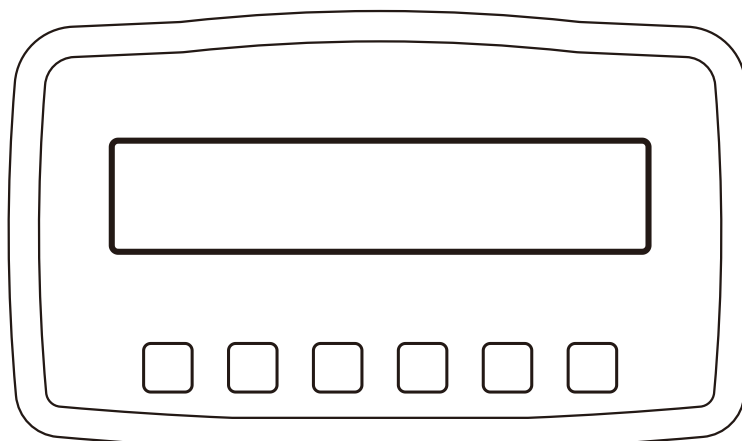
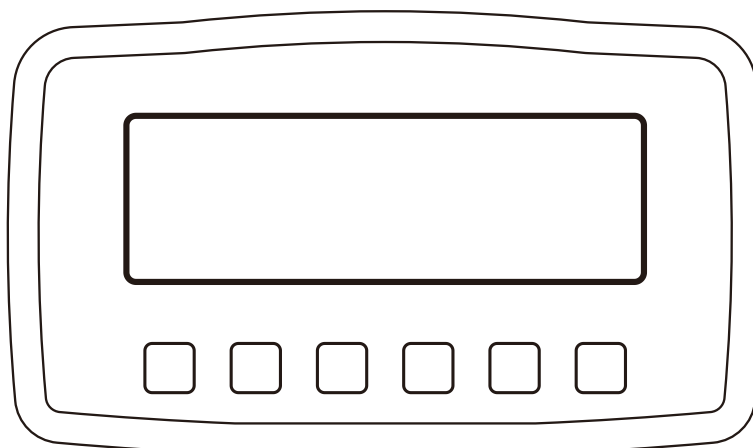




Digital Weight Indicator

TD-W2




User Guide

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 Please read this manual carefully before operating the indicator.

1 Introduction

1.1 Warnings

Failure to heed may result in serious injury or death.

-  DO NOT allow children or inexperienced persons to operate the indicator.
-  DO NOT operate without all shields and guards in place.
-  DO NOT step on the unit.
-  DO NOT use for purposes other than weight taking.
-  DO NOT place fingers into slots or possible pinch points.
-  DO NOT use the indicator if any of the components are cracked.
-  DO NOT exceed the rated load limit of the indicator.
-  DO NOT make alterations or modifications to the indicator.
-  DO NOT remove or obscure warning labels or seals.
-  DO NOT use near water.

Before opening the indicator, ensure the power cord is disconnected from the outlet.

Keep hands, feet and loose clothing away from moving parts.

1.2 Features

This indicator is a single-channel high resolution digital weight indicator. Housed in enhanced ABS plastic enclosure, the indicator's front panel consists of a large 6-digit segmental display and 6-button keypad.

- Available in alphanumeric LED and HTN LCD display versions
- Available in 110/115 VAC and 220/230 VAC versions
- One configurable user-defined function key
- One configurable software set-point
- Supports 4- and 6-wire load cell connections
- Built-in high capacity maintenance free rechargeable battery
- Calibration switch with seal protection
- One full duplex RS-232 communication port
- One RS-485 communication port (optional)
- Built-in full time and date stamping clock (optional)
- Extended serial interface printer (optional)
- Built-in RF module for interfacing with RF scoreboard or RF transceiver (optional)

1.3 Specifications

Analog Performance

Accuracy Class	III Class (eqv. to OIML R76)
Full Scale Input Signal	-11.7 ~ +11.7 mV
Loadcell Excitation Voltage	3.00±3% Vdc (typ.)
Number of Loadcells	4X350 ohm; 8X700 ohm
Input Impedance	1M ohm (typ.)
Internal Resolution	1 000 000 counts
Measurement Rate	10 measurements/s
System Linearity	±6 ppm
System Offset Error	-1 µV
System Offset Drift	25 nV/degC
System Gain Error	±0.1%
System Gain Drift	6 ppm/degC (max.)

Metrology Performance

Tare Range	100 %F.S.
Auto-Zero Range	20 %F.S. (dft.)
Manual-Zero Range	4 %F.S. (dft.)
Center of Zero	±0.25 d
Return-to-Zero Range	5.0 d
Zero-tracking	0.5 d/s (dft.)

