PRECISION   BALANCE

USER'S MANUAL

Contents

Weighing Pan Fixing Steps

1. When installing the weighing pan, tighten the fixing screw in the centre of the plastic weighing pan.

2. Unscrew and remove the shipping protection screw on the side of the scale.

3. After removing the shipping protection screw on the side of the scale, fasten the shipping protection buckle.

Protection Device Disassembly Steps

1. In the upright position, locate the shipping protection screw device on the left side of the scale.
2. Before using the scale, unscrew counterclockwise and remove the shipping protection screw.
3. Before transporting the scale, hold the shipping protection screw down inwards and tighten it clockwise.

Precautions

1. Please pay attention to the environment when performing weight calibration on the scale. Avoid wind blow and vibration.
2. Use of wrong batteries or wrong wiring may cause danger.

Descriptions of Keys

ON/OFF : Power switch (on the left rear side of the scale when it's in the upright position).

ZERO The zero key for resetting the equipment, functional only when weight is within 4% of the weighing capacity.

TARE The tare key for deducting the weight of container on the weighing pan.

MODE The weighing function switching key to select weighing, counting and percentage modes in turn.

UNIT Weighing units switching key
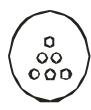
SMPL In the weighing mode, the key is for switching on/off backlight; in the counting and percentage modes, the key is for sampling, by pressing which constantly, you may select sample size of 20, 50, 100, 200 or 500 in turn.

CAL Calibration function key.

Precision Balance

Functional Operation of Keys

Weighing:

Press 「 **ON/OFF** 」 key, the screen will have full display and start counting down. When the screen displays

, you can start weighing. If you need backlight, press **SMPL** key.

**Counting:**
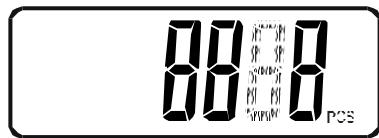
Press **MODE** key, the screen will show , then press **SMPL** key, and the screen will show
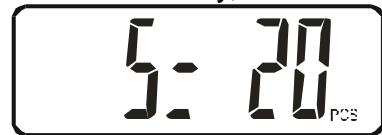
. You may select sample size of 20, 50, 100, 200 or 500 in turn by pressing **SMPL** in succession. After selection, put the sample on the weighing pan and start counting operation when you hear a beep sound. (Automatic averaging function is provided for simple counting)

Percentage:
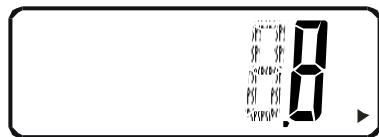
Press **MODE** key, the screen will show , then press **SMPL** key, and the screen will show

. You may select sample size of 20, 50, 100, 200 or 500 in turn by pressing **SMPL** in succession. After selection, put the sample on the weighing pan and start using the percentage function when you hear a beep sound.

Notes: 1. Min. unit weight of sample >=1 d (e.g.: unit weight of sample of 300g is at least bigger than 0.01g)

