INTRODUCTION

SNUG precision balance series contains four models ---- SNUG -150,300, 600 and 1500 with weighing capacities of 150g, 300g, 600g and 1500g. The display resolution is 1/30,000 and internal resolution is1/150,000.

SNUG series contains 13 selectable weighing units ---- Gram, Carat, Pound(avoir), Dram(avoir), Grain, Troy Ounce, Pennyweight, Momme, Hong Kong Jewelry Tael, Taiwan Tael, Hong Kong Tael andTola (India).

Three operation modes --- Normal Weighing, Piece Counting and Percentage Weighing mode --- are provided and it can be powered by a6V/300 mA AC/DC adapter or four size-C (UM-2) dry batteries. The LCD is incorporated with backlight function for easy read in dark environment.

SNUG series also can transmit data to a personal computer or printer via its standard RS-232C interface on the rear panel.

INSTALLATION

UNPACKING

When unpacking the portable carton you will find the following items:

- ● SNUG Precision Balance with an anti-dust/draft cover
- ● One plastic round pan covered by stainless plate
- ● One cylindrical draft shield with top cover
- ● One 6V/300mA AC/DC **adapter**
- ● Operation Manual

!!!   UNLOCK / LOCK LOAD CELL PROTECTION   !!!

A metal cylinder is inserted from a hole in the battery box into the supporting plates around the load cell for avoiding possible deflection caused to load cell by abnormal shock during the transportation.

Remember to remove the cylinder by extracting the clamp first before you are going to use the balance and to insert it with the clamp stalled in the hole when the balance is to be delivered.

ROUND PAN

Insert the round plastic pan with stainless plate into the pan support in the central hole of the upper plastic case.

LEVELING THE BALANCE

The balance is equipped with four adjustable leveling feet and a level indicator in the front panel. Adjust the leveling feet until the bubble appears in the center circle of the indicator.

DUST/DRAFT SHIELD

The anti-dust/draft cover can be secured on the upper case, opened and Extended to 180°or removed. After opening or removing the anti-dust cover, you could put on the cylindrical draft shield.

POWER

Use either the 6V/300mA AC/DC adapter or four size-C (UM-2 / R14) batteries as power supply. The adapter connector is on the right side of the balance and battery box is in the rear bottom side.

※ It could be dangerous by using improper battery or wrong connection of battery.

KEYS

SNUG Precision Balances are software controlled devices with a variety of user-programmable features. These features can be programmed by the six keys on the front panel:

ON OFF : This key switches the unit between power on and off modes.

ZERO : This key returns the display to the center of ZERO when the pan is empty. The ZERO range is within +/-1.5% of the maximum capacity. A ZERO sign, → **0** ← , will be shown in the upper-left of the display window when the balance is stable in the ZERO range.

TARE : This key stores the TARE weight into memory and ZERO'S the display. The maximum TARE value is the maximum capacity. A TARE sign will be shown in the lower-left of the display window when the balance is in the TARE mode.

MODE : This key switches the balance among **Normal Weighing, Piece Counting** and **Percentage Weighing** modes with revolving order.

UNIT : This key switches the weighing units in revolving order among those units already chosen in the Weighing Units Setup of POWER ON SETUP.

SMPL : In Normal Weighing mode, this key is used to enable/disable backlight. In Piece Counting and Percentage Weighing modes, this key is used to choose the sampling amount being as 20pcs(%).50pcs(%) or 100pcs(%) being as 20pcs(%), 50pcs(%) or 100pcs(%).