User Interface

LED Display	6-digit 1.2inch super luminant alphanumeric LED
LED Annunciators (LED display)	Zero, Net, Stable, Hold, Peak-Hold, View Total
LCD Display	6-digit 40mm alphanumeric HTN LCD
Backlight (LCD display)	6 high luminant white LEDs
Keypad	6-key flat keypads

Serial Communications

Port	Full duplex RS-232 (optional) and RS-485 (optional)
Baudrate	9600, 4800, 2400, 1200 bps
Data Format	1-bit start, 8-bit data, 1-bit stop
Parity	None parity

Power Supply

AC Power Supply	110/115 or 220/230Vac; 50 or 60Hz
Fusing	1.1A PPTC resettable fuse
Internal Battery	6V4.0Ah acid-lead rechargeable battery
Low Battery Caution	5.80 Vdc (typ.)
Low Battery Auto Power-Off	5.60 Vdc (typ.)
Battery Life	50 ~ 130 hours (typ.)
Battery Charging Cycles	over 300 cycles (typ.)
Auto Power-Off Timing	Disabled (dft.)
Sleep Timing	30 s (dft.)

Environmental

Operating Temperature	-10 ~ +40 degC (+14 ~ +104 degF)
Storage Temperature	-20 ~ +50 degC (-4 ~ +122 degF)
Operating Humidity at 20 degC	0 ~ 90 % (rel.)

Enclosure

Enclosure Material	ABS plastic
Indicator Net Weight	1.55 kg (3.40 lb)
Mounting Bracket	Stainless steel for wall or bulkhead mounting
Mounting Bracket Net Weight	0.25 kg (0.55 lb)
Enclosure Dimensions	24.5 x 14.5 x 10 cm (9.5 x 6 x 4 inch)
Package Gross Weight	2.15 kg (0.98 lb)
Package Dimensions	29 x 20.5 x 16.5 cm (11.5 x 8 x 6.5 inch)
Outer Package Gross Weight	27 kg (12 lb)
Outer Package Dimensions	61 x 42 x 51 cm (24 x 16.5 x 20.5 inch)

1.4 Functions

- Zero, Tare-in, Tare-out, Tare-view, Total, Total-view, Hold, Peak-hold
- Battery Supervision, Charging Indication, Low Battery Power-off
- Auto Power-off, Auto-sleep, Display Luminance Adjustment
- Delay-Hold (Animal Weighing), Extended Resolution View, Conversion Code View
- Set-point Alarm
- Serial Communication

1.5 Options

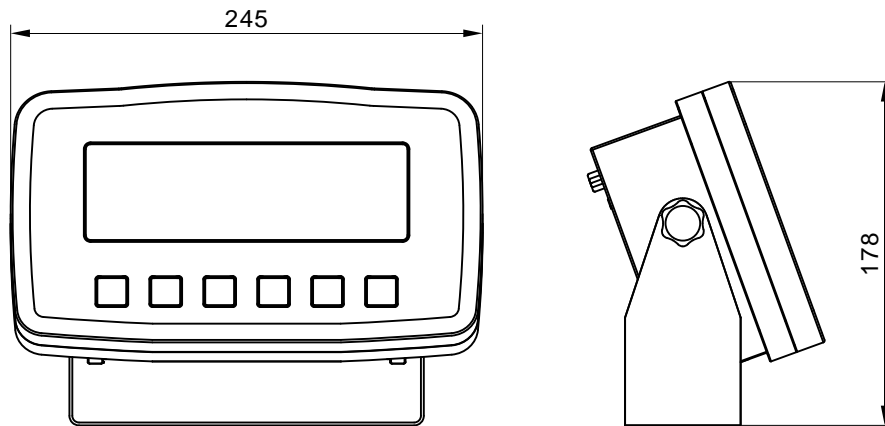
Options which you may have ordered with this indicator include:

- kg/lb measurement unit switch function
- One RS-485 communication port
- Built-in full time and date stamping clock
- Extended serial interface printer
- Built-in RF module for interfacing with RF scoreboard or RF transceiver

