



PRECISION BALANCE **FH**

User Manual



v.201811

Value Each Gram

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1.0 CAUTION AND PREPARATION



CAUTION

- 1.1 Avoid installing the balance in direct sunlight-this may cause poor performance or malfunctions.
- 1.2 Do not mix different type of batteries. Replace all the Batteries at the same time.
- 1.3 If the balance is not to be used for a long period of time, remove all batteries from the battery compartment to avoid leakage which may cause damage to the instrument.
- 1.4 Avoid overloading or dropping material onto the platform as that could damage the balance.
- 1.5 Do not spill liquids on the balance as it is not water-resistant. Liquids may damage the case and if it gets inside the balance it may cause damage to the electronics.
- 1.6 Material that has a static electric charge could influence the weighing. Discharge the static electricity of the samples, if possible. Another solution to the problem is to wipe both sides of the pan and the top of the case with an antistatic agent .

FUNCTION CHARACTER

1. With rechargeable battery, capacity range is from 100g -8000g by the division of 1/100000.
2. With on/off soft-touch switch and reposition key, so that it recovers when abnormal display happen.
3. With dual display and RS232 interface selectable (only one interface available).
4. With the power supply: external AC 220v/12v 150mA supply and 6V rechargeable battery or 9V dry battery(optional).

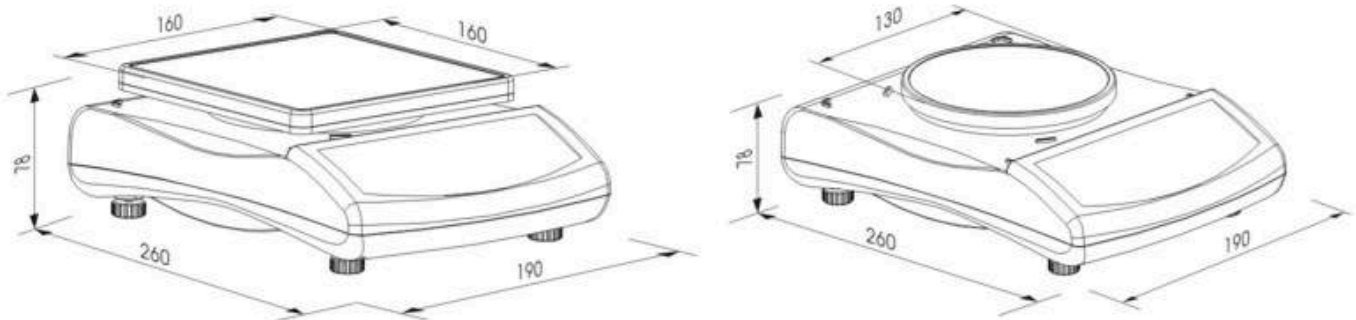
PREPARATION

- 1.1 Place your balance on a firm and level table, and then level the balance by adjusting the feet to center the bubble in the spirit Level.
- 1.2 Avoid placing the balance in direct strong sunlight or draught that may cause poor performance or malfunctions.
- 1.3 Use the individual socket to avoid the interfere of other wirings.
- 1.4 Turn on the balance while there is no load on the pan.
- 1.5 Place the weight on the center of the pan for accurate weighing. Make sure the weight do not over the Max capacity as it could damage the load cell inside.
- 1.6 We suggest to warm-up the balance for 5 minutes for accurate weighing.
- 1.7 Calibration may be required before weighing or when the balance is initially installed or moved from a location.
- 1.8 The voltage of auto-check after turning off should be CHE6.70V. When it is less than 5.70V,  mark flash, and it does not work when voltage is less than 5.5V.
- 1.9 Please replace the battery when the low battery  mark comes.

