

# **Digital Weighing Indicator XK3190-A12(E)**

## **User Manual**

2008.10 0C Version

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# XK3190—A12 (E)

**DEAR CUSTOMERS, PLEASE READ THE USER GUIDE CAREFULLY BEFORE USING THE INDICATOR!**

## Chapter 1 Main Specifications

### 1.1 TECHNICAL PARAMETERS OF INDICATOR

Indicator	Model name	XK3190 - A12 XK3190 - A12E
	Indicator type	① Self-indicating instrument ② Non-automatic weighing indicator ③ Software-embedded indicator
	Application	Platform scales ● Commercial weighing and industrial weighing ● Instrument for not direct sales to the public
Metrological parameters	Accuracy Class	Class III
	Value of the fractional error ( $p_i$ )	0.5
	Maximum number of verification scale intervals ( $n_{ind}$ )	3000
	Operating temperature range	0℃ ~ 40℃
	Initial zero-setting range	±10% Max
	Semi-automatic zero-setting range	±2% Max
	Zero-tracking range	±2% Max
	Subtractive tare T-	Max
	Scale divisions	1/2/5/10/20/50 optional
	Relative humidity	≤85%RH
	Storage and transportation temperature	-25 ~ 55℃
Power supply	AC	230V / 50Hz
	Battery	DC 6V/2.8Ah
	Load cell excitation voltage ( $U_{exc}$ )	DC 5V
Minimum signal voltage for dead load	0mV	

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	Maximum signal voltage for dead load	14mV
	Minimum input-voltage per verification scale interval ( $\Delta U_{min}$ )	2 $\mu$ V
	Measuring range minimum voltage ( $U_{MRmin}$ )	6mV
	Measuring range maximum voltage ( $U_{MRmax}$ )	20mV
	Minimum load cell impedance ( $R_{Lmin}$ )	87 $\Omega$
	Maximum load cell impedance ( $R_{Lmax}$ )	350 $\Omega$
	Sense system	Six wires with compensation
	A/D sample rate	10 times/s
	Display	A12: 6 bits LCD , 7 state indicating signals ( ▼ ) A12E: 6 bits LED , 8 state indicating lights ( LED lights )
		In the following chapter, indicating signal and indicating light will not be distinguished, both will be called indicating signal ( ▼ ) to indicate the position
Structure	Housing	Anti flaming plastic housing
	Specifications	248mm*140mm*156mm
	Weight	2.2kg
Load cell interface	Six wires, connect 1-4 pieces 350 $\Omega$ load cells	
	Six-core shielded cable Material : Copper Max length : 100m/0.5mm <sup>2</sup> When the cable is longer than 3m, it's strongly advised to add a magnetic loop (optional component) on the RS232 interface of the indicator to enhance the anti-interference ability	

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Serial communication interfaces	<p>RS232C:</p> <p>①Unidirectional communication. Only the indicator can transfer the data to computer, the computer can not control the indicator.</p> <p>②Baud rate: 1200/2400/4800/9600 optional.</p> <p>③Data for RS232 communication is in ASCII code as below:</p> <p>The 1st bit is starting bit, the 10th bit is stopping bit, and the middle 8 bits are data bits. Even check.</p> <p>④Transmission distance&lt;10m</p>
	<p>Cable specifications:</p> <p>2-core shielded cable</p> <p>Material : Copper</p> <p>Max length : 10m</p> <p>When the cable is longer than 3m, it's strongly advised to add a magnetic loop (optional component) on the RS232 interface of the indicator to enhance the anti-interference ability</p>
	<p>Software:</p> <p>Third party softwares are optional, such as: COMPort, Debugger...etc</p>
	<p>Software environment:</p> <p>Windows 2000 , Windows XP</p>

## 1.2 INTRODUCTION OF INDICATOR

XK3190-A12(E) weighing indicator is non-automatic weighing indicator applied to platform scale. It can be connected to electric platform scale, electric floor scale, and can be connected 1-4 350 ohm load cells. It is mainly applied to enterprise with factory, wholesale market, bus station, port, mine, warehouse etc, all kinds of weighing occasions.

The indicator is composed of anti flaming ABS plastic housing, PCB, LED/LCD indicator, keypad, power transformer and AC power plug, fuse, load cell socket, RS232 interface, 6V/4AH rechargeable battery. A/D conversion adopts  $\Delta-\Sigma$  conversion technology, and STC MCU with excellent stability and anti interference ability.