2 Installation

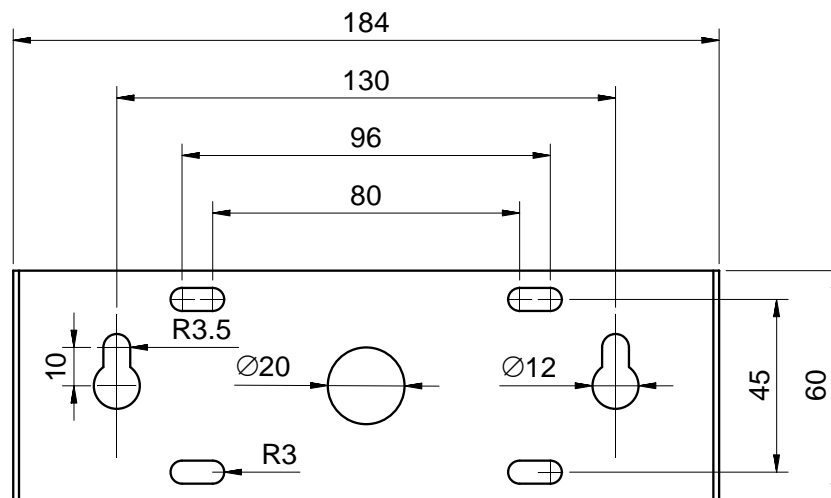
2.1 Dimensions

2.1.1 Indicator



Dimensions in Millimeters

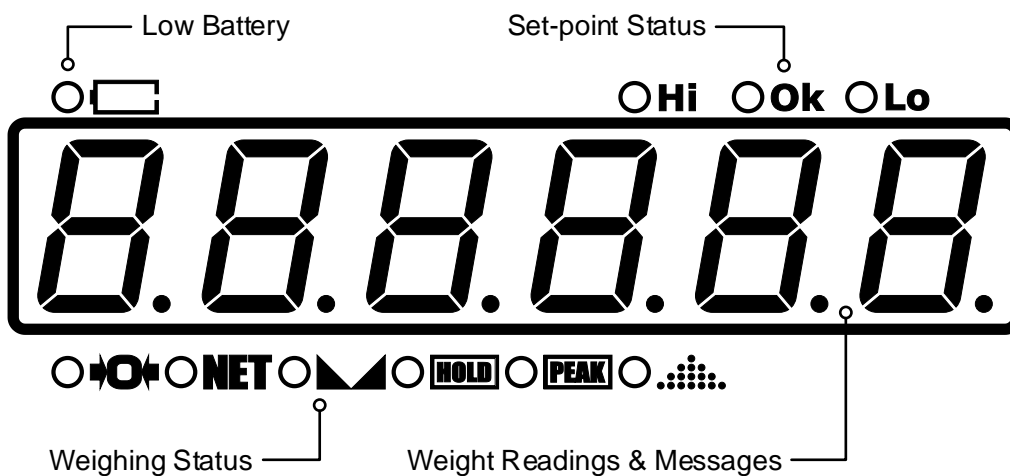
2.1.2 Mounting Bracket



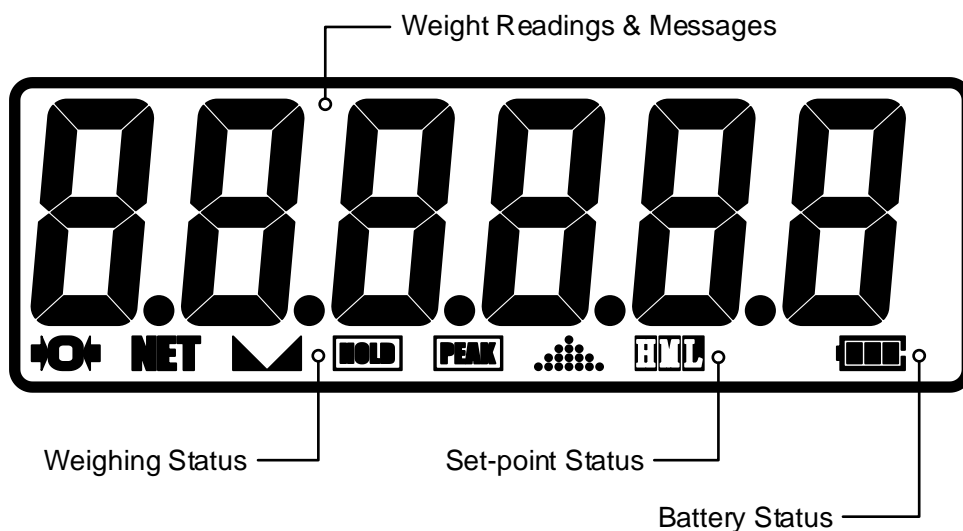
Dimensions in Millimeters

2.2 Front Panel

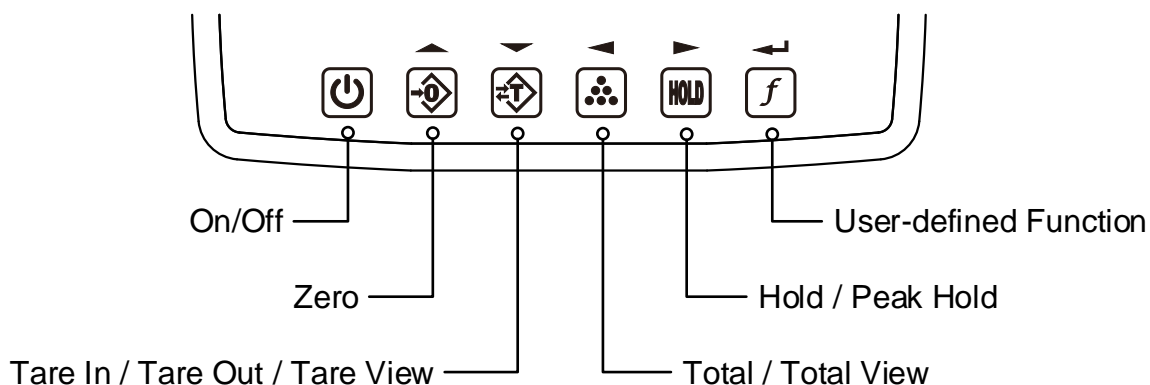
2.2.1 LED Display
















2.2.2 LCD Display



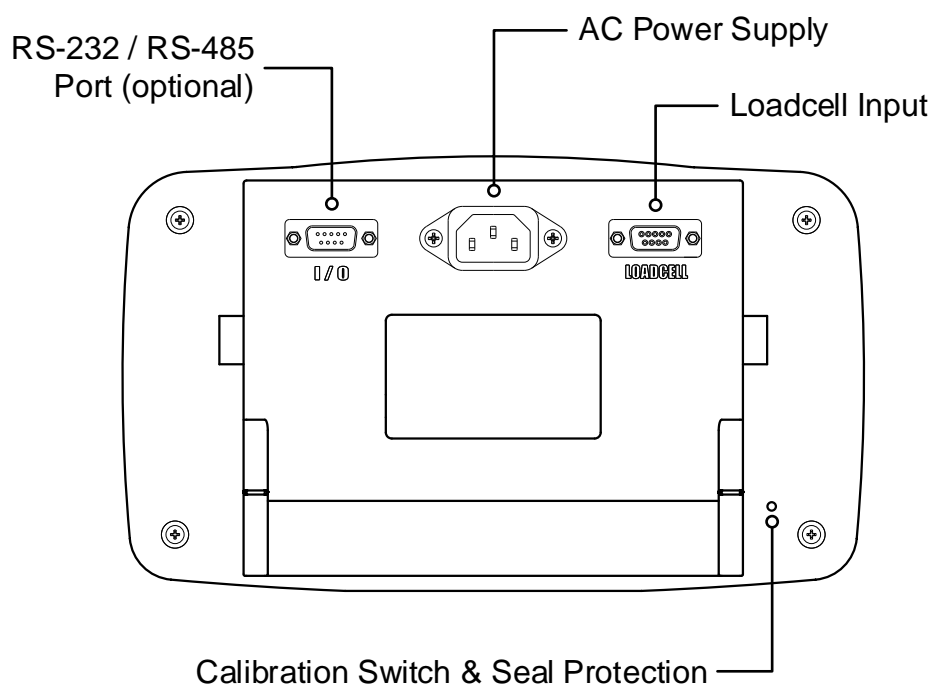
2.2.3 Keypad



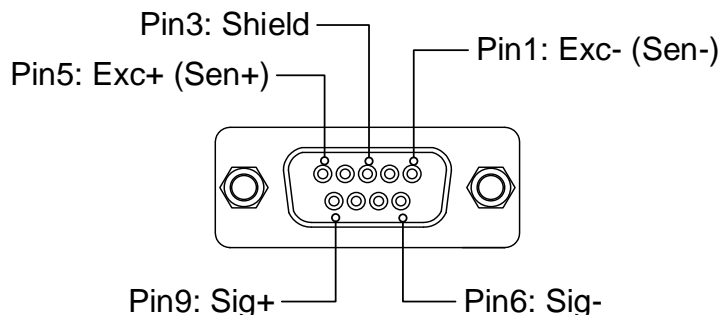
2.2.4 Annunciators

	Zero	shows if weight is within center of zero (+/- 0.25d)
	Net	shows if weight is in NET mode
	Stable	shows if load is stable
	Hold	shows if weight reading is locked in HOLD mode
	Peak-Hold	shows if weight reading is locked in PEAK-HOLD mode
	View Total	shows if indicator is in VIEW TOTAL mode
	Low Battery (LED display)	shows if battery is out of power blinks if battery is being charged hides if battery is fully charged
Hi	Set-point	Hi shows if load is greater than high setpoint; Lo shows if load is less than low setpoint; Hi and Lo shows if load is either greater than high setpoint or less than low setpoint; Ok shows if load is in between high and low setpoint
Ok	Status	
Lo	(LED display)	
	Battery (LCD display)	scrolls if battery is being charged hides if battery is fully charged
	Set-point (LCD display)	 shows if load is greater than high setpoint;  shows if load is less than low setpoint;  shows if load is either greater than high setpoint or less than low setpoint;  shows if load is in between high and low setpoint

