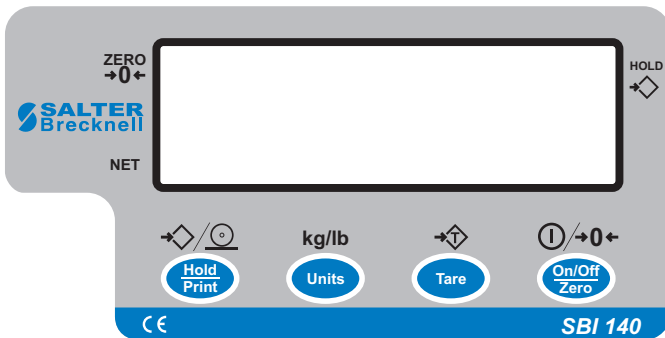


SBI 140 Indicator

User/Service Instructions



Specifications

Model SBI 140 indicator

Calibration Method Software calibration with long term storage in EEPROM

SERIAL COMMUNICATIONS

Mode Full Duplex

Baud rate 1200, 2400, 4800, 9600, 19,200 bps

Data format 7 data bits, even or odd parity, 1 stop bit
8 data bits, non-parity, 1 stop bit

Protocol Compatible with NCI standard SCP-01

OPERATION INTERFACE

Display 0.65" (17 mm) 7-segment LCD, 5 1/2 digits

Keyboard 4-key push button

POWER

Alkaline Batteries 4 x "AA" batteries (When all displayed segments of the LCD display flash, the batteries are low and should be replaced immediately.)

AC Adapter 6 VDC, 500mA, with central negative



DC Power Consumption 25mA@6Vdc (does not include load cell's consumption)

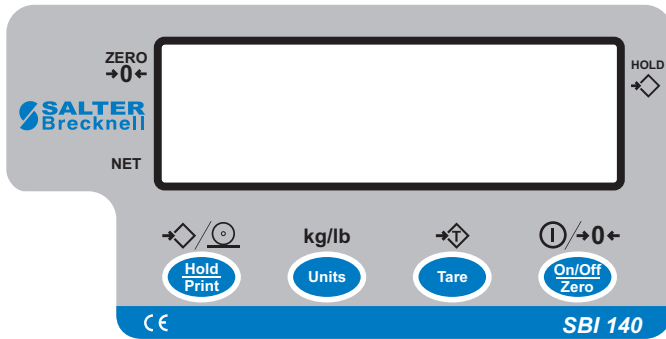
Operation temperature 9° to 107°F (5° to 35°C)

Loadcell

1. Sensitivity: 0.5mV/V --- 2mV/V
2. Input Resistor: 300 Ω --- 1100 Ω
3. Output Resistor: 300 Ω --- 1100 Ω
4. Pins Definition of connect socket:

Pin1 = load cell excitation positive
Pin2 = load cell excitation negative
Pin3 = load cell input signal negative
Pin4 = load cell input signal positive

Quick Start Guide



KEYS

On/ Zero/Off key

Press this key to turn the scale on. The display will show the scale's capacity, the scale will automatically zero if the weight is within 10% of the calibrated zero point, and then **0** (kg/lb) will be displayed. This is normal weighing mode.

The scale powers up in the same unit of measure as when it was turned off.

Press this key to zero any weight, up to 2% of full capacity, on the scale.

Press and hold this key for five seconds to turn the scale off.

Tare Key

Press the tare key to tare the weight on the scale. The net annunciator will illuminate.

To cancel a tare, press the tare key with no weight on the scale.

Units key

All units of measure within the scale should be able to be enabled / disable through the configuration mode.

When the unit's key is pressed the scale will automatically switch to the new unit of measure and display the correct weight, even if there is a hold or tare is active.

Hold / Print key

This key can be configured so it operates as a hold key only, operate as a print key only or operate as both.

Performing a Weighment

Turn the scale on and press the **ZERO** key if the display shows any weight.

Place item on the scale. Weight is displayed.

Press the **TARE** key to tare a weight. Press **UNITS** key to change unit of measure.

1.0 Introduction

Thank you for purchasing the SBI 140 indicator. Please read all instructions carefully before using the indicator and keep the following points in mind:

- Avoid lengthy exposure to extreme heat or cold. Your scale works best when operated at normal room temperature. Always allow the scale to acclimate to a normal room temperature before use.
- Allow sufficient warm up time. Turn the scale on and wait for a few minutes if possible, to give the internal components a change to stabilize before weighing.
- These electronic scales are precision instruments. Do not operate near an in-use cell phone, radio, computer or other electronic device. These devices emit RF and can cause unstable readings. If your scale ever performs poorly, try moving the scale to a different room or location.

