VALUE EACH GRAM
HiWEIGH

Value Each Gram: A professional weighing products manufacturer and supplier

Weight Indicator K1C
User Manual

An ISO9001 registered company
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Before Use

Safety precautions

WARNING!

Please be sure to observe the following items and the precautions in this manual. If the precautions are not followed, there is a danger of serious injury or accident.

If a malfunction or abnormality of this product may cause a major accident in the system, please install an appropriate protection circuit externally.

Do not use it outside the range of specifications described in this product. Otherwise, it may cause electric shock, fire, or malfunction.

Do not use in places with flammable and explosive gas.

Do not disassemble or modify this product. Otherwise, it may cause electric shock, fire, or malfunction.

ATTENTION!

Please do not use it on nuclear power equipment and life-related medical equipment.

In order to prevent surges from occurring on all input and output signal lines of this product, please install an appropriate surge suppression circuit.

In order to prevent damage to the instrument and prevent machine failures, please install a safety circuit breaker such as a fuse of appropriate capacity on the power cord connected to the instrument or the input/output line with large current capacity to protect the instrument.

Please do not mix metal pieces or wire scraps into this product, otherwise it may cause electric shock, fire, or malfunction.

Please tighten the terminal screws securely. If they are not tightened completely, it may cause electric shock or fire.

Be sure to cut off the power before cleaning.

When cleaning, please wipe off the dirt from this product with a dry soft cloth. Please do not use hygroscopic agents. Otherwise it may cause deformation and discoloration.

Please do not rub or knock the display part with hard objects.

The installation, debugging and maintenance of this product should be carried out by qualified engineering and technical personnel.

Before Use

In order to use this product safely for a long time, regular maintenance is necessary. Some parts of this product are limited by life, and some have changes in performance due to year-round use.

This manual is subject to change without notice and will be updated at any time. Please refer to the latest version when consulting. If you have any questions, please contact our company.

The company is not responsible for any direct or indirect losses other than the product itself.

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1.Technical Specifications

Model	K1C
Enclosure Type	Stainless Steel | ABS
Product Dimension	250x120x90mm
Accuracy	Class III
Display Resolution	1/3,000 – 1/60,000
Display	1.35"LCD (FSTN)
Power	100-240V AC
	4.8~5.5V DC
	3.7V4000mAh Li-ion battery
Display	FSTN LCD with backlight
Load cell No.	6*350ohm or 12*700ohm
Excitation voltage	5 VDC
Units	Kg | lb
Operating Temperature	-10°C ~40°C
Relative humidity	85%Rh non-condensing
Communication	RS232, Optional Bluetooth/WiFi/RS485/4~20mA

2.Installation

Warning

In order to prevent electric shock and prevent machine malfunction, please be sure to turn off the power before installing and disassembling the machine.

2.1 Precautions for installation

(1)Please use this instrument within the scope of the following environmental conditions:
·Surrounding temperature: -40~85··Avoid direct sunlight
·Surrounding humidity: 35%~85%RH,No condensation
(absolute humidity: MAX.W.C29.3g/m3dryairat101.3kPa)
·Set Surrounding conditions: Indoor use, height <2000m

(2)Please avoid installing in the following places:
·Places where condensation may occur due to drastic temperature changes
·Place where corrosive gas and flammable gas are generated
·Places that directly vibrate or may impact the product
·Places with a lot of dust, salt, and metal powder
·Places with large clutter interference, static electricity, magnetic field, and noise
·Places directly blown by air-conditioning or heating
·Places exposed to direct sunlight
·Places that may accumulate heat due to heat radiation

(3)When installing, please consider the following points:
·In order not to hinder the heat dissipation, please do not block the surroundings of the product, do not block

the vents, and leave enough space for ventilation.
·Considering wiring and maintenance, please ensure that there is a space of more than 50mm above and below the meter.
·Please avoid installing it directly above instruments that generate a lot of heat (heaters, transformers, semiconductor operators, high-power resistors).
·When the ambient temperature is above 50°C, please use a forced fan or cooler to cool it. However, do not let the cooling air blow directly onto the instrument.
·In order to improve noise resistance and safety, please try to install it far away from high-voltage equipment, power lines, and power equipment.

3.Connection

3.1 Connection of the load cell to indicator

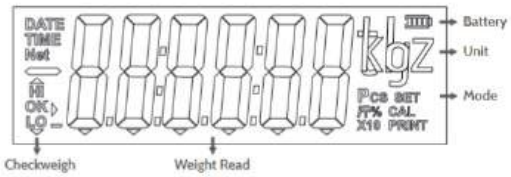
For 6-wire load cells		for 4-wire load cells (short connect: +EXC and +SEN, −SEN and -EXC.)	
+EXC	Excitation +	+EXC	Excitation +
+SEN	Sense +	+SEN	Excitation +
+SIG	Signal +	+SIG	Signal +
SHIELD	Shield	SHIELD	Shield
-SIG	Signal –	-SIG	Signal –
-SEN	Sense –	-SEN	Excitation –
-EXC	Excitation –	-EXC	Excitation –

3.2 Connection of RS232 to PC or Printer

Indicator	Device
232T	Rx
232R	Tx
GND	GND

4.Basic operation

Panel and button description



Serial number	Module Name		Description
1	Display window		In weighing mode, it displays the measured value.
2	Status of Indicator	ZERO	When lit, the total value is zero.
		STABLE	When lit, the force value is stable.
		NET	When lit, the current display is the net weight.
3	→0←		In weighing mode:clear function; In setting state,:when the parameter number is displayed: switch to the previous parameter; When modifying the parameter value:increase the value of the parameter.
4	→T←		In weighing mode: place the container and clear the container's weight. In setting state: when the parameter symbol is displayed: switch to the next parameter. When modifying the parameter value: activate the cursor, the leftmost digit flashes, after allowing the modification to be activated, short press to move the numeric cursor.
5	FN		In weighing mode: the function keys. In setting state:enter the value modification state.
6	CE		In setting state: clear the display value. In the menu state,:exit the current menu.
7	PT		In weighing mode:When the parameter F4.2.1 is "FC 4", press the key to output data once. In weighing mode:press and hold for more than 2 seconds without releasing to enter the setting state. In the setting state, save the modified parameter value and switch to the next parameter.