2.0 SPECIFICATIONS

| UNIT \ MODEL | FH300 | FH600 | FH1000 | FH3000 | FH6000 |
|------------------|--|-----------------|---|---------------|----------------|
| g | 300×0.01 | 600×0.01 | 1000×0.01 | 3000×0.1 | 6000×0.1 |
| ct | 1500×0.05 | 3000×0.05 | 5000×0.05 | 15000×0.5 | 30000×0.5 |
| lb | 0.66140×0.00002 | 1.32278×0.00002 | 2.20462×0.00002 | 105.820×0.005 | 211.640×0.005 |
| oz | 10.5820×0.0005 | 21.1640×0.0005 | 35.2740×0.0005 | 1929.0×0.1 | 3858.1×0.1 |
| dr | 169.315×0.005 | 338.630×0.005 | 564.380×0.005 | 257.21×0.01 | 514.41×0.01 |
| GN | 4629.8×0.2 | 9259.4×0.2 | 15432.2×0.2 | 79.365×0.005 | 158.730×0.005 |
| ozt | 9.6450×0.0005 | 19.2900×0.0005 | 32.1510×0.0005 | 6.6138×0.0002 | 13.2276×0.0002 |
| dwt | 192.90×0.01 | 385.81×0.01 | 643.01×0.01 | 1693.15×0.05 | 3386.30×0.05 |
| MM | 80.000×0.005 | 160.000×0.005 | 266.670×0.005 | 80.150×0.005 | 160.300×0.005 |
| tl.J | 8.0150×0.0005 | 16.0300×0.0005 | 26.7170×0.0005 | 46296×2 | 92594×2 |
| tl.T | 8.0000×0.0005 | 16.0000×0.0005 | 26.6670×0.0005 | 96.450×0.005 | 192.900×0.005 |
| tl.H | 7.9370×0.0005 | 15.8730×0.0005 | 26.4550×0.0005 | 800.00×0.05 | 1600.00×0.05 |
| t | 25.720×0.001 | 51.441×0.001 | 85.735×0.001 | 80.000×0.005 | 160.000×0.005 |
| Capacity | 300g | 600g | 1000g | 3000g | 6000g |
| Resolution | 0.01g | 0.01g | 0.01g | 0.1g | 0.1g |
| Division | 1:30,000 | 1:60,000 | 1:100,000 | 1:30,000 | 1:60,000 |
| Response | 3~5 seconds | | | | |
| Display | LCD display with backlight | | | | |
| Tare | equal to Max capacity | | | | |
| Overload alarm | Auto alarm when load over 9e | | | | |
| Source | 6AA dry battery and 6V 1.3Ah Rechargeable battery (optional) 220V 50Hz 12V AC 150mA | | | | |
| Power | Backlight 90mA No backlight 70mA | | | | |
| Temperature | Storage -10°C ~ +50°C Work 0°C ~ +40°C | | | | |
| Humidity | Storage 5% ~ 90%R.H. Work 10% ~ 80%R.H. | | | | |
| Pan size | round pan D130mm square pan 160×160mm | | | | |
| Net/gross weight | 1.35 / 1.90kg | | | | |
| Package | 8 Units in one carton box size 315×245×170 (cm ³) | | Weight 16kg carton size 640×500×350 (cm ³) | | |

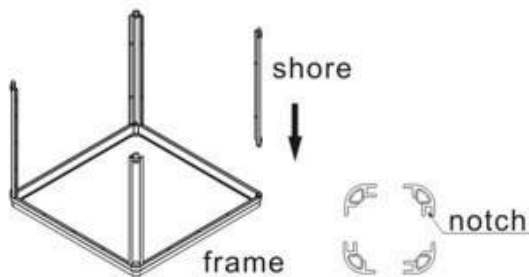
Dimension(mm):



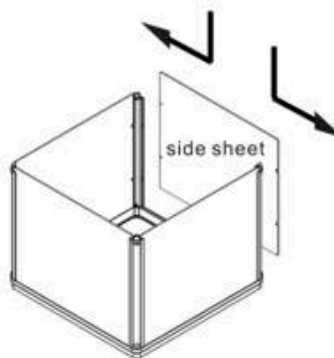
3.0 ILLUSTRATION OF WINDSHIELD

1. remove the films on the surface of sheets

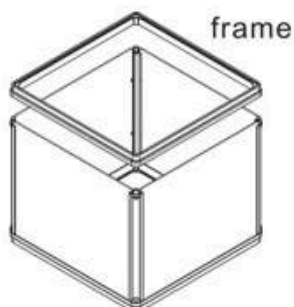
2. Insert 4 shores to the frame as the arrow shown. Please see the order alternation of notch.



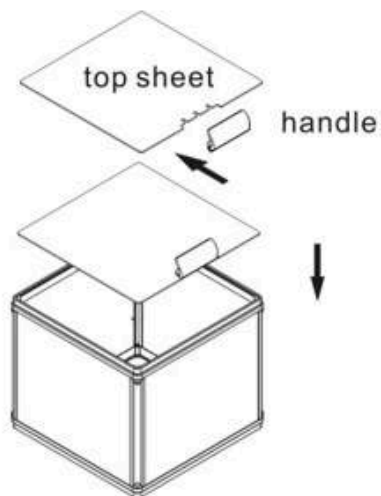
3. Insert 4 side sheets into frame and shores ordinarily.



4. Another frame to be assembled into.



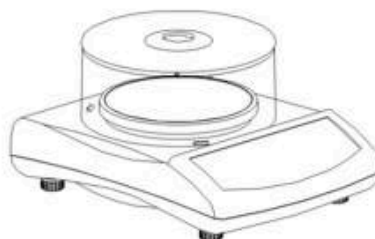
5. Insert handle and top sheet then place them on the top of the frame as the arrow shown.