A12(LCD) has three types of backlight user mode: still closed, still open and automatic. Under automatic mode, backlight will be off automatically after the indicating weight is stable for few seconds. When the weight changes, the backlight will be on automatically. It has automatic power off function.

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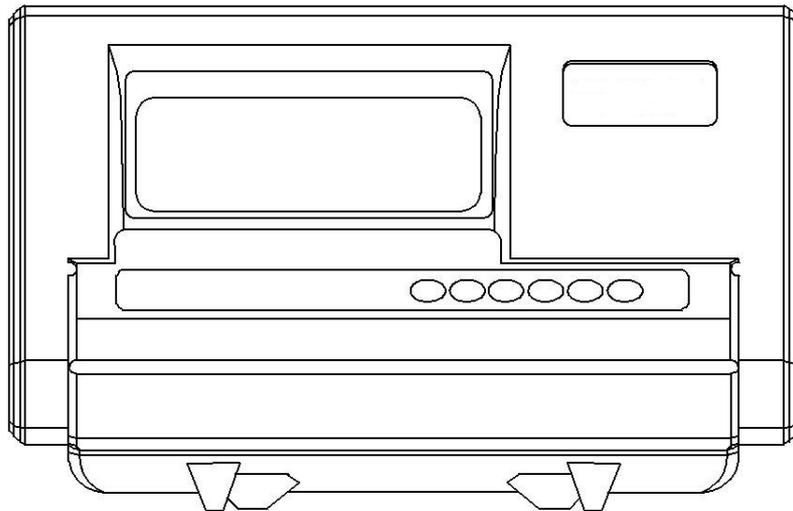
Indicator will turn off automatically to save electricity consumption after no operations for a while. When the voltage of built in battery decreases to a certain value, indicator will alert and remind user to recharge in time.

A12(LED) has electricity saving function for the indication. After the weight is stable for a few seconds, it will indicate a record segment; When there is weight changes, indicator will turn on automatically and display the weight. When the voltage of built in battery decreases to a certain value, indicator will alert and remind user to recharge in time.

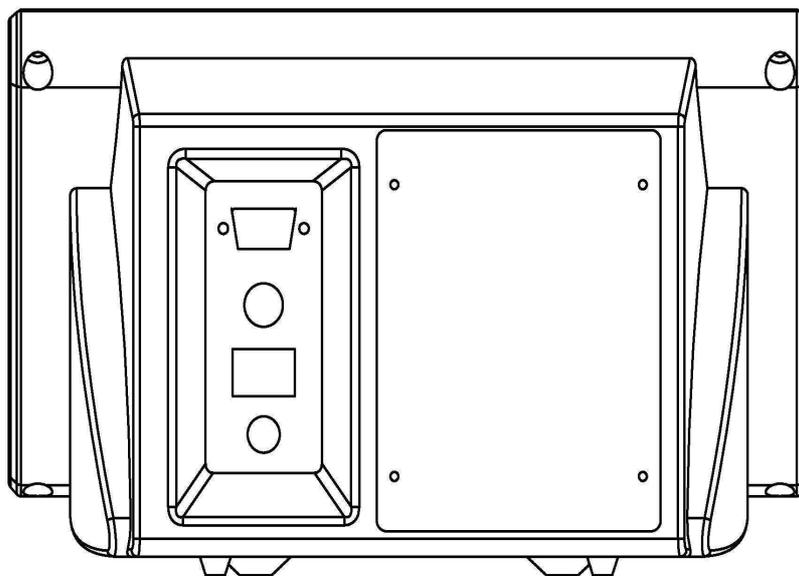
XK3190-A12(E) indicator has the calibration protection and software tamper-proof function. There is calibration switch on the hardware and is protected with lead seal. Only when you open the lead seal and softly touch the calibration switch, the data will be saved. Otherwise, after the restart-up, the calibration data will recovery to previously saved one. There is software version, software verifying code, calibration counter and parameter verifying code for legal metrology. This is for relevant metrology bureau to test and control.