5.Parameter Settings

5.1 Method of entering parameter setting

In the boot state,press and hold the PT for more than 2 seconds without releasing, enter the setting state, display "MRSTER" to prompts to enter the password.

Super password: →0← →T← →0← →T←

User password: →0← →0← →0←

After entering the password,then press PT, the screen displays "SETUP", which means it has entered the setting state.

·If F1.1 is set to "OIML" or "NETP". After entering the setting according to the method above, the parameters F1、F5.1and F5.4 can not be set. At this time, if you need to set F1, you must turn off the machine first, and then press and hold the S1 button on the back of PCB board when turning on the indicator. Until SETUP is displayed. You can directly enter the setting state without a password, and you can set any parameters.

·If F1.1 is set to "other", you can only enter the setting according to the method above.

5.2 Buttons in parameter setting

→0←	Select the previous parameter
→T←	Select next parameter
FN	Back to the previous setting
CE	Back to the previous setting,;exit the setting
PT	Confirm input value; confirm exit.

5.3 Input number operation

→0←	Modify the input value, or move the current input cursor one place to the left
→T←	Clear all input values
FN	The current number decreases
CE	Increase in current numbers
PT	Confirm input value

5.4 Parameter introduction and explanation

Main parameter list		
Parameter symbol	Parameter Name	Description
F1	Scale settings	Configure scale related parameters
F2	Application settings	Application parameter settings
F3	Instrument settings	Configure instrument parameters
F4	Communication settings	Instrument's communication parameters
F5	Diagnostic maintenance	Instrument maintenance information
F6	Exit settings	Whether to save the configuration

F1: Scale settings					
Symbol	Submenu	Parameter name	Optional parameters	Defaults	Explaination
F1.1	none	Certification requirements	no oiml ntep other	no	**no**: No certification required. **oiml**: Meet OIML requirements. **ntep**: Meet NTEP requirements. **other**: Meet other requirements.
F1.2	F1.2.1	Unit	1 2	1	**1**: kg **2**: lb
	F1.2.2	Number of ranges	1r 2r	1r	**1r**: One range **2r**: Two ranges
	F1.2.3	Full scale range (the first range)	3~10000	15	none
	F1.2.4	Division value of the first range	0.01 0.05 0.001 0.002 0.005 0.0001 0.0002 0.0005	0.001	none
	F1.2.5	Full scale range (the second range)	3~10000	15	none
	F1.2.6	Division value of the Second range	0.01 0.05 0.001 0.002 0.005 0.0001 0.0002 0.0005	0.001	none
F1.3	F1.3.1	Weight acceleration correction factor	GEO 0~GEO31	GEO16	Not recommended to modify.
	F1.3.2	Non-linear correction	LinOFF LinOn	LinOFF	The way to do the calibration.
	F1.3.3	Calibration	none	none	Refer to 6.2 Calibration Process.

F1.4 (If F1.1 is set to OIML, F1.4.2 is fixed at 10%, and F1.4.3 is fixed at 2%)	F1.4.1	Automatic zero tracking range	0 5d 1d 3d 5d 10d OFF	3d	When the weight value fluctuates around the zero point within this range.
	F1.4.2	Auto reset range on startup	2 3 10 20 OFF	2	This is the percentage of the range, and the weight can be automatically set to zero within this range when starting up.
	F1.4.3	Zero range of the zero button	2 3 10 20 OFF	2	This is the percentage of the range. The weight when pressing the zero key can be successfully zeroed within this range.
F1.5	F1.5.1	Automatic Tare	ON·OFF	OFF	Literally
	F1.5.2	Automatic clear Tare weight	ON·OFF	OFF	Literally
	F1.5.3	Tare lock	ON·OFF	OFF	Literally
F1.6	F1.6.1	Digital filter	LO MED HIGH3 HIGH4 HIGH5	HIGH5	**LO** -- No filtering **Med**--Moderate filtering **HIGH3** -- heavy filter 3 **HIGH4** --heavy filter 4 **HIGH5** -- Heavy filter 5
	F1.6.2	Stable-state range	0 5d 1d2d 5d 10d 20d	2d	This parameter is to provide a steady-state fluctuation range for the following animal scale function.
F1.10	none	Restore default parameters	F1 series parameter reset	none	Literally