2. When weight is unstable, the ◣ ◢ indicator will go off.

3. After warming up the machine, the ◯ **WARM UP** indicator will go off.

Panel Illustration
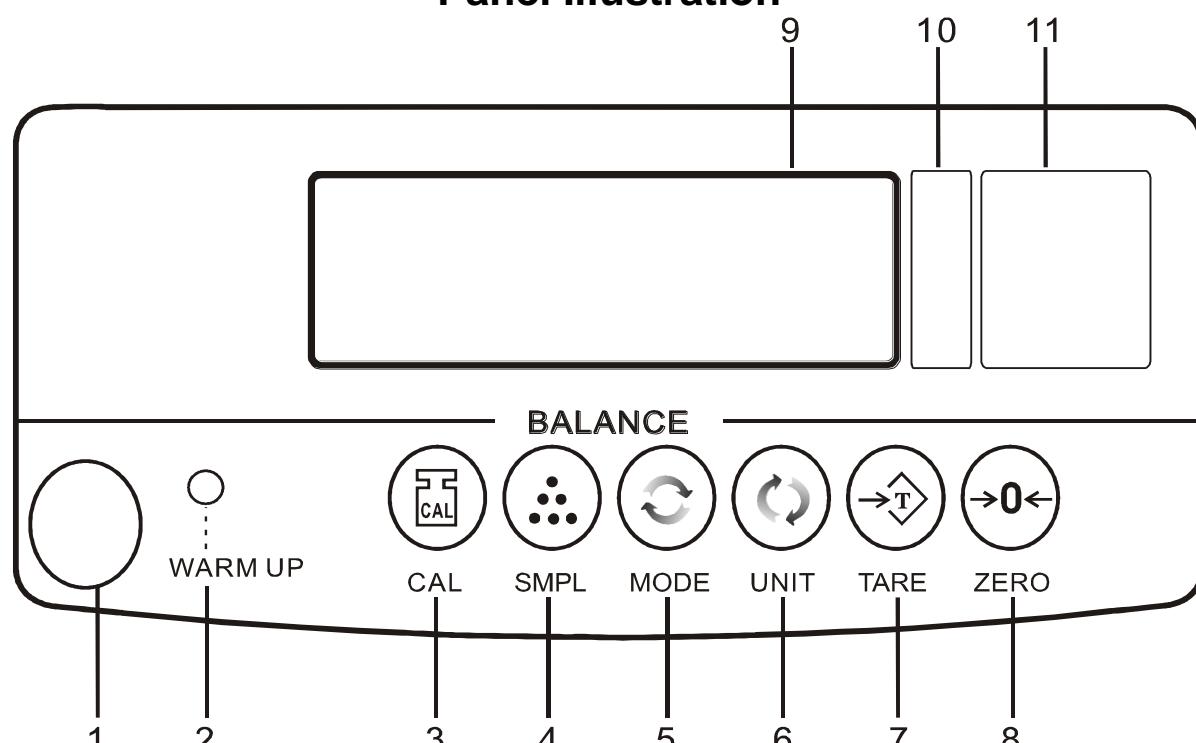
| 1	gradienter	7	Tare key
2	Warming up indicator	8	Zero key
3	Calibration function key	9	Weight display window
4	Sampling/Backlight key	10	Weighing unit
5	Weighing function switch key	11	Specification
6	Unit switch key		

Single Point Calibration of Weight

Steps	Operation	Display
Step I	Power off while holding down 🔄 MODE key, and then press 「ON/OFF」to switch on the scale.	$Count$
Step II	🔄 Press MODE key	CAL
Step III	⟲ Press UNIT key to start zero point calibration. Make sure there is nothing on the weighing pan.	$C2Ero$
		$CAL-5$
Step IV	Please place weights of equivalent weight onto the pan	Place 1/3 of load $on1$
		Place 2/3 of load $on2$
		Place full load $on3$
	Wait for a beep sound	$PASS$
Step V	🔄　　　⬤ Press MODE key, then press SMPL key	$bu5Y$
Step VI	After countdown, the single point calibration is completed and the scale returns to the normal weighing mode.	0.00 g

Precision Balance

Single Point Calibration of Weight when Power on

Steps	Operation	Display
Step I	 **Hold down CAL key**	**[AL**
Step II	 **Then press UNIT key to start zero point calibration. Make sure there is nothing on the weighing pan.**	**[2Ero** **[AL - 5**
Step III	**Please place weights of equivalent weight onto the pan**	Place 1/3 of load **on 1** Place 2/3 of load **on2** Place full load **on3**
	Wait for a beep sound	**PASS**
Step IV	 **Press MODE key**	**0.00 g**
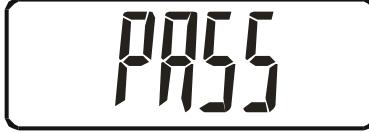
Linearity Calibration of Weight

Step I	Power off while holding down ZERO TARE keys, and then press 「ON/OFF」 to switch on the scale.	CAL
Step II	Clear the weighing pan, then press TARE key, (zero point calibration)	$on0$
Step III	Wait for a beep sound	$on1$
Step IV	Place 1/3 of load on the weighing pan and press TARE to perform 1/3 load calibration. Wait for a beep sound.	$on2$
Step V	Place 2/3 of load on the weighing pan and press TARE to perform 2/3 load calibration. Wait for a beep sound.	$on3$
Step VI	Place full load on the weighing pan and press TARE to perform full load calibration. Wait for a beep sound.	$PASS$
Step VII	Clear the weighing pan, then press TARE key	$busy$
Step VIII	After countdown, the linearity calibration is completed and the scale returns to the normal weighing mode.	0.00 g
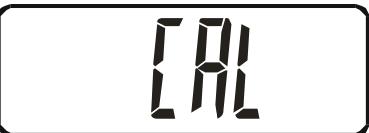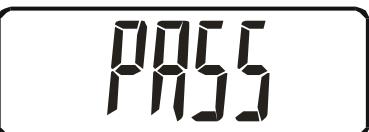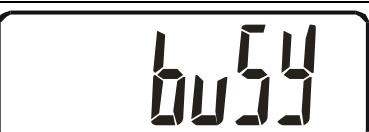
Parameter Setting

