

SI-01 Indicator User Manual

Version June. 2020

- Please read this manual carefully before using
- Please keep this manual properly for reference

Keli Sensing Technology (Ningbo) Co., Ltd.

Precautions for use

- ▲ Connection between digital load cell and indicator must be reliable, load cell shield wire must be grounded.◦
- ▲ all cable does not allow plug / unplug when indicator is connecting to power supply, to protect indicator or load cell from electrostatic.◦
- ▲ Load cell and indicator are sensitive to static electricity, so the necessary measures must be carried out when using.◦
- ▲ During the thunderstorm season, The system must be with reliable lightning protection measures to prevent damage to load cell and indicator due to lightning strikes.
Ensure the personal safety of operators and the safe operation of weighing equipment and related equipment.◦
- ▲ Limited using for flammable gas, or flammable vapor areas, or tank system with pressure.◦
- ▲ Keep indicator and load cell away from strong electric magnetic field, corrosive substances and explosive materials.◦
- ▲ Do not sue strong solvents(such as: benzene, nitro-class oil) to clean the cover.◦
- ▲ Do not inject liquid or other conductive particles into indicator.◦
- ▲ Without technical supervision department's promise, no one can open the seals, or calibrate..◦

- ☆ The battery is a consumable item, not within the scope of guarantees.◦
- ☆ In order to extend the service life of the battery, it must be fully charged before use.◦
- ☆ If you do not use it for a long time, you must charge it every 2 months, around 20 hours per charge.◦
- ☆ Be careful to handle or install to avoid strong vibration, impact, and prevent short circuit of the internal electrode of the battery, to avoid damage to battery.◦

- ◆ To ensure Indicator display clearly, and work longer, do not use it under direct sunlight, and put it stable.◦
- ◆ Indicator should be away from dust, vibration, wet environment.
- ◆ Before plugging/unplugging, pls cut off indicator or other equipments' power.◦
- ◆ connecting each connector as the manual book.◦
- ◆ Indicator is forbidden to be disassembled randomly, or else any warranty is failed. Avoiding any further damage, non-professional people is forbidden to repair
- ◆ Within one year from the date of sale, under normal use environment, non-human faults are within the scope of warranty. Please send the product and invoice copy (number matching corresponding indicator) to the assigned maintenance point or dealer for professional maintenance.◦
- ◆ If the warranty period is expired and human faults or other accidental damages occur, the manufacturer will charge user for repairs.
Due to product function improvements, the printed manual may be slightly different from the actual product, please contact the company for the latest electronic version

Thanks for using SI-01.

Before operate indicator SI-01, please read this manual carefully



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Only keli has corresponding right to improve and modify manual

1.0 Brief

SI-01 SI-01 series instruments adopt high-strength anti-interference single-chip microprocessor, to be with high-precision $\Delta-\Sigma$ A / D conversion technology, to be equipped with ports of RS232, RS485, Ethernet, large screen, relay output, TFT screen, interactive information is intuitive, and can work with platform scales, weighbridges and other static detection systems.

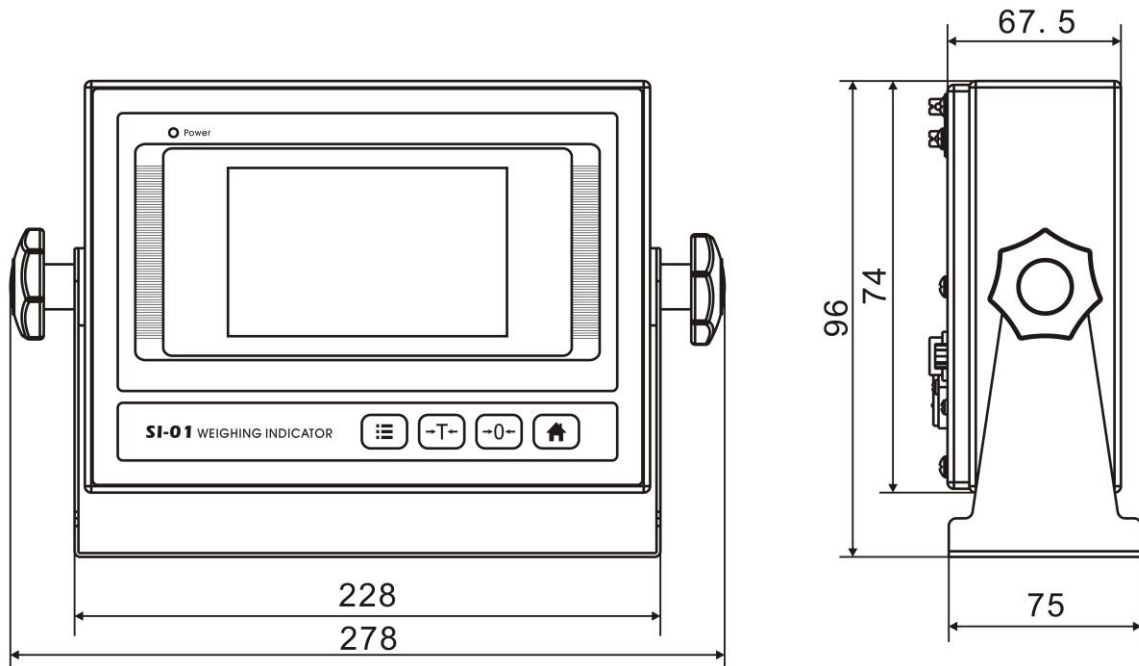
main function: Accumulation, upper and lower limits, average value, animal scale, RS232, RS485, Ethernet communication, large screen.