F2: Application settings					
Symbol	Submenu	Parameter name	Optional parameters	Defaults	Explaination
F2.1	none	Function of function keys	MUL10 Unit OVEr Count Dyna Peahkhd Anmial G2N	Unit	**MUL10** - 10 times accuracy function **Unit** - Unit conversion **Over** - Over/Under function **Count** - counting function **Dyna** - dynamic data mean capture **Peakhd** - peak capture **Anmial** - animal scale **G2N** - gross/net switching
	F2.2.1	Display mode	CHECk CLASS OVER	CHECk	It determines which mode indicator display.
	F2.2.2	Input method of target weight	Weight Manual	Weight	It determines how to input target.
	F2.2.3	Positive error range	0.000~100.000	0.010	The positive fluctuation range of the target weight.
	F2.2.4	Negative error range	0.000~100.000	0.010	The negative fluctuation range of the target weight.
F2.3	none	APW function	ON·OFF	OFF	Turn on the automatic enhancement function, as the counted quantity increases,the meter will automatically modify the single piece weight value to make it closer to the average weight. To improve counting accuracy.
F2.4	none	Dynamic value time	3 sec 5 sec 10 sec	3 sec	It determines how much time indicator cost to calculate weight when in Dyna function or Animal function.
F2.5	F2.5.1	Whether to output when OKG	ON OFF	OFF	This is to determine whether there is IO output in checkweigh mode.
	F2.5.2	Whether the output is judged stable	ON OFF	OFF	It determines whether the stable state needs to be judged before output.
	F2.5.3	output method	0 1 2 3 4	0	**0**-- No alarm output **1** -- Output at lower limit **2**-- Output when qualified **3**-- Output at upper limit **4**-- Output at lower limit and upper limit
F2.10	none	Restore default parameters	F2 series parameter reset	none	Literally

F3: Instrument settings					
Symbol	Submenu	Parameter name	Optional parameters	Defaults	Explaination
F3.1	F3.1.1	Timeout function	0 10~999	60	It determines how long does it take to enter standby.
	F3.1.2	Display brightness	Lu 1~Lu6		The brightness gradually decreases from 1 to 6.
	F3.1.3	Date setting	none	0	This machine does not support this function.
	F3.1.4	Time setting	none	0	This machine does not support this function.
F3.2	none	Automatic shut-down	0 5~60	0	It determines how long does it take to shut down automaticly.
F3.3	none	Battery Type	Li-Po LEAD-A Dry	Li-Po	Literally
F3.10	none	Restore default parameters	F3 series parameter reset	none	Literally

F4: Communication settings					
Symbol	Submenu	Parameter name	Optional parameters	Defaults	Explaination
F4.1	F4.1.1	Serial port 1's baud rate	1200 2400 4800 9600 19200 38400 57600 115200	9600	It determines the baud rate of serial port 1.
	F4.1.2	Serial port 1's parity bit	7-odd 7-even 8-none	8-none	**7-odd**: 7-bit odd parity **7-even**: 7-bit even parity **8-none**: 8 digits without parity
	F4.1.3	Xon/Xoff control	ON OFF	OFF	It determines whether indicator use Xon/Xoff.(XON/XOFF is a flow control protocol (communication rate matching protocol)).
	F4.1.4	Send checksum character	ON OFF	OFF	It determines whether indicator Send checksum character.
	F4.1.5	Instrument address	1~32	1	It determines address as indicator use Modbus.

F4.2	F4.2.1	Communication mode	OFF FC 1~5	FC 1	**OFF**: Disable serial port output. **FC 1**: Continuously output the weight value according to the set sending frequency. **FC2**: Single weighing and stable sending (return to zero after power-on, and send data once when the weight of the item is stable after 5 d. After the item is taken down and reset to zero, it will be weighed again and the data will be sent again after it is stable). **FC3**: PF0 and PF9 protocols support interactive commands. **FC 4**: In this mode, press the confirm key to output data once. **FC 5**: Repeated weighing and stable sending (return to zero after power-on, that is, send data once, the current weight will be sent again as long as the weight of the weighing platform changes ≥1 d, and the data will be sent once after the weight greater than 1 d is reset to zero; if the weighing platform No data will be sent when the weight is negative).
	F4.2.2	Protocol	Print APrint SiCS toledo YH-A9 RTU PF 0 PF 2 PF 4 PF 7 PF 9 PF 10 PF 16 PF 17 PF 18 PF C2	PF 0	The specific agreement content is in the appendix.
	F4.2.3	Communication frequency	1~200 times/ sec	30	Literally
F4.3	F4.3.1	Print format	MuLti Single	MuLti	**MuLti**:Multi-line output **Single**:Single line output

	F4.3.2	Print data	Standr Over Count	Standr	**Standr**: standard format **Over**: over/under format **Count**: Count format Please refer to the appendix for specific format content.
	F4.3.3	Print language	EnG CHn	EnG	EnG:English CHn:Chinese
	F4.3.4	Carriage return character	0~9	3	Literally
F4.4	F4.4.1	Serial port 2's baud rate	1200, 2400 4800, 9600 19200 38400 57600 115200	9600	It determines the baud rate of serial port 2.
	F4.4.2	Serial port 1's parity bit	7-odd 7-even 8-none	8-none	**7-odd**: 7-bit odd parity **7-even**: 7-bit even parity **8-none**: 8 digits without parity
F4.5	F4.5.1	Communication mode	OFF·FC 1~5	FC 1	**OFF**: Disable serial port output. **FC1**: Continuously output the weight value according to the set sending frequency. **FC2**: Single weighing and stable sending (return to zero after power-on, and send data once when the weight of the item is stable after 5 d. After the item is taken down and reset to zero, it will be weighed again and the data will be sent again after it is stable). **FC3**: PF 0 and PF 9 protocols support interactive commands. **FC4**: In this mode, press the confirm key to output data once. **FC5**: Repeated weighing and stable sending (return to zero after power-on, that is, send data once, the current weight will be sent again as long as the weight of the weighing platform changes ≥1 d, and the data will be sent once after the weight greater than 1 d is reset to zero; if the weighing platform No data will be sent when the weight is negative).