## CHAPTER 2 INSTALLATION

### 2.1 FRONT AND BACK VIEW OF THE INDICATOR



# XK3190—A12 (E)



( 2-1 ) Housing

## 2.2 KEY FUNCTIONS

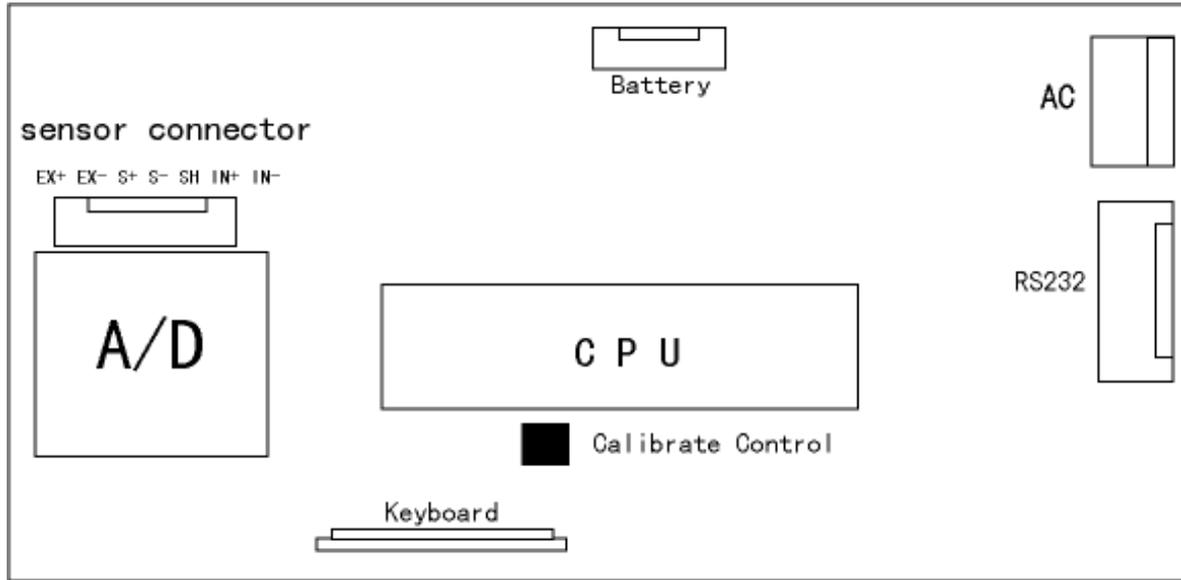
Key	Function
<b>【 # 】</b>	When turning on the indicator, keep pressing this key to enter the calibration mode When calibration, press this key to switch from parameters
<b>【Func】</b>	At weighing mode, press this key to start counting; and keep pressing this key for more than 5 seconds to enter the user parameters setting mode
A12 : <b>【Accum】</b> A12E : <b>【 * 】</b>	At weighing mode, press this key to accumulate the weight At counting mode, press this key for sample taking At user parameters setting mode, press this key to switch from parameters
<b>【 Tare 】</b>	At weighing mode, press this key to tare At user parameters setting mode, press this key to change the parameter's value
<b>【 Zero 】</b>	At weighing mode, press this key to zero When calibration, press this key to change the parameter's value

# XK3190—A12 (E)

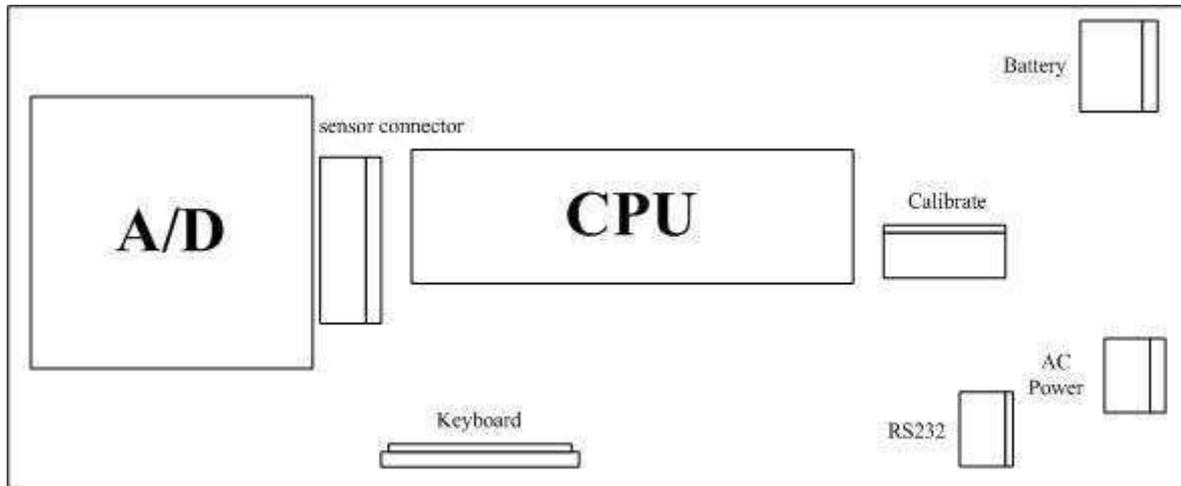
<b>【ON/OFF】</b>	Power on/off <b>Note: A12E has no such button, on and off controlled by switch at the back</b>
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## 2.3 CONNECTION OF THE INDICATOR

