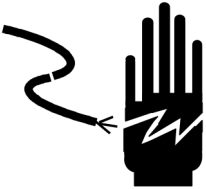# USA Measurements

"We Outmeasure the Competition"
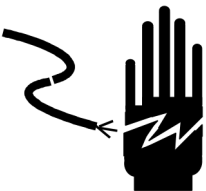
Weighing Indicator

User Manual

R1.1

		Warning
		Ask professional personnel to debug, detect and repair controller.

		Warning
		Please keep good grounding of controller.

	Warning
In electrical connection of controller, please cut off the power supply in advance. Wait for 30 seconds between power-on of the controller for 2 times.	

	Pay Attention to Static Electricity
The controller is a device sensitive to static electricity, thus please take anti-static precautions in use and maintenance.	

Contents

I Technical Indicators

- 6-digit 1.2-inch LED display, 7 state indicator lamps. Long service life and shock resistance

- 7 function keys. Operation is simple and convenient

- Protection level: IP5X

- Excitation voltage: +5VDC

- Load capacity of sensor: at most 4 350Ω simulation sensors

- Input signal range of null point: 0-5mV

- Input signal range of full scale: 1-10 mV

- Inner resolution: 1 million

- Weight upgrading rate: 40 times per second

- Power supply mode

  Battery: Lithium battery 7.4V4Ah

  Adapter: voltage 100-240VAC   Current 0.1A   Frequency 50-60Hz.

- 2 RS232 ports

- Operating temperature: -10℃-40℃, relative humidity is below 85 %

- Storage temperature: -20℃-60℃, relative humidity is below 85 %

- Conforming to standard :GB/T 7724-1999

II Main Function

- Basic weighing function: resetting, removing the peel and clearing the peel

- Weight detection function, counting function, animal scale function

- Weight keeping function, weight accumulation function, percentage display

- Set redundant backup function of parameters

- Automatic screen protection and automatic shutdown energy-saving function

- Rich printing formats and communication protocol

III Boundary Dimension

Instrument size: detailed in the following figure (mm); instrument weight: 1.5kg
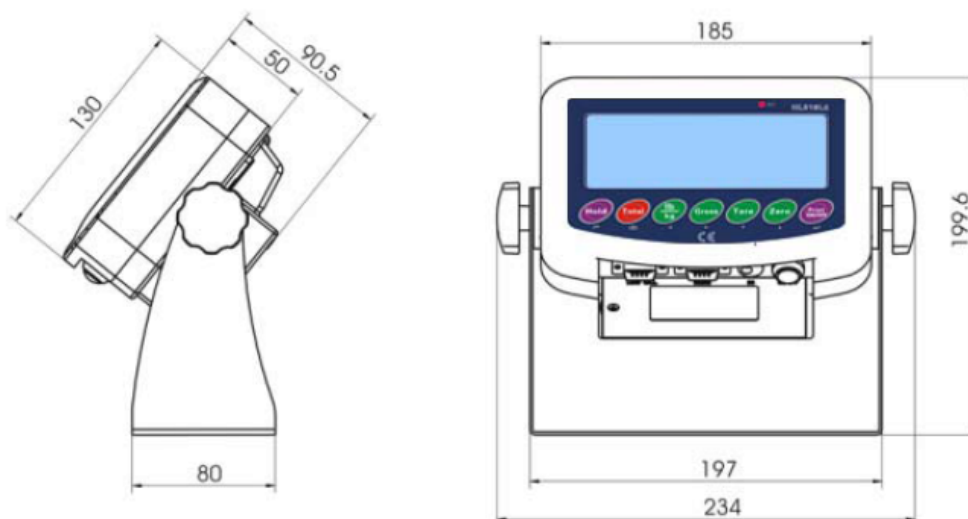
IV Introduction to Panel

- Introduction to indicator lamps

Identification	Analysis
← OK +	Sorting and weight check status indicator
x10	Extension indicator
⠿	Counting scale indicator
🐂	Animal scale indicator
⟩Σ⟩	Accumulating scale indicator
⇦⟩	Accumulating scale adjustment display indicator

HOLD	Weight hold indicator
NET	Net weight indicator
~	Scale in dynamic status
→0←	Scale at zero indicator
⊗	Key pressed indicator
▮▯▯▯▯	Battery indicator
kg	Weight unit
PCS	Counting scale unit
%	Weight % indicator

● Introduction to operation keys

Operation without special specification refers to short press on keys.

