the following is a print format file. Place printer parameters in the beginning of each line as required, and then use double quotes to contain the text that you want to print on the ticket (see table above).

Note in the above example, N, AxxxxN, B, and P1 are printer specific parameters for the Eltron LP 2742.

You can also send the characters using ASCII HEX values. To start, use WPF=0, then send the remaining values as HEX characters.

ASCII characters in HEX mode:

```
wpf=0
4E 0D 41 30 2C 30 2C 30 2C 33 2C 31 2C 32 2C 4E 2C 22 52 69 63 65 20 4C 61 6B 65 69 67 68 69 6E 67 20 53 79 73 74 65 6D
73 20 40 64 20 40 74 20 40 43 22 20 41 38 2C 35 30 2C 30 2C 35 2C 31 2C 31 2C 4E 2C 22 40 47 22 20 40 4D 41 38 2C 31 32
30 2C 30 2C 35 2C 31 2C 31 2C 4E 2C 22 40 54 22 0D 41 38 2C 31 39 30 2C 30 2C 35 2C 31 2C  31 2C 4E 2C 22 40 4E 22 40
4D 20 42 38 2C 32 36 30 2C 30 2C 33 2C 33 2C 37 2C 31 30 30 2C 42 2C 22 40 47 22 0D 50 31 0D
```

First, place "WPF=0" in the first line to indicate that the following is a print format file. Then place each character in ASCII HEX format and include a 0D for carriage return.

## 6.3 Using Front Panel Editing

Using the PFORMT menu (see Figure 3-8), you can edit the print format string by changing the hex values of the ASCII characters in the format string.

To edit a print format, do the following:

1. In configuration mode, use the navigation keys to go to the PFORMAT menu.

2. Press the 8 key to show the ***EDIT*** submenu.
3. Press the 8 key again to show the print format string.
4. Use the 4 key and the 6 key to scroll through the format. The number position of each character is shown in the two digits at the left of the display.

## To Edit a Character:

1. Press the **ENTER** key while the character is displayed. The right most digit blinks, indicating that it can be changed.
2. Use the 2 key and 8 keys to increase or decrease the value, or use the 4 key to move to the next digit.
3. Press the **ENTER** key to save any changes and advance to the next character in the string.
4. If done, press the 2 key to return to the ***EDIT*** submenu.

## To Insert One of More Characters:

1. Move the cursor to the character after which new characters are to be inserted.
2. Press the 2 key to return to the ***EDIT*** submenu, and then press the 6 key to show the ***INSERT*** parameter.
3. Press the **ENTER** key to insert one character; press repeatedly to add more characters. Each press of the **ENTER** key adds a character at the location last shown under ***EDIT*** submenu and shifts all subsequent characters to the right. Inserted characters are assigned hex value 00 (null). To edit inserted characters, return to the EDIT submenu and make changes as described in this section "To edit a character."

## To Delete One of More Characters

1. Move the cursor to the character to be deleted.
2. Press the 2 key to return to the ***EDIT*** submenu, and then press the 6 key twice to show the ***DELETE*** parameter.
3. Press **ENTER** key to delete one character; press repeatedly to delete more characters. Each press of the **ENTER** key deletes a character, starting at the location last shown under ***EDIT*** submenu, and then moving left to preceding characters. Each deletion shifts all subsequent characters to the left.

The format of the characters to be entered is shown.

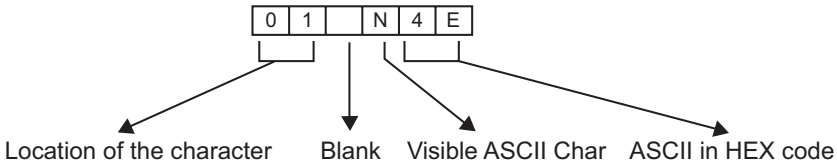



*Figure 6-1. Print Format*

Note

- ***EDP or Electronic Data Processing refers to a PC or a terminal that can enter ASCII characters using a keyboard and a screen via the EDP interface of the 120 Plus.***
- ***Some characters cannot be displayed on the 120 Plus front panel (See the ASCII character chart in Appendix C - ASCII Set and Specifications and Appendix E - Front Panel Display Characters on pages 44 and 48.) and are shown as blanks. The 120 Plus can send or receive any ASCII character; the character printed depends on the particular ASCII character set implemented for the receiving device.***

# 7.0 Continuous Output

## 7.1 Continuous Output (Stream) Format

All values are ASCII code characters.

