AD2020EA Force Value Display Controller

Instruction Manual

Before using this product, please read this instruction manual carefully. Use it correctly and store it properly after fully understanding its contents, so that you can...

Refer as needed.

⊙If the failure or abnormality of this product could potentially lead to a serious system accident, please install appropriate protective circuits externally.

⊙Do not use in locations with flammable or explosive gases, corrosive gases, dust, salt, or high concentrations of metal powder.

⊙Please avoid installing in locations with drastic temperature fluctuations (which may cause condensation) or in areas where heat accumulation might occur due to thermal radiation, etc.

⊙The instructions are subject to change without prior notice. Please refer to the latest version when consulting them. If you have any questions, please contact our company.

⊙ur company shall not be liable for any direct or indirect losses other than those caused by the product itself.

1.Technical Specifications

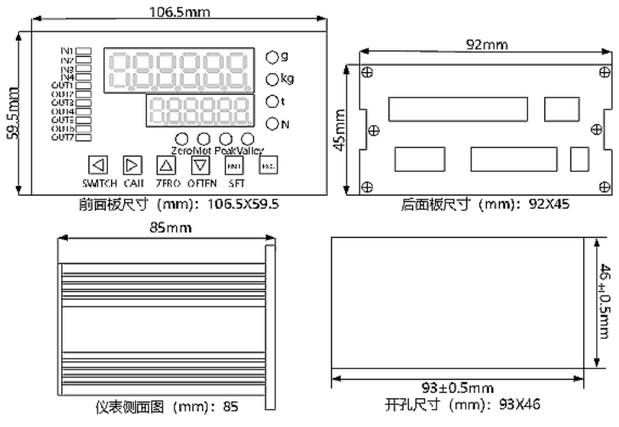
Supply voltage	DC:12V-30V
Input sensitivity	0.4mV/V~6mV/V
Display window	Double-row six-digit LED
Sensor excitation voltage	5VDC ±2%, 100mA (up to 4 sensors, each with 350Ω)
A/D Performance	24 Bit, Delta-Sigma Method
Display accuracy	1/300000
Output rate	10 40/80/120/200/400/600/800/1200/1600/2400/4800 times per second
Baud rate	1200/2400/4800/9600/19200/38400/57600/115200/230400/460800/921600
Operating temperature	30℃~60℃
Withstand voltage	1 minute at 2000V AC 50/60Hz
Agreement	Modbus RTU, ASCII, and Free (Free Protocol)
Digital input/output	5 Point transistor output (maximum 1A), 2-point relay output, 4-point input
Serial port	RS485+RS232
Analog (optional)	0~20mA, 4~20mA, 0~±5V, 0~±10V; resolution 1/60000

2.Install

Warning △!

The machine is being disassembled and assembled.

⊙xternal dimensions (The following drawings are for reference only; the actual product shall prevail.)

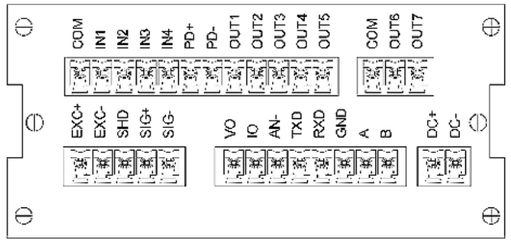


3.Wiring

Warning △!

To prevent electric shock and machine malfunction, be sure to energize the equipment only after confirming that the wiring is correct, and verify the energization range.

⊙erminal configuration (if TEDS functionality is added, the wiring terminals should be changed to **DB9** plug)



O.1 Power Wiring

Symbol	DC+	DC-
Wiring	Positive power,	egative power

O.2 Sensor Wiring (This instrument requires a resistance strain-gage bridge sensor, and the wiring method is four-wire connection.) **O**

Compliant	EXC+	EXC-	SHD	SIG+	SIG-
Wiring	Excitation Voltage+	Excitation Voltage-	Shielding Wire	Signal+	Signal-

Note: When using a six-wire sensor, you should short-circuit the sensor's EXC+ and SIG+ terminals and then connect them to the instrument's EXC+ port.