Hold down **MODE** key, then press 「**ON/OFF**」 key to enter the setting mode. The screen will show

 :

MODE key: To switch functions; **UNIT key:** To enter or exit function setting selection; **SMPL key:** To end setting.

LCD Display **MODE key:**	*Function*	*Selection* **UNIT key:**	*Selection* **SMPL key:**	*Page*
	Internal value display			Item 1, Page
	Single point auto calibration			Page 4
	Weight unit selection	g, ct, lb, oz, ozt For application in Europe, America and China g, ct, lb, GN, dwt For application in Britain g, ct, lb, ozt, tl.j For application in Hong Kong g, ct, lb, oz, tl.T For application in Taiwan g, ct, lb, g/m^2, oz/yd^2 For plaiting purpose g, ct, lb, XX, XX For other purposes	ON/OFF	Item 2, Page 8
	Initial weight unit selection	g, ct, lb, oz, dr, GN, ozt, dwt, MM, tl.j, tl.T, tl.H, t, oz/yd^2, g/m^2 Setting according to the specific applications in various regions		Item 3, Page 8
	transfers rate selection	9600		Item 4, Page 8
	Auto zero range selection	d0/1/2/3/4/5		Item 5, Page 9
	filter selection	Fil1/2/4/8		Item 6, Page 9
	Backlight selection	onoFF/oFF/ON		Item 7, Page 9
	Printing mode selection	Pr-St/Co		Item 8, Page 9
	External device	PC（computer）/ SH-24(matrix printer)/ large screen		Item 9, Page 9

Parameter Function Description

1. When the screen shows **Count** press the **UNIT** key, the current internal value will be displayed. Press **UNIT** key to return to the display **Count** 。

2. When the screen shows **unit**, press **UNIT** key to enter into unit selection mode, the screen will show **on** g or **oFF** g, "on" means to use the current unit displayed, "oFF" means not to use the current unit displayed. Press **SMPL** to switch between ON and OFF [to use the unit displayed select "on", if you do not require the unit displayed select "oFF"]. Press **UNIT** to select from 5 kinds of weighing units, after selecting the unit required, press **MODE** to return to the display **unit** 。

3. When the screen shows **InitU**, press **UNIT** to enter initial unit selection mode. LCD display **Init-** g means the initial unit is g, press **UNIT** to switch the unit required, then Press **MODE** key to return to the display **InitU** 。

4. When the screen shows **bAud**, press **UNIT** to enter the RS-232 transfers Rate selection. LCD display **9600** represents the RS-232 transfers rate. Press **MODE** key to return to the display **bAud** 。『9600』