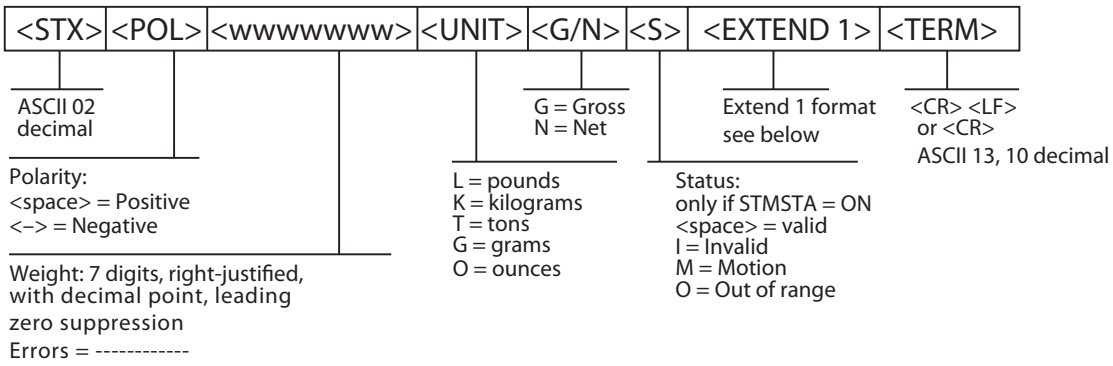



*Figure 7-1. Continuous Output Format*

## 7.2 Extended Format

• Extend 1: (If CINSTR = ON)

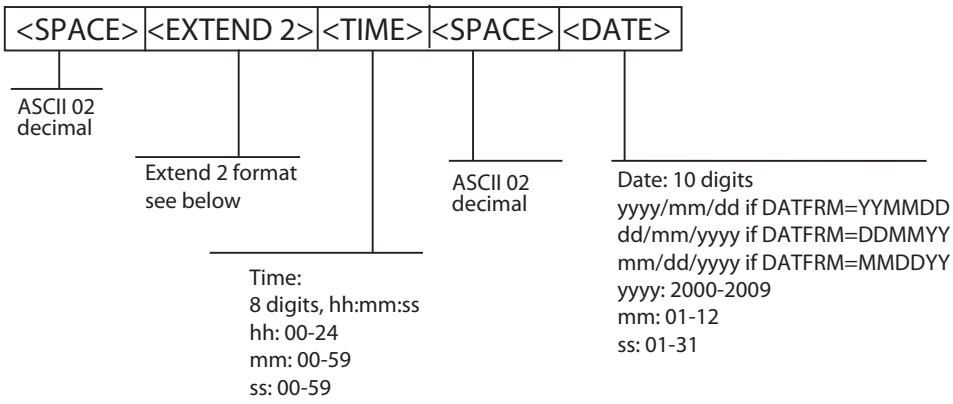



*Figure 7-2. Continuous Output Format*

• Extend 2: (If MONBAT = ON)

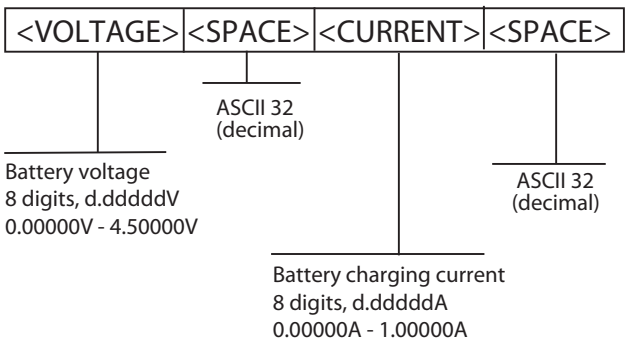



*Figure 7-3. Continuous Output Format*

# 8.0 Appendix

## 8.1 Electronic Data Processing Commands EDP

The EDP port and commands may be used to set indicator parameters, retrieve indicator parameters, and perform keypad functions.

To set parameter values, enter the corresponding EDP commands from the terminal. In order to set the parameter values, use the following format:

“Command=Parameter Value"
For example: To set GRADS (graduations) to 5000, do the following:

grads=5000 (Press "Enter" on the keyboard)

OK

The indicator responds with OK. OK means the setting was valid, and the indicator was in a mode that allowed the setting to be made.

To retrieve parameter values, send the parameter name. For example: To retrieve the GRADS (graduations) value, do the following:

grads (Press "Enter" on the keyboard)

5000

The indicator responds with 5000. This means the current value for the parameter GRADS is 5000.

If an unknown command is sent, or a known command is sent, but an attempt is made to set it to an incorrect value, the indicator will respond with the value as set by the WHAT parameter, either ?? (default) or ?.