Main parameters:

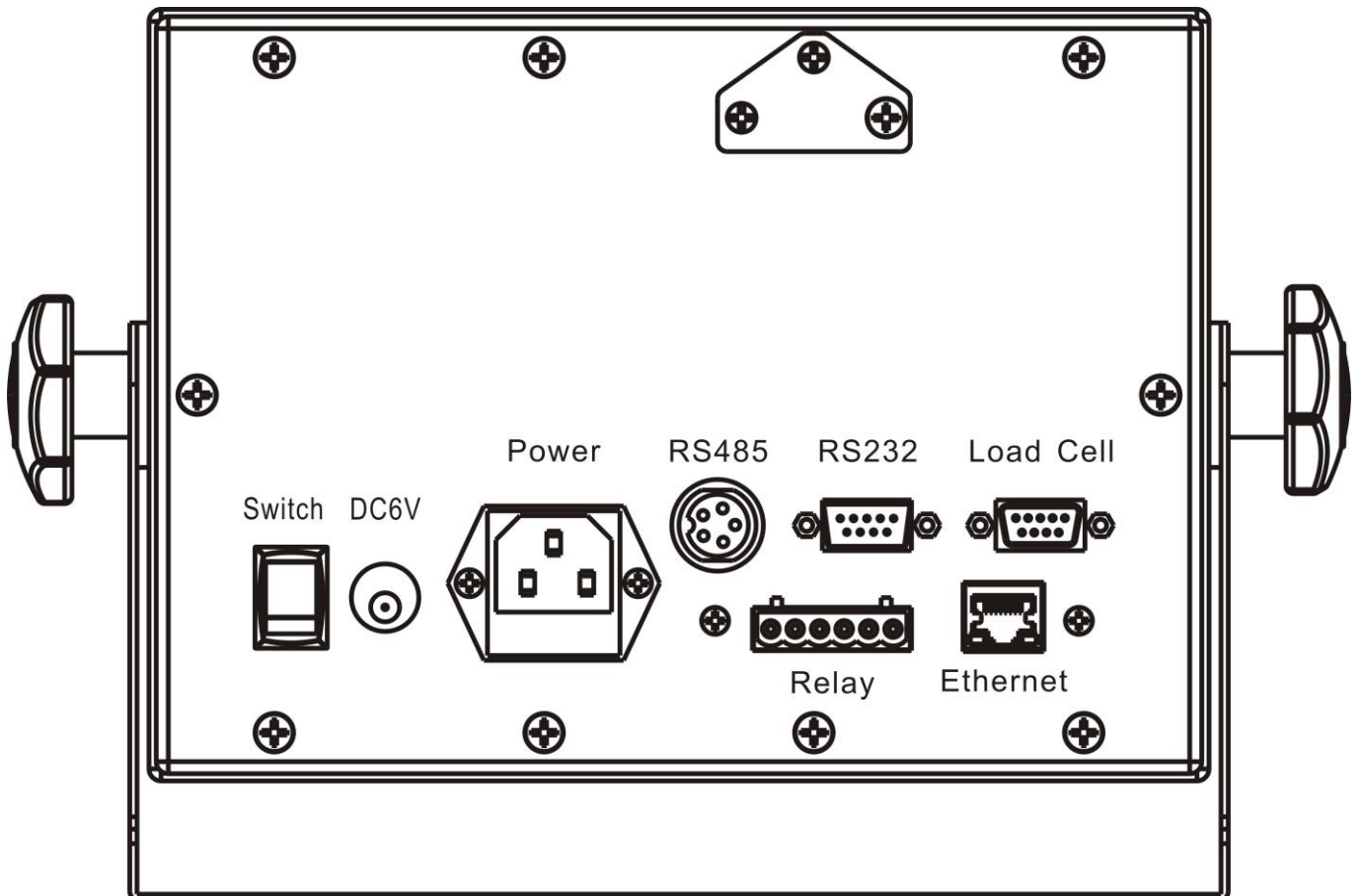
- ◆ A/D conversion mode: $\Delta-\Sigma$ conversion technology, 24bit AD, 100times per second;
 - ◆ Verification input minimum Sensitivity: $\approx 1.5\mu\text{V/e}$;
 - ◆ Load Cell Bridge Voltage: DC 5V, can drive 1~6pcs load cell with 350 Ω output;
 - ◆ Load cell signal range: -16mV~18mV;
 - ◆ Load Cell Connection Mode: 4-wire mode;
 - ◆ Division value: 1/2/5/10/20/50 optional;
 - ◆ Display: 5inch TFT screen;
 - ◆ Port of large screen: current loop/RS232, baud rate: 600bps;
 - ◆ port of Ethernet: TCP/IP MODBUS protocol
- Serial communication port:
- Transmission Mode: RS232 ;
 - Baud rate: 1200/2400/4800/9600/19200 optional;
 - ◆ Power Supply: AC 220V, 50Hz/60Hz;
 - ◆ Accessorial power supply: 6V/7Ah maintenance-free lead-acid battery. (external connection, optional) ;
 - ◆ Operation temp: 0 $^{\circ}\text{C}$ ~40 $^{\circ}\text{C}$, Humidity 10%~85%(RH), No condensation;
 - ◆ Storage temp: -10 $^{\circ}\text{C}$ ~40 $^{\circ}\text{C}$, Humidity 10%~95%(RH), No condensation;
 - ◆ Weight: around 1.5kg;
 - ◆ Size (mm) (L*W*H): around 236*150*150mm.