5. When the screen shows ⟦Zₜro⟧, press **UNIT** to enter auto zero range selection. LCD display ⟦d 2⟧ represents the auto zero range. Press **UNIT to** select the desired auto zero range, then press **MODE** to return to the display ⟦Zₜro⟧. 『**d0、1、2、3、4、5**』 (The higher the value is, the wider auto zero range is.)
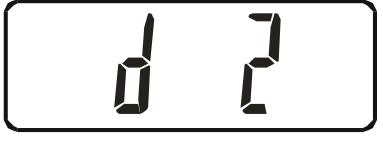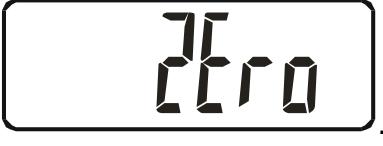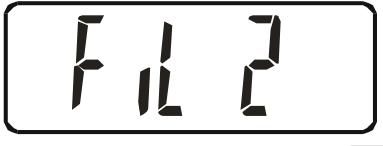
6. When the screen shows ⟦FiL⟧, press **UNIT** to enter filetr setting mode. LCD display ⟦FiL 2⟧ means the filter lever. Press **UNIT** to select the desired filter level and press **MODE** key to return to the display ⟦FiL⟧. 『**FiL1、2、4、8**』 (The higher the value is, the higher the filter level is.)
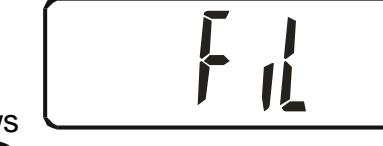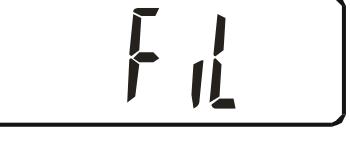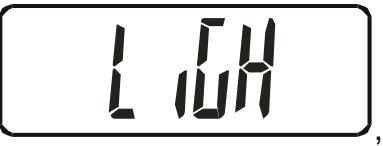
7. When the screen shows ⟦LiGH⟧, press **UNIT** to enter backlight setting mode. The screen shows ⟦onoFF⟧. onoFF represents the auto backlight setting. Press **UNIT** to select the desired backlight setting and press **MODE** key to return to the display ⟦LiGH⟧. 『**onoFF-** *means auto-backlight,* **oFF-** *means backlight off,* **ON-** *means backlight on*』
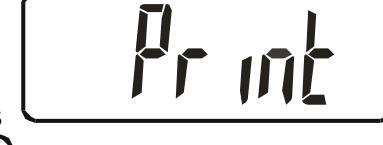
8. When the screen shows ⟦Print⟧, press **UNIT** to enter printing mode selection. LCD display ⟦Pr-Co⟧ represents the printing mode. Press **UNIT** to select the desired printing mode and press **MODE** key to return to the display ⟦Print⟧. 『**Pr-Co-** *means continuous output,* **Pr-St -** *means stable output*』

9. When the screen shows $Pr\ Fu$, press **UNIT** to enter external device selection mode. LCD

display $-PC-$ represents external device. Press **UNIT** to select the desired external device,

then press **MODE** key to return to the display $Pr\ Fu$. 『*-PC-- external PC, SH-24 - external dot matrix mini printer*』

10. When the screen shows $dU-7$, press **UNIT** to enter display range selection mode. LCD

display $7Ero2$ represents display range. Press **UNIT** to select the desired external device,

then press **MODE** key to return to the display $dU-7$. 『*Zero0．1．2．3．4．5*』(means weight displayed when the weight exceeds the division)

11. Before entering function setting, press **SMPL** to end function setting and return to normal weighing mode. Press

the **MODE** key continuously to select function setting modes.

Precision Balance

Units Conversion Table

1 ct	[MET.CARAT]	=0.1999694	g
1 lb	[AVORIRDUPOIS POUND]	=453.59237	g
1 oz	[AVORIRDUPOIS OUNCE]	=28.349523125	g
1 dr	[AVOIRDUPOIS DRAM]	=1.7718451	g
1 GN	[GRAIN](U.K)	=0.06479891	g
1 ozt	[TROY OUNCE]	=31.1034768	g
1 dwt	[PENNY WEIGHT]	=1.55517384	g
1 MM	[MOMME] (JPN)	=3.749996	g
1 tl.j	[HONG KONG JEWELRY TAEL]	=37.4290018	g
1 tl.T	[TAEL](TWN)	=37.49995	g
1 tl.H	[HONG KONG TAEL]	=37.799375	g
1 t	[TOLA] (INDIA)	=11.6638038	g
1 oz/yd^2		=0.33898306	g
1 g/m^2		=0.01	g