Key symbol	Normal weighing state	Set stage
Hold	Weight maintenance key-> 『Hold』 Short press→ F2.1 = 1, keep/cancel. F2.1 = 2, switch between percentage and weight. F2.1 = 5, switch between quantity and weight. Long key→ enter setting menu.	Return to the last menu.

Total	Accumulation key-> 『Total』
	Short key → F2.1 = 4, include display weight in accumulation value.。
	Long key → F2.1 = 3, select scale to sample target weight.
	    F2.1 = 4, accumulate weight of scale display.
	    F2.1 = 5, count sampling of scale.
		No definition.

（lb/kg）	Unit conversion key-> 『lb/kg』 Short key → in weighing state, switch weight unit. The corresponding unit indication lamp is on.	Flicker bit is on the left.
Gross	Skin removal key-> 『Gross』 Short key → net weight turns to gross weight; induction lamp of net weight "Net" is off.	Flicker bit is on the right.
Tare	Skin removal key-> 『Tare』 Short key →gross weight turns to net weight. Indication lamp of net weight "Net" is on. Conduct skin removal operation for multiple times.	Digit flicker position reduces.
Zero	Zero clearing key -> 『Zero』 Gross weight state resets weight. When the scale is in net weight, dynamic state, saving state and out of resetting range, zero clearing operation is invalid.	In setting, digit of flicker position increases. In adjustment of display, accumulation is cleared.
Print ON/OFF	Printing key-> 『Print』 Short key → start up or print. 　　　　Printing format refers to *Appendix1*. Long key → shut down.	Confirm operation, to save setting data.

V. Parameter Setting

Setting entry:

Press the [Hold] button on the operating panel in the state of normal weighing.

If F1.14 = 0, you can set all the parameters within F1~F5.

If F1.14 = 1, you can only set all parameters within F2~F5.

If F1.14 = 1 and you need to set the parameters within F1 menu, you can press the calibration switch button until the F1 menu is entered.

Parameter Setting of F1 Scale

F1.1 Measuring Range

Selectable parameters: 3~200000 (default value: 6)

F1.2 Decimal Places

Selectable parameters: 0 ---- no decimal point

0.0 ---- 1 decimal place

0.00 ---- 2 decimal places

0.000 ---- 3 decimal places (default value)

0.0000 ---- 4 decimal places

F1.3   Number of Divisions

Selectable parameters: 1 (default value), 2, 5, 10, 20, 50

F1.4   Calibration Unit

Selectable parameters: 0 ----   kg (default value)

1 ----   lb

F1.5   Gravitational Acceleration

Selectable parameters: 9.70000~9.99999. Default value = 9.79455.

F1.6   Null-point Calibration

【 E_SCL 】   Keeping empty the scale

Remove the weights on the weighing platform to guarantee the scale is in the empty state. Press the [Print] key and the meter will display [10 CAL]. The displayed digits will reduce slowly until the meter displays [00 CAL]. In the end it will display [End   ] for one second, which indicates the end of null-point calibration.

F1.7   Load-point Calibration

【 LOAd 】   Loading weights

Load weights on the weighing platform to ensure that 10% of full-scale value $\leq$ weight of weights $\leq$ full-scale value, and then press the [Print] key to start the next step.

【 000000】   Entering the same weight value as that of the loaded weights.

Entering the same weight value as that of the loaded weights, please press the [Print] key after the scale becomes stable, and the meter will display [10 CAL]. After that, the displayed digits will reduce slowly until the meter displays [00 CAL]. In the end it will display [End   ] for one second, which indicates the end of

null-point calibration.