2.0 Installation:
2.1 Indicator layout


SI-01 Front Panel layout and size



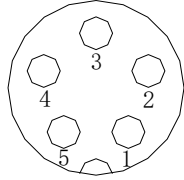
SI-01 back layout



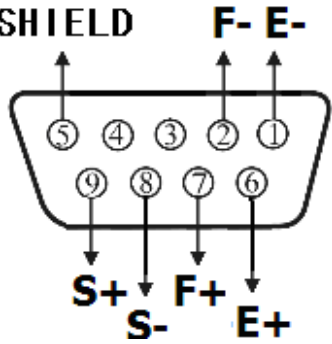
2.2、 RS232 port (DB9-needle)

Indicator interface DB9 port(needle) Instruction				
	①	reserve +5V power output	⑥	reserve RS232 (RXD)
	②	Indicator RS232 (RXD)	⑦	reserve RS232 TXD)
	③	Indicator RS232 (TXD)	⑧	large screen current loop output (-)
	④	GND	⑨	large screen current loop output (+)
	⑤	GND		

2.3、 RS485 port (5-wire socket)

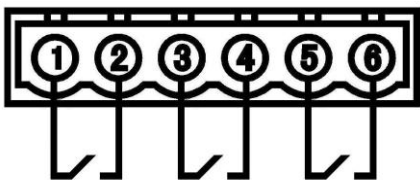
Indicator interface 5-wire socket Instruction		
	②	GND
	③	A
	④	B

2.4、 Interface of analog load cell (DB9-hole)

Indicator terminal DB9 female socket (hole)		
	①	-EXE
	②	-sense
	⑥	+EXE
	⑦	+Sense
	⑧	-Sig
	⑨	+Sig
	⑤	Shield

if use 4-wire load cell, short circuit of +EXE and +Sense, short circuit of -EXE and -sense.

2.5、 Interface of Relay output

Indicator switch interface		
	①	No. 1 relay output
	②	Low limit output
	③	No. 2 relay output
	④	approved output

	⑤	No. 3 relay output
	⑥	upper limit output

2.6、Interface of storage battery



▲ ! The connection between the sensor and the instrument must be reliable, and the connection line is not allowed to be plugged and unplugged while the instrument is energized to prevent static electricity from damaging the instrument or sensor.

▲ ! Sensors and meters are static-sensitive devices. In use, anti-static measures must be taken effectively. Welding operations or other strong electrical operations on the weighing platform are strictly prohibited. During lightning storms, reliable lightning protection measures must be implemented to prevent sensors and The damage of the instrument ensures the personal safety of the operator and the safe operation of the weighing equipment and related equipment.

3.0 Main display interface description

3.1 Boot display



Start-up display interface, this interface can customize customer information.

3.2 Weighing interface



Status: displays AC power supply, battery status, modbus address, clock, etc.

Mode switching: three common weighing pages, dynamic weighing pages, and counting pages can be switched.

Weighing status display symbol: High, Ok, Low to check weighing indicator; ~ stable identification, GROSS GW identifier, → 0 ← zero identifier.

Weight display area: displays the current weight value.

Cumulative display area: cumulative value, cumulative frequency, tare weight, etc.