Selection of windshield

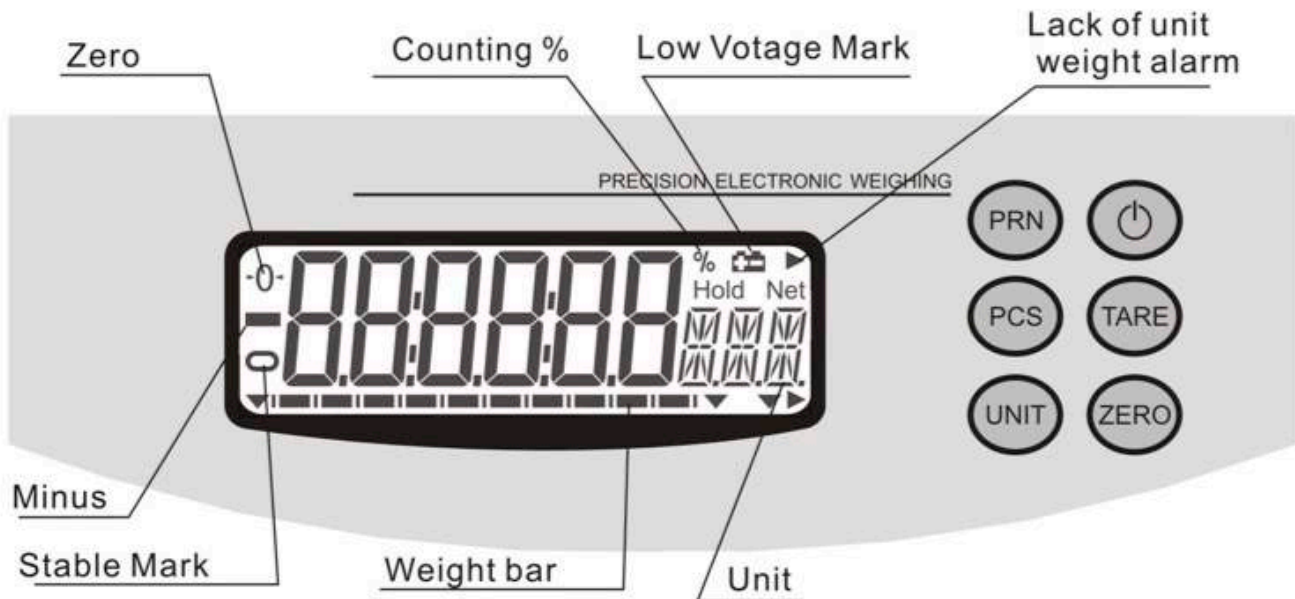


Square(recommended)
Size: 170mm×170mm×150mm



Round
Size: \varnothing 160mm×70mm

4.0 DISPLAY AND KEY DESCRIPTION



Print/Exit key

Print key in the default mode
save and exit key in setting mode.



Sample/Shift key

Sample key in the default mode
shift key in the setting mode.



Tare/Devalue key

Tares the container in the default mode
devalue key in the setting mode.



Units/Mode key

Changes weighing units in the default mode
choose and shift the mode in the setting mode.




Zero/Add key

Zero in the default mode
add key in the setting mode.



Auto shut-off key

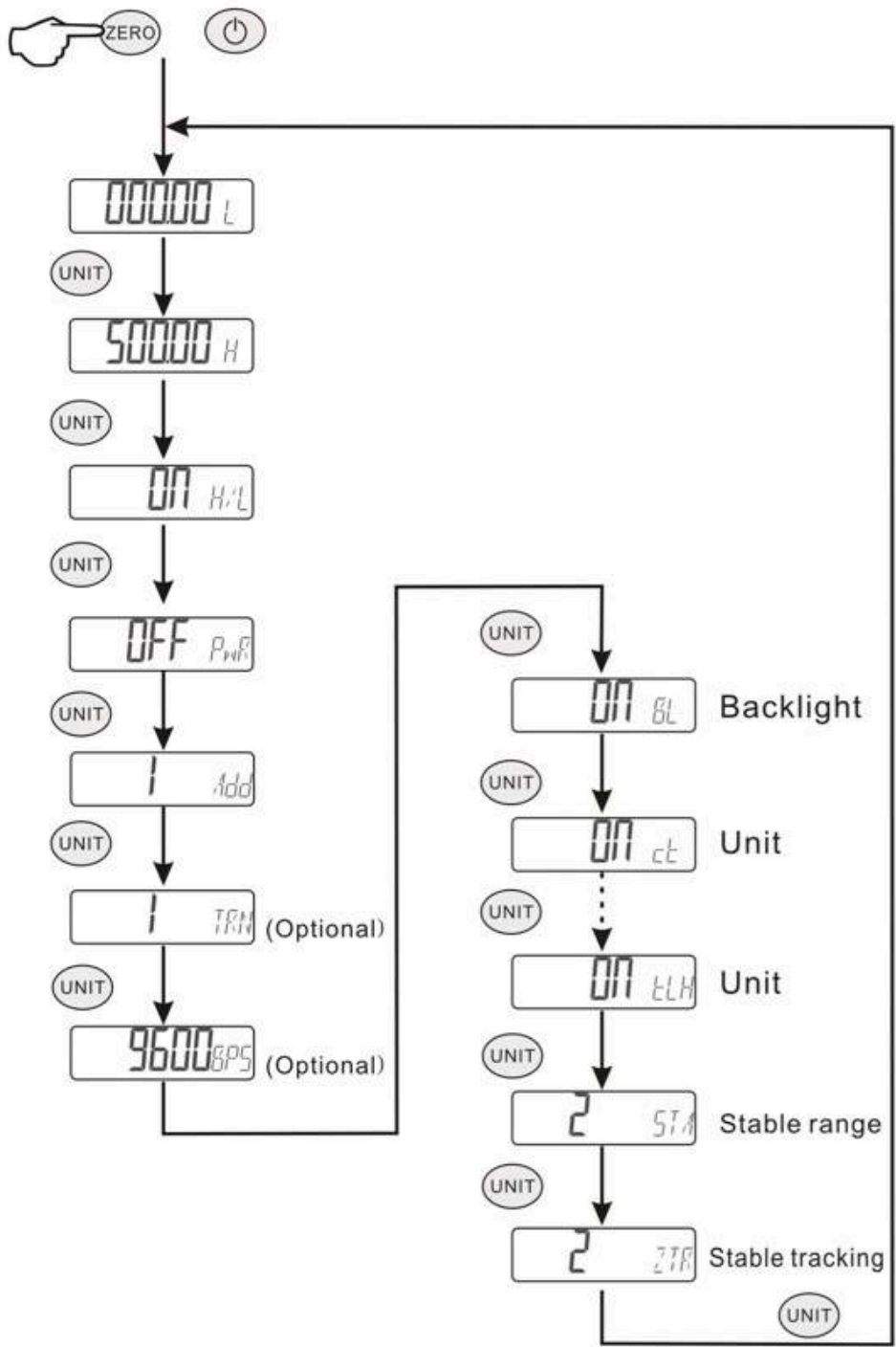
Hold the key for two seconds
Then repeat the key for function shifting.