### 8.1.1 General Commands

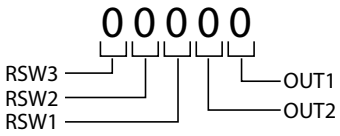
| Command | Function |
|---|---|
| DUMPALL | List all parameter values |
| VERSION | Return the firmware version, checksum, and serial number in the following format:<br>120PLS v.vv_ccccc SN: sssss where v.vv is the version, cccccc is the checksum and ssssss is the serial number. |
| P | Show currently displayed weight with single letter unit (L for pounds, K for kilograms) |
| ZZ | Return current displayed weight with unit Format: swwwwwww uu zzz<br>s: positive " ", negative "-"<br>wwwwwww: currently displayed weight value - - - - - - - (overload), :::::: (underrange)<br>uu: currently displayed unit<br>zzz: annunciator status value<br>0 = kg<br>1 = lb<br>2 = t<br>4 = oz<br>8 = g<br>16 = hold<br>32 = net<br>64 = center of zero<br>128 = standstill<br>For example, if the annunciator status value returned with the ZZ command is 161, the net, standstill, and lb annunciators are lit: 161 represents the sum of the values for the standstill annunciator (128), net mode annunciator (32), and the lb units annunciator (1). |
| BAT | Battery voltage and charging current |
| ADS | A/D converter memory map |
| IO | List status of digital input (Remote Switch) and output (Set Point)<br>  |
| DEFAULT | Reset default parameter values |
| RS | Software reset |

*Table 8-1. General Commands*

### 8.1.2 Configuration Commands

| Command | Description | Values |
|---|---|---|
| GRADS | Graduations | 1 - 999999 |
| ZTRKBND | Zero Track Band | OFF, 0.5D, 1D, and 3D |
| ZRANGE | Zero Range | 1.9%, 100% |
| MOTBAND | Motion Band | OFF, 1D, 3D, 5D, 10D, 20D, and 50D |
| OVRLOAD | Overload | FS+2%, FS+1D, FS+9D, and FS |
| DIGFLTR 1<br>DIGFLTR 2<br>DIGFLTR 3 | Digital Filtering 1-3 | 1, 2, 4, 8, 16, 32, 64, and 128 |
| DFSENS | Digital Filtering Cutout Sensitivity | 2OUT, 4OUT, 8OUT, 16OUT, 32OUT, 64OUT, and 128OUT |
| DFTHRH | Digital Filtering Cutout Threshold | NONE, 1DD, 2DD, 5DD, 10DD, 20DD, 50DD, 100DD, 200DD, and 250DD |
| INIZR | Initial Zero Range | 8%, 20%, 50%, 100%, OFF |
| REGULAT | Regulatory Compliance | NTEP, OIML, CANADA, NONE |
| PROTECT | Protection | DISABLE, ENABLE |

*Table 8-2. Configuration Commands*

### 8.1.3 Format Commands

| Command | Description | Values |
|---|---|---|
| PRI.DECPNT | primary units decimal point position | 8.88888, 88.8888, 888.888, 8888.88, 88888.8, and 888888 |
| PRI.DSPDIV | Primary units display division | 1D, 2D, 5D, 10D, 20D, 50D, 100D, 200D, and 500D |
| PRI.UNITS | Primary units | LB, KG, OZ, G |
| SEC.DECPNT | Secondary units decimal points position | 8.88888, 88.8888, 888.888, 8888.88, 88888.8, and 888888 |
| SEC.DSPDIV | Secondary units display division | 1D, 2D, 5D, 10D, 20D, 50D, 100D, 200D, and 500D |
| SEC.UNITS | Secondary units | LB, KG, OZ, G |
| DSPRAT | Display rate | 250 MS, 500 MS, 1 SEC, 2 SEC |
| HIRES | Hires | ON, OFF |

*Table 8-3. Format Commands*

### 8.1.4 Calibration Commands

| Command | Description | Values |
|---|---|---|
| WZERO | Perform zero calibration | - |
| WVAL | Test weight value | 0-999999 |
| WSPAN | Perform span calibration | - |
| REZERO | Perform rezero calibration | - |
| LC.CD | Set deadload coefficient | value |
| LC.CW | Set span coefficient | value |
| LAT.CAL | Latitude (degrees) at point of calibration | 0 - 90 |
| ELEV.CAL | Elevation (meters) at point of calibration | -9999 - 9999 |

*Table 8-4. Calibration Commands*

### 8.1.5 Serial Commands

| Command | Description | Values |
|---|---|---|
| EDP.BAUD | EDP port baud rate | 1200, 2400, 4800, 9600, 19200, 38400 |
| EDP.BITS | EDP port data bits/parity | 8NONE, 7EVEN, 7ODD, and 7SPACE |
| EDP.TERMIN | EDP port termination character | CR/LF, CR |
| EDP.ECHO | EDP port echo input | ON, OFF |
| EDP.ADDRESS | EDP port RS-485 address | Value in hex (00~ffh) |
| PRN.BAUD | Printer port baud rate | 1200, 2400, 4800, and 9600 |
| PRN.BITS | Printer port data bits/parity | 8NONE, 7EVEN, 7ODD, 7SPACE |
| PRN.TERMIN | Printer port termination character | CR/LF, CR |
| PRN.LNGUGE | Ticket language | ENGLIS, GERMAN |
| PRN.DEST | Print destination | EDP, PRN |
| STREAM | Continuous weight transmission | OFF, EDP, PRN |
| STMDLY | Stream output delay period | 250MS, 500MS, 1SEC, 2SEC, 4SEC, 8SEC, 15SEC |
| CINSTR | Stream additional information with raw data and time | ON, OFF |
| STMSTA | Stream additional information with weight status | ON, OFF |
| MONBAT | Stream additional information with battery data | ON, OFF |
| WHAT | Defines response to invalid command | ??, ? |