2.0 Key Function

The keys have different functions depending on what mode the unit is in and how long the key is pressed.

In normal mode, hold down the key for less than five seconds for these functions:



In normal weighing mode, hold down the key for more than five seconds for these functions:



| |
|------|
| CODE |
|------|

 - Go to display inner code mode

| |
|-------|
| SETUP |
|-------|

 - Go to user setup mode

| |
|-------------|
| CALIBRATION |
|-------------|

 - Go to calibration mode

In setting mode, press the keys for these functions.



SHIFT/BACK/DEC

- Shift the flashing position to the left;
Or go back to above step;
Or decrease the flashing digit

CHANGE/INC

- Change the item in flashing position;
Or increase the flashing digit

ENTER/NEXT

- Confirm your input or selection;
Or go to next item

EXIT

- Exit from setting mode to normal work mode

2.1 Key Details

HOLD

(1) From normal weighing mode, press this key for less than five seconds to enable or disable the display data hold function. When this is enabled the ► will flash or continuously appear in the upper right of the display window.

There are three hold function modes (set these in the Setup mode explained later in the manual):

(a) If **Hld.00** is set, a stable displayed weight, above 10 divisions, will be held/locked when the weight is removed from the scale. If you place a heavier weight on the scale, that new weight will be displayed and held. If you remove the weight and let the scale become stable, when you place a smaller weight on the scale, that weight will be displayed and held.

(b) If **Hld.01** is set, a stable displayed weight, above 10 divisions, will be held/locked when the weight is removed from the scale. If you place a heavier weight on the scale, that new weight will be displayed and held. Only a larger weight than the held weight will change the display. This is different than the **Hld.00** mode.

(c) If **Hld.02** (... **Hld.99**) is set, the stable, displayed weight will be held/locked when the weight changes are larger than the \pm window set ($\pm 02d$... $\pm 99d$).

Note: Only stable weight can be held! When the unit of measure symbol is not flashing, the weight is stable. When ► flashes, the displayed reading is the current weight on the scale. When ► is continuously lit, the displayed reading is a steady reading held by the indicator/scale.

If you press **TARE** when the hold function is enabled, the held reading will be cleared, but the hold function is still enabled. To disable hold function, press **HOLD** once more.

2) Press this key for more than five seconds to access the DISPLAY INTERNAL CODE mode.

UNIT

1) Press this key for less than five seconds to toggle the unit of measure between lb and kg. This information is saved when you turn off the scale. It will power up in the same unit of measure.

2) Press this key for more than five seconds to access the SETUP mode. In this mode you can set the auto-off timer and select the serial communication protocol.

TARE

1) From normal weighing mode, press this key less than five seconds to zero or tare the scale if the weight is stable. When the current gross weight is in the zero-point range, this will zero the scale and clear the **NET**. When current gross weight is not in zero-point range, this will tare the scale and light **NET** on the display window. If the weight is not stable, the scale will attempt the zero/tare function for approximately 10 seconds.

2) From normal weighing mode, press this key more than five seconds to access CALIBRATION mode.

ON/OFF

1) When the scale is off, press this key to power on the scale. It will display the scale's capacity, try to get a proper zero, and then it will display **0** (kg/lb); This is normal weighing mode. (Note: the proper zero-point weight range is calibration zero-point $\pm 10\%$ full capacity. If the scale is not in zero-point range, the scale will display **0** _____ or **0** _____ and wait.

2) When the scale is on, press this key to turn off the scale.

3.0 Calibration

You can perform a two or three point calibration.

P0 = zero point

P1 = 12.5%-100% of full capacity

P2 = 25%-200% of full capacity

For three point calibration you need two test weights. One must be more than 12.5% of full capacity. The other must be more than 25% of full capacity.

For two point calibration you need just one weight that is more than 25% of full capacity.

3.1 Calibration Steps

Follow these instructions for two or three point calibration of your scale:

NOTE: To exit the calibration mode any time during these steps, press the ON/OFF key. This ignores any new settings and returns the scale to normal weighing mode.

1. With the scale in normal weighing mode, remove all weight from the scale and press and hold the **TARE** key until
CAL? is shown. **?** will flash, asking if you are sure you want to calibrate the scale.

