



Technical Manual


TBWS Washdown Bench scales

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PRECAUTIONS

	 WARNING
	DISCONNECT ALL POWER TO THIS UNIT BEFORE INSTALLING, CLEANING, OR SERVICING. FAILURE TO DO SO COULD RESULT IN BODILY HARM OR DAMAGE THE UNIT.

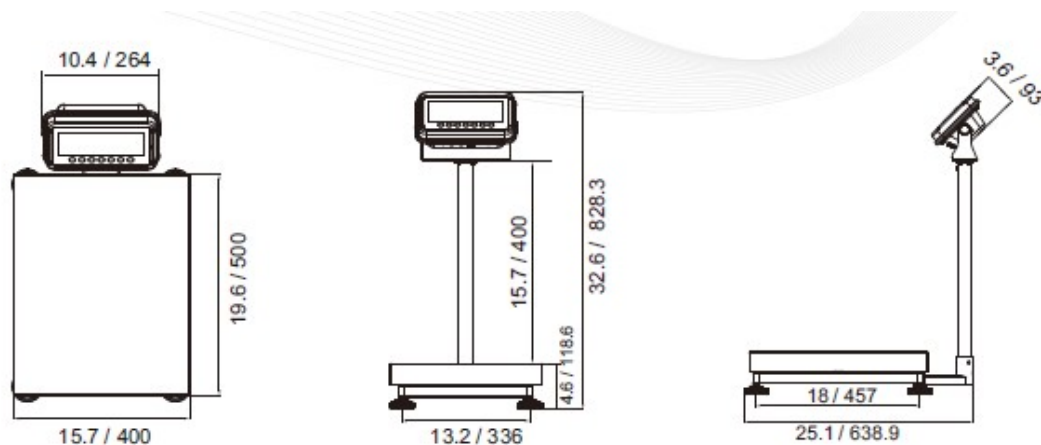
 CAUTION
<ul style="list-style-type: none">• Permit only qualified persons to service the instrument• Before connecting or disconnecting any components, remove the power.• Failure to observe these precautions could result in bodily harm or damage to or destruction of the equipment.



- The weighing indicator is a precision electronic instrument, handle it carefully.
- Do not install the scale in direct sunlight.
- Verify the local voltage and receptacle type are correct for the scale.
- Only use original adaptor, other could cause damage to the scale.
- Pluggable equipment must be installed near an easily accessible socket outlet.
- Avoid unstable power sources. Do not use near large users of electricity such as welding equipment or large motors.
- Avoid sudden temperature changes, vibration, wind and water.
- Avoid heavy RF noise.
- Keep the indicator clean

1. SPECIFICATION

DIMENSIONS (inch/mm)



Model	TBWS-100	TBWS-200	TBWS-500
Display	2.05inch / 52mm LCD		
Housing	Stainless steel		
Operating Temperature	-10°C - 40°C / 14°F - 104°F		
Resolution	1/5000		
Keypad	7 Keys		
Power	AC (110V/60Hz)/ Battery (6V/4Ah)		
Calibration	Automatic External		
Interface	RS-232 Output		
Load cell drive Voltage	Max: 5V/150mA		
Load Cells	Up to 4 load cell		
ADC	Sigma Delta		
ADC Update	≤1/10 second		
Stabilization Time	One seconds typical		

2. INTRODUCTION

- The TBWS series weighing indicator that amplifies signals from a load cell, converts it to digital data and displays it as a mass value.
- It is suitable for general weighing or more specialized applications such as check weighing, animal weighing and accumulation applications.
- It can connect the indicator to a printer or a PC.
- Large LCD with white LED back light displays

3. INSTALLATION

3.1 Unpacking

When you receive the Indicator, inspect it to make sure that it is not damaged and that all are parts are included:

- Remove the Indicator from the carton.
- Remove the protective covering. Store the packaging to use if you need to transport the scale later.
- Inspect the indicator for damage.
- Make sure all components are included.
 1. Indicator
 2. Manual
 3. Indicator holder (Optional)
 4. Load cell Output connector (Optional)
 5. RS-232 Output Connector (Optional)

3.2 Installation

- Place the Indicator on a table or use indicator holder to connect with stand.
- Connect the plat form load cell cable to the indicator load cell connector. Load cell connector is locating back side of the indicator.
- Connect the adaptor pin to the indicator adaptor jack. Adaptor jack is locating, back side of the indicator.
- Adaptor connects into your AC power socket. Pluggable equipment must be installed near an easily accessible socket outlet with a protective ground/ earth contact.
- Turn on the On/Off key. If you want to turn off, press the key again.
- Display will show the scale capacity and will be starting self-checking.
- After self-checking, display will be come to normal weighing mode.
- Warm-up time of 15 minutes stabilizes the measured values after switching on.
- Calibrate with exact calibration weights, minimum 1/3 of the scale capacity should be used for calibration. For calibration see details in parameter.

Then you can start your operation.

3.3 Load cell connections

- Connect the load cell cables to the terminal as shown below.

7Pin Connection	
Pin 1	Signal -
Pin 2	Signal +
Pin 3	Exc -
Pin 4	Exc +
Pin 5	Sen -
Pin 6	Sen +
Pin 7	Shield

- It can connect four 350 ohm load cells.
- The load cell drive voltage is 5V DC $\pm 5\%$ between Excitation + and Excitation -.

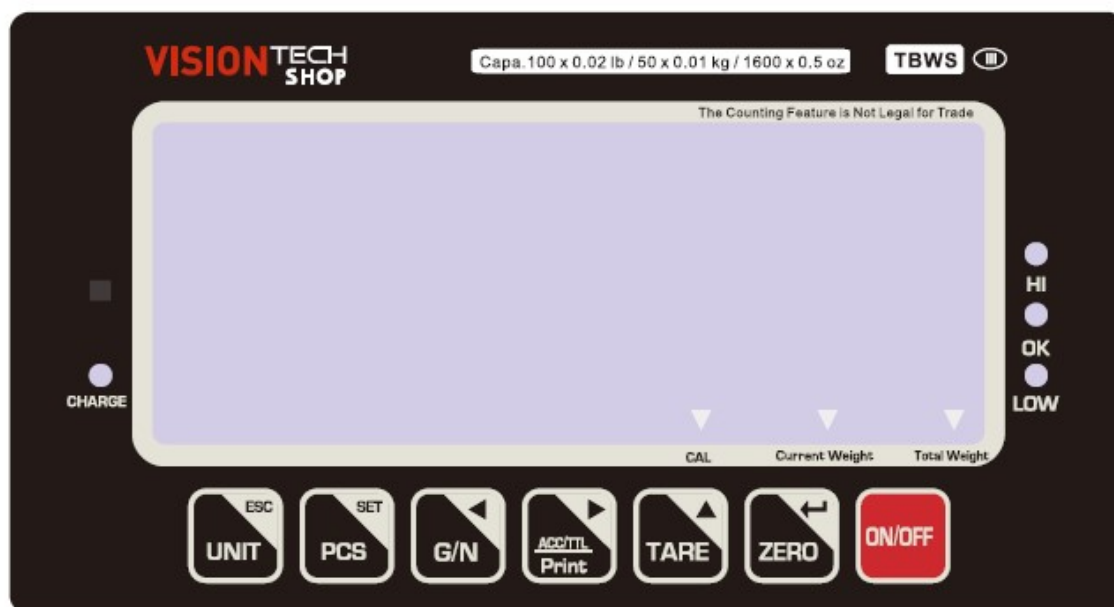
3.4 Connect Adaptor and Charging








- To charge the battery insert the adaptor pin to jack. Simply plug the adaptor into the main power. The scale does not need to be turned on.
- The battery should be charged for 8 hours for full capacity.
- In lower left side of the keyboard is an LED to indicate the status of battery charging. When the scale is plugged into the main power the internal battery will be recharged. If the LED is green, the battery is fully charged. If it is red, the battery is nearly out and if yellow, the battery is being charged.
- Do not use any other type of power adaptor than the one supplied with the scale.
- Verify that the AC power socket outlet is properly protected.