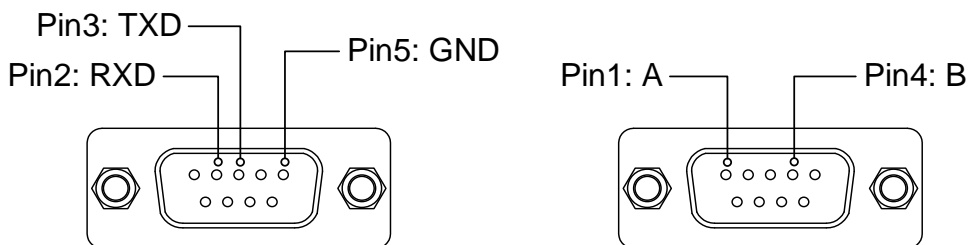
2.3 Interface



2.3.1 Loadcell Cabling



2.3.2 RS-232 & RS-485 Cabling





2.4 Built-in Battery

This indicator has a built-in 6V4.0Ah rechargeable maintenance-free lead-acid backup battery.

Depending on the configuration of display luminance and sleep timing, loadcell resistance and daily operations, battery works from 50 hours to 130 hours. When powered by the built-in battery, proper configurations of Auto-Off, sleep timing and display luminance, greatly reduce power consumption and conserve battery life.

The AC power supply charges battery automatically. Charging time for a completely discharged battery is approximately from 10 to 20 hours, depending on battery's charged cycles and charging temperature.

During battery charging,  (LED display) blinks or  (LCD display) scrolls.


After battery is fully charged,  (LED display) or  (LCD display) hides.

To obtain the built-in battery maximum service life, stored indicator shall be re-charged every three months.

3 Operation

3.1 Power On / Off


When powered off

 Press **1** 1s to power on the indicator.

Indicator starts with power-on beeping, and 9 to 0 count-down display. It then performs weight detection until load is stable. Finally, the indicator Auto Zeros the scale if possible.

- ❗ If **-----** keeps showing, check if the load is in motion, the loadcell cable connection is loosen, loadcell is defective, and re-calibrate the scale if necessary.
- ❗ If the load is out of Auto Zero Range, message **error** shows 1s.


In WEIGHING mode


 Press **1** 1s to power off the indicator.


3.2 Zero

Sets the zero reading of the scale. Use the **2** key to take out small deviations in zero when scale is unloaded.

In WEIGHING mode

 Press **2** to set the scale to zero.

 shows, indicating weight is within +/-0.25d.

- ❗ If the load is unstable ( hides), or in NET mode (**NET** shows), or out of Manual Zero Range, message **error** shows 1s.


3.3 Tare

Tare is typically used to zero out a known weight such as a packing container or pallet and display the load in NET mode.


Tare will reduce the apparent overload range of scale. For example, tare in a 20kg container on a 100kg scale, the scale will overload at a new net weight of 80kg (100-20) plus 9.0d.

3.3.1 Tare In

In GROSS mode


 Press **3** to tare in the weight.

NET shows, indicating weight is in NET mode.

- ❗ If the load is unstable ( hides), or negative, or within zero (+/-0.25d), or out of full scale, message **error** shows 1s.


3.3.2 Tare Out

In NET mode

 Press **3** to tare out the weight.

NET hides, indicating weight is in GROSS mode.

3.3.3 Tare View**In NET mode**


 Press **3** 1s to view the stored tare weight in 5s.

3.4 Total



For accumulation of multiple weighments, the indicator's accumulator always uses the displayed weight, so GROSS and NET readings are added into the same memory.

It requires that the weight on the scale falls below +5.0d before the next weighment can be totaled. This assures that a weight on the scale is only totaled to the accumulator once.

3.4.1 Manual Total**In WEIGHING mode**


 Press **4** to total current weight.

Message **total** shows, indicating weight is totaled.

 If the load is unstable ( hides), or negative, or less than +5.0d, or out of full scale, or hasn't returned +5.0d before, message **error** shows 1s.


3.4.2 View Total**In WEIGHING mode**

 Press **4** 1s to enter VIEW TOTAL mode.


 shows, indicating indicator is in VIEW TOTAL mode.

In VIEW TOTAL mode

 Press **4** 1s to exit from VIEW TOTAL mode.

 hides, indicating indicator is in WEIGHING mode.

3.4.3 Clear Total**In VIEW TOTAL mode**


 Press **6** 1s to clear the total.

Message **clear** shows, indicating the accumulator is cleared and empty.


3.5 Hold**3.5.1 Weight Hold**

Hold function is used to pause display refreshing when weight reading is changing or weight is

unloaded.

 In HOLD mode, the indicator still calculates actual weight in background, therefore, all functions like set-point capturing, serial port output, etc., still work normally.

In WEIGHING mode

 Press **5** to lock the weight reading.

 shows.

In HOLD mode

 Press **5** to unlock the weight reading.

 hides.

3.5.2 Peak Hold


Peak Hold is used to monitor and capture peak weight. Different from Hold, Peak Hold only locks the maximum weight reading. If new weight comes and is greater than current locked weight, display refreshes to the new weight reading.