Buttons

Key number	Key name	Function 1 : Tap in normal weighing state
①	Zero key	Manual zero function
②	Tare key	Tare function
③	Accumulation key	Cumulative function
④	Clear key	Clear function
⑤	Print key	When the serial port is set to print mode,
⑥	Main menu key	Return to main page

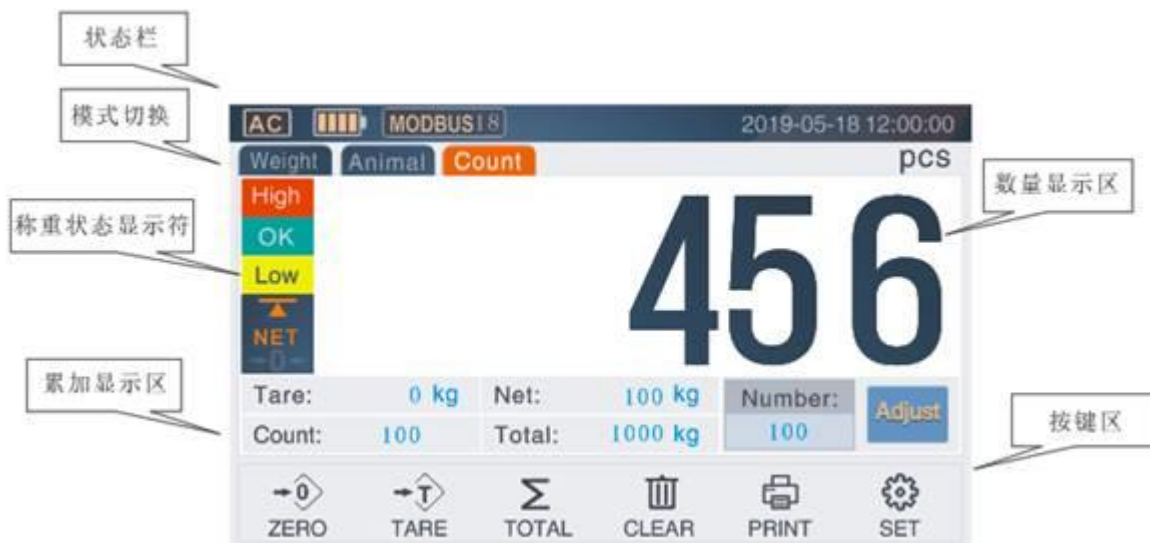


3. 3 animal scale weighing main interface



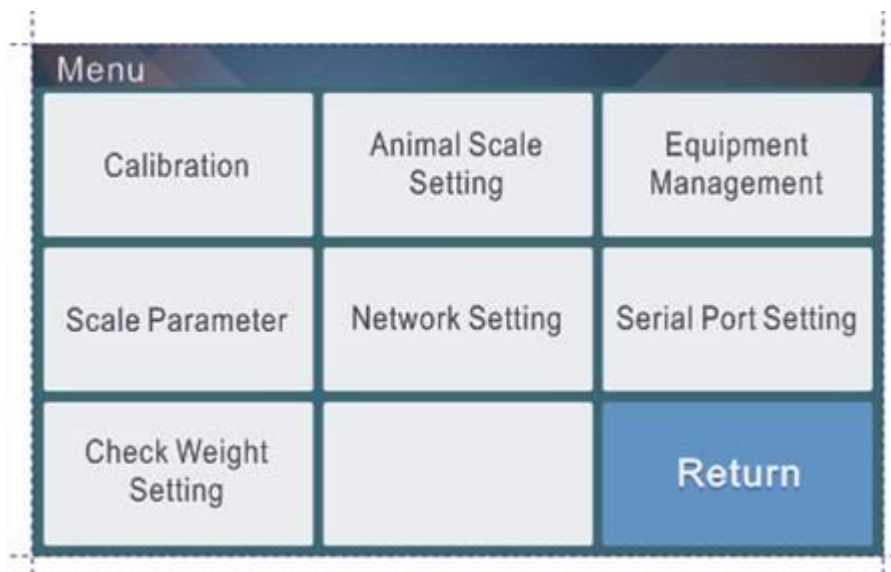
Three buttons are buttons for setting animal scale parameters, and the first two buttons are buttons for quick setting. For on-site use, you can customize parameter settings after the last button. Other functions are the same as weighing main interface functions.