*Table 8-5. Serial Commands*

### 8.1.6 Program Commands

| Command | Description | Values |
|---|---|---|
| PWRUPMD | Power up mode | GO, DELAY |
| RPNBAND | Return to zero point band | 10D, OFF, 1D, 2D, 3D, 5D,20D, 50D |
| SHUTDN | Power shut down mode | None, 1 min, 2 min, 5 min, 10 min |
| BAKLIT | Back light of LCD | OFF, 15 sec, 30 sec, 1 min, ON |
| BUZZER | Sound of key press | OFF, ON |
| HOLDMD | Hold mode | DISABL, TOGGLE, AVERAG, AUTO |
| AVGTM | Average timer for hold function | 2SEC, 3SEC, 4SEC, 5SEC, 6SEC, 8SEC, 12SEC, 14SEC, 16SEC |
| HOLDTM | Hold timer for hold function | 1MIN, 2MIN, 3MIN, 4MIN, 5MIN, 6MIN, 8MIN, 10MIN, |
| KYLOCK | Lock the keypad | NONE, UNIT, PRN, HOLD, ZOTA, UMPR, BMUNPR, ALL |
| CONSNUM | Consecutive number | 1 - 999999 |
| DATE | Date | 20yy/mm/dd |
| TIME | Time | hh:mm:ss |
| DATFRM | Date format | YYMMDD, MMDDYY, DDMMYY |
| GRAVADJ | On/Off | Turns the gravity correction feature on or off |
| LATITUD | Latitude (degrees) at point of use | 0 - 90 |
| ELEVATN | Elevation (meters) at point of use | -9999 to 9999 |

*Table 8-6. Program Commands*

### 8.1.7 Print Format Commands

| Command | Description | Values |
|---|---|---|
| WWPF | Print format strings in ASCII characters | See "Print Formats" |
| WPF | Print format strings in ASCII hex code | See "Print Formats" |

*Table 8-7. PFROMT Commands*

### 8.1.8 Set Points Commands

| Command | Description | Values |
|---|---|---|
| S1.KIND | Kinds of Operation mode for set point 1 | OFF, GROSS, NET, DISPLA, ABSNET |
| S1.CONTACT | Contact status below the set point 1 value | N.CLOSE, N.OPEN |
| S1.CONDITI | Output enabled only after the weight reading has stabilized | NORMAL, STABLE |
| S1.WAVL | Set weight thresholds for set point 1. Output 1 active if load over this weight (load >= wval) | 0 - 999999 |
| S1.HYSTER | Set weight thresholds for set point 1. Output 1 deactive if load under this weight (load < wval x hysteresis) | 0%, 2%, 5%, and 10% |
| S1.TIMER | Output is disabled after the time period has expired | NONE, 250MS, 500MS, 750MS, 1.5SEC, 3.0SEC, 4.0SEC, 5.0SEC |
| S1.DELAY | Time delay before the output is enabled | NONE, 250MS, 500MS, 750MS, 1.5SEC, 3.0SEC, 4.0SEC, 5.0SEC |
| S1.BUZZER | Enable/Disable set point | OFF, ON |
| S2.KIND | Kinds of Operation mode for set point 2 | OFF, GROSS, NET, DISPLA, ABSNET |

*Table 8-8. Set Points Commands*

| Command | Description | Values |
|---|---|---|
| S2.CONTACT | Contact status below the set point 2 value | N.CLOSE, N.OPEN |
| S2.CONDITI | Output enabled only after the weight reading has stabilized | NORMAL, STABLE |
| S2.WAVL | Set weight thresholds for set point 2. Output 2 active if load over this weight (load >= wval) | 0 - 999999 |
| S2.HYSTER | Set weight thresholds for set point 2. Output 2 deactive if load under this weight. (load < wval x hysteresis) | 0%, 2%, 5%, and 10% |
| S2.TIMER | The output is disabled after the time period has expired | NONE, 250MS, 500 MS, 750 MS, 1.5 SEC, 3.0 SEC, 4.0 SEC, 5.0 SEC |
| S2.DELAY | Time delay before the output is enabled | NONE, 250 MS, 500 MS, 750 MS, 1.5 SEC, 3.0 SEC, 4.0 SEC, 5.0 SEC |
| S2.BUZZER | Enable/Disable set point | OFF, ON |
| RSWDEF | Specifies the function activated by remote switch inputs 1, 2, and 3. | OF.OF.OF, PR.TA.ZO, UN.TA.ZO |