MAXIMUM DISPLAY & DOSPLAY RESOLUTION

	MODEL	
UNIT	**SNUG-150**	**SNUG-300**
	(maximum display ×display resolution)	
g	150.045 x 0.005	300.09 x 0.01
ct	750.18 x 0.02	1500.45 x 0.05
lb	0.35018 x 0.00002	0.70045 x 0.00005
oz	5.5018 x 0.0002	11.0045 x0.0005
dr	85.045 x 0.005	170.09 x0.01
GN	2500.9 x 0.1	5001.8 x 0.2
ozt	5.0018 x 0.0002	10.0045 x 0.0005
dwt	100.045 x 0.005	200.09 x 0.01
MM	40.018 x 0.002	80.045 x 0.005
tl.J	4.2018 x 0.0002	8.2045 x0.0005
tl.T	4.0018 x 0.0002	8.0045 x 0.0005
tl.H	4.0018 x 0.0002	8.0045 x 0.0005
t	13.0045 x 0.0005	26.009 x 0.001

UNIT	MODEL SNUG-600	SNUG-1500
	MODEL	
	(maximum display x display resolution)	
g	600.18 x 0.02	1500.45 X 0.05
ct	3000.9 x 0.1	7501.8 x 0.2
lb	1.5009 x 0.0001	3.5018 x 0.0002
oz	22.009 x 0.001	55.018 x 0.002
dr	350.18 x 0.02	850.45 x 0.05
GN	9504.5 x 0.5	25009 x 1
Ozt	20.009 x 0.001	50.018 x 0.002
Dwt	400.18 x 0.02	1000.45 x 0.05
MM	160.09 x 0.01	400.18 x 0.02
tl.J	18.009 x 0.001	42.018 x 0.002
tl.T	16.009 x 0.001	40.018 x 0.002
tl.H	16.009 x 0.001	40.018 x 0.002
t	52.018 x 0.002	130.045 x 0.005

REMARK:

1. Maximum Display = Maximum Capacity +   (9 x Display Resolution)

2. Conversion Factors for Weights - - - -

1 **ct**	(Carat)	=	0.1999694 g
1 **lb**	(Avoirdupois Pound)	=	453.59237 g
1 **oz**	(Avoirdupois Ounce)	=	28.349523125 g
1 **dr**	(Avoirdupois Dram)	=	1.7718451 g
1 **GN**	(Grain)	=	0.06479891 g
1 **ozt**	(Troy Ounce)	=	31.1034768 g
1 **dwt**	(Pennyweight)	=	I.55517384 g
1 **MM**	(Momme)	=	3.749996 g
1 **tl.J**	(Tael, Hong Kong Jewelry)	=	37.4290018 g
1 **tl.T**	(Tael, Taiwan)	=	37.49995 g
1 **tl.H**	(Tael, Hong Kong)	=	37.799375 g
1 **t**	(Tola, India)	=	11.6638038 g

TURN ON THE BALANCE

With no load on the pan, turn on the balance by   **99999**

pressing the ON/OFF key. The whole display of   **..........**

the LCD will be shown(as listed below) with backlight   **..........**

enabled, then the balance wilt count down from 9 to 0.   **00000**

After the balance is stable in the center of zero, the zero sign, zero value and the unit set as the power on weighing unit will be displayed.

→0←   0.000 g

NOTE: WARM UP THE BALANCE

In order to warm up the balance and get accurate weight, please use the balance or execute the calibration **15 minutes** after the balance has been powered on.

BATTERY STATUS INDICATION

This balance can operate continuously 50 to 60 hours with manganese batteries and 90 to 100 hours with alkaline batteries (depend on the application status, e.g., the backlight is enabled or not, and different brands of batteries) before the dry battery sign starts blinking on the upper-right of the display window to indicate the low battery power status.

Replace the batteries within **5 hours** since the battery sign starts blinking, otherwise, the balance probably will not work properly after that period.

POWER ON SETUP (POS)

SNUG Precision Balances are software managed devices with a variety of user-programmable features. These features are easily achieved through the software using the front panel buttons and display.

These features include Count Value Display, ZERO and SPAN Calibration, Weighing Units Setup, Initial Unit Setup, Software Version, Automatic Power-off, Baud Rate Setup and Zero Band.