### 2.3.1 The definition of the connectors on the PCB

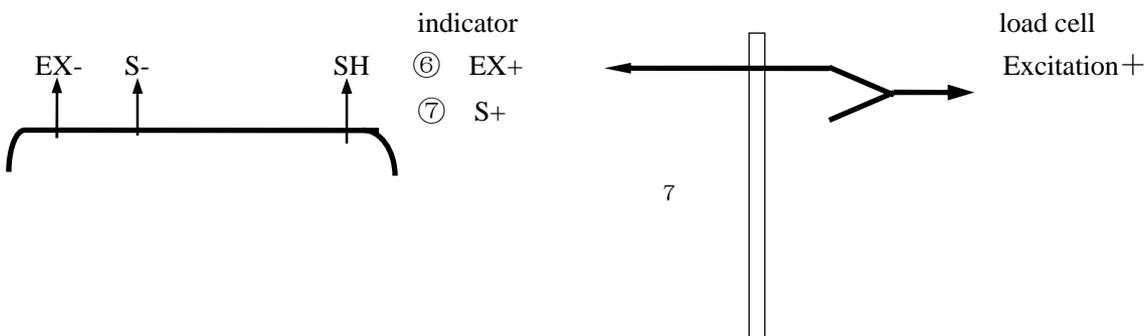


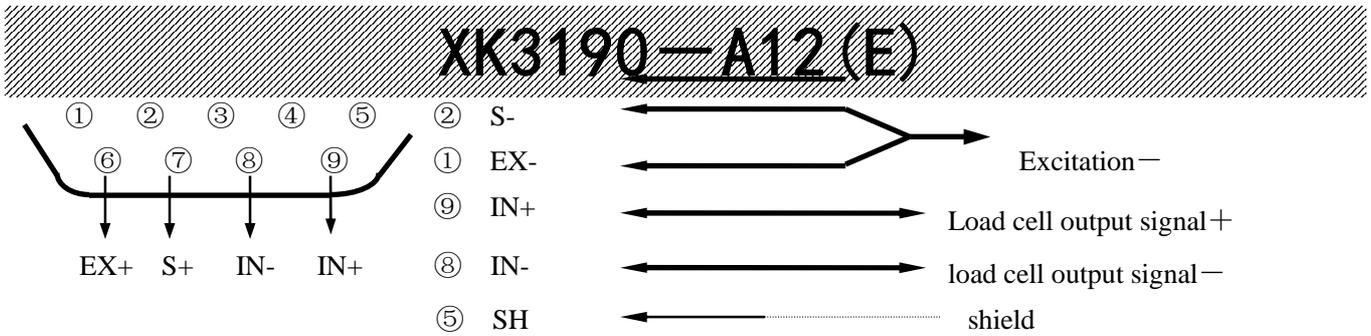
(2-2) A12 main board connecting figure



(2-3) A12E main board connecting figure

### 2.3.2 Load cell connection





(2-4) Load cell connection

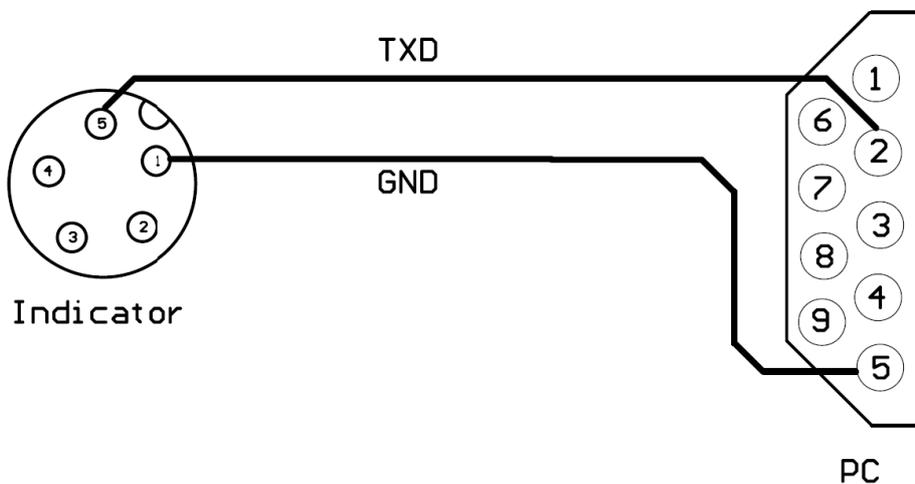
**Please use 6-core shielded cable to connect the load cell.**

**If uses 4-core cable, please short “EX+” and “S+”, “EX-” and “S-”. If the cable is longer than 3m, it’s strongly advised to add a magnetic loop (optional component) on the RS232 interface of the indicator to enhance the anti-interference ability.**

- ▲. Indicator must be reliably connected to load cell, and the shielded-cable of load cell must be reliably connected to underground
- ▲. To protect the indicator and load cell, we cannot plug or withdraw the connector when the indicator is power on.
- ▲. Both the load cell and indicator are static sensitive devices. You must adopt anti-static measures. The electric welding operation and other strong electric operation on the scale platform are strictly prohibited. In order to protect the operator, indicator, and relevant devices, you should install lightning rod in the thunderstorm frequently happen area

### 2.3.3 RS232 connection

Please use 2-core shielded cable. If the transmission distance is longer than 3 meter, it’s strongly advised to add a magnetic loop (optional component) on the RS232 interface of the indicator to ensure the reliability of the data transmission.



( 2-5 ) RS232 connection

## Chapter 3 Operation

### 3.1 POWER ON AND AUTO ZERO

3.1.1 After turning on the switch on the back housing, keep pressing **[ON/OFF]** key to turn on the indicator.

3.1.2 The indicator displays all sections, and all the indication signs first, then the display is as follow

- (1) Model name: **【 - A 1 2 - 】**
- (2) Version of the software: such as **【V 1.01】**
- (3) Sections check: 111111-999999

If press **[Func]** before the indicator displaying the version of software, the indicator will display as below

- (1) Model name: **【 - A 1 2 - 】**