	F4.5.2	Protocol	AOut IOOut YH-A7 RTU PF 0 PF 2 PF 4 PF 7 PF 9 PF 10 PF 16 PF 17 PF 18	PF 0	The specific agreement content is in the appendix.
	F4.5.3	Communication frequency	1~200 times/sec	30	Literally
	F4.5.4	Method of U-disk storage	OFF·SV A·SV H	OFF	The current version does not support this feature, so ignore the setting.
F4.6	F4.6.1	Zero output	0~65535	10868	The current version does not support this feature, so ignore the setting.
	F4.6.2	Range output	0~65535	54730	The current version does not support this feature, so ignore the setting.
F4.10	none	Restore default parameters	F4 series parameter reset	none	Literally

F5: Diagnostic maintenance					
Symbol	Submenu	Parameter name	Optional parameters	Defaults	Explaination
F5.1	F5.1.1	Zero reading	none	none	The current version does not support this feature, so ignore the setting.
	F5.1.4	Full-scale load weight	none	none	The current version does not support this feature, so ignore the setting.
	F5.1.5	The meter reading corresponding to the load weight of the full scale	none	none	The current version does not support this feature, so ignore the setting.
F5.2	none	Key test	none	none	The meter displays PRESS, press the keys one by one, and display 1~5. Press the shutdown key to exit.
F5.3	none	Display test	none	none	Light up all digital tubes.
F5.4	none	Display the internal code of the instrument	none	none	Literally
F5.5	none	Serial 1 test	none	none	Serial output from 1 to 100
F5.6	none	Print parameter table	none	none	Literally
F5.10	none	Restore default parameters	F5 series parameter reset	none	Literally

F6: Exit settings
Display SAVE and press OK to save the data and exit. Press the TARE key to display ABORT and press the confirm key to exit without saving the data.

6. Operating instructions

6.1 Basic function operation

6.1.1On/OFF

In the shutdown state, press the key once, all the strokes of the indicator will light up, and then the software version number: [L3.01.06] will be displayed. The meter displays the current weight. In the normal display state, press the key for 2 seconds, the meter displays [-OFF-] and then shuts down.

6.1.2 Zero/Clear →0←

In the measurement state, the indicator supports clearing the total value (gross weight) by pressing →0← ;

Clearing:When the zero point of the weighing platform changes, use the clearing function to clear the display. Only when the displayed value is within the range set by the reset range parameter can the reset function be used. Clearing is not maintained after power failure.

6.1.3 Tare →T←

In the measurement state, the meter supports tare by pressing the →T← ;

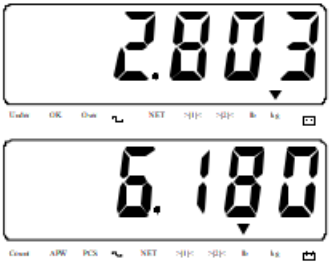
Tare: The tare value will not be maintained after power failure.

6.2 Extended function operation

6.2.1 MUL10 function

In the measurement state, the instrument supports pressing the FN key to magnify the total value by 10 times; X10: F2.1 is set to MUL 10. Press the F key, and the display scale of the meter will automatically expand by 10 times. Get a more accurate weight display. After 20 seconds, it will automatically return to the normal display state. The X10 display status meter prohibits printing output.

6.2.2 Unit conversion



F2.1 is set to Unit; In the measurement state, the instrument supports pressing the FN key, and the weight unit can be automatically switched between kg and lb.

6.2.3 Over/Under function

· Checkweighing
· F2.1 is set to Over;
· F2.1.1 is set to CHECK-Checkweighing mode;

·In the measurement state, press the FN key to switch to the Over/Under function; press and hold the FN key for 2 seconds. The meter displays the original target weight;

· If F2.2.2 is Weight-obtain the target value by weighing. Place the new target weight on the weighing platform and press the FN key to save the new target weight.

· If F2.2.2 is Manual-Obtain the target value through input. Then enter the new target weight and press the FN key to save the new target weight.

Effect: When the weight is less than the target value and exceeds the tolerance range, low is displayed; when the weight is within the tolerance range of the target value, ok is displayed; when the weight is greater than the target value and exceeds the tolerance range, high is displayed.

· Classifying
· F2.1 is set to Over;
· F2.1.1 is set to CHECK-Classifying checking method;

· In the measurement state, press the FN key to switch to the Over/Under function; press and hold the FN key for 2 seconds. The meter displays the original target weight;

· If F2.2.2 is Weight-obtain the target value by weighing. Place the new target weight on the weighing platform and press the FN key to save the new target weight.

· If F2.2.2 is Manual-Obtain the target value through input. Then enter the new target weight and press the FN key to save the new target weight.

Effect: When the weight is less than the target value and exceeds the allowable error range, nnnnnn will be displayed;
When the weight is within the tolerance range of the target value, it will display ------;
When the weight is greater than the target value and exceeds the allowable error range, uuuuuu will be displayed.

6.2.5 DynA function

F2.1 is set to DynA --- the average value of dynamic data;

In the measurement state, press the FN key to automatically take the dynamic data within a certain period of time and calculate the average value display(The dynamic value time is set in F2.4).

6.2.6 PeakHold function

F2.1 is set to PeakHD --- peak capture;

In the measurement state, press the FN key to display the peak value during the automatic capture process.

6.2.7 ANMIAL function

F2.1 is set to ANMIAL ---animal scale;

In the measurement state, press the FN key, according to the value of F1.6.2 (within the stable range), the average value of the weight value that meets the fluctuation in the stable range during the automatic capture process is displayed.