*Table 8-8. Set Points Commands*

### 8.1.9 Key Press EDP Commands

| Command | Description | Values |
|---|---|---|
| KZERO | Same function as **ZERO** key press | - |
| KGROSSNET | Same function as **GROSS/NET** key press | - |
| KTARE | Same function as **TARE** key press | - |
| KUNITS | Same function as **UNITS** key press | - |
| KPRIUNIT | Force to primary unit | - |
| KSECUNIT | Force to secondary unit | - |
| KPRINT | Same function as **PRINT** key press | - |
| KHOLD | Same function as **HOLD** key press | |
| KENTER | Same function as **ENTER** key press | |
| KPTARE | Same function as **PRESET TARE** key press | |
| KCLEAR | Same function as **CLEAR** key press | |
| KNR0-9 | Same function as **0-9** key press | |

*Table 8-9. Key Press Commands*

### 8.1.10 Tare, Zero key and REGULAT Parameter

The function of the **TARE** and **ZERO** keys depends on the value specified for the ***REGULAT*** parameter. Table 8-11 below describes the function of these keys for each of the regulatory modes.

| REGULAT parameter value | Weight on scale | Tare in system | Key press function | |
|---|---|---|---|---|
| | | | KTARE | KZERO |
| USA | zero or negative | no | no active | zero |
| | | yes | clear tare | |
| | positive | no | tare | |
| | | yes | tare | |
| CANADA | zero or negative | no | no active | zero |
| | | yes | clear tare | |
| | positive | no | tare | |
| | | yes | no active | |
| EUROPE | zero or negative | no | no active | zero |
| | | yes | clear tare | zero and clear tare |
| | positive | no | tare | zero |
| | | yes | tare | zero and clear tare |
| NONE | zero or negative | no | tare | zero |
| | | yes | clear tare | |
| | positive | no | tare | |
| | | yes | clear tare | |

*Table 8-10. Regulate Parameter Values*

**Note**

- ***ZERO if in Standstill.***
- ***ZERO if Weight is within ZRANGE. No action if weight is outside of ZRANGE.***
- ***CLEAR TARE or ZERO force indicators into gross mode.***
- ***TARE force indicator into net mode***

## 8.2 Conversion Factors and Continuous Output Format

### 8.2.1 Conversion Factors - Secondary Unit = Primary Unit x Multiplier

| Primary Unit | X Multiplier or Divisor | Secondary Unit |
|---|---|---|
| KG | x 2.20462262184878 | lb |
| KG | x 1000 | g |
| KG | x 35.2739619495804 | oz |
| lb | x 2.20462262184878 | kg |
| lb | x 453.59237 | g |
| lb | x 16 | oz |
| g | / 1000 | kg |
| g | x 453.59237 | lb |
| g | x 0.00228571428571429 | oz |
| oz | / 35.2739619495804 | kg |
| oz | / 16 | lb |
| oz | / 0.00228571428571429 | g |

*Table 8-11. Conversion Factors*

## 8.3 ASCII Set and Specifications

Use the decimal values for ASCII characters listed in the table, when specifying print format strings on the 120 Plus PFORMT menu. The actual character printed depends on the character mapping used by the output device. The 120 Plus can send and receive any ASCII character value (decimal 0-255) but the indicator display is limited to numbers, upper- case, unaccented letters, and a few special characters.