(If there is no  on the panel, please use the switch on the bottom of the scale which function is same to  .)

5.0 Operation

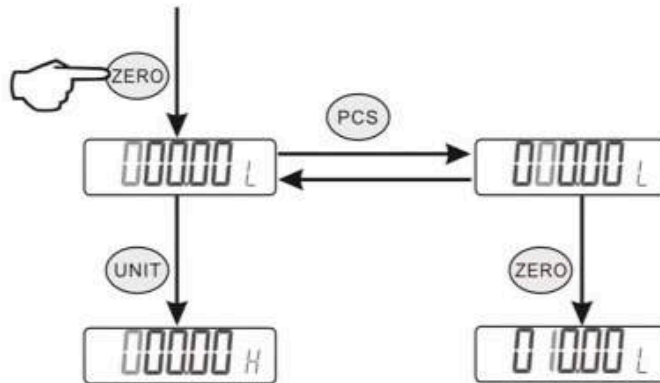
Press **ZERO** and **POWER** to turn on and enter function setting mode, and the display will show **00000 L**.

Press **PCS** to select the mode. **UNIT** key is available if you want to go to the next setting mode directly. Press **PRN** to exit the function setting mode.



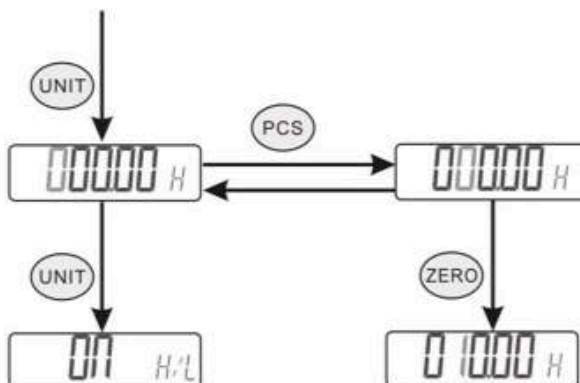
5.1 Down-limit Alarm Setting

Press **(ZERO)** to enter the parameter setting. Press **(PCS)** to move the value, and press **(ZERO)** or **(TARE)** to change the value. Press **(UNIT)** key to enter next step.



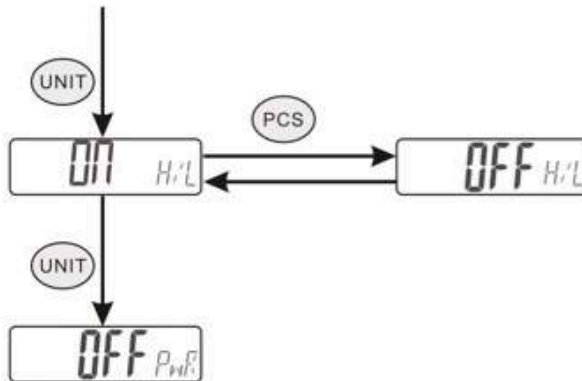
5.2 Up-limit Alarm Setting

Press **(ZERO)** to enter the parameter setting. Press **(PCS)** to move the value, and press **(ZERO)** or **(TARE)** to change the value. Press **(UNIT)** key to enter next step.



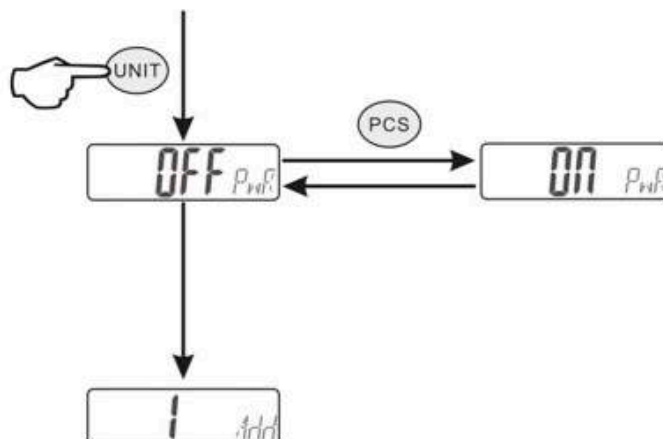
5.3 Up/down Limit Alarm Function

This function is for reminding the up limit weight or down limit weight. Press (PCS), when it's **ON** means the function is active, **OFF** means the function is in active.