6.3 Calibration process and A/D Internal Code Check

6.3.1 1-stage calibration

· Step 1:
Set F1.3.2 to OFF.

· Step 2:

Enter F1.3.3 and press the PT key, the meter displays E SCL, remove the weight on the weighing platform, and empty the scale. Then press the PT key. The meter displays 10 CAL, and then the display number decreases to 1. Display FULL LD prompt to load weight.

· Step 3:

Add a weight on the weighing platform, and then press the PT key. The meter displays 000000, press

→0← →T← FN to enter the weight of the loaded weight, press the PT key, the meter displays 10 CAL, and then the displayed number decreases to 1.

· Step 4:
Done is displayed, and the calibration is complete.

6.3.2 2-stage calibration
· Step 1:
Set F1.3.2 to On.

· Step 2:

Enter F1.3.3 and press the PT key, the meter displays E SCL, remove the weight on the weighing platform, and empty the scale. Then press the PT key. The meter displays 10 CAL, and then the display number decreases to 1. Display add LD prompt to load weight 1.

· Step 3:

Add a weight on the weighing platform, and then press the PT key. The meter displays 000000, press →0← →T← FN to enter the weight value of the loaded weight, press the PT key, the meter displays 10 CAL, and then after the displayed number is reduced to 1, it displays FULL LD prompting to load the weight

· Step 4:

Continue to add weights on the weighing platform, and then press the PT key. The meter displays 000000, press →0← →T← FN to enter the weight of the loaded weight, press the PT key, the meter displays 10 CAL, and then the displayed number decreases to 1.

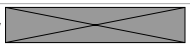
· Step 5:
Done is displayed, and the calibration is complete.

6.3.3 A/D Internal Code Check
· Step 1:

Enter F5.4 and press the PT ,there will be a number around 170000±50000,this is the AD internal value,

· Step 2:
when a pressure is applied to the weighing platform, the AD internal value will increase, and when the pressure is removed, the AD internal value will decrease.
This means that the meter is correctly connected to the weighing platform and working properly, and can be calibrated.

7.Trouble Shooting

Trouble Phenomenon	Explanation	Solution
Display EEE or -EEE	F1.1 is set to OIML or NTEP, it cannot be cleared after the instrument is turned on	Reduce the weight on the weighing platform
Display Err 3	EEPROM verification error	Reset the meter
Display Err 4	The sampling weight of the counting function is too small	Increase the number of samples
Display Err 6	EEPROM read and write error	Replace EEPROM
Display Err 35	When calibrating the scale, the scale is in dynamic	Check the scale body
Display Err 70	Long keystrokes or keyboard short circuit	Change keyboard
Display Err AD1	The sensor signal exceeds the detection range	Check the sensor and weighing platform
Display Err AD2	No change in sensor signal response	Check the sensor and weighing platform
Display ----no----	This feature is forbidden	Check whether the parameter setting is allowed
Display ----------	Scale dynamics during function operation	Automatically perform operations after steady state
Display 	Indicates that the weighed object exceeds the full scale by 9d	Reduce the weight on the weighing platform
Display 	Indicates that the object is less than 0 and less than 5d	Press the clear key to clear
Display 	Exceed the clear range	Check whether there are heavy objects on the weighing platform. Remove heavy objects.
The meter automatically shuts down	The instrument is set to automatically shut down. Or the battery voltage is too low.	Press the power button to turn on and charge the meter

8: Appendix

8.1 Serial port protocol

· PF 0

1.Command format sent by the host computer

R	T	CR	LF
Header		13	10

Header(command)		
R	N	Read the net weight
	T	Read tare weight
	G	Reading gross weight
	C	Read internal code
S	Z	Zero
	T	Tare
	U	Unit

Note: The value of CR is 13 and the value of LF is 10.

2.Data format (19 bytes, unsigned output of weight data)

Note: When the weight is negative, the sign bit will output "-", when the weight is positive, the sign bit will be filled with spaces

S	T	,	N	T	,		1	2	3	4	.	5	6		k	g	CR	LF
Header1			Header2			Data·8 digits in length·									Unit			

Header1				Header2			
S	T	,	Stable	N	T	,	Net
U	S	,	Unstable	G	S	,	Gross
O	V	,	Overload	T	R	,	Tare

Example·ST,NT, 0.876 kg

HEX: 53 54 2C 4E 54 2C 20 20 20 30 2E 38 37 36 20 6B 67 0D 0A

Example·ST,NT,- 0.876 kg

HEX: 53 54 2C 4E 54 2C 2D 20 20 30 2E 38 37 36 20 6B 67 0D 0A

· PF 2

Data format(10 bytes, weight data output with sign)

+/-	1	2	3	4	.	5	6		k	g	CR	LF
sign	Data(7 digits in length)							Unit				

Example·-0.5kg

HEX·2D 20 20 20 20 30 2E 35 20 6B 67 0D 0A

· **PF 4**

Data format(10 bytes, weight data output with sign)

CR	LF	+/-	1	2	3	4	.	5	6
0A	0D	sign	Data(7 digits in length)						

Example·-3.8kg

HEX·0A 0D 2D 30 30 30 30 33 2E 38

Example·+1997.8

HEX·0A 0D 2B 30 31 39 39 37 2E 38

· **PF 7**

S	T	,	N	T	,	+/-	1	2	3	4	.	5	6	k	g	CR	LF
Header1			Header2			Data(8 digits in length)								Unit			

Data format(18 bytes, weight data output with sign)