| Control | ASCII | Dec | Hex | ASCII | Dec | Hex | ASCII | Dec | Hex | ASCII | Dec | Hex |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ctrl-@ | NUL | 00 | 00 | space | 32 | 20 | @ | 64 | 40 | ` | 96 | 60 |
| Ctrl-A | SOH | 01 | 01 | ! | 33 | 21 | A | 65 | 41 | a | 97 | 61 |
| Ctrl-B | STX | 02 | 02 | “ | 34 | 22 | B | 66 | 42 | b | 98 | 62 |
| Ctrl-C | ETX | 03 | 03 | # | 35 | 23 | C | 67 | 43 | c | 99 | 63 |
| Ctrl-D | EOT | 04 | 04 | $ | 36 | 24 | D | 68 | 44 | d | 100 | 64 |
| Ctrl-E | ENQ | 05 | 05 | % | 37 | 25 | E | 69 | 45 | e | 101 | 65 |
| Ctrl-F | ACK | 06 | 06 | & | 38 | 26 | F | 70 | 46 | f | 102 | 66 |
| Ctrl-G | BEL | 07 | 07 | ’ | 39 | 27 | G | 71 | 47 | g | 103 | 67 |
| Ctrl-H | BS | 08 | 08 | ( | 40 | 28 | H | 72 | 48 | h | 104 | 68 |
| Ctrl-I | HT | 09 | 09 | ) | 41 | 29 | I | 73 | 49 | i | 105 | 69 |
| Ctrl-J | LF | 10 | 0A | * | 42 | 2A | J | 74 | 4A | j | 106 | 6A |
| Ctrl-K | VT | 11 | 0B | + | 43 | 2B | K | 75 | 4B | k | 107 | 6B |
| Ctrl-L | FF | 12 | 0C | , | 44 | 2C | L | 76 | 4C | l | 108 | 6C |
| Ctrl-M | CR | 13 | 0D | - | 45 | 2D | M | 77 | 4D | m | 109 | 6D |
| Ctrl-N | SO | 14 | 0E | . | 46 | 2E | N | 78 | 4E | n | 110 | 6E |
| Ctrl-O | SI | 15 | 0F | / | 47 | 2F | O | 79 | 4F | o | 111 | 6F |
| Ctrl-P | DLE | 16 | 10 | 0 | 48 | 30 | P | 80 | 50 | p | 112 | 70 |
| Ctrl-Q | DC1 | 17 | 11 | 1 | 49 | 31 | Q | 81 | 51 | q | 113 | 71 |
| Ctrl-R | DC2 | 18 | 12 | 2 | 50 | 32 | R | 82 | 52 | r | 114 | 72 |
| Ctrl-S | DC3 | 19 | 13 | 3 | 51 | 33 | S | 83 | 53 | s | 115 | 73 |
| Ctrl-T | DC4 | 20 | 14 | 4 | 52 | 34 | T | 84 | 54 | t | 116 | 74 |
| Ctrl-U | NAK | 21 | 15 | 5 | 53 | 35 | U | 85 | 55 | u | 117 | 75 |
| Ctrl-V | SYN | 22 | 16 | 6 | 54 | 36 | V | 86 | 56 | v | 118 | 76 |
| Ctrl-W | ETB | 23 | 17 | 7 | 55 | 37 | W | 87 | 57 | w | 119 | 77 |
| Ctrl-X | CAN | 24 | 18 | 8 | 56 | 38 | X | 88 | 58 | x | 120 | 78 |
| Ctrl-Y | EM | 25 | 19 | 9 | 57 | 39 | Y | 89 | 59 | y | 121 | 79 |
| Ctrl-Z | SUB | 26 | 1A | : | 58 | 3A | Z | 90 | 5A | z | 122 | 7A |
| Ctrl-[ | ESC | 27 | 1B | ; | 59 | 3B | [ | 91 | 5B | { | 123 | 7B |
| Ctrl-\ | FS | 28 | 1C | < | 60 | 3C | \ | 92 | 5C | \| | 124 | 7C |
| Ctrl-] | GS | 29 | 1D | = | 61 | 3D | ] | 93 | 5D | } | 125 | 7D |
| Ctrl-^ | RS | 30 | 1E | > | 62 | 3E | ^ | 94 | 5E | ~ | 126 | 7E |
| Ctrl-_ | US | 31 | 1F | ? | 63 | 3F | _ | 95 | 5F | DEL | 127 | 7F |