- (2) Version of the software: such as **【V 1.01】**
- (3) Calibration times of the indicator: such as **【n 10】**
- (4) Verification code of metrology parameters: such as **【C 1A5D】**
- (5) Verification code of the software : such as **【F 2B6C】**
- (6) Sections check: 111111-999999

3.1.3 When power on, if the scale deviates from the zero point, but it's still within auto zero range ( $\pm 10\%$ Max), the indicator will zero automatically; if it is out of auto zero range, the indicator will display **【Err 3】** as warning, then show the weight.

**Please warm the indicator up for 20 minutes before using to ensure the best performance**

### 3.2 SEMI-AUTOMATIC ZERO-SETTING

3.2.1 At weighing mode, if there is any tolerance when unloaded, and the tolerance is within the semi-automatic zero-setting range, press **[Zero]** to zero the scale.

If the tolerance is beyond the semi-automatic zero-setting range, the **[Zero]** key is invalid( **【Err 7】** ), and you need to recalibrate the scale.

3.2.2 Only when the stable indication sign is on, zero operation is valid.

### 3.3 TARE

At weighing mode, when displaying stable positive weight, and the weight is no more than F.S. , press the **[Tare]** key to deduct the weight as tare. The indicator displays net weight as "0", and the "Net" indication sign is on. When the displaying weight is negative or zero, pressing **[Tare]** key can clear the saved tare weight, and get back to gross weight displaying mode. The "Net" indication sign will be off.

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## 3.4 COUNTING

At weighing mode, press **[Func]** to enter the counting mode. Indicator displays “count”, and we can load the scale. When stable indication sign is on, press **[\*]** key, indicator displays “C00000”, then press **[Tare]** to move the small indication triangle directedly, the number corresponded with the small triangle means the sample quantity, and this number will increase by one when press **[Zero]** key. After inputting the sample quantity, press **[\*]** key to start the counting. The counting indication sign will be on.