Header1				Header2			
S	T	,	Stable	N	T	,	Net
U	S	,	Unstable	G	S	,	Gross
O	L	,	Overload	T	R	,	Tare

Example·ST,NT,+ 0.876kg

HEX: 53 54 2C 4E 54 2C 2B 20 20 30 2E 38 37 36 6B 67 0D 0A

· **PF 9**

1. Weight data output by continuous sending mode:

The transmitted data is the current weighing (gross weight or net weight) displayed on the meter. Each frame of data consists of 12 groups of data. The format is as follows:

02	2B	30	30	30	37	38	32	32	31	34	03
Start bit	Sign bit	Data(6 digits in length)						Decimal point	XOR check high 4 digits	XOR check low 4 digits	End bit

Example····· 7.82

HEX·02 2B 30 30 30 37 38 32 32 31 34 03

2.Reply to send the weight data output:

The instrument outputs the corresponding data according to the instructions sent by the host computer. Each time the host computer sends an instruction, the instrument outputs a frame of data accordingly.

The host computer sends the command (hexadecimal):

Command (output net weight):02 41 44 30 35 03

Command (output gross weight):02 41 42 30 33 03

Instrument feedback:

02	41	44	2B	30	30	30	37	38	32	32	31	34	03
Start bit	Address code	Order	Sign bit	Data(6 digits in length)						Decimal point	XOR check high 4 digits	XOR check low 4 digits	End bit

Protocol description:

1. Start bit: STX; ASCII 02
2 .Address code: ASCII A~Z(Scale number: 001-026, address code is ignored when the scale number is 0)
3. Order: ASCII A~D
A: Handshake
B: read/send gross weight
C: Read/send tare weight
D: Read/send net weight
4. Sign bit+Data+Decimal point:
Command A: No data
Command B: Gross weight: sign (+/-) gross weight value (high to low 6 digits) decimal point (right to left)
Command C: tare weight: sign (+/-) tare weight value (high to low 6 digits) decimal point (right to left)
Command D: Net weight: sign (+/-) net weight value (high to low 6 digits) decimal point (right to left)
5. XOR check high 4 digits+XOR check low 4 bits:
Command: the result of the logical exclusive OR between the address code and the command;
Return: the result of the logical exclusive OR of each data from the address encoding to the last data;
The result is high or low 4BIT. If it is less than or equal to 9, add 48 to become an ASCII code number and send; if it is greater than 9, add 55 to become an ASCII code letter to send;
6. Data transmission: ASCII mode, command sending.

· **PF 10**
Continuously send <weight data (including decimal point)>: Six-digit signed weight data including decimal point, ASCII code.
The weight data is the least significant bit first, and the high bit and sign bit are last. The sign bit of the negative number is sent as "-", and the sign bit is sent as 0 when the number is positive; the total length of the protocol is 8 bytes.
E.g:
The weight currently displayed by the meter is -500.00kg, and the serial output data is: = 00.005-.
The weight currently displayed by the meter is 500.00kg, and the serial output data is: = 00.0050.
Example:6.00kg
HEX·3D 30 30 2E 36 30 30 30
ASCII:= 00.6000
Example:-1.02kg
HEX·3D 32 30 2E 31 30 30 2D
ASCII:= 20.100-

·PF 16

Data format·XXX·XX·The above characters are all ASCII codes·

Example·-0.5kg

HEX·30 2E 35

· PF 17

Data format·XXX·XX‹CR›‹LF›·The above characters are all ASCII codes·

Example·-0.5kg

HEX· 30 2E 35 0D 0A

1.Host computer send command format:

ASCII·P

HEX: 0x50

Return command (fixed 13-byte command):

Data bit	Status bit	End bit
7BYTE	5BYTE	1BYTE
A0 A0 A0 30 2E 30 30	A0 EB E7 A0 8D	0x0A

instruction:

Data bits: fixed to 7 bits, filled with data bits in front of 0xa0.

The status is: fixed data as shown in the table above.

Weight data: output as unsigned data.

· PF 18

1.Host computer send command format:

address	Function	Parameter address	Sync code	Checksum
1BYTE	1BYTE	1BYTE	1BYTE	1BYTE
N	05	02	05	SUM

Return command:

address	Function	Parameter address	state	ivision value	Internal Code	Checksum
1BYTE	1BYTE	1BYTE	1BYTE	1BYTE	3BYTE	
N	06	02	ST	X4	X3 X2 X1	SUM

Status code description:

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	1---AD Fault	1---Cell Fault	1---Zero initialization failure	1---overload	0	1--stable	1--Zero position

List of index numbers:

Serial number	explanation	Serial number	explanation
0	d= 0.0001	8	d= 0.05
1	d= 0.0002	9	d= 0.1
2	d= 0.0005	10	d= 0.2
3	d= 0.001	11	d= 0.5
4	d= 0.002	12	d= 1
5	d= 0.005	13	d= 2
6	d= 0.01	14	d= 5
7	d= 0.02	15	d= 10

instruction:
1. The address code N is 0, which is a global address.
2. The check bit is the sum check from the address bit to the synchronization code.
3. The highest bit of the index number is the sign bit, negative numbers are set to 1, and integers are set to 0.
4. Weight = division value * internal code.
Example: The instrument address is 1
Send: 01 05 02 05 0D
Response: 01 06 02 02 04 00 03 E8 FA
Means: indexing value serial number 0x04 = 0.002, internal code 0x03E8 = 1000. Weight: 1000 * 0.002 = 2.000kg

· PF C2

The original data message received by serial port 2 is forwarded to serial port 1 for output.