*Table 8-12. ASCII Chart Part 1*

| ASCII | Dec | Hex | ASCII | Dec | Hex | ASCII | Dec | Hex | ASCII | Dec | Hex |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ç | 128 | 80 | á | 160 | A0 | | 192 | C0 | α | 224 | E0 |
| ü | 129 | 81 | í | 161 | A1 | | 193 | C1 | β | 225 | E1 |
| é | 130 | 82 | ó | 162 | A2 | | 194 | C2 | Γ | 226 | E2 |
| â | 131 | 83 | ú | 163 | A3 | | 195 | C3 | π | 227 | E3 |
| ä | 132 | 84 | ñ | 164 | A4 | | 196 | C4 | Σ | 228 | E4 |
| à | 133 | 85 | Ñ | 165 | A5 | | 197 | C5 | σ | 229 | E5 |
| å | 134 | 86 | ª | 166 | A6 | | 198 | C6 | µ | 230 | E6 |
| ç | 135 | 87 | º | 167 | A7 | | 199 | C7 | τ | 231 | E7 |
| ê | 136 | 88 | ¿ | 168 | A8 | | 200 | C8 | Φ | 232 | E8 |
| ë | 137 | 89 | | 169 | A9 | | 201 | C9 | Θ | 233 | E9 |
| è | 138 | 8A | ¬ | 170 | AA | | 202 | CA | Ω | 234 | EA |
| ï | 139 | 8B | 1/2 | 171 | AB | | 203 | CB | δ | 235 | EB |
| î | 140 | 8C | 1/4 | 172 | AC | | 204 | CC | ∞ | 236 | EC |
| ì | 141 | 8D | ¡ | 173 | AD | | 205 | CD | ϕ | 237 | ED |
| Ä | 142 | 8E | « | 174 | AE | | 206 | CE | ∈ | 238 | EE |
| Å | 143 | 8F | » | 175 | AF | | 207 | CF | ∩ | 239 | EF |
| É | 144 | 90 | | 176 | B0 | | 208 | D0 | ≡ | 240 | F0 |
| æ | 145 | 91 | | 177 | B1 | | 209 | D1 | ± | 241 | F1 |
| Æ | 146 | 92 | | 178 | B2 | | 210 | D2 | ≥ | 242 | F2 |
| ô | 147 | 93 | | 179 | B3 | | 211 | D3 | ≤ | 243 | F3 |
| ö | 148 | 94 | | 180 | B4 | | 212 | D4 | ⌠ | 244 | F4 |
| ò | 149 | 95 | | 181 | B5 | | 213 | D5 | ⌡ | 245 | F5 |
| û | 150 | 96 | | 182 | B6 | | 214 | D6 | ÷ | 246 | F6 |
| ù | 151 | 97 | | 183 | B7 | | 215 | D7 | ≈ | 247 | F7 |
| ÿ | 152 | 98 | | 184 | B8 | | 216 | D8 | ° | 248 | F8 |
| Ö | 153 | 99 | | 185 | B9 | | 217 | D9 | • | 249 | F9 |
| Ü | 154 | 9A | | 186 | BA | | 218 | DA | | 250 | FA |
| ¢ | 155 | 9B | | 187 | BB | | 219 | DB | | 251 | FB |
| £ | 156 | 9C | | 188 | BC | | 220 | DC | | 252 | FC |
| ¥ | 157 | 9D | | 189 | BD | | 221 | DD | ² | 253 | FD |
| Pts | 158 | 9E | | 190 | BE | | 222 | DE | | 254 | FE |
| *f* | 159 | 9F | | 191 | BF | | 223 | DF | | 255 | FF |

*Table 8-13. ASCII Chart Part 2*

## 8.4 Error Messages

The 120 Plus indicator displays a number of error messages. When an error occurs, the message is shown on the indicator LED display.

| Error Message | Description | Solution |
|---|---|---|
| CENTER DASHES | Gross > Overload limit | Gross value exceeds overload limit. Check configuration or signal input level. |
| UNDER DASHES | Underflow error | Weight value too small to be displayed |
| OVER DASHES | Overflow error | Weight value too large to be displayed |
| AD LOW | A/D over negative range | Check scale for binding or damage |
| AD HI | A/D over positive range | Check scale for binding or damage |
| EE SUM | Parameter or calibration check- sum error | Recalibration is needed; contact Rice Lake Weighing Systems service |
| WW WR | EEPROM write error | Contact Rice Lake Weighing Systems service |
| PM SUM | Internal program checksum error | Contact Rice Lake Weighing systems service |
| HOFSET | Load > calibrated zero + capacity x INIZR | Check weight and INIZR |
| LOFSET | Load < calibrated zero + capacity x INIZR | Check weight and INIZR |
| UOFSET | Unstable within 2 sec of powering on | Check weight and INIZR |

*Table 8-14. Error Messages*

## 8.5 Front Panel Display Characters

*Figure 8-1. 120 Plus Display Characters*

## 8.6 Gravity Compensation

This feature is used to compensate for the variance in gravitational pull from one location to another and is available for the 120 Plus. To calibrate with gravity compensation, the GRAVADJ parameter must be set to ON, and the LATITD (latitude in degree) and ELEVTN (elevation in meters, relative to sea level) parameters set before calibrating the 120 Plus.

If the indicator is later installed at a different location, gravity compensation can be applied to a pre-calibrated 120 Plus by adjusting the LATITD and ELEVTN parameters.

Gravity is greater at the poles than at the equator and decreases with increase in altitude. The effect of gravity at any given location can be calculated using the following formula:-

$$g_{CAL} = 9.80632 - 0.0258Cos(0.0349065850Ø_{CAL}) + 0.00003Cos(0.00698131701Ø) - 0.00000293h_{CAL} \quad \text{(EQ 1)}$$

$$g_{Opa} = 9.80632 - 0.0258Cos(0.0349065850Ø_{OPA}) + 0.00003Cos(0.00698131701Ø) - 0.00000293h_{OPA} \quad \text{(EQ 2)}$$

Where $Ø$ = degrees latitude and h = height in meters

$$W_{0pa} = \frac{W_{CAL}}{\frac{g_{Opa}}{g_{CAL}}} \quad \text{if GRAVADJ = ON}$$

$$W_{0pa} = W_{CAL} \quad \text{if GRAVADJ = OFF}$$

For example:

Calibration location at Canada Magog, and Operation location at Taiwan Taipei.