F1.8   Automatic Null Tracking

Selectable parameters: OFF, 1 d, 2 d, 3 d (default value)

F1.9   Automatic Reset Range at Startup
Selectable parameters: OFF, 2 %, 10 %, 20 % (default value)

F1.10 Button Reset Range

Selectable parameters: OFF, 2 %, 10 % (default value),
20 %

F1.11 Digital Filter

Selectable parameters: 0 ---- Mild Filtering

1 ---- Moderate Filtering (default
value)

2 ---- Severe Filtering

F1.12 Steady Range

Selectable parameters: 1 d, 2 d, 3 d (default value)

F1.13 Overload Display Range

Selectable Parameters: 9d, 5% (default value), 10%, 20%

F1.14 F1 Menu Protection

Selectable Parameters: 0 ---- Enter F1 menu by keyboard
operation

1 ---- Enter F1 menu by pressing
the calibration button

F1.15 Restoring Factory Default

Set the parameters within F1~F4 as the defaults, which can't
impact the parameters of standard scale.

F2 Application Function Setting

F2.1 Function Selection

Selectable Parameters: 0 ---- ×10 functions

1 ---- Weight keeping function

2 ---- Percentage display function

3 ---- Weight checking and sorting function

(default value)

4 ---- Accumulative scale function

5 ---- Counting scale function

6 ---- Animal scale function

F2.2 Empty-scale threshold value
Selectable Parameters: 0~ full range (default value: 0.001)

F2.3 Target Weight for Weight Checking and Sorting

Selectable Parameters: 0~ full range (default value: 2.000)

F2.4 Positive Error for Weight Checking and Sorting

Selectable Parameters: 0~ full range (default value: 0.100)

F2.5 Negative Error for Weight Checking and Sorting

Selectable Parameters: 0~ full range (default value: 0.100)

F2.6 Access to Target Weight for Weight Checking and Sorting, and Counting Sample Weight

Selectable Parameters: 0 ---- Access to Platform Weighing (default value)

1 ---- Manual Input Access

F3 Energy-saving Parameter Setting

F3.1 Automatic backlight energy-saving time setting

Parameters selectable: 0 ~ 999。

0: Backlight NC;

1: Backlight NO;

2~999: 2~999s automatic backlight (default 10s)

F3.2 Automatic OFF energy-saving time setting

Parameters settable: 0 ~ 60min. (default 5 minutes)

"0" stands for deactivation of this function.

F4 Serial-port Setting

F4.1 Setting of UART0 Communication Interface Parameter

F4.1.1 Communication Mode

Selectable Parameters:

0   ---- no output (default value)

1   ---- continuous output protocol A

2   ---- continuous output protocol B

3   ---- continuous output MT

<div align="center">

4   ---- firm output protocol A

5   ---- firm output protocol B

6   ---- key dispatch protocol A

7   ---- key dispatch protocol B

8   ---- key dispatch protocol A

9   ---- key dispatch protocol B

10   ---- key dispatch protocol C

11   ---- key dispatch protocol D

</div>

F4.1.2 Setting of Data and Check Pit

Selectable Parameters: 8_N_1---- 8-pit no parity check (default value)

7_E_1 ---- 7-pit odd parity check

7_O_1 ---- 7-pit even parity check

8_E_1 ---- 8-pit odd parity check

8_O_1 ---- 8-pit even parity check

F4.1.3 Baud Rate

Selectable Parameters: 1200, 2400, 4800, 9600 (default value)

F4.1.4 Continuous Output & Delivery Parity Check and Character (only for F4.1=3)

Selectable Parameters: 0 ---- no delivery (default value)

1 ---- delivery

F4.1.5 Bluetooth Node Setting (effective only when Bluetooth module option is configured)

Selectable Parameters: HoLi01~HoLi99 (default value: HoLi01)

F4.2 Parameter Setting of UART1 Printing Interface

F4.2.1 Whether to connect the printer

Selectable Parameters: 0 ---- not connected to the miniprinter (default)

1 ---- connected to the miniprinter

F4.2.2 Printing Carriage Return Character

<div align="right">9</div>

Selectable Parameters: 0~9 carriage return characters
(default value: 3)

F4.2.3 Printing Setting of Accumulative Scale

Selectable Parameters: 0 ---- total accumulative data for printing (default value)

1 ---- printing detail + total accumulative data

F4.2.4 Print language setting

Parameters selectable: 0 ---- in Chinese (default)

1 ---- in English

F5 Maintenance and Service

F5.1 Key test

Instrument display 【PrESS】, press 『Print』, 『Zero』, 『Tare』, 『Gross』, 『lb/kg』 and 『Total』 in order, and the instrument displays 【Print】, 【ZEro】, 【tArE】, 【GroSS】, 【Unit】 and 【totAL】, press 『Hold』 to quit key test.