Note: Please charge the battery before using the scale for the first time.







4. KEYS DESCRIPTION

Key Board



Keys	Description
	Power turn ON/OFF
	Set the Zero Display
	To perform a tare function, Subtracts weights.
	Accumulator key, current values will store to the memory to send the data to printer or PC
	Shift to Gross / Net Weight.
	Counting
	To change the unit (kg/g/lb/oz)

Secondary functions of the keys

Function	Keys
To confirm the selected menu	
To change the menu and active digit	
To move the active digit to right	
To move the active digit to left	
To enter the menu	
Escape from the menu to normal operation.	

5. OPERATION

Initial Start-up

Warm-up time of 15 minutes stabilizes the measured values after switching on.

5.1. Basic Operation

1. Power On/Off:

Turn on the balance by pressing on/off key.


The display is switched on and the test is started and to turn off the scale, press the key again.




2. Zero

Environmental conditions can lead to the balance exactly zero despite the platform not taking any strain. However, you can set the display of your

balance to zero any time by pressing  key, ensuring that the weighing starts at zero.

3. Tare

The weight of any container can be tared by pressing  button so that with subsequent weighing the net weight of the object being weighed is always displayed.

- Load weight on the platform.
- Press  key. Zero is displayed, and tare is subtracted.
- Remove weight on the platform. Tared weight is displayed. It can set only one tare value. It will be shown with a minus value.
- Press  to change between gross weight and net weight.
- To clear the tare value, remove the load and press  key. Zero is displayed, tare weight is cleared.














4. Select Unit and Sampling operation

Press  key, it can change unit and sampling operation.





5.2. Check Weighing

It can set an upper or lower limit when weighing with the limit range. During the limit controls, whether a value is within the upper or lower limits can be known with an alarm sound.

5.2.1. Set Limits

- Press  and  key together, display will be show **set h**.
- Press  key to select **set h** or **set l**
- Press  key to confirm, display will show **00000** and will blink the last digit.
- Enter the high limit value by using  and  keys to change the active digits and press  key to increment the value.
- Press  key to confirm, display will show **set l**
- Enter the high limit value by using  and  keys to change the active digits and press  key to increment the value.
- Press  key to confirm.
- To escape from the settings press  key.

5.2.2. Set Check Weighing


- Press  and  key together, display will be show **set h**.
- Press  key to select display **beep**.
- Press  key to confirm, display will be shown **none** or **ok** or **ng**
- **Check mode none** : No beep sound in the limits. Function turned off.
- **Check mode ok** : When the weight is between the limits. OK will shown and beeper will be sounded.

- **Check mode ng** : When the weight is out of the limits, the beeper will be sounded and OK will shown.

Note: Check weighing available only when weight more than 20d


5.3. Accumulation



The scale can be set to accumulate manually by pressing  key. For settings, see the parameter **p 1 Com » mode » pr 2**


Before operation scale should be stable and return to zero, accumulation available only when weight more than 20d

Accumulation Operation

- Place the load on the platform.
- Press  key, when displayed STABLE indication.
- Display will be show **acc 1** then will be show the total saved value. These displays will be shown only three seconds.
- Remove the weight from the pan.
- When display get zero and stable then place the second weight.
- It can continue until the memory gets fully or 99 items.

5.3.1 Memory Recall



To recall the memory press  key when there is no load on the platform.

Display will be show **acc X** (X: Total number of accumulation) then will be show the total saved value. These displays will be shown only three seconds.

5.3.2. Memory Clear



To clear the memory, press  and  keys together.