In WEIGHING mode

 Press **5** 1s to enter PEAK HOLD mode.


 shows.

In PEAK HOLD mode

 Press **5** 1s to exit from PEAK HOLD mode.

 hides.

3.6 User-defined Function

 By default, Sleep function is assigned to the User-defined Key **6**. For details about the User-defined Key, refer to **f** in **config** menu.


3.6.1 Sleep

Sleep function switches indicator to SLEEP mode immediately.

 Press **6** to set indicator to SLEEP mode.

3.6.2 Delay Hold (Animal Weighing)

In certain application, the loads (animal, etc) keep in motion on the scale. Delay Hold samples and calculates the average weight within 5s.

 Press **6** to Delay Hold.

3.6.3 Extended Resolution View

Usually used in testing or calibration, Extended Resolution View enables user to read weight in 10 times high division for 5s. After 5s, display interval resumes normal.

 Press **6** to start Extended Resolution View.

3.6.4 Conversion Code View

Usually used in linearity testing, Conversion Code View enables user to read indicator's internal ADC conversion code for 5s. After 5s, display resumes normal.

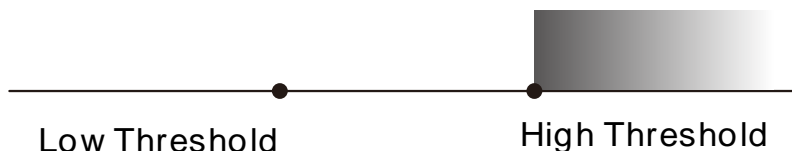
 Press **6** to start Conversion Code View.

3.7 Set-point

The indicator comes with 1 software setpoint, which can fill a variety of applications in control, batching, safety and informational warnings. When net weight meets configured triggering condition, the indicator responds with annunciator indication and beeping alarm.


There are 4 types of setpoint triggering conditions:

1) **hi**: triggered if weight is greater than high threshold, **Hi** or  shows.



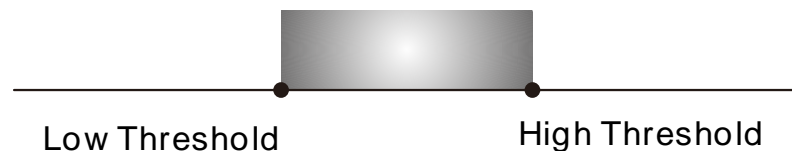
2) **lo**: triggered if weight is less than low threshold, **Lo** or  shows.



3) **lohi**: triggered if 1) or 2) satisfied, **Hi** or  and **Lo** or  shows.




4) **ok**: triggered if weight is in between high and low threshold, **Ok** or  shows.




When setpoint triggered, indicator can be configured to:

- **dis**: no response (setpoint function disabled),
- **nobp**: no beeping (only annunciator indication),
- annunciator indication and beeping alarm.

4 Calibration


 Display resolution **d** and capacity **c** shall be set in **config** menu.

4.1 Calibration Operation




 It is NOT recommended to do the calibration unless you are authorized from your local representative and with accurate test weight system of adequate capacity.

Step 1. Enable Calibration (optional)

As OIML and other Legal-for-Trade standards required, before calibration, the seal must be opened, and the calibration switch must be set to ON (button depressed), so as to enter calibration procedure.



 Before Calibration, the Calibration Switch must be set to ON, otherwise message **caloff** shows 1s.

Step 2. Enter Calibration

-  Press **6** 1s to enter Configuration menu, **config** shows.
-  Press **2** or **3** to scroll from Configuration to Calibration menu, **cal** shows.
-  Press **6** to enter Calibration.





Step 3. Zero Calibration

When **load0** shows, remove load from the scale's load receptor, make the scale empty (without any load).

-  Press **6** to view the internal conversion code.
Wait until the internal conversion code is settled.
-  Press **6** to save zero.

Step 4. Weight Calibration

When **load1** shows, apply the test weight on the scale's load receptor.