The POS procedure is as follows:
1. Turn off the balance.
2. Press and hold **MODE** key, then press **ON/OFF** key,
   the display will show **Count.**

The balance is now in the POS mode. The **MODE, UNIT** and **SMPL** keys will be used for the whole POS procedure and their functions are as follow:

MODE
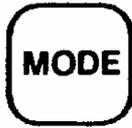
- To switch among all the POS functions with revolving order Count ⟶ CAL ⟶ Unit ⟶ Init U ↓ ZEro ⟵ bAud ⟵ Auto ⟵ VEr
- To leave setup for Weighing Units Setup and Initial Unit Setup functions.
- To leave setup for Automatic Power-off and Baud Rate Setup functions
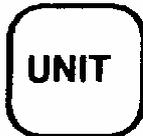
UNIT

- To enter/leave each function.
- To switch among all the weighing units in the Weighing Units Setup and Initial Unit Setup functions.
- To Enable/Disable Automatic Power-off Function.
- To select baud rate in Baud Rate Setup function.

SMPL

- To complete and leave the POS operation.
- To enable/disable units in Weighing Units Setup function
- To leave POS after ZERO/SPAN Calibration is completed

COUNT VALUE DISPLAY

When **Count** is displayed, press **UNIT** to check the count value. This value is around 15000 and used to check if the balance is properly tuned or not. Press UNIT again will leave the count value display and **Count** will be shown again.

**Count
15000**

WEIGHING UNITS SETUP

Each of the 13 weighing units can be enabled (ON) or disabled (OFF) in the POS, only those enabled will be available in the normal weighing mode.

1. Press **UNIT** when **Unit** is shown on the display. The display will show the unit --- gram --- with its previous set status.

    Unit

2. Press **SMPL** to set gram being **ON** or **OFF**.
    When ON is chosen, gram will be available in the normal weighing mode.
    If OFF is chosen, gram will not be available in the normal weighing mode.

    On   **g**

    OFF   **g**

3   Press **UNIT** to go to next unit for setup.

4   Repeat step 2 and 3 until the required status for each unit is set, then press **MODE** to complete and leave Weighing Units Setup.

INITIAL UNIT SETUP

One of the weighing units which have been enabled in Weighing Units Setup can be set as the power on weighing unit. Once set, that unit will be the weighing unit each time when the balance is powered on.

1. Press **UNIT** when **Init U** is displayed, the display will show **Init =** (the first enabled unit in Weighing Units Setup).

    Init   **=g**

2. Press **UNIT** repeatedly until the desired unit is shown on the display.

3. Press **MODE** to complete and leave Initial Unit Setup.

SOFTWARE VERSION

Press **UNIT** when **VEr** is displayed, display will show **d1 X.X,** X.X represents the software version. Check the software version whenever it is necessary for maintenance.

AUTOMATIC POWER-OFF

This feature is provided for power-saving purpose, once enabled, the balance
will be automatically turned off   **5 minutes** after there is no load on the pan.

1.   Press UNIT to enter the setup of automatic **Auto   NO**
        power-off function when **Auto** is shown.
        The display will show the status set last time.

2.   Press UNIT to enable (YES) or disable (NO) **Auto   YES**
        this function.

3.   Press **MODE** to complete the setup when the
        desired status is displayed. The display will show
        Auto again.

BAUD RATE SETUP

Use this function to set the transmission rate of the RS-232C interface as 4800
or 9600.

1.   Press **UNIT** to setup the baud rate when **bAud** **bAud**
        is shown, the previously set baud rate will be shown

2.   Press **UNIT** again, the baud rate will be changed **4800**
        the other one.

3.   Press **MODE** when desired baud rate is shown to
        complete the setup and **bAud** will be shown again.

ZERO BAND

Input the weight range where the balance will display zero. The weight range
is in terms of number of display divisions set for both positive and negative
directions.