Display will show **Acc 0**; all accumulation memory is cleared from the memory.

5.3.3. Automatically accumulation.


The scale can be set to accumulate automatically. For settings, see the parameter **p 1 Com » mode » auto**

Automatic Accumulation Operation


- Place the load on the platform.
- When display gets STABLE indication, display will be show **acc 1** then will show the total saved value. These displays will only be shown for three seconds.
- Remove the weight from the platform.
- When display shows zero and stable then place the second weight.
- It can continue until the memory gets fully or 99 items.


5.4. Parts Counting

To enter the parts counting, press  key and select until display will be show **p 10**

Press  to change the parts quantity.
Options: **p10 / p20 / p50 / p100 / p200**

Parts Counting Operation

- Place the load on the platform
- Select the parts quantity as per the option
- Choose from option depending on how many pieces/items are on the scale
- Press  key to confirm, display will be shown ---- then will show the quantity
- Then can add goods on the platform, display will update the parts quantity automatically


Press  key back to the weighing mode.

5.5. Animal Weighing

TBWS can be used for weighing vibrating loads. This function can use for animal weighing. For settings, see the parameter **p 3 oth » anm**

Bring the load on the platform, when the load few seconds get stable, the reading will be locked for few seconds.

It can add or remove loads also update the weighing locked values.



To enter or exit animal weighing mode, press  key until HOLD indicator will be displayed or not..


When in animal weighing mode **HOLD** indicator will be displayed.

5.6. Keyboard Lock

It can set lock key board, for settings, see the parameter **p 3 oth » lock**





When the keys are not using within 10 minutes, the keys will lock automatically. After entering the lock function, pressing any keys will cause the display to show **k-lok**. Then will come to normal display.

If want to unlock and want to use the keys press and hold ,  and



 keys three seconds. Display will be show **u lck** Then will come to normal display

5.7. Set auto power off

It can set auto power of the scale, when scale not in use, scale will turn off after the setting time.



- Hold  key three seconds display will show **setbl**
- Press  key to change **Set of** and press  key to confirm
- Press  key to change the options.

Set of	off	To set auto off function turn off, for scale always on
	Of 5	Set to turn off five minutes later
	Of 15	Set to turn off fifteen minutes later



- After selecting the auto off option press  key to confirm and press  key to escape from the settings.

5.8. Set Back Light

It can set back light when scale is in use.





- Hold  key three seconds display will show **setbl**.
- Press  key to confirm.

setbl	au	To set auto option. When start to use back light will be on and when stop the operation back light also will off.
	on	To set always on. After turn on the power, back light also will be on.
	off	To set back light turn off. No back light in the operations


- After selecting the back light option, press  key to confirm and press  key to escape from the settings.

6. PARAMETERS

To set parameter, turn on the scale.

- Press  key during the self checking.
- Display will be show **pn**
- Press ,  and  to enter, display will be show **po chk**

(To access parameters **P2 mod**; **P4 ST**; **P5CLR** ,the jumper K2 need to make short; if K2 is not shorted ,press K3 button inside the unit to enter)











Menu	Sub Menu	Description
P 0 chk	Set H	Set high limits for check weighing
	Set l	Set low limits for check weighing
	beep None	No beep for check weighing
	Ok	Beep, when check weighing between the limits
	ng	Beep, when check weighing out of the limits
P 1 com	Mode	<p>This option is used to set accumulation and RS-232 communication</p> <p>Options:</p> <p>Cont : data send continues</p> <p>St 1 : Send data one time, when stable.</p> <p>St c : Send data continuously, when stable</p> <p>P r1 : Send data one time, when press print Key (in printer mode)</p> <p>Pr 2 : Send data to print and accumulation,</p> <p style="text-align: center;">When press .key</p> <p>Auto : Auto accumulate and auto print mode.</p> <p style="text-align: center;">When weight stable and return to zero.</p> <p>Ask : Ask mode,</p> <p style="text-align: center;">Command R: read data Command T: Tare Command Z: Zero</p> <p>Wirel: Optional Wireless mode (communication through wireless)</p> <p>KIT 1: Optional Wireless Mode</p>