At counting mode, press **[Func]** key to return to weighing mode.

### Note:

When “count” is displayed after we pressing **[Func]** key at the weighing mode, press **[\*]** twice to enter counting mode directly. Indicator will count according to last time sampling result.

In this process, if the **[Err 4]** appears, it means sampling failed, the indicator will keep the result of last sampling.

## 3.5 ACCUMULATING

At weighing mode, when the displaying value is positive and stable, press **[\*]** key to accumulate the present weight. Press **[\*]** key again, it gets back to weighing mode. The next accumulating operation must be performed after the weight return to zero. When the scale displaying zero, press **[\*]** to display the accumulated weight.

At accumulating mode, press **[Func]** key to clear the accumulated weight in Memory.

## 3.6 USER FUNCTIONS SETTING

At weighing mode, keeping pressing **[Func]** for more than 5 seconds, it enters user functions setting mode (mode P). There are 9 parameters. Press **[\*]** to change the parameter, and press **[Tare]** to change the value. After setting the parameters, press **[Func]** to save.

**Note:** The parameters P6, P7, P8, and P9 are metrological related. We need to press the calibration switch on the back housing to save the settings.

Parameters are as below:

1、 P1	x	Automatically power off	(Default setting:1)
	X=1:	Close this function	
	X=2:	Auto power off 10 minutes after last operation	
	X=3 :	Auto power off 20 minutes after last operation	
	X=4 :	Auto power off 30 minutes after last operation	
2、 P2	x	Baud rate setting	(Default setting:4)
	X=1:	9600	
	X=2:	4800	
	X=3:	2400	
	X=4:	1200	
3、 P3	x	RS232 output content	(Default setting:1)

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	X=1:	Net weight output	
	X=2:	Gross weight output	
4、 P4	x	RS232 output mode	(Default setting:1)
	X=1:	No transmission (RS232 stop)	
	X=2:	Continuous transmission	
	X=3:	Continuous transmission only when stable	
5、 P5	x	Backlight mode	(Default setting:2)
	X=1:	No backlight	
	X=2:	Automatic backlight	
	X=3:	Constant backlight	
6、 P6	x	Zero-tracking range	(Default setting:1)
	X=1:	0.5e	
	X=2:	No zero tracking	
7、 P7	x	Digital filtering intensity	(Default setting:2)
	X=1:	High	
	X=2:	Medium	
	X=3:	Low	
8、 P8	x	Stabling speed	(Default setting:2)
	X=1:	Fast	
	X=2:	Medium	
	X=3:	Slow	
9、 P9	x	Stable range	(Default setting:2)
	X=1:	Wide	
	X=2:	Medium	
	X=3:	Narrow	

## 3.7 SERIAL COMMUNICATION (RS232)

- Make sure that communication interfaces are correctly connected. If there is anything wrong with the connection, damage may happen to output port of the indicator, input port of the computer, and even other peripherals may get involved.
- Necessary computer technology and programming skills are required for computer communication, which should be participated and instructed by professionals. Non-professional staff is supposed not to be involved in this regard.
- Detailed connection instruction kindly check the 2.3.3 on page 8

Data for RS232 communication is in ASCII code. The format is as below:

The 1<sup>st</sup> bit is starting bit, the 10<sup>th</sup> bit is stopping bit, and the middle 8 bits are data bits. Even check.

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## Communication mode as follows:

(1) At normal weighing mode, every group of data consists of 15 bytes as below:

1<sup>st</sup> byte: 'W'

2<sup>nd</sup> byte: 'G' (when the weighing result is gross weight)

'N' (when the weighing result is net weight)

3<sup>rd</sup> -9<sup>th</sup> byte: Weighing result including the decimal point

When there is no decimal point, the 9<sup>th</sup> bit is blank (0x20)

When the weight is negative, the 3<sup>rd</sup> bit is the negative sign (0x2d)

10<sup>th</sup> and 11<sup>th</sup> byte: Unit k g (0x6B, 0x67)

12<sup>th</sup> byte: the 4 high bits of checksum

13<sup>th</sup> byte: the 4 low bits of checksum

14<sup>th</sup> byte: 0x0d

15<sup>th</sup> byte: 0x0a

## Note:

The checksum is from 1<sup>st</sup> byte to 11<sup>th</sup> byte

If 4 high bits or 4 low bits of checksum is  $\leq 9$ , add 30h and transmit in ASCII code.