2. Press **TARE** to accept.

If the Function Set is enabled you are allowed to modify the calibration unit of measure, display divisions (n), the division size (d) and location of the decimal (dot). For information on the Function Set, see the section *Function Set*.

Go to step 3 if the Function Set is enabled. If it is disabled, skip to the indented portion of step 8b.

3. From the key press (**TARE**) in step two. . .

Unit. x is displayed. Use this to set the default unit of measure on power up and the calibration weight unit of measure. If $x = 1$, lbs is the unit of measure. If $x = 0$, kg is the unit of measure.

4. Toggle between the two choices by pressing the **UNITS** key. Press **TARE** to accept the displayed value. . .

The current display divisions value is displayed. Choices are: 500, 600, 750, 800, 1000, 1200, 1500, 2000, 2400, 2500, 3000, 3500, 4000, 5000, 6000, 7000, 7500, 8000, 10000, 12000, 15000, 20000, 25000, 30000, 35000, 40000, 50000, 60000, 70000, 75000, 80000

5. Press the **HOLD** or **UNITS** key to move through the list of choices. Press **TARE** to accept the displayed value. . .

d. x is displayed. **x** = division size. Choices are 1, 2, and 5. This means the country will be by 1, 2 or 5.

In the next parameter you will select if the country is, for example, 1, 0.1, 0.01, etc.

Refer to the section:

How to Determine the Display Division, Division Size and Decimal Point
for information on choosing usable parameters.

6. Press the **UNITS** key to move through the list of choices. Press **TARE** to accept the displayed value. . .

dot. x is displayed. **x** = number of digits after the decimal point.
Choices are 0, 1, 2, or 3.

7. Press the **UNITS** key to move through the list of choices. Press **TARE** to accept the displayed value. . .

xxxxxx flashes on the display. This is the scale capacity calculated from the choices you made for display divisions (n), division size (d) and decimal point (dot).

8. Perform step 8a or 8b.

- 8a. Press the **HOLD** or **UNITS** key to return to step 3 and reset any of the parameters in steps 4-7.

OR

- 8b. Press the **TARE** key to continue with calibration. . .

CAL.P0 is briefly displayed, showing the indicator is ready to acquire the calibration zero point, then displays **0.0** weight with the last digit flashing.

9. Remove all weight from the scale and press the **TARE** key to acquire the zero point.

The display will blink and then **CAL.P1** is temporarily displayed, then **xxx** is displayed (50% of capacity is the default value) with the last digit blinking. This shows the scale is ready for the P1 calibration point.

10. Place the test weight on the scale. (between 25%-100% of full capacity for 2 point calibration; between 12.5% - 100% for three point calibration) Enter the test weight value by using the **HOLD** and **UNITS** keys. Press the **HOLD** key to select which digit to change (it will flash). Press the **UNITS** key to change the flashing digit. Press the **TARE** key to accept this value.

The display will blink and then **CAL.P2** is temporarily displayed if successful, then **xxx** is displayed (100% of capacity is the default value) with the last digit blinking. This shows the scale is ready for the P2 (25%-100% of full capacity) calibration point.

If you want to do a two point calibration, press the ON/OFF key now. The unit will restart with the new calibration in effect. Skip to step 13. Go to step 11 to finish the three point calibration.

CAL.P0 is displayed if calibration failed. Repeat from step 8b.

11. Place the P2 weight on the scale and use the **HOLD** and **UNITS** keys to enter this weight. Press the **TARE** key to accept. . .

The display will blink and then **CAL.P0** is temporarily displayed if successful, then **0.0** is displayed.

If calibration failed, repeat from step 8b.

12. Remove the weight from the scale and press the **TARE** key. . .

The display blinks and the zero point is captured again. If calibration is successful the unit will go through the power up display routine. If an error occurs in calibration, **CAL.Er** is temporarily displayed and the indicator repeats the procedure from step 8b.

13. The indicator is now calibrated and in normal weighing mode.

3.2 How to Determine the Display Division (n), Division Size (d) and Decimal Point (dot)

1. The **display division** can be determined by following expression:

$$\frac{\text{Capacity}}{\text{Division Size}} = \text{Display Division}$$

Display division should always be 25,000 or less.