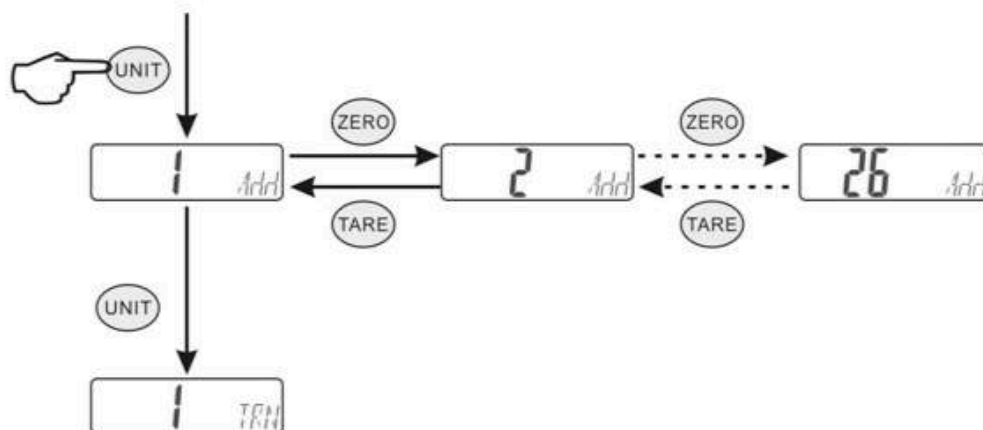
5.4 Selection Of Auto Shut Off Mode

Press (UNIT) to select auto shut off setting mode. The display will show **ON** or **OFF**. Press (PCS) to choose **ON** or **OFF** mode. **ON** Means auto shut off function is active and **OFF** means this function is inactive.



5.5 Selection of Communication Address

There are 1-26 addresses selectable. Press **ZERO** to increase the code of ADD and press **TARE** to decrease the number. And then exit by pressing **PRN** go to next function selection by **UNIT**.



5.6 Selection of Transmission Way

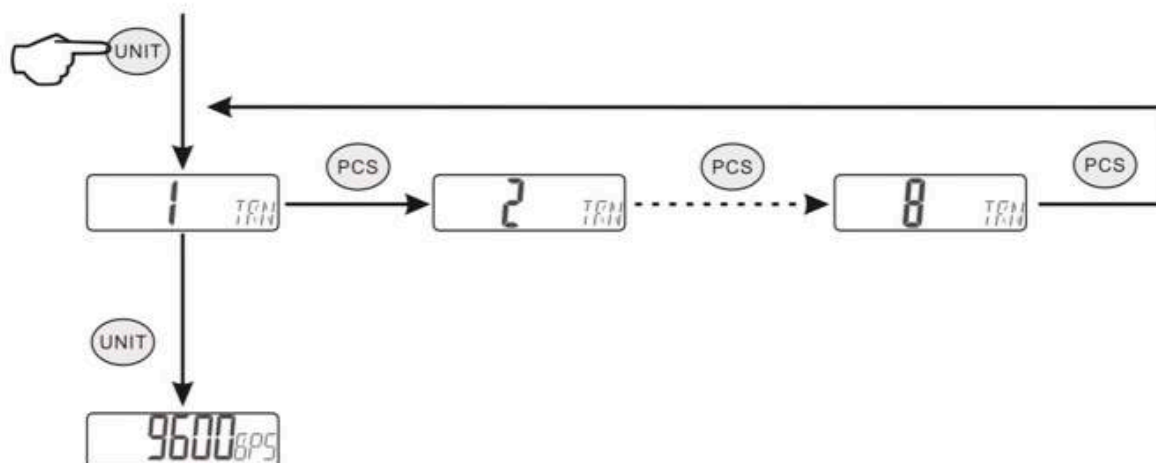
This function is active while the balance is connected with printer, computer and the relative equipment. Press **PCS** to Choose the number of 1-8 and then press **PRN** to save or exit. Press **UNIT** go to the next function mode selection.

On weighing mode

- 1.continuous transfer mode
- 2.Stable transfer mode
- 3.serial print key transfer mode
- 4.serial print stable transfer mode