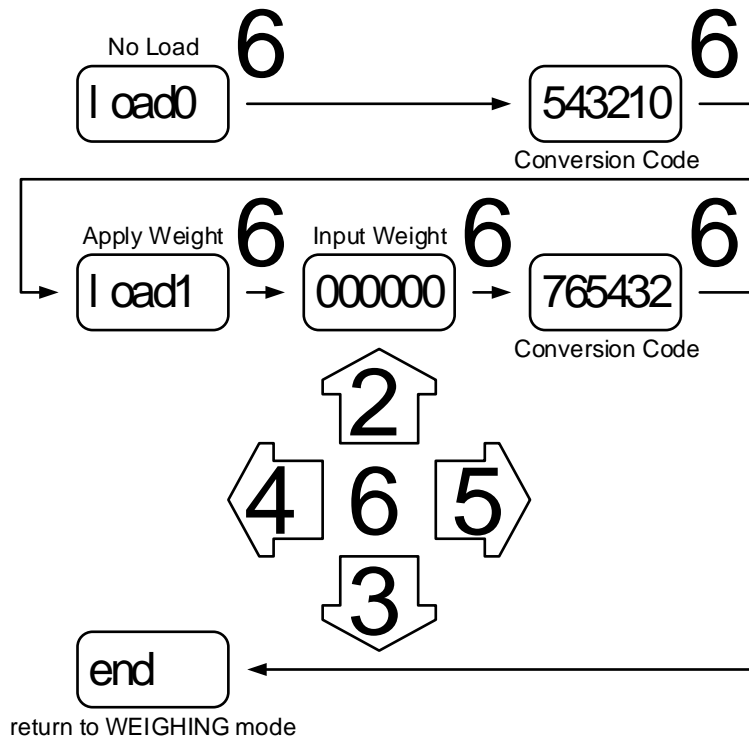
-  Press **6** to enter USER INPUT mode.
-  Press **2345** to input weight value, press **6** 1s to input/cancel decimal point if needed.
-  Press **6** to confirm and view the internal conversion code.
Wait until the internal conversion code is settled.
-  Press **6** to save weight, finish Calibration, and return to WEIGHING mode.

Step 5. Disable Calibration (optional)

As OIML and other Legal-for-Trade standards required, after calibration, the calibration switch must be set to OFF (button released).

 After Calibration, the Calibration Switch must be set back to OFF, otherwise message **cal on** keeps showing.

4.2 Calibration Flowchart

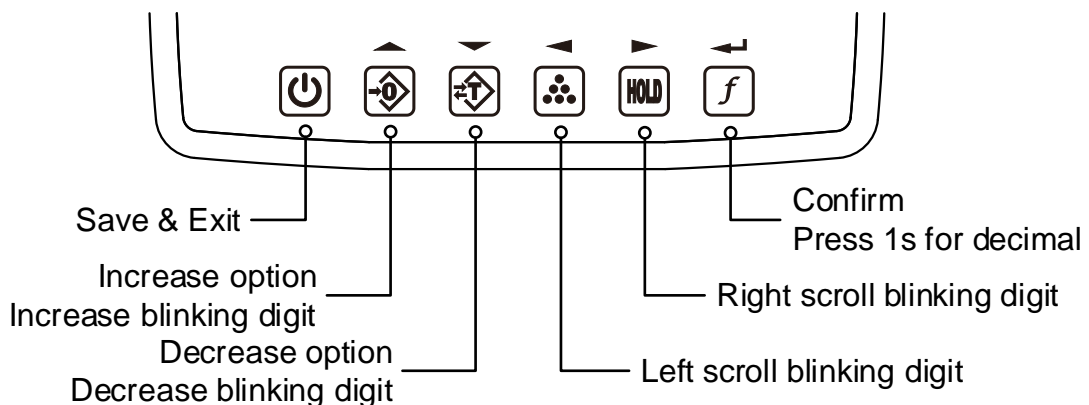


5 Configuration

5.1 Menu Navigation

In WEIGHING mode

- 👉 Press **6** 1s to enter Configuration menu, **config** shows.
- 👉 Press **6** to enter next parameter.
- 👉 If option is selectable, press **2** / **3** to scroll up / down blinking value.
- 👉 If option is user input, press **2** / **3** to increase / decrease blinking digit, press **4** / **5** to right / left move blinking digit. Press **6** 1s to input / cancel decimal point.
- 👉 Press **1** to save and exit from Configuration immediately.



5.2 Parameter Overview

	Name	Unit	Options
off	Auto- OFF Timing	min.	dis, 3, 5, 10, 15, 30, 60
slp	S Le P Timing	sec.	dis, 3, 5, 10, 15, 30, 60
lu	Display L Uminance	level	1, 2, 3
f	User-defined F unction		dis, sleep: enter SLEEP mode, ext d: Extended Resolution View, d hd: Delay Hold (Animal Hold), code: Conversion Code View
d	D isplay Resolution)001,)002,)005,)01,)02,)05,)1,)2,)5, 1, 2, 5
c	Maximum C apacity		User Input
az	A uto- Z ero Range	%F.S.	0, 2, 3, 4, 10, 20, 50, 100
mz	M anual- Z ero Range	%F.S.	0, 2, 3, 4, 10, 20, 50, 100
zr	Z ero-tracking R ange	d)1,)2,)3,)4,)5,)75, 1, !25, !5, !75, 2, @5, 3, #5, 4, 5
zs	Z ero-tracking S peed	sec.	dis,)5, 1, 2
flt	F i L Ter	level	0, 1, 2, 3, 4, 5, 6, 7
st	S t a ble-checking T iming	sec.)5, 1, !5, 2, 3, 5
sr	S t a ble-checking R ange	d)1,)2,)3,)4,)5,)75, 1, !25, !5, !75, 2, @5, 3, #5, 4, 5
sp	S et- P oint		dis, nobp: no beeping, lo: less than low threshold, ok: in between low and high threshold, hi: greater than high threshold, lohi: less than low or greater than high
h	H igh Threshold		User Input
l	L ow Threshold		User Input
ot	Serial O u T put		dis, cont: output continuously, req: output upon request
b	B audrate	bps	1200, 2400, 4800, 9600
da	Output D Ata		gros: output gross weight, net: output net weight, tare: output tare weight