1.   Press **UNIT** to enter the setup of ZERO BAND **ZEro**
        when **ZEro** is shown. The display will then show
        the current setup.

2.   Press **UNIT** repeatedly until the desired number **d   1**
        of divisions is displayed. There are six choices,
        0d(d 0), 1d(d 1), 2d(d 2), 3d(d 3), 4d(d 4), 5d(d 5).

3. Press **MODE** when desired weight range is displayed
   to complete the setup of ZERO BAND.

After all the status have been set in each function, press **SMPL** to complete and leave the POS. The balance will then enter into normal weighing mode and you can start using the balance with all the features you have setup.

PIECE COUNTING

In the piece counting mode, the balance calculates the quantity of the parts based on the average weight of a single piece got from the sampling procedure.

The procedure for piece counting mode is as follows:

1. Press **MODE** until **O pcs** is displayed.   **O pcs**

2. Press **SMPL** repeatedly until the desired   **S = 50 pcs**
   sampling amount for single piece weight
   calculation is shown on the display.
   Three categories, 20, 50 or 100 pcs, are available.

3. Put the parts for sampling on the pan when the desired amount is shown on the display. The display will show the number of the sampled parts and the alarm will sound a beep when sampling procedure is completed.

4. Take away the sampling parts and then put on the parts desired for quantity calculation, the display will show the calculated quantity when the word **pcs** stop blinking

   .

PERCENTAGE WEIGHING

Percent Weighing allows you to set a reference weight displayed as 20,50 or 100%, then the balance can measure and display other loads as a percentage weight based on the reference weight.

The procedure for percentage weighing mode is as follows:

1. Press **MODE** until **0.0%** is displayed.   **0.0%**

2.   Press **SMPL** until the desired sampling   **S = 100%**
      percent for reference weight is shown
      on the display. Three categories, 20,
      50 or 100%. are available.

3   Put the reference weight on the pan when
      the desired percentage is shown on the display.

      The display will show the percentage of the sampled weight and the
      alarm will sound a beep when sampling procedure is completed.

4   Take away the reference weight and then put on the material desired
      for weighing, the display will show the measured weight as a percentage
      based on the reference weight when the percentage sign stop blinking.

RS-232C INTERFACE

The **SNUG** precision balance is equipped with a **uni-directional** RS-232C

interface for output of data to printers or computers.

A 9-pin subminiature D-type connector is provided on the rear of the balance.
Pin 2 is Data Output (TXD) pin and pin 5 is the Ground pin, the other pins are
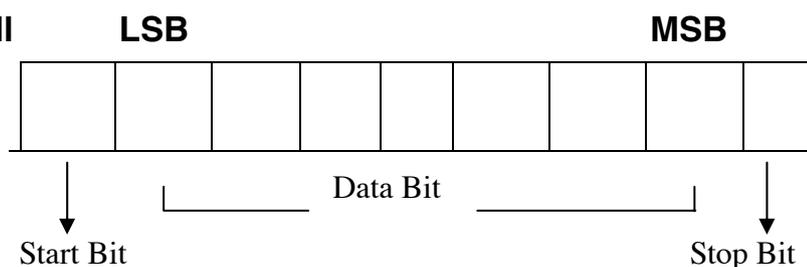left unused.

SIGNAL FORMAT

Baud rate   ：**4800 and 9600 bps, selectable**

Data bit   ：**7**

Parity bit ：**None**

Stop bit   ：**1**

Code   ：**ASCII**   **LSB**   **MSB**

Start Bit   Data Bit   Stop Bit

DATA FORMAT

Example for output data:

+150.00	g	-80.00	ct
5000	pcs	50.0	%

OVER RANGE (output data for excessive load on the pan)

Example of program in BASICA for executing data output:

```
10    OPEN "COM1：9600, N, 7, 1, RS, DS, LF" AS #1
20    INPUT #1,A$
30    PRINT A$
40    GOTO 20
50    END
```