	Baud	To set the baud rate. Options: 600 / 1200 / 2400 / 4800 / 9600	
	Pr	To set the parity Options: 7 e1 / 7 o1 / 8 n1	
	Ptype	To set printer model Options: Lp50 : Set the scale printer LP-50 EP50 : Set the scale printer EP-50	
P 2 mod	SinGLE	To select single range operation	
		Count	To check internal counts
		Deci	To set decimal points
		Div	To set increment
		Cap	Set Capacity
		Cal	Calibration
		gra	Gravity
	duAL 1	To select dual range - mode 1 Note: Once active second interval (div 2), Then second interval will work until display return to zero	
		Count	To check internal counts
		Deci	To set decimal points
		Div	Di v 1 To select first division
			Di v 2 To select second division
		Cap	Cap 1 To select first capacity
			Cap 2 To select second capacity
		Cal	Calibration
		gra	Gravity
	duAL 2	To select dual interval - mode 2 Note: First interval will active in CAP 1 Second interval will active in CAP 2	
		Count	To check internal counts
		Deci	To set decimal points
		Div	Di v 1 To select first division
			Di v 2 To select second division
		Cap	Cap 1 To select first capacity
			Cap 2 To select second capacity
		Cal	Calibration
		gra	Gravity
P3 oth	Lock	To set keypad lock Options: on / off	
	anm	To set animal mode.	



		Options: on / off
P4 S T	ST ON	Mutli Tare Function On
	ST OFF	Mutli Tare Function Off
P5 CLR	CLRCAL	Clear the calibration record
	CLROPT	Clear the parameter modification record
P6 <i>Unit</i>	g	Weighing units select to turn on / off
	Oz	






7. CALIBRATION

To set calibration, turn on the scale.

- Press  key during the self-checking.
- Display will be show **pn**
- Press ,  and  to enter, display will be show **po chk**
- Press  until display will be show **p 2 mod.**
- **Open the display by unscrewing and locate K3 on mainboard. Upon locating, press the button to enter calibration mode.**
- Press  key to confirm and press  to select **sinGLE /dual 1 /dual 2**
- Press  key to confirm and press  to select **cal**
- Press  key to confirm

Calibration Cal

- Press  key to enter calibration, display will be show **unld**
- Remove all the weight from the platform.
- When indicator get stable, press  key to confirm.

- Display will show the last calibration weight. If want to change the calibration weight value, press  and  keys to change the active digits and press  key to increment the value.
- When the calibration value is correct, press  key to confirm.
- Display will be show **load**.
- Place the calibration weight on the platform.
- When indicator becomes stable, press  key to confirm.
- Display will come to normal weighing mode.

8. RS-232 OUTPUT

The TBWS Series of scales can be ordered with a standard RS-232 output.

8.1. Specifications:

RS-232 output of weighing data

Code : ASCII

Data bits : 8 data bits

Parity : No Parity

Baud rate : 600bps to 9600bps selectable

8.2. RS-232 (9pin D type connector)

Pin 2	RXD	Input	Receiving data
Pin 3	TXD	Output	Transmission data
Pin 5	GND	—	Signal ground

9pin D Connector:

Indicator

Pin 2:

Pin 3:

Pin 5:

Computer

Pin 3

Pin 2

Pin 5

Check Weighing Output

Pin 1: VB

Pin 4: Vcc 5v (Output)

Pin 5: Com (Ground)

Pin 6: Ok (Output)

Pin 7: Low (Output)
Pin 8: Hi (Output)
Pin 9: Beep (Output)