· Modbus-RTU

32-bit integer data is in 3412 format

ModBus RTU /Support 03H, 06H, 10H function						
menu	address		Parameter Description	Defaults	type of data	Operational attributes
	40001/40002		Display weight (ignoring decimal point)		Integer (1)	Read only
	40003	.0	0=dynamic· 1=stable		bit	Read
		.1	0=non-zero position; 1=zero position		bit	
		.2	0=Gross weight mode; 1=Net weight mode		bit	
		.3	0=no upper limit overload; 1=upper limit overload		bit	
		.4	0=no lower limit overload; 1=lower limit overload		bit	
		.5	0=In the low range; 1=In the high range (single range is usually 1)		bit	
		.6	0=normal display weight; 1=division value reduced by 10 times and display weight		bit	
		.7·15			bit	
	40003		Scale operation· 0: none; 1: zero; 2: tare; 3: clear tare; 4: X10; 5: switch to gross mode		Integer	Write
	40004		Number of decimal places, optional: 0,1,2,3,4.	0	Integer	Read&Write
	40009		Optional division value· 1,2,5,10,20,50,100.	1	Integer	Read&Write
	40011/40012		full range	6000	Integer(1)	Read&Write
	40031		Slave address (own address):1~32	32	integer	Read&Write
	40032		Software version number		Integer	Read only

Command example:
The address of the instrument is 32

Command description	Command address	Command direction	HEX data
Read weight		Send:	20 03 00 00 00 02 C2 BA
		Response: The weight data is·0x0000017C = 380	20 03 04 01 7C 00 00 0B 15
Read status	40003	Send:	20 03 00 02 00 01 23 7B
		Response: The weight data is·0x0020 Indicates dynamic, non-zero position, gross weight mode, no upper limit overload, no lower limit overload, single range, normal display weight, in weighing mode	20 03 02 00 20 05 9B
Scale operation	40003	Send: 1: zero; 2: tare; 3: clear tare; 4: X10; 5: switch to gross mode	20 06 00 02 00 01 EF 7B
		Response:Successful operation	20 06 00 02 00 01 EF 7B
Read the decimal point	40004	Send:	20 03 00 03 00 01 72 BB
		Response: The weight data is·0x0000	20 03 02 00 00 04 43
Write decimal point	40004	Send: The weight data is·0x0003 = 3	20 06 00 03 00 03 3F 7A
		Response:	20 06 00 03 00 03 3F 7A
Read slave address	40031	Send:	20 03 00 1E 00 01 E2 BD
		Response: The weight data is·0x0020= 32	20 03 02 00 20 05 9B
Write slave address	40031	Send: The weight data is·0x0001= 1	20 06 00 1E 00 01 2E BD
		Response:	20 06 00 1E 00 01 2E BD

· **Mettler Toledo**

Data format:The continuous output format is 17 + 1 bytes (Bytes), and the last byte is the check digit. The meter can be set to send or not to send.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
STX	A, B, C			Gross/Net						Tare						CR	CHK

Data address	meaning	Description
Byte 1	STX	0x02
Byte 2·4	A, B, C	Status word A, B, C
Byte 5·10	Gross/Net	6-digit gross or net weight value (without sign and decimal point)
Byte 11·16	Tare	6-digit tare value (without sign and decimal point)
Byte 17	CR	0x0D
Byte 18	Checksum	Checksum. Add Byte1·18, and the sum is 0x00.

Status word A:

Data address	value	Description
Bit 6	0	constant
Bit 5	1	constant
Bit 4~3	1 1 1 0 0 1	Division value factor: x 5 x 2 x 1
Bit 2~0	111 110 101 100 011 010 001 000	Decimal point position: X.XXXXX XX.XXXX XXX.XXX XXXX.XX XXXXX.X XXXXXX XXXXX0 XXXX 00

Status word B:

Data address	value	Description
Bit 6	1 0	Power-on state:powered on normal work
Bit 5	1	constant
Bit 4	1 0	Weight unit: kg lb
Bit 3	1 0	The scale is in dynamic The scale is in steady state
Bit 2	1 0	Positive overload or negative overload normal status
Bit 1	1 0	Symbol: negative weight Positive weight
Bit 0	1 0	Net weight: Net weight status Gross weight status

Status word C:

Data address	value	Description
Bit 6	0	constant
Bit 5	1	constant
Bit 4	1 0	Extended display: x10 display normal display
Bit 3	1 0	Print: There is a print command normal status
Bit 2	0	constant
Bit 1	0	constant
Bit 0	0	constant

8.2 Command output format

If the meter is set to output in command mode, any of the following methods can trigger print output:
· Press the print button, and the scale is in a steady state.
· Send the "P" character to the instrument from the RS232 serial port.
· The meter is set to automatically print and meet the printing conditions.