The geographic data and calculation:

Magog: $Ø$ = 45° and h = 222m, Taipei $Ø$ = 23° and h = 10m

$$g_{CAL} = 9.80564, \; g_{Opa} = 9.78836$$

$$W_{0pa} = \frac{W_{CAL}}{\frac{9.78836}{9.80564}} = 1.00174W_{CAL}$$

## 8.7 120 Plus Specifications

### Performance

Resolution: up to 999,999 dd (setup selectable)
Conversion Speed: 3, 7, 15, 30 (setup selectable)
Sensitivity: 1.0µV/Vsi for approved scales; 0.5µV/Vsi for non-approved scales.
Full Scale Range: 17.5 mV/V
Linearity: 0.01% of full scale
Excitation: 5 ± 0.3 VDC, 4 x 350Ω or 8 x 700Ω load cells (4- and 6- wires)
Offset Drift: 3.5 ppm /ºC
Span Drift: 3.5 ppm /ºC
A/D Converter Type: Sigma-Delta, ratiometric. Filter: Digital filter, software selectable
Count By: x1, x2, x5, x10, x20, x50, x100, x200, x500
Decimal point setting: between any digits of the weight display
Calibration Methods: Software, constants stored in EEPROM
Weighing Functions:

- Automatic zero tracking
- No motion detection
- Auto-zero on power-up
- Zero
- Tare
- GROSS/Net
- Print
- Units conversion

### Serial Communications

EDP Port: Full duplex RS-232
Transmission Rate: 38400, 19200, 9600, 4800, 2400, 1200 bps
Printer Port: Output-only RS-232 or active 20mA current loop
Transmission Rate: 9600, 4800, 2400, 1200 bps

### Environmental

Operating Temperature: -10ºC to +40ºC (14ºF to 104ºF)
Storage Temperature: -25ºC to +70ºC (-13ºF to 158ºF)
Relative Humidity: 0-95%

### Display and Keyboard

Display: 6 digit, 7-segment, LCD, 21.2 mm
Status annunciators: No motion, Center of Zero, Net, units used (lb, kg, g, oz, t), Battery, Set Points, Hold, HI/ OK/ LO Weight Digits: 4, 5 or 6 (setup selectable)
Keyboard: 18 key flat membrane panel

### Power and Battery

Voltage: 5VDC, using power adapter 115 or 230VAC Power Consumption: 11W in-charger, 2W off-charger
Battery Operation: Charge Time: 7 ~ 10 hours
Estimated Battery Life:
Full active: 46 ~ 63 hours Saving: 300 hours

### Enclosure

Black ABS
Dimensions: 18.6 x 10 x 9.5 cm (7.32" x 4.05" x 3.74") L x H x D
Weight: 0.4 kg (without battery)
Mounting: Desktop, Wall and Tilt mount

### Approvals

OIML - TC7626
Accuracy Class III $n_{max}$: 10 000

Measurement Canada - Approval: AM 5517 - rev.1
Accuracy Class III / III HD $n_{max}$: 10 000

NTEP
CoC Number 03-059A1
Accuracy Class III / III L $n_{max}$: 10 000

CE

# 120 Plus Limited Warranty

Rice Lake Weighing Systems (RLWS) warrants that all RLWS equipment and systems properly installed by a Distributor or Original Equipment Manufacturer (OEM) will operate per written specifications as confirmed by the Distributor/OEM and accepted by RLWS. All systems and components are warranted against defects in materials and workmanship for one year.

RLWS warrants that the equipment sold hereunder will conform to the current written specifications authorized by RLWS. RLWS warrants the equipment against faulty workmanship and defective materials. If any equipment fails to conform to these warranties, RLWS will, at its option, repair or replace such goods returned within the warranty period subject to the following conditions:

- Upon discovery by Buyer of such nonconformity, RLWS will be given prompt written notice with a detailed explanation of the alleged deficiencies.
- Individual electronic components returned to RLWS for warranty purposes must be packaged to prevent electrostatic discharge (ESD) damage in shipment. Packaging requirements are listed in a publication, *Protecting Your Components From Static Damage in Shipment*, available from RLWS Equipment Return Department.
- Examination of such equipment by RLWS confirms that the nonconformity actually exists, and was not caused by accident, misuse, neglect, alteration, improper installation, improper repair or improper testing; RLWS shall be the sole judge of all alleged non-conformities.
- Such equipment has not been modified, altered, or changed by any person other than RLWS or its duly authorized repair agents.
- RLWS will have a reasonable time to repair or replace the defective equipment. Buyer is responsible for shipping charges both ways.
- In no event will RLWS be responsible for travel time or on-location repairs, including assembly or disassembly of equipment, nor will RLWS be liable for the cost of any repairs made by others.

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