3. 4 count main interface



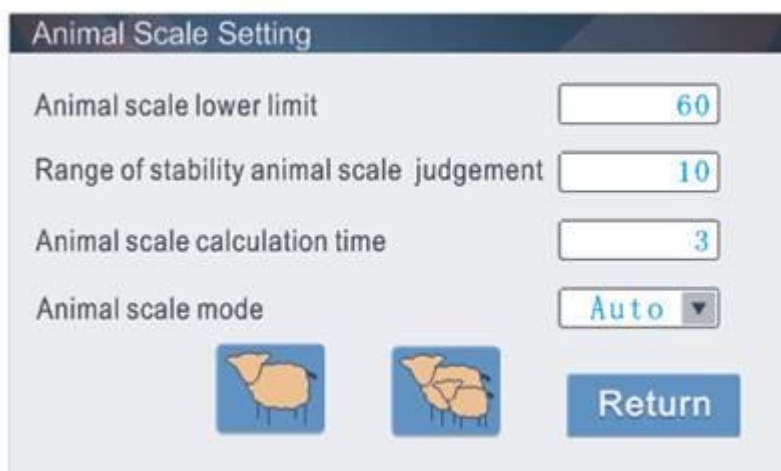
The quantity display area displays the quantity of the item. The Adjust button is added in the button area . When placing the item, after the weight is stable, enter the actual item quantity value and calibrate the count.

3. 4 main menu interface



For the calibration interface and scale reference interface, please refer to the commissioning instructions; For details , please refer to 3.5 for Ethernet scale settings , 3.6 for Ethernet settings , 3.7 for check weighing function settings , 3.8 for serial port parameter settings , and 3.9 for device management.

3. 5 animal scale parameter setting interface





Animal Scale Setting

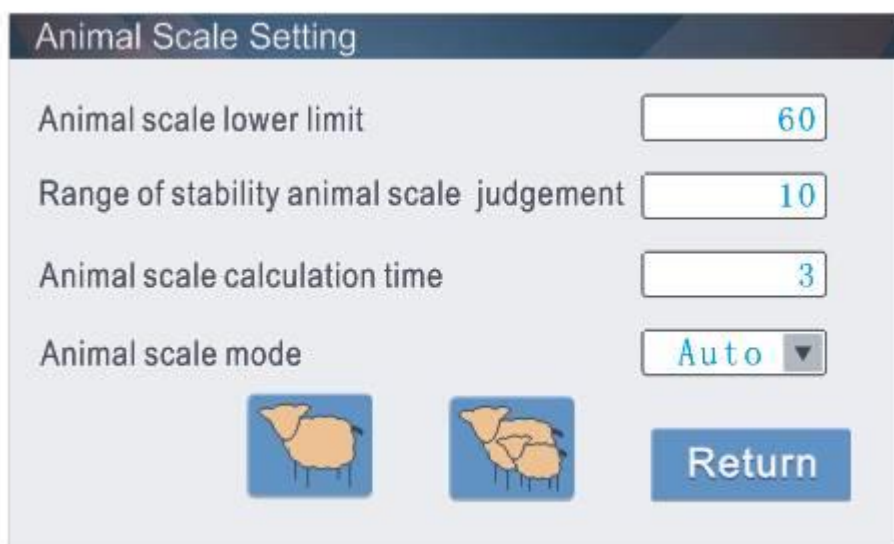
Animal scale lower limit

Range of stability animal scale judgement

Animal scale calculation time

Animal scale mode




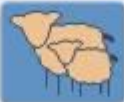
Animal Scale Setting

Animal scale lower limit

Range of stability animal scale judgement

Animal scale calculation time

Animal scale mode

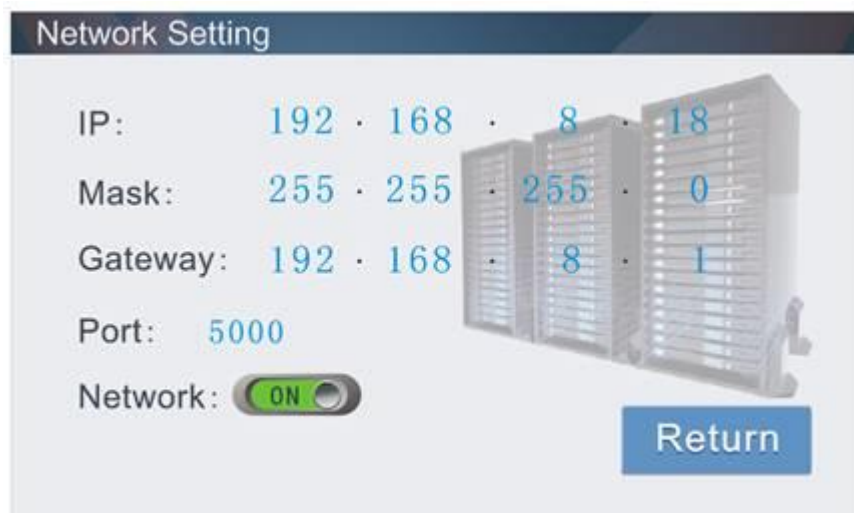
 

When the animal scale mode is manual, when the "weight lock" key is pressed, when the weight is greater than the lower limit of the animal scale, the calculated weight value is locked after the setting time of the animal scale is set.