F5.2 Display screen test

All strokes of meter display will have self-inspection, to observe whether there is lacks of strokes.

Press 『Hold』 or 『Print』 to quit test of display screen.

F5.3 Display current internal code

The display will show internal code of current instrument after smoothing. Press 『Hold』 or 『Print』 to quit the interface.

VI Function Description

- ×10 function   F2.1 = 0

<u>How to operate</u>

In normal weighing mode, press 『Total』 on the operation panel once, the display accuracy will promote for 10 times and icon ×10 gets on at the same time; press the key again it returns to normal weighing mode and the icon of ×10 gets off.

Note:

1. In net weight status, it's forbidden to change over to ×10 function status;

2. If there have been 4 decimal places, it's forbidden to change over to ×10 function status;

3. Under ×10 function status, both serial output and printing output are forbidden.

4. Under ×10 function status, it's forbidden to tare.

● Weight hold function F2.1 = 1

How to operate

In normal weighing mode, press 『Hold』 on the operation panel once, the weight presently displayed can be locked and "Hold" indicator gets. Weight Hold operation is valid only when the displayed weight is ≥F2.2 set value; otherwise, it displays invalid operation with 【--ПD--】 for one second and the scale goes back to normal weighing mode.

If the weight is locked, press 『Hold』 again to unlock and it goes back to normal weighing mode and "Hold" indicator goes off.

In weight locked status, it refuses to tare, clear tare and zero.

● Percentage display F2.1 = 2

Display introduction

Displaying 【 *20.5*】 indicates 20.5 %.

Pr = present actual weight / measuring range ×100%

Pressing 『Hold』 key to change over between percentage and weight.

● Weight check, sorting scale function F2.1 = 3

Function description:

Parameters as F2.2 = A, F2.3 = B, F2.4 = C, F2.5 = D etc shall be set.

Presently displayed weight is X.

If X ≤ A, no weight check or sorting will be performed.

If X < (B − D), it stands for short weight; the short-weight icon goes on.

If (B − D) ≤ X ≤ (B − C), it stands for PASS; PASS icon goes on.

If   X > (B – C). It stands for overweight; overweight icon goes on.

Target value acquisition

    Hold 『Total』 until 【TARGET】 is displayed, and then press『Print』; the present target value goes on and flashes.

    If F2.6 = 0, press 『Print』, the present weight on the scale will be taken as new target value and it exits setting interface.

    If F2.6 = 1, it displays 【000000】, requiring modifying the target value manually. After the modification, press 『Print』 to save the data and exit the setting interface.

    Press 『Hold』 to exit target value acquisition.

● Accumulating scale function F2.1 = 4

How to operate

    In normal weighing state, the scale is at zero; apply the scale with load and press 『Total』 on the operation panel; if it displays 【Add-- 】, it means that the present weight has been counted in the accumulated value; then it goes back to normal weighing status. If it displays 【--NO--】 for one second and then goes back to normal weighing mode, it means invalid operation! Causes: 1. The scale must be zeroed between two successive accumulation operations, otherwise, accumulation will be refused. 2. Accumulation is valid only when the displayed weight is ≥F2.2 setting. 3. The scale is in dynamic status.

Adjusted display, clearing, and printing of accumulated value

    In normal weighing mode, hold 『Total』 on the operation panel for over two seconds, it displays 【tOtAL 】 for one second; then the monitor shows the present accumulated value 【 9.500】 or times of accumulation 【Cn 9】; press 『Gross』 and 『Ib/kg』 to change over; now the adjustment display icon goes on. Now if it's necessary to clear the accumulated value, press 『Zero』 to have the display becomes into "0". If F4.2.1=1, pressing 『Print』 can print the accumulated data. To exit the interface, press 『Hold』.

    Note: whether to be over the specific data and accumulated data can

be set in F4.6.