8. 3. Continuously output protocol

Weighing mode

		,			-/ □									k	g	CR	LF
HEADER1--		HEADER2-		--- WEIGHT DATA --										-WEIGHT UNIT-		TERMINATOR	

Counting mode

P	C	S	:								□	p	c	s	CR	LF
- QTY -										- QTY UNIT -						

HEADER1: ST=STABLE, US=UNSTABLE HEADER2: NT=NET, GS=GROS

Print formats

THANK YOU
Weight: **1.745lb**

Label Format

```

-----
1  1.100 lb
2  1.100 lb
3  1.105 lb
4  1.100 lb
5  1.100 lb
6  1.100 lb
-----
TOTAL : 6.605 lb
COUNT :      6
-----

```

Receipt Format # 1

```

Gross : 0.500 lb
Tare  : 0.000 lb
Net   : 0.500 lb

Gross : 0.106 lb
Tare  : 0.000 lb
Net   : 0.106 lb

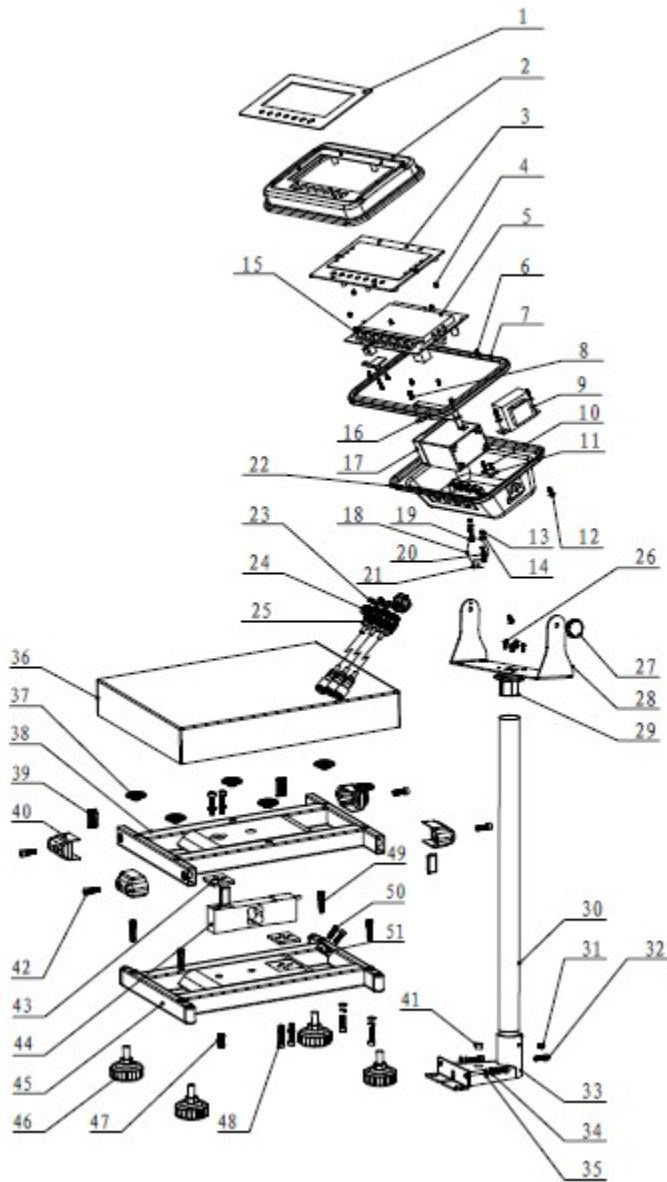
Gross : 0.606 lb
Tare  : 0.106 lb
Net   : 0.500 lb

-----
TOTAL : 1.106 lb
-----