6 Communication

This indicator is equipped with a standard full duplex RS-232 (optional) and RS-485 (optional) serial communication port, intended for interfacing extended printer, scoreboard and computer, etc. Communication state, baudrate and output data type can be configured in Configuration menu.

6.1 Communication Format

The indicator outputs data in the format 8N1, which is 1-bit start flag, 8-bit data, 1-bit stop flag, and no checking bit.

6.2 Communication Protocol

The indicator outputs data in frames. One frame is consisted of 14 bytes.

1	2	3	4	5	6	7	8	9	10	11	12	13	14
>	S	G	X	X	X	X	X	X	X	k	g	CR	LF

The 1st byte is always fixed to ASCII code 0x3E (>).

The 2nd byte indicates the weight state.

- ‘S’: stable
- ‘U’: unstable
- ‘V’: overloading

The 3rd byte indicates the weight data type.

- ‘G’: gross weight
- ‘N’: net weight
- ‘T’: tare weight

From 4th to 10th bytes are the weight value.

The 11th and 12th bytes indicates measurement unit.

- ‘k”g’: kilo gram
- ‘l”b’: pound

The 13th byte is fixed to ASCII code 0x0D, carriage return (CR).

The 14th byte is fixed to ASCII code 0x0A, line feed (LF).

6.2.1 Continuous Mode

If the output mode **ot** in Configuration is set to continuous **cont**, indicator outputs data frame by frame.

6.2.2 Request Mode

If the output mode **ot** in Configuration is set to request **req**, indicator outputs one frame of data right after ASCII code ‘r’ (0x72) or ‘R’ (0x52) is received.

7 Appendix

7.1 Message

-----	power-up weight detection
over	scale is overloading
-	blinking in Sleep mode (LED display)
caloff	before Calibration, the Calibration Switch must be set to ON state
cal on	after Calibration, the Calibration Switch must be set to OFF state
error	invalid operation
end	save and exit from Configuration or Calibration
off	indicator is powering off
total	weighing data is stored in memory
clear	all weighing data cleared
load0	in Calibration, keep the scale no load
load1	in Calibration, apply the test weight on scale

7.2 ASCII Character Chart

Display	0	1	2	3	4	5	6	7	8	9
Character	0	1	2	3	4	5	6	7	8	9
ASCII (Hex)	0x30	0x31	0x32	0x33	0x34	0x35	0x36	0x37	0x38	0x39
Display	a	b	c	d	e	f	g	h	i	j
Character	A	B	C	D	E	F	G	H	I	J
ASCII (Hex)	0x41	0x42	0x43	0x44	0x45	0x46	0x47	0x48	0x49	0x4A
Display	k	l	m	n	o	p	q	r	s	t
Character	K	L	M	N	O	P	Q	R	S	T
ASCII (Hex)	0x4B	0x4C	0x4D	0x4E	0x4F	0x50	0x51	0x52	0x53	0x54
Display	u	v	w	x	y	z				
Character	U	V	W	X	Y	Z				
ASCII (Hex)	0x55	0x56	0x57	0x58	0x59	0x5A				

7.3 Troubleshooting

Simple problems can be resolved as below listed solutions. If problems still exist, please contact your local representative for help.

Symptom	Possible Cause	Suggested Solution
not power-on after 1 pressed	discharged or defective battery	charge battery
	power switch is set to OFF	set power switch to ON
	defective 1 key	press harder and keep pressing for 1s
	defective mainboard	contact representative
no action taken after key pressed	indicator is disturbed	re-boot indicator
	defective key	contact representative
weight reading is not stable	load in motion	wait or keep load stable
	weak filter setting	increase filter level
	damped loadcell or mainboard	dry loadcell or mainboard
	defective mainboard	contact representative
weight reading is not zero when no load	loadcell stressed too long	unload scale in storage
	loadcell zero drifts	contact representative
large error in weight reading	scale not zeroed before loading	zero scale before loading
	improper measurement unit	switch to correct unit
	calibration required	re-calibrate the scale
	defective loadcell or mainboard	contact representative
battery can not be charged	defective mainboard	contact representative
	defective battery	contact representative

7.4 Note