● Counting scale functionF2.1 = 5

Instrument display

【 *l28*】 displays the present counts

Sampling method

1. Check whether the scale is at Zero, otherwise, press 『Zero』.

2. Put the counted material onto the scale platform.

3. Hold 『Total』 until 【*SAMPLE*】 is displayed; then press 『Print』. If F2.6 = 0, it displays 【 *000*】. Enter the value just counted and then press 『Print』 to confirm, the sampled data will be saved and the system exits sampling interface. If F2.6 = 1, it displays【 *000000*】; enter the sample weight and press 『Print』; the system saves the setting data and exits sampling setting interface.

4. In this function, press 『Hold』 to switch between counts and weight.

● Animal scale functions F2.1 = 6

Operation method

In normal weighing state, place the animal on the weighing platform and its weight must be ≥threshold value set in F2.2. Press 『Total』, instrument will collect data sampling. After sampling, the average value of sampling data will be locked, showing X.XXX kg; animal state indicator flashes. Press 『Print』 to print; press 『Hold』 or 『Total』 to quit the interface.

● VII Prompt Message of Instrument

The instrument has extremely high stability and reliability, thus is not easy to have error in general situation. Once an error occurs, please make clear the error first and observe whether the instrument still has error after power-on. Do not hurry to repair the scale body or instrument. Repair the instrument according to error code of the instrument as possible.

No.	Symbol	Analysis	Treatment Method
1	【 *_EEE* 】 【 *EEE* 】	Unable to reset after startup	1、Determine it is no-load state in startup;

			2、Make zero calibration again.
2	【┌────┐】	The weighed object is over full range for 9 days	Reduce weight on weighing platform
3	【└────┘】	The weighed object is below 0 for 5 days	Press 〖Zero〗 to reset
4	【┌─no─┐】 【└─no─┘】	Out of zero clearing range	Check whether the weighing platform has weight. Remove weight.
5	【──ⁿo──】	Invalid operation	
6	【Err 03】	EEPROM checksum and error	Press 〖Print〗 reprint factory value. Start up again. If the information occurs again, return to factory for repair. Please calibrate the scale again if the situation does not occur; **Attention:** this place is provided with all parameters of instruments of the factory.
7	【Err 05】	The calibration input weight is too small	Input≥10 % weight of full range
8	【Err 06】	The weight in calibration is too light	Load≥10% weight of full range
9	【Err 07】	The scale is dynamic in scale	Inspect the scale body
10	【Err 08】	Setting error of date and time	Set according to specification of date and time
11	【Err 09】	Error of AD initialization	If the error occurs after restarting, return it to the factory for repair
12	【LOAd 】	In loading scale, it indicates to loading weight;	Load weight according to requirements;
13	【SEtUP】	It has enters menu setting	Press 〖Print〗 to continue setting.
14	【End 】	End of zero point and	

		loading point calibration	
15	【Add-- 】	Including current display weight in accumulated value	
16	【-OUEΓ-】	Accumulated weight overflows	Clear accumulated weight in time
17	【Ld--- 】	Loading default value	
18	【Print】	Printing	

Appendix 1. Continuous Output Format Specification

1. Continuous output MT format

Continuous output MT format has 18 digits.

Continuous output format																	
STX	A	B	C	X	X	X	X	X	X	X	X	X	X	X	X	CR	CKS
1	3			6						6						1	1

Where:

1. <STX> ASCII start characters (02H)

2. Status word: A, B, C

3. Display weight, possibly gross weight or net weight, 6 digits without symbol or decimal point.

4. Tare weight, 6 digits without symbol or decimal point

5. <CR> ASCII carriage return (ODH)

6, <CKS> optional checksum and (no output in F4.2.3 = 0)

Status word: A, B, C.

Status word A			
Bit 0	Bit 1	Bit 2	Position of decimal point
0	1	0	XXXXXX
1	1	0	XXXXX.X
0	0	1	XXXX.XX

1	0	1	XXX.XXX
0	1	1	XX.XXXX

Bit 3	Constant 0
Bit 4	Constant 1
Bit 5	Constant 0
Bit 6	Constant 1
Bit 7	Constant 0/check bit

Status word B	
Bits	Function
Bit 0	Gross weight = 0, net weight = 1
Bit 1	Symbol: positive = 0, negative = 1
Bit 2	Overload (upper and lower overload) = 1
Bit 3	Static = 0, dynamic = 1
Bit 4	Constant 1
Bit 5	Constant 1
Bit 6	Constant 0
Bit 7	Constant 0/check bit

Status word C	
Bits	Function
Bit 0	Unit: kg = 0, lb = 1
Bit 1	Constant 0
Bit 2	Constant 0
Bit 3	Constant 0
Bit 4	Constant 1
Bit 5	Constant 1
Bit 6	Constant 0
Bit 7	Constant 0/check bit

2. Continuous output A format

The data transmitted by continuous output protocol A is present display weight.