Cross-reference Table of Full Loads

| CAP	150	300	600	1500	3000
Gram	150X0.005/002	300×0.01/0.005	600×0.02/0.01	1500×0.05/0.02	3000×0.1/0.05
Carat	750.34X0.02	1500.70X0.05	3001.36X0.1	7503.4X0.2	15007.0X0.5
Pound(Avoir)	0.33080X0.00002	0.66160X0.00005	1.323X0.0001	3.3080X0.0002	6.6160X0.0005
Ounce(Avoir)	5.2926X0.0002	10.5855X0.0005	21.171X0.001	52.926X0.002	105.855X0.005
Dram(Avoir)	84.685X0.005	169.37X0.01	338.72X0.02	846.85X0.05	1693.7X0.1
Grain	2315.5X0.1	4631.0X0.2	9262.0X0.5	23155X1	46310X2
Ounce(Troy)	4.8240X0.0002	9.6480X0.0005	19.296X0.001	48.240X0.002	96.480X0.005
Penny weight	96.480X0.005	192.96X0.01	385.92X0.02	964.80X0.05	1929.6X0.1
Momme	40.012X0.002	80.025X0.005	160.05X0.01	400.12X0.02	800.25X0.05
Tael (HK Jewelry)	4.0088X0.0002	8.0175X0.0005	16.035X0.001	40.088X0.002	80.175X0.005
Tael (Taiwan)	4.0012X0.0002	8.0025X0.0005	16.005X0.001	40.012X0.002	80.025X0.005
Tael (Hong Kong)	3.9696X0.0002	7.9390X0.0005	15.878X0.001	39.696X0.002	79.390X0.005
Tola (India)	12.865X0.0005	25.728X0.001	51.456X0.002	128.640X0.005	257.28X0.01
oz/yd^2	442.49X0.01	884.99X0.01	1770.27 X0.01		
g/m^2	15000.5 X0.5	30000 X1	60000 X1		

Note: Full Load = Capacity + (Readabilityx9)

RS-232 Serial Interface

The 9PIN connector at the right back is a RS-232 standard interface. Pin 3 is for output, Pin 5 is for grounding and the rest have no functions.

BAUD RATE : **9600 bps**   DATA BIT : **8**   PARITY BIT : **N（ NONE ）**   STOP BIT : **1**   CODE : **ASCII**

BIT FORMAT :

| LSB | | | | | | | MSB |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

START BIT   DATA BIT   STOP BIT

SCALE

1
6
2 TXD
7
3 RXD
8
4
9
5 GND

BI-DIRECTION DSUB9
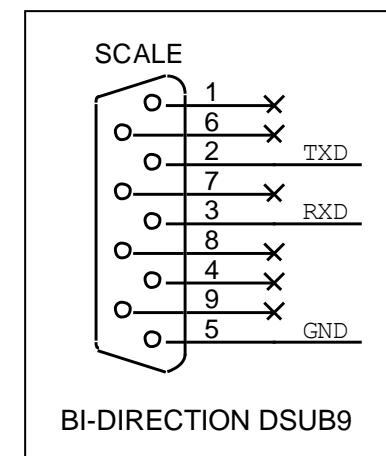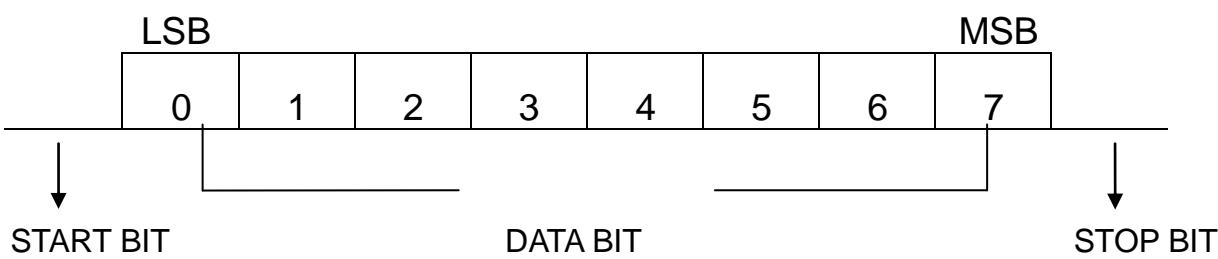
DATA FORMAT :

S/U	T		G/N	W		+/-	D1	D2	D3	D4	D5	D6		U1	U2	U3	U4	U5	LF	CR
		SP			SP				WEIGHT				SP			UNIT				

ST : **STABLE**   UT : **UNSTABLE**   GW : **GROSS WEIGHT**   SP : **SPACE**
NW : **NET WEIGHT**   D1~D6 : **WEIGHT**   U1~U5 : **UNIT**

Examples: ST GW +   150.00   g
          UT NW -   80.00   ct   …………..

2007/5/22

Precision Balance