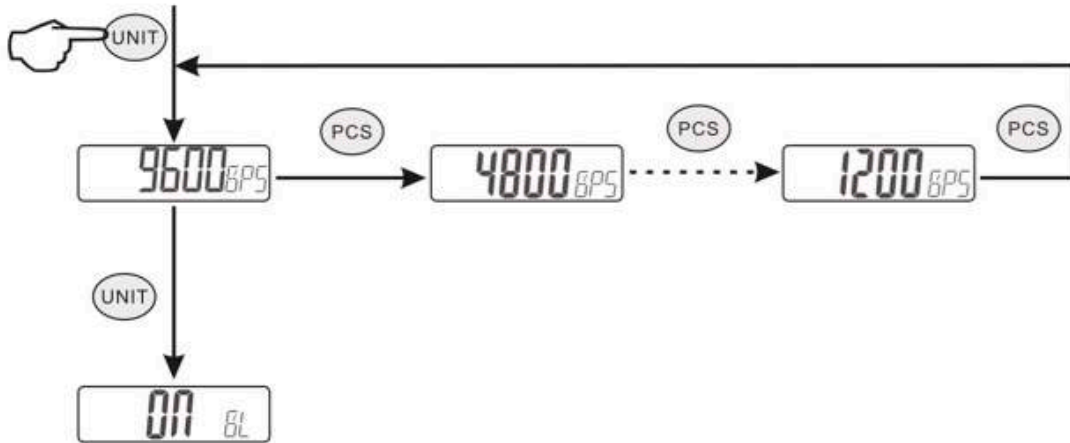
On counting mode

- 5.continuous transfer mode
- 6.stable transfer mode
7. serial print key transfer mode
- 8.serial print stable transfer mode



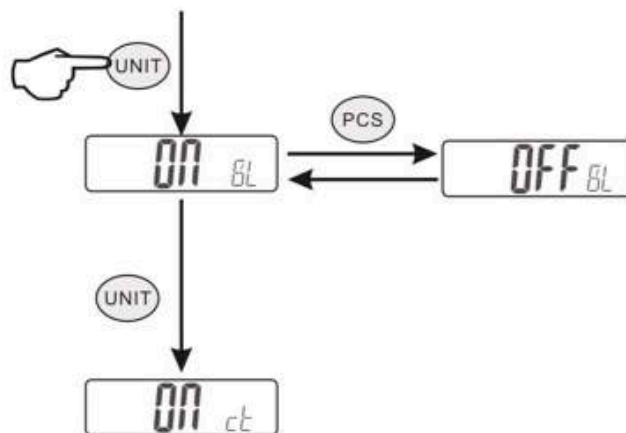
5.7 Selection of BPS (Optional)

This is for the selection of communication speed. Press **(PCS)** to choose the different speed “9600” “4800” “2400” and “1200”. Then press **(PRN)** to save and exit or go to the next mode by pressing **(UNIT)**.



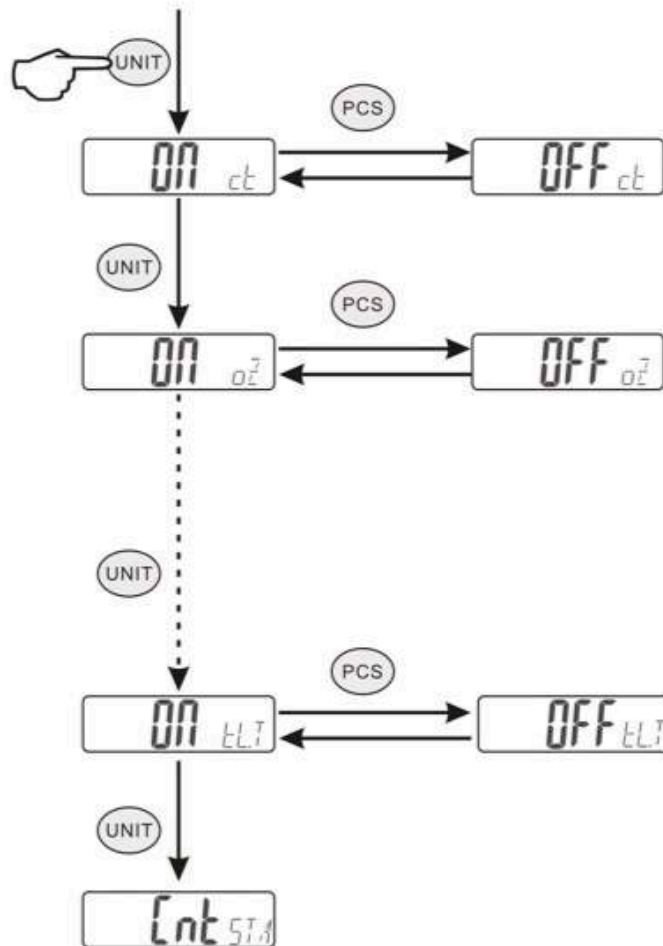
5.8 Selection Of Backlight

Press **(PCS)** to select auto backlight setting mode. The display will show **0n** or **OFF**. **0n** Means auto backlight function is active **OFF** means this function is inactive. Then press **(PRN)** to save and exit or go to the next mode by pressing **(UNIT)**.