For example:

The scale's capacity is 400kg and 4 load cells are used, the capacity of load cell is 300kg (capacity's unit of scale and load cell must be same) and the sensitivity of load cell is 1.5(the unit must be mV/V). according to above expression, the display division must be less: $25000 \times 1.5 \times 400 \div 300 \div 4 = 12500$

From following scale capacity selection table, you can select unit.0, n=8000, d=5, dot=2; and you will get a 400.00kg \times 0.05kg (8000 \times 5 \times 10⁽⁻²⁾)scale

2. Scale capacity selection table:

The scale's capacity is limited mainly by loadcell's capacity; the max. display division is determined by input signal; for 51/2 LCD, The max. capacity that can be displayed is 199999 lb/kg if the decimal point is not ignored.

Table 1
Capacity selection (weight unit is Kg or Lb)

| display division | division size (d=1) | | | |
|------------------|---------------------|--------|--------|--------|
| | decimal point (dot) | | | |
| | 0 | 1 | 2 | 3 |
| 500 | 500 | 50.0 | 5.00 | 0.500 |
| 600 | 600 | 60.0 | 6.00 | 0.600 |
| 750 | 750 | 75.0 | 7.50 | 0.750 |
| 800 | 800 | 80.0 | 8.00 | 0.800 |
| 1000 | 1000 | 100.0 | 10.00 | 1.000 |
| 1200 | 1200 | 120.0 | 12.00 | 1.200 |
| 1500 | 1500 | 150.0 | 15.00 | 1.500 |
| 2000 | 2000 | 200.0 | 20.00 | 2.000 |
| 2400 | 2400 | 240.0 | 24.00 | 2.400 |
| 2500 | 2500 | 250.0 | 25.00 | 2.500 |
| 3000 | 3000 | 300.0 | 30.00 | 3.000 |
| 3500 | 3500 | 350.0 | 35.00 | 3.500 |
| 4000 | 4000 | 400.0 | 40.00 | 4.000 |
| 5000 | 5000 | 500.0 | 50.00 | 5.000 |
| 6000 | 6000 | 600.0 | 60.00 | 6.000 |
| 7000 | 7000 | 700.0 | 70.00 | 7.000 |
| 7500 | 7500 | 750.0 | 75.00 | 7.500 |
| 8000 | 8000 | 800.0 | 80.00 | 8.000 |
| 10000 | 10000 | 1000.0 | 100.00 | 10.000 |
| 12000 | 12000 | 1200.0 | 120.00 | 12.000 |
| 15000 | 15000 | 1500.0 | 150.00 | 15.000 |
| 20000 | 20000 | 2000.0 | 200.00 | 20.000 |
| 25000 | 25000 | 2500.0 | 250.00 | 25.000 |
| 30000 | 30000 | 3000.0 | 300.00 | 30.000 |
| 35000 | 35000 | 3500.0 | 350.00 | 35.000 |
| 40000 | 40000 | 4000.0 | 400.00 | 40.000 |
| 50000 | 50000 | 5000.0 | 500.00 | 50.000 |
| 60000 | 60000 | 6000.0 | 600.00 | 60.000 |
| 70000 | 70000 | 7000.0 | 700.00 | 70.000 |
| 75000 | 75000 | 7500.0 | 750.00 | 75.000 |
| 80000 | 80000 | 8000.0 | 800.00 | 80.000 |

Table 2
Capacity selection (weight unit is Kg or Lb)

| display division | division size (d=2) | | | |
|------------------|---------------------|---------|---------|---------|
| | decimal point (dot) | | | |
| | 0 | 1 | 2 | 3 |
| 500 | 1000 | 100.0 | 10.00 | 1.000 |
| 600 | 1200 | 120.0 | 12.00 | 1.200 |
| 750 | 1500 | 150.0 | 15.00 | 1.500 |
| 800 | 1600 | 160.0 | 16.00 | 1.600 |
| 1000 | 2000 | 200.0 | 20.00 | 2.000 |
| 1200 | 240 | 240.0 | 24.00 | 2.400 |
| 1500 | 3000 | 300.0 | 30.00 | 3.000 |
| 2000 | 4000 | 400.0 | 40.00 | 4.000 |
| 2400 | 4800 | 480.0 | 48.00 | 4.800 |
| 2500 | 5000 | 500.0 | 50.00 | 5.000 |
| 3000 | 6000 | 600.0 | 60.00 | 6.000 |
| 3500 | 7000 | 700.0 | 70.00 | 7.000 |
| 4000 | 8000 | 800.0 | 80.00 | 8.000 |
| 5000 | 10000 | 1000.0 | 100.00 | 10.000 |
| 6000 | 12000 | 1200.0 | 120.00 | 12.000 |
| 7000 | 14000 | 1400.0 | 140.00 | 14.000 |
| 7500 | 15000 | 1500.0 | 150.00 | 15.000 |
| 8000 | 16000 | 1600.0 | 160.00 | 16.000 |
| 10000 | 20000 | 2000.0 | 200.00 | 20.000 |
| 12000 | 24000 | 2400.0 | 240.00 | 24.000 |
| 15000 | 30000 | 3000.0 | 300.00 | 30.000 |
| 20000 | 40000 | 4000.0 | 400.00 | 40.000 |
| 25000 | 50000 | 5000.0 | 500.00 | 50.000 |
| 30000 | 60000 | 6000.0 | 600.00 | 60.000 |
| 35000 | 70000 | 7000.0 | 700.00 | 70.000 |
| 40000 | 80000 | 8000.0 | 800.00 | 80.000 |
| 50000 | 100000 | 10000.0 | 1000.00 | 100.000 |
| 60000 | 120000 | 12000.0 | 1200.00 | 120.000 |
| 70000 | 140000 | 14000.0 | 1400.00 | 140.000 |
| 75000 | 150000 | 15000.0 | 1500.00 | 150.000 |
| 80000 | 160000 | 16000.0 | 1600.00 | 160.000 |