Gross weight format: ww0000.000kg or ww0000.000lb

Net weight format: wn0000.000kg or wn0000.000lb

Example: gross weight of 15.000kg

w	w	0	0	0	1	5	.	0	0	0	k	g	0d	0a

Net weight of 15.000kg

w	n	0	0	0	1	5	.	0	0	0	k	g	0d	0a

Gross weight-15.000kg

w	w	-	0	0	1	5	.	0	0	0	k	g	0d	0a

Note: the above position of the decimal point is determined according to that in the instrument.

3、 Continuous output B format

Continuous output agreement B format:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

HEAD1 , HEAD2 , ←————————— DATA —————————→ ←UNIT← CR/LF→

HEAD1: OL   Upper overload or lower overload, or no zero clearing in startup;

        ST   the scale is in stable state;

        US   the scale is in unstable state;

HEAD2: GS   gross weight；

        NT   net weight；

DATA: instrument display data；

UNIT: kg or lb；

CR/LF: new line.

Example 1:   in stale state, gross weight is 18.000kg. sp = space.

S	T	,	G	S	,	sp	sp	1	8	.	0	0	0	k	g	0d	0a

Example 2:   in unstable state, net weight is -0.200kg. sp = space.

U	S	,	N	T	,	-	sp	sp	0	.	2	0	0	k	g	0d	0a

4. Continuous output format C

Data format: = <**weight data (including decimal point)>**; all the data are ASCII codes.

Note:'=' is data format head, ASCII code.

      < weight data (including decimal point)> : Six bits including decimal points have sign weight data and ASCII code.

For weight data, the lowest bit is in the front; high bits and signs are in the back; negative

sign bit is sent as "-". For positive number, the sign bit is set as "0".

For example: present displayed weight **-500.00**kg, the serial output data is: = **00.005-**。

present displayed weight **500.00**kg, the serial output data is: = **00.0050**。

5, Continuous output format D

All the data transmitted is the present weight (gross weight or net weight) displayed; each frame of data is composed of 12 groups of data.

Byte X	Contents and Explanation	
1	02(\STX)	start character
2	＋ or －	sign bit
3	weighing data	highest bit of weight data
-	weighing data	-
-	weighing data	-
8	weighing data	lowest bit of weight data
9	Decimal places	Right to left (0~4)
10	xor checkout	Four high bits
11	xor checkout	Four low bits
12	03(\ETX)	End character

xor **=** 2⊕3⊕……8⊕9

Appendix 2. Printing Format Specification

F2.1 = 0, 1, 4, 6，print current resetting, press 『Print』.

```
     REPORT
------------------------
Gross      0.200kg
Tare       0.000kg
Net        0.200kg
```

F2.1 = 1 weight maintenance function:

Weight is not in maintenance state:

```
      REPORT
------------------------
Gross      0.200kg
Tare       0.000kg
Net        0.200kg
```

Weight is in maintenance state:

```
      REPORT
----------------------
Gross   25.000kg
Status        Hold
```

or

```
      REPORT
----------------------
Net     25.000kg
Status        Hold
```

F2.1 = 3 selection, check weight, press 『Print』:

REPORT	REPORT	REPORT
-----------------------	-----------------------	-----------------------
Gross 1.980kg	Gross 2.000kg	Gross 2.020kg
State Less	State OK	State Over

Underweight	Qualified	Overweight

F2.1 = 4 accumulation scale, print detailed statement or format of total weight:

Print details and total weight   Only print total weight

```
         REPORT
-----------------------
    1        0.200kg
    2        0.175kg
    3        0.347kg
    4        0.375kg
-----------------------
Total      1.097kg
```

```
         REPORT
-----------------------
Total      1.097kg
```

F2.1 = 5 counting scale, press 『Print』:

```
         REPORT
-----------------------
Gross       0.547kg
Amount        55
```