8.2.1 Standard command output format

Multi-line English format:
Gross 10.000 kg
Tare 5.000 kg
Net 5.000 kg

Multi-line Chinese format:
毛重 10.000 kg
皮重 5.000 kg
净重 5.000 kg

Single-line English format:
10.000 kg 5.000 kg T 5.000 kg NET

Single-line Chinese format:
毛重 10.000 kg 皮重 5.000 kg 净重 5.000 kg

8.2.2 Over/Under command output format

Multi-line English format:
Target 5.000 kg
Tol+ 2%
Tol- 1%
Gross 10.000 kg
Tare 5.000 kg
Net 5.000 kg

Multi-line Chinese format:
··· 5.000 kg
··· 2·
··· 1·
·· 10.000 kg
·· 5.000 kg
·· 5.000 kg

Single-line English format:
5.000 kg Target 2% Tol+ 1% Tol- 10.000 kg 5.000 kg T 5.000 kg NET

Single-line Chinese format:
··· 5.000 kg ··· 2· ··· 1· ·· 10.000 kg ·· 5.000 kg ·· 5.000 kg

8.2.3 Count command output format

Multi-line English format:
Pieces 500 PCS
APW 0.01000 kg
Gross 10.000 kg
Tare 5.000 kg

Multi-line Chinese format:
·· 500 PCS
APW 0.01000 kg
·· 10.000 kg
·· 5.000 kg

Single-line English format:
500 PCS Pieces 0.01000 kg APW 10.000 kg 5.000 kg T 5.000 kg NET

Single-line Chinese format:
·· 500 PCS APW 0.01000 kg ·· 10.000 kg ·· 5.000 kg ·· 5.000 kg

8.3 SICS communication format

Mettler Toledo Standard Interface Command Set (SICS) is a common communication format for Mettler Toledo. It is divided into four layers according to function:
MT-SICS level 0-basic command set.
MT-SICS level 1-extended command set 1.
MT-SICS level 2-extended command set 2.
MT-SICS level 3-extended command set 3.
K1 only supports the basic command set and part of the extended command set 1.

8.3.1 Main functions of MT-SICS level 0 and level 1

The main functions of MT-SICS level 0 and level 1 include:
· Read weight data
·Tare and clear tare
· Zero the instrument
· View the execution of MT-SICS commands
· Check the scale number
·Instrument initialization

For the serial interface communication protocol settings such as: baud rate, data bits, parity bit, handshake signal, etc., as well as the description of the hardware connection harness, please refer to the previous relevant chapters, or search in the manual of the external serial communication device.

Command format:
The peripheral sends ASCII character commands to the instrument. like:

SI	SP	CR	LF

Among them: SI is a character command, 1 to 2 Bytes, which must be uppercase letters.
SP is the space character 20H.
CR LF (0DH, 0AH) is the end character.

Response format:
The instrument may respond as follows after receiving the command:
The response contains weight data:

ID	SP	Status	SP	Weight	SP	Unit	CR	LF

Among them: ID is response identification, 1-2 bytes.
SP is the space character 20H.
Status is the status character, 1 byte
Weight: weight data, 10 numbers (including sign and decimal point), invalid zeros are filled with blanks.
Unit: Weight unit, 1-3 bytes
CR LF (0DH, 0AH) is the end character.

The weight data is not included in the response:

ID	SP	Status	SP	Parameter	CR	LF

Among them: ID is response identification, 1-4 bytes.
SP is the space character 20H.
Status is the status character, 1 byte
Parameters: related parameters.
CR LF (0DH, 0AH) is the end character.

Error message:

ID	CR	LF

Among them: ID is the error code: ES-synchronization error, ET-transmission error, EL-logic error.
CR LF (0DH, 0AH) is the end character.

MT-SICS level 0 commands include:

I0 Query MT-SICS command set
I1 Query MT-SICS level and version number
I2 Query the relevant information of the scale
I3 Query the software version number and identification number of the scale
I4 Query serial number
S send steady state weight data
SI sends weight data immediately
SIR sends weight data immediately and repeats sending
Z zero
ZI zero immediately
@ Reset

Some commands of MT-SICS level 1 include:

T Tare.
TAC clears the tare weight.
TI Tare immediately.

8.3.2 Detailed explanation of MT-SICS commands

Detailed explanation of MT-SICS commands:

I0 Query MT-SICS command set

Send: I0
Receive: I0 B 0 "I0"; All Level 0 commands.
I0 B 0 "I1"
...
I0 B 1 "TI" ;All Level 1 commands.

I1 Query MT-SICS level and version number

Send: I1
Receive: I1 A "01" "2.00" "2.00" "" "-"; Command set: Level 0 and 1,Version: 2.00.

I2 Query the relevant information of the scale

Send: I2
Receiving: I2 A "WS 10.00 kg"; information about the scale.

I3 Query the software version number and identification number of the scale

Send: I3
Receive: I3 A "178036 Lx.x"; software version number.

I4 Query serial number

Send: I4
Receive: I4 A "0123456789"; serial number.

S Send steady state weight data

Send: S
Receive: S S 10.00 kg; steady-state weight data.
S I; The command failed.
S +; Overload.
S-; The weight is less than zero.

SI sends weight data immediately
Send: SI
Receive: S S 10.00 kg; steady-state weight data.
S D 9.00 kg; dynamic weight data.
S I; The command failed.
S +; Overload.
S-; The weight is less than zero.

SIR sends weight data immediately and repeats sending
Send: SIR
Receive: S S 10.00 kg; steady-state weight data.
S D 9.00 kg; dynamic weight data.
S I; The operation failed.
S +; Overload.
S-; The weight is less than zero.
Note: After receiving the SIR command, the meter will continuously send data until it receives the S, SI or @ command. instrument
The watch will stop sending continuous data.

Z Zero
Send: Z
Receive: Z A; Cleared successfully.
Z I; The operation failed.
Z +; Exceeds the upper limit of the clear range.
Z-; Exceeds the lower limit of the clearing range.

ZI Zero immediately
Send: ZI
Receiving: ZI D; Cleared successfully when the scale is in dynamic state.
ZI S; Cleared successfully when the scale is in steady state.
ZI I; The operation failed.
ZI +; Exceeds the upper limit of the clear range.
ZI-; Exceeds the lower limit of the clearing range.

VALUE EACH GRAM

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