Table 3
Capacity selection (weight unit is Kg or Lb)

| display division | division size (d=5) | | | |
|------------------|---------------------|---------|---------|---------|
| | decimal point (dot) | | | |
| | 0 | 1 | 2 | 3 |
| 500 | 2500 | 250.0 | 25.00 | 2.500 |
| 600 | 3000 | 300.0 | 30.00 | 3.000 |
| 750 | 3750 | 375.0 | 37.50 | 3.750 |
| 800 | 4000 | 400.0 | 40.00 | 4.000 |
| 1000 | 5000 | 500.0 | 50.00 | 5.000 |
| 1200 | 6000 | 600.0 | 60.00 | 6.000 |
| 1500 | 7500 | 750.0 | 75.00 | 7.500 |
| 2000 | 10000 | 1000.0 | 100.00 | 10.000 |
| 2400 | 12000 | 1200.0 | 120.00 | 12.000 |
| 2500 | 12500 | 1250.0 | 125.00 | 12.500 |
| 3000 | 15000 | 1500.0 | 150.00 | 15.000 |
| 3500 | 17500 | 1750.0 | 175.00 | 17.500 |
| 4000 | 20000 | 2000.0 | 200.00 | 20.000 |
| 5000 | 25000 | 2500.0 | 250.00 | 25.000 |
| 6000 | 30000 | 3000.0 | 300.00 | 30.000 |
| 7000 | 35000 | 3500.0 | 350.00 | 35.000 |
| 7500 | 37500 | 3750.0 | 375.00 | 37.500 |
| 8000 | 40000 | 4000.0 | 400.00 | 40.000 |
| 10000 | 50000 | 5000.0 | 500.00 | 50.000 |
| 12000 | 60000 | 6000.0 | 600.00 | 60.000 |
| 15000 | 75000 | 7500.0 | 750.00 | 75.000 |
| 20000 | 100000 | 10000.0 | 1000.00 | 100.000 |
| 25000 | 125000 | 12500.0 | 1250.00 | 125.000 |
| 30000 | 150000 | 15000.0 | 1500.00 | 150.000 |
| 35000 | 175000 | 17500.0 | 1750.00 | 175.000 |
| 40000 | - | - | - | - |
| 50000 | - | - | - | - |
| 60000 | - | - | - | - |
| 70000 | - | - | - | - |
| 75000 | - | - | - | - |
| 80000 | - | - | - | - |

3. Display division size changing:

Because the calibration weight unit (same with selected capacity unit) and displayed weight unit can be selected to “kg” or “lb”, the indicator will automatically change the display division size and decimal point position according to the weight unit you selected. Please refer the following table:

| Calibration weight unit and division size | Weighing mode display size and unit | |
|--|-------------------------------------|------------------|
| | KG unit selected | LB unit selected |
| 1kg | 1kg | 2 lb |
| 0.1kg | 0.1kg | 0.2 lb |
| 0.01kg | 0.01kg | 0.02 lb |
| 0.001kg | 0.001kg | 0.002 lb |
| 2kg | 2kg | 5 lb |
| 0.2kg | 0.2kg | 0.5 lb |
| 0.02kg | 0.02kg | 0.05 lb |
| 0.002kg | 0.002kg | 0.005 lb |
| 5kg | 5kg | 10 lb |
| 0.5kg | 0.5kg | 1 lb |
| 0.05kg | 0.05kg | 0.1 lb |
| 0.005kg | 0.005kg | 0.01 lb |
| 1 lb | 0.5kg | 1 lb |
| 0.1 lb | 0.05kg | 0.1 lb |
| 0.01 lb | 0.005kg | 0.01 lb |
| 0.001 lb | 0.0005kg | 0.001 lb |
| 2 lb | 1kg | 2 lb |
| 0.2 lb | 0.1kg | 0.2 lb |
| 0.02 lb | 0.01kg | 0.02 lb |
| 0.002 lb | 0.001kg | 0.002 lb |
| 5 lb | 2kg | 5 lb |
| 0.5 lb | 0.2kg | 0.5 lb |
| 0.05 lb | 0.02kg | 0.05 lb |
| 0.005 lb | 0.002kg | 0.005 lb |

4.0 SETUP

(auto off time, RS232 and hold function setting):

Follow these steps to setup the auto off timer and the RS-232 settings:

1. With the scale in normal weighing mode, press the hold the **UNITS** key until. . .

A.oFF.x is shown. This shows that you are in the auto off time setting mode. **x** can be equal to 1-9 minutes or 0, which means the feature is disabled. Default value is 0.

2. To change the **x** value, press the **UNITS** key. . .

The **x** value will change and flash.

3. When the value you want is displayed, press the **TARE** key to accept the value.

The value is stored and **SP.X** is displayed. This shows the unit is in the RS-232 setting mode. X is defined below.

SP.0 continuous data output. The scale will continuously communicate the displayed weight including the unit of measure, a line feed and a carriage return. Example below:

120.2 kg
120.3 kg
120.4 kg
120.4 kg
120.4 kg

SP.1 If the **HOLD/PRINT** key is active and pressed, the scale will transmit the displayed weight, including the unit of measure, a line feed and a carriage return once the weight becomes stable and locked on the display. Example below:

120.4 kg

SP.2 The scale will transmit the following data once the reading becomes stable and will not allow a second print until the scale reading returns back to gross zero :

| | |
|-------|----------|
| Gross | 123.8 kg |
| Net | 120.4 kg |
| Tare | 3.4 kg |

- Use the **HOLD** and **UNITS** keys to change the value of **X**. When you are done making changes press the **TARE** key to accept the changes and go to next step (hold function). . .

Hld.xx is displayed. This means you are in Hold function setting mode. xx values 00,01,02,03...99

Hld.00 = hold function mode 0

Hld.01 = hold function mode 1

Hld.02 . . .99 = hold function mode 2-99

- Use the **HOLD** and **UNITS** keys to change the value of each **xx**. When you are done making changes press the **TARE** key to accept the changes and retart the scale.

On any step in this section you can press the **ZERO** key to exit the setting mode.

5.0 RS-232 Details

- RS-232 Connections between scale and host

| Indicator | ----- | Cable----- | ----- | Host |
|--------------|-------|----------------|--------------|-----------------|
| (DB9 female) | ---- | DB9 male)----- | (DB9 female) | ---- (DB9 male) |
| TXD 2 | ----- | 2 | ----- | 2 RXD |
| RXD 3 | ----- | 3 | ----- | 3 TXD |
| GND 5 | ----- | 5 | ----- | 5 GND |
| DSR 4 | ----- | 4 | ----- | 4 DTR |
| DTR 6 | ----- | 6 | ----- | 6 DSR |
| CTS 7 | ----- | 7 | ----- | 7 RTS |
| RTS 8 | ----- | 8 | ----- | 8 CTS |
| NC 1 | ----- | 1 | ----- | 1 |
| NC 9 | ----- | 9 | ----- | 9 |

Notes:

On the indicator's DB9 female, pins 4 and 6 are shorted and pins 7 and 8 are shorted.

- The baud rate and parity are configurable. Parity, start (low) and stop (high) bits will each be fixed at one. Data bits will be fixed at seven (if no parity bit, the data bit is eight). Modem lines will not be supported. Baud rates supported will be 1200, 2400, 4800, 9600 and 19200. Responses to serial commands will be immediate, or within one weight meter cycle

of the scale. One second should be more than adequate for use as a time-out value by the remote (controlling) device.

3. The length of the weight field will be 10 bytes (for 51/2 LCD): one for minus sign, one for decimal point, two for unit of measure (e.g. "lb", "kg"), six for weight data; The leading zero in weight data will be suppressed.