When the animal scale mode is automatic, in some weighing occasions, dynamic weighing may be required, and the weighing platform is not stable at this time. The meter will automatically collect the weight of the objects on the weighing platform to calculate the average value. If it is within the range of the animal scale judgment stability and the display value is greater than the lower limit, the calculation result will be locked. When the weight exceeds the animal scale judgment stability range, The meter automatically unlocks the value.

The unit of the lower limit of animal scale and the stable range of animal scale is KG, which is set according to the actual needs; the calculation time of animal scale, the setting range is 1-9 seconds.

3. 6 Ethernet parameter setting interface



Network Setting

IP: 192 · 168 · 8 · 18

Mask: 255 · 255 · 255 · 0

Gateway: 192 · 168 · 8 · 1

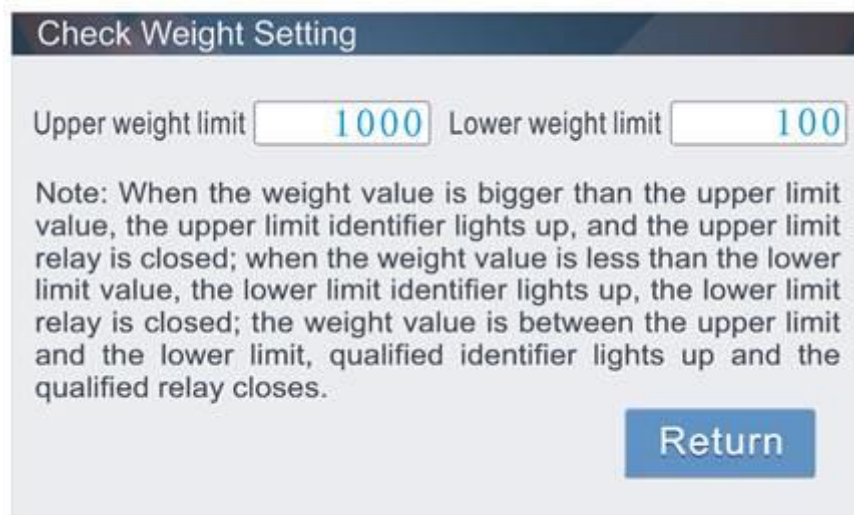
Port: 5000

Network: ON

Return

After setting the above information, you need to restart the meter to take effect.

3. 7 Check weighing parameter setting interface



Check Weight Setting

Upper weight limit Lower weight limit

Note: When the weight value is bigger than the upper limit value, the upper limit identifier lights up, and the upper limit relay is closed; when the weight value is less than the lower limit value, the lower limit identifier lights up, the lower limit relay is closed; the weight value is between the upper limit and the lower limit, qualified identifier lights up and the qualified relay closes.

Return

Set the upper limit and lower limit of check weight, the unit is KG . When the weight is greater than the upper limit, the upper limit relay is output and the display indicator lights up; when the weight is less than the lower limit, the lower limit relay is output and the display indicator lights up; when the weight is between the upper and lower limits In between, the qualified relay outputs and the display indicator lights up at the same time.

3. 8 serial port parameter setting interface

RS232/RS485 Setting		
Communication Protocol Continuous 6	Baud Rate 1200bps	Data and Check Bits 8 None
Address 10		
		Return

RS232 communication protocol and related parameter settings, see the communication protocol for details.



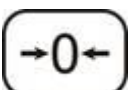

3. 9 device related settings interface

Equipment Management		
Date and Time	Touch Screen Calibrate	Backlight
Output Test	Restore Default Parameters	Password Management
Device Information		Return

Date and time setting, touch screen calibration, backlight setting, relay output test, restore default parameters (function-related parameters) , password management (parameter password and calibration password can be reset) , set running status view, etc.

4.0 Operating Instructions

4.1 Key Description

Key icon	Key name	Function 1 : Tap in normal weighing state
	Main menu key	Enter the main menu
	Tare key	TARE function
	Zero key	Zero operation
	home page	Return to main page

4.2 Features

4.2.1 startup and automatic startup zero

When the instrument is off, the instrument presses the power switch. After the instrument is turned on, the instrument performs a self-test display. If it is found that the weighing platform deviates from the calibration zero point and the weighing platform is stable, but it is still within the range of automatic zero setting at startup, it will be automatically set to zero. The meter displays zero and the "zero position" indicator is on. If it deviates from the zero setting range or the weighing platform is unstable, the actual weight on the weighing platform is displayed.

The switch in the rear view of the instrument is the power switch.

4.2.2 manually set to zero

When the gross weight of the instrument is within the range of manual zero setting and is stable, press the "zero setting" key to set the zero. The "net weight" display mode does not allow zero setting.

4.2.3 to tare

When the gross weight is greater than zero, and it is stable, the tare operation can be performed. After pressing the "Tare" key, the meter displays the reading " 0 ", the tare weight is the current gross weight, and enters the "net weight" display mode, the "net weight" indicator lights;

When the gross weight is " 0 " and in the "net weight" display mode, press the "tare" key to exit the "net weight" display mode.