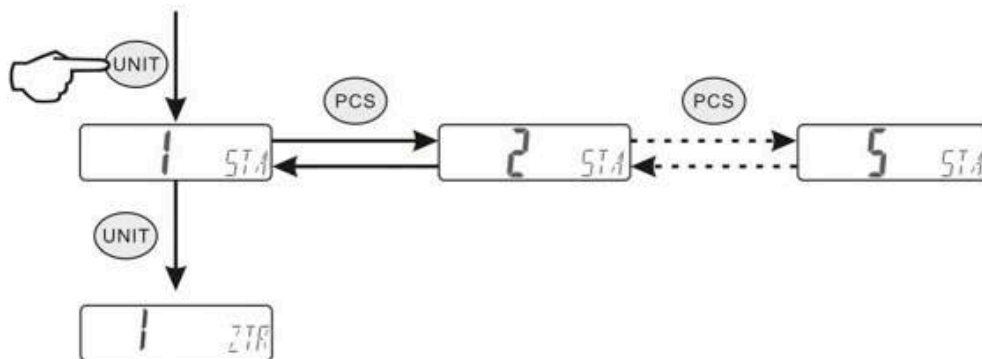
5.9 Units Selection

This function is on the weighing mode only. There are thirteen units selectable: *g*, *ct*, *oz*, *wt*, *lb*, *tlh*, *lb*, *dr*, *tlj*, *gn*, *ozt*, *mm*, *elt*. Combine the unit group by pressing **PCS**.



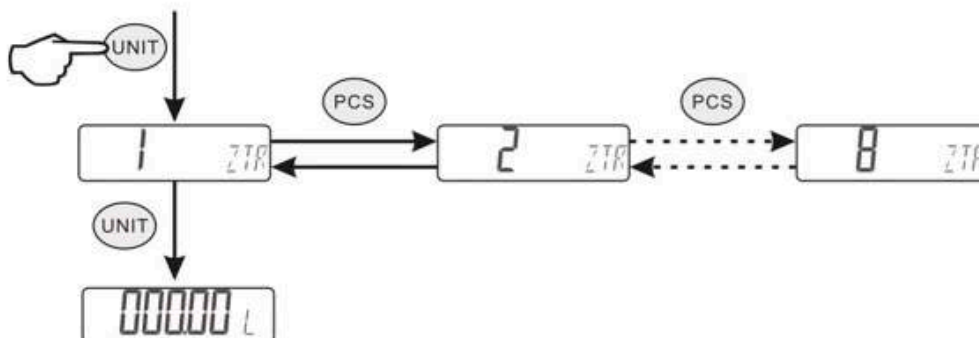
5.10 Stable Range Selection

This is the stable range selection function. User could select number 1-5 by pressing (PCS), and then confirm it by pressing (UNIT). Or to press (PRN) to exit and go to auto shut-off function



5.11 Stable Tracking Range Selection

This is the stable tracking range selection function. User could select number 1-8 by pressing (PCS), and then confirm it by pressing (UNIT). Or to press (PRN) to exit and go to auto shut-off function.



6.0 OPERATION INSTRUCTION

Weighing Function

1. Turn on the balance, and all display segments appear on LCD for few seconds, and then enter the weighing mode auto-matically.
2. Verify the stable sign before weighing. If not press **ZERO**
 Note: the zero range is 4% of capacity
3. The weight bar will show the percentage of weight possess the max capacity.
4. If you use a container for weighing:
 place an empty container on the pan. Press **TARE** and see the indicator sign. If the reading is not 0.00, press **ZERO** to tare and zero.

Note:

- a. If the reading becomes minus after moving the container, then press **TARE** to display 0.00 so the "-0-" is display.
 - b. Press **ZERO** within the zero range, it will display 0.00 and zero indicator comes and tare indicator disappear.
5. Press **UNIT** shift Unit of *g, ct, oz, dwt, t, tLH. Lb, dr, tLJ, GN, pzt, MM, tLT.*

Counting mode

1. When the stable arrow appear under weighing status, press **(PCS)** to enter counting/ percentage status. The screen will display **P 10.000**, P display numeral value, *NUM* indicate that it's under counting status.
2. Press **(ZERO)** or **(TARE)** to shift the numeral value (100-1000)
3. Press **(PCS)** for collecting sample weight. After 2 seconds' display of unit weight, it starts the counting function. If the unit weight is less than one d, the sample weight is too small to indicate or will cause a big difference.
4. Press **(UNIT)** key to shift the function between weighing and counting
5. Press **(PCS)** key, it displays **P 10.000** press again **(PCS)** to display the last unit weight and start the counting function.

Percentage mode

1. When the stable arrow appear under weighing status, press **(PCS)** to enter counting/ percentage status. The screen will display **P 10.000**, P display percentage, *NUM* indicate that it's under counting status.
2. Press **(ZERO)** Or **(TARE)** to shift the percentage value (100.0%)
3. Press **(PCS)** for collecting sample weight. After 2 seconds' display of unit weight, it starts the percentage function. If the unit weight is less than one d, the sample weight is too small to indicate or will cause a big difference.
4. Press **(UNIT)** key to shift the function between weighing and counting
5. Press **(PCS)** key, it displays **P 10.000** , press again **(PCS)** to display the last unit weight and start the percentage function.