```

Receipt Format # 2

9. DRAWING



TBWS Parts List-1

51	cable gland	1	PA	
50	inner hexagon screw	2	SST	M5*10
49	hexagon screw	4	SST	M6*35
48	inner hexagon screw	8	SST	M6*30
47	inner hexagon screw	1	SST	M10*20
46	feet	4	rubber	M10
45	lower load cell bracket	1	SST	
44	load cell	1	Aluminum	
43	gasket	2	SUS301	
42	inner hexagon screw	4	SST	M6X20
41	level bubble	1		14.7MM
40	pan support stand	4	PA	
39	pipe plug	4	PA	
38	upper load cell bracket	1	SUS304	
37	rubber gasket	6	rubber	
36	SST pan	1	SST	
35	gasket	4	SST	M6
34	spring gasket	8	spring steel	M6
33	pole stand	1	SST	
32	inner hexagon screw	5	SST	M6*16
31	inner hexagon screw	2	SST	M6*10
30	M type pole	1	SST	
29	Support Bracket	1	Zinc Alloy	
28	bracket	1	SUS304	
27	bracket screw	2	ABS	
26	big head screw	4	SST	M4X8

TBWS Parts List-2

26	bin head screw	4	SST	M4X8
25	waterproof connector	3	PA6	black
24	adapter port assembly	1	rubber	
23	rubber gasket	1	rubber	
22	back cover	1	SUS304	
21	Seal lead	0.1	Cu	
20	hexagon seal screws	1	SUS304	M4X16
19	hexagon seal screws	1	SUS304	M4X10
18	Seal wire	0.1	Cu	
17	battery	1		6V/4An
16	battery bar	1	SPCC	
15	switch cover	7	PE	
14	gasket cover	7	SUS304	
13	rubber gasket	7	rubber	
12	"+"screw	6		M4X16
11	calibration switch board	1		
10	"+"screw	2		M3*6
9	transformer	1		
8	"+"screw	2		M4X10
7	waterproof rubber bar	1	EPDM60°	
6	self-tapping screws	6		M3X8
5	main PCBA	1		
4	"+"screw	6		M3*6
3	display protection plate	1	PC	
2	front cover	1	SUS304	
1	overlay	1	PC	
No.	Name	QTY	Material	Mark

10. ERROR CODES

Error Message	Description	Solution
-----	Maximum load exceeded	Unload or reduce weight
Err 1	Incorrect date	Enter the date by using format "yy:mm:dd"
Err 2	Incorrect time	Enter the time by using format "hh:mm:ss"
Err 4	Zero setting error	Zero setting range exceeded due to switching on.(4%max) Make sure platform empty.
Err 5	Key board error	Check the keys and connector.
Err 6	A/D value out of range	Make sure platform empty and check the pan is installed proper. Check the load cell connectors.
Err 7	Percentage Error	Please check input data, must be > 0.5d
Err 8	Calibration weight error	Check the test weights for calibration or linear calibration
Err 9	Unstable Reading	Check any air variation, vibration, RF noise and touching some where. Check the load cell and connectors.
Err 10	Wireless communication failure	Check wireless settings or change Com settings from the wireless
Err 11	Communication protocol error	Check communication settings
Err 12	Accumulation error	Max accumulation times 99 / 999 / weight 999999
Err 13	Lack of unit weight	Check unit weight entry data, must be >0.5d
Err 14	Lack of sample	Check counting samples entry, must be >20d
Err 15	Gravity error	Check the gravity settings. Gravity range must be 0.9xx ~ 1.0xx

Err 16	Paper error	Check the printer paper
Err 17	Tare out of range	Minus weight or overload. Remove the load and restart scale again.
Err 18	Pre-tare error	Check the pre-tare value
Err19	Initialize zero error	Calibration the scale.
Err P	Printer error	Check the printer settings or connections
Err I	Approval setting error	Check the PCB jumper settings. Must be connect jumper pin to K1 (BW series)
--ol--	Over range	Remove the load. Re calibrate
--lo--	Underload	Minus weight, check the platform and restart or calibrate.
Fai I h / fai I I / fai I	Calibration Error	Check the test weights & Re calibrate
Ba lo / lo ba	Battery low	Re charge battery, check the voltages.

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100 Temple Ave. Hackensack, NJ 07601
Tel: + 1-201-679-7793