For example, if the 4 high bits checksum is 6, then we add 30h, and transmit 36h in ASCII code "6".

If the checksum  $> 9$ , then add 37h, and transmit in ASCII code. For example, if the 4 high bits checksum is B, then we add 37h, and transmit 42h in ASCII code "B".

For example, if the weight is 4.139 Kg, the transmission format is as follow:

ASCII: W G 0 0 4 . 1 3 9 k g 3 D

Hex: 57 47 30 30 34 2E 31 33 39 6B 67 33 44 0D 0A

(2) When the scale is overloaded ( $G.W > \text{Max} + 9e$ ), the indicator will send " OL23" in 15 bytes as follow:

1<sup>st</sup> to 9<sup>th</sup> byte: Blank (0x20)

10<sup>th</sup> byte: 'O' (0x4f)

11<sup>th</sup> byte: 'L' (0x4c)

12<sup>th</sup> byte: the 4 high bits of checksum (0x32)

13<sup>th</sup> byte: the 4 low bits of checksum (0x33)

14<sup>th</sup> byte: 0x0d

15<sup>th</sup> byte: 0x0a

(3) When the weight is less than -20d, the indicator will send " L023" in 15 bytes as follow:

1<sup>st</sup> to 9<sup>th</sup> byte: Blank (0x20)

10<sup>th</sup> byte: 'L' (0x4c)

11<sup>th</sup> byte: 'O' (0x4f)

12<sup>th</sup> byte: the 4 high bits of checksum (0x32)

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13th byte: the 4 low bits of checksum (0x33)

14<sup>th</sup> byte: 0x0d

15<sup>th</sup> byte: 0x0a

## Chapter 4 Calibration

### 4.1 CALIBRATION

Connect load cell properly, then turn on the indicator, keep pressing **[#]** key while it's initializing, it will enter the calibration mode, and display **[d X ]**.

STEP	OPERATION	DISPLAY	NOTES
1	Press <b>[TARE]</b> to change the division, and press <b>[#]</b> to confirm	<b>[d X ]</b>	Division setting. For example: Press <b>[#]</b> when displayed <b>[d 5 ]</b> , then the division is set to be "5", and the indicator enters decimal point setting. Note: The 10, 20, 50 divisions are only valid when there is no decimal point. When there is a decimal point, the 10, 20, 50 divisions will be turned to 1, 2, and 5 automatically.
2	Press <b>[TARE]</b> to change the decimal point, and press <b>[#]</b> to confirm	<b>[P X ]</b>	Decimal point setting For example: Press <b>[#]</b> when displayed <b>[P 0.000 ]</b> , then the decimal point is set to be "0.000", and the indicator enters full capacity setting Note: When there is a decimal point, division 10, 20, 50 are invalid, and will be turned to 1, 2, and 5 automatically.
3	Press <b>[TARE]</b> to select the digit bit; Press <b>[ZERO]</b> to change the value; Press <b>[#]</b> for confirm the input of full capacity	<b>[FULL ]</b>	Full capacity setting For example: Press <b>[#]</b> when displayed <b>[025000 ]</b> , then the full capacity is set to be "25000", and the indicator enters zero point calibration
4	Make sure there is no load on scale, and press <b>[#]</b> when the stable indication sign is on	<b>[nOLOAD]</b>	Zero point calibration

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5	Add full capacity load, press <b>[TARE]</b> to continue	<b>[AdLOAD]</b>	Calibrate the full capacity For example: Load 25000 weight on scale(as we set in step 3)
	Press <b>[TARE]</b> to select the digit bit; Press <b>[ZERO]</b> to change the value accordingly with the full capacity; Press <b>[#]</b> to confirm when the stable indication sign is on	<b>[025000]</b>	Use <b>[TARE]</b> and <b>[ZERO]</b> to change the value to be 25000.  When stable indication sign is on, press <b>[#]</b> to confirm.
6	Press the calibration switch at the back housing of the indicator.	<b>[ End]</b>	It saves the calibration parameter and back to the weighing mode. Note: if no pressing the calibration switch, all the parameters won't be saved.