4.2.4 accumulated was tired and tired clear operation:

In the weighing state, press the touch screen accumulation key to accumulate. The display interface has accumulated times and accumulated weight. The cumulative clear operation only needs to press the touch screen cumulative clear key.

4.2.5 Communication data format:

Serial number	Number of frames	Comment
1	8	Send the net weight data in the reverse direction , if the net weight is 23.45kg , send the ASCII code = 54.3200 ; If the net weight is -23.45kg , send ASCII code = 54.320-
2	9	Send net weight data in reverse, the format is 1
3	14	Send the net weight data in the forward direction with unit indication. If the net weight is 23.45kg , send the ASCII code: = 0023.45 (kg) Finally, with a hexadecimal number 0D , 0A end
4	12	See 4.2.5.1 (A9) for details
5	18	See 4.2.5.2 (Toledo) for details
6	18	See 4.2.5.3 (British Exhibition) for details
7		The net weight and accumulated data are automatically output during the accumulation operation, and can be connected to a serial printer for printing.
8		Keli large screen RS232 mode, when this communication format is selected, the large screen current loop mode is invalid. If the current loop is used to connect the large screen, [Co *] is set to a working mode other than 7 .
9	9	Connect a serial printer (POS58 printer)
10	10	For Modbus protocol, see 4.2.5.3 for details .

4.2.5.1 Continuous mode 4 :

The transmitted data is the current weight (gross weight) data displayed by the meter (the weight value when overloaded is 999999) . Each frame of data consists of 12 sets of data . The format is shown in the following table: (XOR = 2 ⊕ 3 ⊕ 8 ⊕ 9)

The first X bytes	content	Note Solution		For Example (transmit + 20.00)	
		content	Code	content	Hex code
1	Start	(XON)	02	XON	02
2	+ Or -	Sign bit	2B / 2D	+	2B
3	Weighing data	Highest position	30 to 39	0	30
4			30 to 39	0	30
5			30 to 39	2	32
6			30 to 39	0	30
7			30 to 39	0	30
8			Lowest bit	30 to 39	0
9	Number of decimal places	From right to left (0 ~ 4)	30 to 34	2	32
10	XOR check	High four		XOR check = 0x1B	01
11		Lower four			0b
12	End	XOFF	03	XOFF	03



4.2.5.2 Continuous mode 5 :

Each byte of data consists of 10 bits, first . 1 -bit start bit, the 10 -bit stop bit intermediate . 8 bits are data bits ; continuous output of data of each frame 18 is bytes.

Even continuously output the format of formula 2																	
StX	A	B	C	X	X	X	X	X	X	X	X	X	X	X	X	CR	CKS
1	2		3						4				5	6			

It in :

1. <STX> the ASCII from the start character (02H) .
2. state status word A, B, C .
3. significant shows weight amount , may be able to be gross weight may also be able to be a net weight of 6 bit without band symbol number and a small number of points of the number of words .
4. Paper weight , . 6 bit without band symbol number and a small number of points of the number of words .
5. The <CR> the ASCII Press vehicle operator (the ODH) .
6. The <CKS> may be selected from the correction inspection and.

State status word A				
Bits 0, 1, 2				
0	1	2	Small number of point location set	
0	0	0	KGKG00	
1	0	0	KGKGX0	
0	1	0	KGKGKG	
1	1	0	KGKGX.X	
0	0	1	KGKG.KG	
1	0	1	KGX.KGX	
0	1	1	KG.KGKG	
1	1	1	X.KGKGX	
Bits 3, 4			Division of values by sub	
3	4			
1	0			X1
0	1			X2
1	1		X5	
Bit 5			Constant is 1	
Bit 6			Heng is 0	

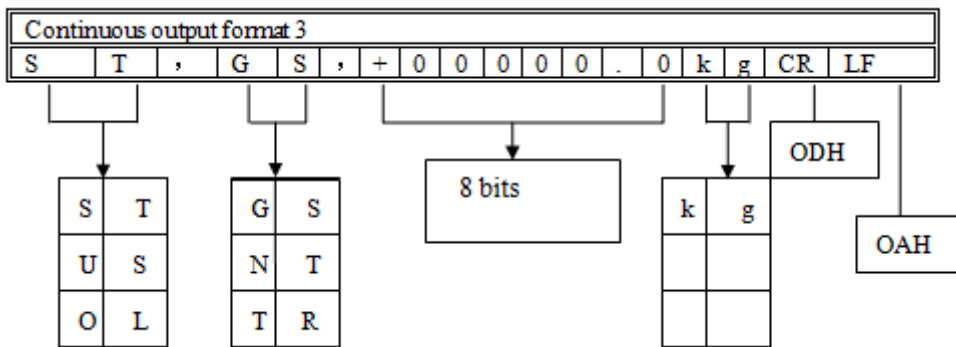
State status word B	
Bits	Function can
Bit 0	Gross weight = 0, net weight = 1
Bit 1	Symbol number : n = 0, negative = 1
Bit 2	Ultra carrier (or less to zero) = 1
Bit 3	Dynamic state = 1
Bit 4	Single Bit : kg = 1
Bit 5	Constant is 1
Bit 6	Instrument table on power when is 1