If the weight is overcapacity, the scale will return eight '^' characters (the field of minus sign, decimal point, weight data is filled by '^').

If the weight is under capacity, it will return eight '_' characters (the field of minus sign, decimal point, and weight data is filled by '_').

4. **SPX** is the serial protocol of RS-232:

- If weight is negative, in motion, the scale will still respond with a weight and status string.
- If the weight is overcapacity, the scale will return eight '^'. If the weight is under capacity, it will return eight '_'; if the zero point is error, it will return eight '-';
- Units of measure abbreviations are always lower case;
- The weight may be negative; therefore a polarity character is present. The character will be '-' for negative weight or a space character for positive weight.
- Weight field is always eight characters (6 for weight, 1 for decimal point, 1 for polarity);
- Leading zeroes are suppressed.

5.1 Key to Symbols Used

<ETX> End of Text character (03 hexadecimal)

<LF> Line Feed character (0A hex)

<CR> Carriage Return character (0D hex)

<SP> Space (20 hex)

x Weight characters from display including minus sign and out-of-range characters

c Message/menu (i.e. non-weight) characters from display

p Polarity character (i.e. - for negative, space for positive)

hh Two status bytes

uu Units of measure (lb, kg, using ANSI standard abbreviations)

There will only be two status bytes: hh. Bit 0 is the least significant bit (in each byte), while bit 7 is the most significant bit. The status bits are defined as follows:

| Bit | Status Byte 1 | Status Byte 2 |
|-----|-----------------------------------|--|
| 0 | 1 = Scale in motion 0 = Stable | 1 = Under capacity 0 = Not under capacity |

| | | |
|---|--------------------------------------|--|
| 1 | 1 = Scale at zero 0 = Not at zero | 1 = Over capacity 0 = Not over capacity |
| 2 | always 0 | always 0 |
| 3 | always 0 | always 0 |
| 4 | always 1 | always 1 |
| 5 | always 1 | always 1 |
| 6 | always 0 | always 0 |
| 7 | parity | parity |

5.2 Commands

- 1) Command: W<CR> (57h 0dh)

Response: Returns decimal weight, units and status.

```
<LF>pxxxxxxuu<CR><LF>hh<CR><ETX>
<LF>^^^^^^uu<CR><LF>hh<CR><ETX>---over capacity
<LF>_____uu<CR><LF>hh<CR><ETX>---under capacity
<LF>-----uu<CR><LF>hh<CR><ETX>---zero-point error
```

- 2) Command: S<CR> (53h 0dh)

Response: Returns scale status.

```
<LF>hh<CR><ETX>
```

- 3) Command: Z<CR> (5ah 0dh)

Response: Scale is zeroed, returns scale status, same as the T<CR> Command.

```
<LF>hh<CR><ETX>
```

- 4) Command: U<CR> (55h 0dh)

Response: Changes units of measure, returns new units and scale status.

```
<LF>uu<CR><LF>hh<CR><ETX>
```

- 5) Command: T<CR> (54h 0dh)

Response: Scale is tared, returns scale status. Like the **TARE** key is pressed.

<LF>hh<CR><ETX>

6) Command: all others

Response: Unrecognized command.

<LF>?<CR><ETX>

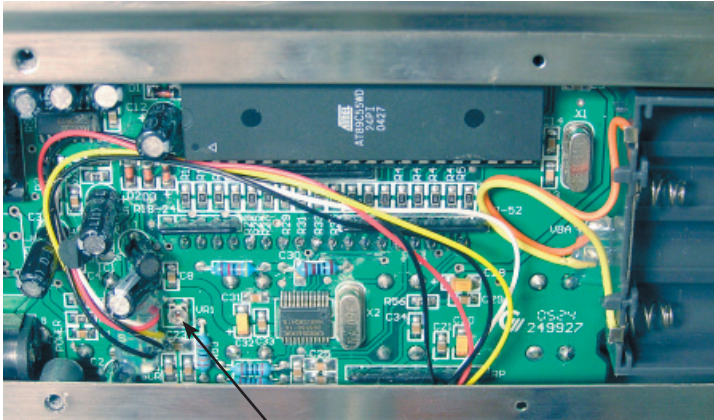
6.0 Display Internal Code

1. In normal weighing mode, press and hold the **HOLD** key for more than five seconds, until **codE** is shown. This means you are in Display Internal Code mode.
2. Press the **UNIT** key to display filtered or unfiltered A/D data; when ► is on, the data is filtered.
3. Press the **HOLD** key to select displaying weight inner code or around current power voltage (4.7V-6.5V); when displaying current voltage, the “p” will be displayed also.
4. Press the **ON/OFF** key to exit this mode.