## 4.2 FAST CALIBRATION FOR ZERO POINT AND FULL CAPACITY

Connect load cell properly, then turn on the indicator, keep pressing **[ # ]** key while its initialization, it will enter into the calibration mode, and display **[d X ]**.

### 4.2.1 Fast calibration of zero point:

At any time before it showing **[noload]**, press **[FUNC]**. Indicator will keep the original division, decimal point, full capacity, and enter the zero point calibration directly. Making sure there is no load on the scale, and the stable indication sign is on, press **[ZERO]** to re-calibrate the zero point. The indicator will display **[End]**. Press the calibration switch at the back of the indicator to save the setting and get back to the weighing status.

### 4.2.2 Fast calibration of full capacity:

At any time before it showing **[AdLOAD]**, press **[\*]**. It keeps the original division, decimal point, full capacity, zero point, and enters into the full capacity calibration directly. After the full capacity is reset, press the calibration switch at the back of the indicator to save the setting and get back to the weighing status.

## Chapter 5 Maintenance

5.1 To ensure the clarity and service life of the indicator, it must be kept away from direct sunlight during using, and the ground where the indicator stands must be smooth.

5.2 It is improper to use this indicator in a dusty or vibrant or damp environment.

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- 5.3 The load cell and indicator need good connection. System must have a good ground connection, and kept away from strong electric field, strong magnetic field. The load cell and indicator must be kept away from strong corrosive substances and inflammable& explosive materials.
- ▲ ! Do not use it where inflammable gases or steams exist. Don't use it for canning system of compressive container.
  - ▲ ! In the area where lightning and thunder happen frequently, reliable lightning arrester should be installed to ensure the personal safety and to prevent any damage to the indicator and relative equipment caused by lightning stroke.
  - ▲ ! The load cell and indicator are both static sensitive equipments, so anti-static measures must be taken during the use. It is strictly invalid to carry out welding operation or other operations with high current on the weighing platform. In the stormy season, lightening prevention measures must be taken reliably to prevent any damage to load cell and indicator caused by lightening stroke, and to guarantee the personal security of operators and safe running of weighing devices and relative equipments.
- 5.4 Strong solvents such as benzyl and nitro oils are forbidden for cleaning the housing
- 5.5 Don't inject any liquid or other conductive particles so as to avoid any damage of indicator and electric shock
- 5.6 Before plugging in or out of the connecting line between indicator and external equipment, the power of both indicator and equipment should be cut off
- 5.7 Advice of the company: our company is responsible for the indicator quality, but not responsible for the problems of the system where the indicator locates. Your attention is required when making purchase.
- 5.8 Please use the indicator outward interfaces strictly as per the operating instruction manual. Do not change the connection at random. If failure occurs in the using process, draw the plug immediately, and send it for professional factory for reparation. Non professional balance manufacturers are not supposed to do the repairing to avoid any worse damage. It is not allowed to open the indicator at will, or else, repairing will be refused.
- 5.9 If non artificial defects and failures happen after normal use within one year after the sale date, the users can mail the product and guarantee repair card ( with correct code) to the appointed reparation station or supplier. The manufacturer guarantees the life-time maintenance for the indicator.

## **Chapter 6 Error Indication**

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<b>ERR 1</b>	The AD value is too small when calibrating the full capacity Please change proper capacity load cell
<b>ERR 2</b>	The zero point is out of range when calibrating the zero point Please make sure no load is on the scale
<b>ERR 3</b>	The zero point is out of range when turning on Please make sure no load is on the scale when turning on
<b>ERR 4</b>	The input sample quantity is zero when sampling in counting mode Please input the right sample quantity
<b>ERR 5</b>	When full capacity calibrating, the weight input is zero Please input the weight in accordance with the load on scale
<b>ERR 6</b>	The unit weight is less than 0.25e when sampling in counting mode Please re-input the sample quantity
<b>ERR 7</b>	The weight is beyond the semi-automatic zero-setting range, the <b>[Zero]</b> key is invalid.
<b>ERR 8</b>	Overflow of the accumulated weight Please clear the accumulated weight
<b>bAt-lo</b>	Low power
<b>Lo</b>	The G.W. is less than -20e
<b>oL</b>	Overload, or load cell malfunction Please recalibrate the F.S., and check the connection of load cell