Like state word C

Bit 0	Heng is 0
Bit 1	Heng is 0
Bit 2	Heng is 0
Bit 3	There dozen Indian life make = 1
Bit 4	Expansion show significant shown (X10) = 1
Bit 5	Constant is 1
Bit 6	Heng is 0

4.2.5.3 Continuous mode 5 :

Each byte of data consists of 10 bits, first . 1 -bit start bit, the 10 -bit stop bit intermediate . 8 bits are data bits and parity bits ;



Header1 Header2

Header 1

- ST weight stability (Stable)
- US weight is unstable (Unstable)
- OL overload (Over Load)

Header 2

- GS gross weight (Gross data)
- NT net weight (Net data)
- TR deduction (Tare data)

4.2.5.4 RS485 communication Modbus protocol, Ethernet TCP/ IP Modbus address are as follows:

Register address	Bit	The following is read-only (03 function code)
40001		Undefined (read as 0)
40002		Undefined (read as 0)
40003	.0	Relay upper limit output, 0 = close, 1 = open
	.1	Relay qualified output, 0 = close, 1 = open
	.2	Relay lower limit output, 0 = close, 1 = open
	.3	Undefined
	.4	Stable, 0 = unstable, 1 = stable
	.5	Zero point, 0 = non-zero point, 1 = zero point
	.6	Overload, 0 = not overloaded, 1 = overloaded
	.7	Undefined
	.8	Weight division value:
	.9	0000 = 1 0001 = 2 0010 = 5 0011 = 10

	.10	0100 = 20 0101 = 50 0110 = 0.1 0111 = 0.2
	.11	1000 = 0.5 1001 = 0.01 1010 = 0.02 1011 = 0.05 1100 = 0.001 1101 = 0.002 1110 = 0.005 1111 : no definition
	.12-.15	Undefined
40004-40005		Net weight, 32 bits (data type: long)
40006-40007		Gross weight, 32 bits (data type: long)
40008-40019		Undefined, read as 0
The following is readable and writable (03 , 06 , 16 function codes)		
40020-40021		Relay upper limit setting value, 32 bits (data type: long)
40022-40023		Relay lower limit setting value, 32 bits (data type: long)
40024	.0	Relay upper limit output control, 0 = off, 1 = on, (modbus control of instrument setting is valid)
	.1	Relay qualified output control, 0 = close, 1 = open, (modbus control of instrument setting is effective)
	.2	Relay lower limit output control, 0 = off, 1 = on, (the instrument setting modbus control is effective)
	.3-.15	Undefined
40025-40039		Undefined
40040	.0	Zero setting (weight is stable and within the allowable zero setting range)
	.1	Tare (stable weight and weight greater than 10d)
	.2	Clear skin
	.3-.15	Undefined

4.3 Undervoltage alarm

If the instrument works with an external battery, when the voltage is higher than 6.1V , the battery voltage prompt displays 3 divisions; when the voltage is 5.8 ~ 6.1V , the battery voltage prompt displays 2 divisions ; when the voltage is 5.5 ~ 5.8V , the battery voltage The prompt shows 1 grid. When the voltage is less than 5.5V , the display of the instrument is off and the indicator light of the instrument flashes.

Serial number	name	Specification model	Quantity	Remarks
1	meter	SI-01	1 set	
2	user's Guide	SI-01 instruction manual (Keli Chinese)	1 serving	
3	Commissioning instructions	SI-01 Commissioning Manual (Keli Chinese)	1 serving	
4	Certificate of conformity	SI-01 certificate	1 serving	
5	Communication cable plug	DB9 core (needle)	1 Ge	
6	Sensor cable plug	DB9 core (hole)	1 Ge	
7	RS485 cable plug	5- core aviation plug (M16)	1 Ge	
8	Relay output plug	6 core 5.08 plug	1 Ge	



9	DC plug	DC plug	1	
10	Power fuse	0.5A, Φ 5mm \times 20mm	1	
11	National standard AC power cord	Double head, with sheath, 3 * 0.75 / 1.5m	1	
12	Platformscale instrument connector	XK3118T1-W1 connector	1	
13	Pan head screw 1	M4 \times 8	4	
14	Pan head screw 2	M6 \times 25	1	
15	Hex nuts	M6	1	