Notes:

- a) The full capacity weight's code must be larger or equal to two times the selected display division-n; otherwise, the calibration cannot be properly completed.
- b) A zero point code of about 5000-20000 is recommended. You can adjust the potentiometer on PC board to make it in this range. Normally this need not be adjusted by the end user.

- c) The position of the zero-point potentiometer on the PC board is shown below:



Zero-point potentiometer

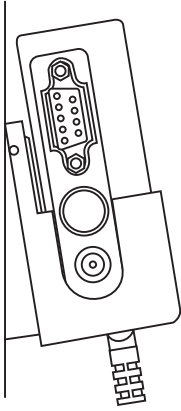
7.0 Function Set

1. When the scale is in normal weighing mode, press and hold the **HOLD** key, and then press down and hold the **ON/OFF** key until. . .
F-Set is temporarily displayed, then **FS. oN** or **FS.oFF** is shown. If the Function Set is enabled you are allowed to modify the calibration unit of measure, display divisions (n), the division size (d) and location of the decimal (dot) during calibration. If you choose OFF, these are not available during calibration.
2. Press the **UNITS** key to toggle between **oN** or **oFF**. Press the **TARE** key to save the displayed choice. . .
tr. oN or **tr. oFF** is displayed. This stands for AZT (auto zero tracking). Choose ON to enable AZT and OFF to disable AZT.
3. Press the **UNITS** key to toggle between **oN** or **oFF**. Press the **TARE** key to save the displayed choice. Factory default is ON. . .
Indicator exits the Function Set mode.
4. Press **ON/OFF** anytime while in the Function Set mode to exit this mode.

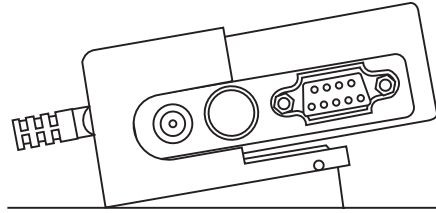
7.1 The meaning of some displayed symbols:

1. **xxxxxx kg/lb** - the scale capacity is xxxxxx kg/lb
2. **0⁻⁻⁻⁻** - zero point is over calibration zero + 10% Full capacity
3. **0₋₋₋₋₋** - zero is below calibration zero – 10%Full capacity
4. **Ad⁻⁻⁻⁻** - ADC is over max. range;
5. **Ad _{_ _ _}** - ADC is below min. range;
6. **-----** - weight signal is too large
7. **-----** - weight signal is too small
8. **EEP.E0** - the EEPROM can't be accessed;
9. **EEP.E1** - The parameters are not same with backup data;
10. **EEP.E2** - The setting parameter(s) is not in normal range;.
11. **A.oFF.x** - the auto-off time is set to x minutes,(when x=0,the scale will not auto-shutoff ;
12. **CAL-Px** - scale's calibration point;
13. **CAL.Er** - there is an error in calibration
14. **xxxxxⁿ** - display division is xxxxx, (xxxxx=500...80000)
15. **uu
Unit.x** - selected the unit for the capacity and standard calibration weight is kg(x=0, uu=kg), or lb(x=1, uu=lb) .
16. **d. x** - division size is x, (x=1,2,5)
17. **dot. x** - the location of decimal point,(x=0,1,2,3)
18. **▶** - hold function is active.
19. **F-Set** - in Function Set mode
20. **FS⁻⁻⁻⁻** - selected Full Scale of the scale is larger than 51/2 LCD display capacity (199999)
21. **FS. oN(oFF)** - Full Scale selection enable (disable)
22. **tr. oN(oFF)** - tracking enable(disable)
23. **H ab / L cdef** - alternately display these information, that means: the display weight is 'abcdef' kg/lb, this only occurs when current weight is larger than 199999kg/lb(not include decimal point).

8.0 The direction of indicator with bracket



(1) Placed vertically



(2) Placed horizontally

9.0 Packing List

SBI 140 Packing

| No. | Name | Quantity |
|-----|---------------------|----------|
| 1 | SBI 140 Indicator | 1 |
| 2 | Adaptor AC 120V | 1 |
| 3 | Communication cable | 1 |
| 4 | Indicator bracket | 1 |
| 5 | User manual | 1 |

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