7.0 COMMUNICATION PROTOCOLS

The balance use RS232 UART signal, one frame consists of 10 Bit

| | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|-------|
| Bit1 | Bit2 | Bit3 | Bit4 | Bit5 | Bit6 | Bit7 | Bit8 | Bit9 | Bit10 |
|------|------|------|------|------|------|------|------|------|-------|

BIT1: Start bit BIT2~BIT9: Data bit BIT10: Stop bit
All data is on ASCII Code

Unit code:

| | | | | | | | | | | | | | | |
|------|---|----|----|-----|----|----|----|-----|----|------|------|------|---|----|
| Code | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| Unit | g | ct | oz | dwt | lb | dr | GN | ozt | MM | tl.J | tl.T | tl.H | t | mg |

Alarm code:

| Code | A | B | C | D |
|-------------|--------|-----|----|---------|
| Net weight | Normal | | OV | Reserve |
| Unit weight | Normal | LOW | | Reserve |

Frame format on weighing mode

| Byte | Notes | Concents |
|-------|---------------|---|
| 1 | Start of text | 02H |
| 2 | Indicator Add | A~Z |
| 3 | Stable status | 0 stable/1 unstable |
| 4 | Power | 0 normal/1 low battery |
| 5 | Data Sign | +/- |
| 6~11 | Data | 6 Byte(From high to low) |
| 12 | Decimal | From right to left(0~5).0means no decimal |
| 13 | Unit Code | A~Z |
| 14 | Alarm Code | A~Z |
| 15~16 | XOR Checksum | 2 Byte(High-half byte,low-half byte) |
| 17 | End of text | 03H |

XOR=2⊕3.....13⊕14

Frame format on counting mode

| Byte | Notes | Contents |
|-------|------------------|---|
| 1 | Start of Text | 02H |
| 2 | Indicator Add | A~Z |
| 3 | Stable Status | 0 stable/1 unstable |
| 4 | Power | 0 normal/1 low battery |
| 5 | Data Sign | +/- |
| 6~11 | Data | 6 Byte(From high to low) |
| 12 | Decimal | From right to left(0~5).0means no decimal |
| 13 | Unit Code | A~Z |
| 14~19 | Unit Weight Data | 6 Byte(From high to low) |
| 20 | Decimal | From right to left(0~5).0means no decimal |
| 21 | Unit Code | A~Z |
| 22 | Alarm Code | A~Z |
| 23~28 | Quantity | 6 Byte(From high to low) |
| 29~30 | XOR Checksum | 2 Byte(High-half byte,low-half byte) |
| 31 | End of Text | 03H |

$$\text{XOR}=2 \oplus 3 \dots 27 \oplus 28$$

Note: Checksum of high-half byte and low-half byte less or equal to 9, adding 30H, then the data transfer as number of ASCII code.

Example: Checksum of high-half is 6, adding 30H, it come up to 36H, data will be transferred as 6 of ASCII code.

Checksum of high-half byte and low-half byte is over 9, adding 37H, the data transfer as alphabet of ASCII code.

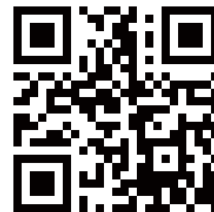
Example: Checksum of high-half is B, adding 37H, it come up to 42H, the data will be transferred as B of ASCII code.

8.0 UNIT CONVERSION

UNIT CONVERSION

| | | |
|---------------------------------|---|---------------|
| 1 ct (MET.CARAT) | = | 0.2g |
| 1 lb (AVOIRDUPOIS POUND) | = | 453.59237g |
| 1 oz (AVOIRDUPOIS OUNCE) | = | 28.349523125g |
| 1 dr (AVOIRDUPOIS DRAM) | = | 1.7718451g |
| 1 GN (GRAIN)(U.K) | = | 0.06479891g |
| 1 ozt (TROY OUNCE) | = | 31.1034768g |
| 1 dwt (PENNYWEIGHT) | = | 1.55517384g |
| 1 MM (MOMME) | = | 3.749996g |
| 1 tl.J (HONG KONG JEWELRY Tael) | = | 37.4290018g |
| 1 tl.T (Tael)(TWN) | = | 37.49995g |
| 1 tl.H (HONG KONG TQEL) | = | 37.799375g |
| 1 t (TOLA)(INDIA) | = | 11.6638038g |

| MODEL UNIT | FH300 | FH600 | FH1000 | FH3000 | FH6000 |
|---------------|---------|---------|---------|---------|---------|
| g | 300.09 | 600.09 | 1000.09 | 3000.9 | 6000.9 |
| ct | 1500.45 | 3000.45 | 5000.45 | 15004.5 | 30004.5 |
| lb | 0.66156 | 1.32294 | 2.20480 | 105.865 | 211.690 |
| oz | 10.5865 | 21.1690 | 35.2780 | 1929.9 | 3859.0 |
| dr | 169.360 | 338.675 | 564.430 | 257.29 | 514.50 |
| GN | 4631.4 | 9261.2 | 15434.0 | 79.410 | 158.780 |
| ozt | 9.6495 | 19.2950 | 32.1550 | 6.6156 | 13.2294 |
| dwt | 192.99 | 385.90 | 643.10 | 1693.60 | 3386.75 |
| MM | 80.045 | 160.045 | 266.710 | 80.195 | 160.350 |
| tl.J | 8.0195 | 16.0350 | 26.7220 | 46314 | 92612 |
| tl.T | 8.0045 | 16.0045 | 26.6710 | 96.495 | 192.950 |
| tl.H | 7.9410 | 15.8780 | 26.4600 | 800.45 | 1600.45 |
| t | 25.729 | 51.450 | 85.744 | 80.045 | 160.045 |



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