EXC−Short-circuit to the SIG−port on the meter.

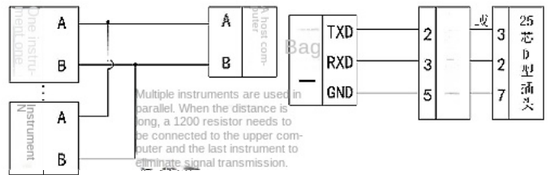
1. Since the sensor output signal is an analog signal that is highly sensitive to electronic noise, the sensor wiring should use...

Shield the cable and lay it separately from other cables, especially keeping it away from AC power sources.

2. For applications involving parallel connection of multiple sensors, it is essential to ensure that the sensitivity (mV/V) of each sensor is consistent.

O.3 Serial Port Wiring

Symbol	A	B	Txd	Rxd	Gnd
Wiring	A	B	Rxd	Txd	Gnd



O.4 Analog Wiring

Symbol	VO	IO	AN-
Current output wiring		IO	AN-
Voltage output wiring	VO		AN-

O.5 Digital Input Wiring

This instrument uses optoelectronic isolation for its digital input/output signals, and the interface requires an external 24V DC power supply to provide the operating voltage for the digital signals.

The power supply's positive terminal is connected to the instrument's PD+, and its negative terminal is connected to PD-. It features both relay and transistor outputs, with the crystal...

The output is configured as an open-collector output.

Transistor output ports: PD+, PD-, OUT1~OUT5

Relay output ports: COM, OUT6, OUT7

Input ports: COM, IN1~IN4

OProtection of DC relays

Apply a resistor-capacitor network in a low-voltage (DC 30V) DC relay circuit, connecting it across the load to form a relay...

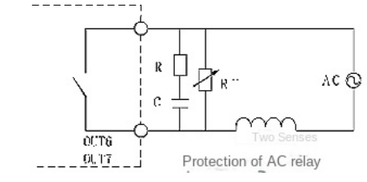
The DC relay protection circuit for DC loads driven by electrical appliances is shown in the figure below:

Note: In the above figure, the external power supply VCC range is 10~30 VDC.

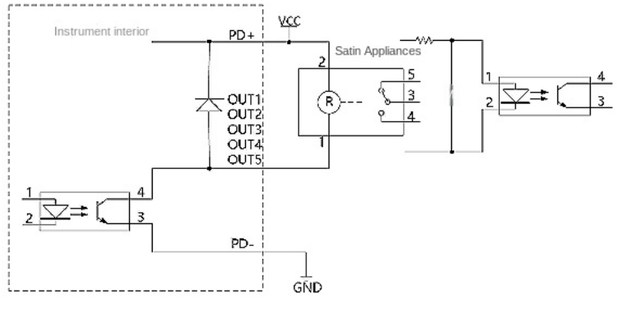
OProtection of AC Relays

When using an AC relay to control a load, it is recommended to connect a resistor-capacitor network in parallel with the AC relay, along with a variable resistor, for protection.

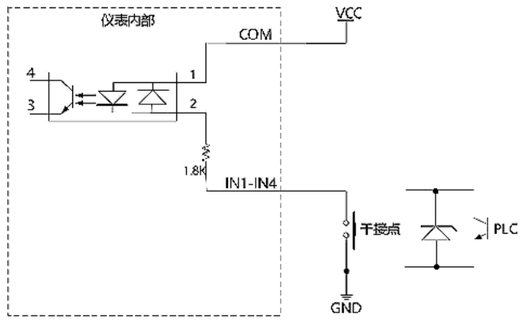
Protect, as shown in the figure below:



ODigital Output Wiring Diagram

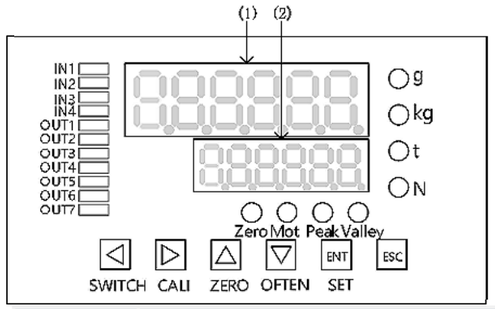


Digital Input Wiring Diagram



4.Basic operations

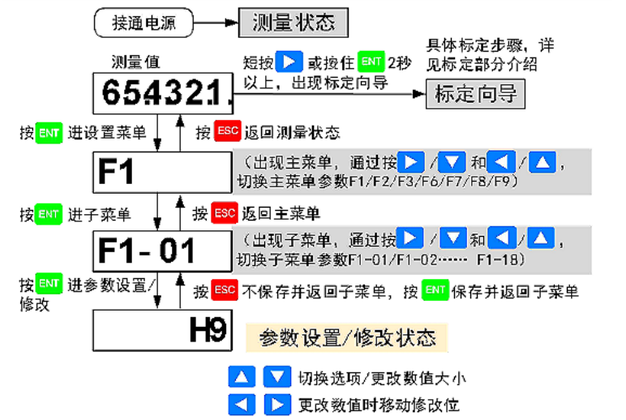
OPanel and Button Instructions



Name	Instructions
Display window (1)	Main interface: Displays gross weight. Menu operation interface: Menu
Display window (2)	Main interface: Displays peak value, valley value, and peak-to-valley value. Menu operation interface: Menu content and values
Weight indicator	g: gram; kg: kilogram; t: ton; N: newton; All weight indicators off: Custom unit
Peak	Main interface, press ◀ key to switch display values: Gross weight: The display window (1) always shows the gross weight. Peak: The window (2) Peak light is on. Valley: The window (2) Valley light is on. Peak-Valley Value: The Peak and Valley lights in window (2) are on.
Valley	
Mot	Light on: Current value is unstable; light off: Current value is stable.
Zero	Light on: The current weight value is 0.
IN1	Light on: Input port 1 is enabled. IN2 Light on: Input port 2 is enabled.
IN3	Light on: Input port 3 is enabled. IN4 Light on: Input port 4 is enabled.
OUT1	Light on: Output port 1 is enabled. OUT2 Light on: Output port 2 is enabled.
OUT3	Light on: Output port 3 is enabled. OUT4 Light on: Output port 4 is enabled.
OUT5	Light on: Output port 5 is enabled. OUT6 Light on: Output port 6 is enabled.
OUT7	

Button	Function Description
SWITCH	Main interface: Switch window (2) displays values (peak, trough, peak-to-trough). Menu interface: Scroll up the menu Editing interface: When modifying a value, move the modification position to the left.
CALI	Main interface: Enter the calibration menu Menu interface: Scroll down the menu Editing interface: When modifying a value, move the modification position to the right.
ZERO	Main interface: Clear gross weight, clear peak and valley values. Menu interface: Scroll up the menu Edit interface: Scroll up when in selection state / Increase value when modifying a numerical value.
OFTEN	Main interface: Enter the frequently used menu Menu interface: Scroll down the menu Edit interface: When in selection mode, scroll down to decrease the value/modify the numerical value.
ENT SET	Main interface: Short press to enter the settings menu; press and hold for more than 2 seconds without releasing to enter the calibration menu. Menu interface: Enter the sub-level interface Edit interface: Save and return to the previous level
ESC	Menu interface: Return to the parent level Edit interface: Don't save and return to the previous level

5. 参数设置方法



6.Parameter Overview

Main menu		
Name	Symbol	Content
F1	**F1**	Basic Parameters
F2	**F2**	Peak/Valley Parameter
F3	**F3**	Comparator parameters
F6	**F6**	Digital parameter
F7	**F7**	Communication parameters
F8	**F8**	Analog parameters
F9	**F9**	Other parameters

6.1 Basic Parameters

F1 Basic Parameters				
Submenu	Parameter Name	Value range	Default	Analysis
F1-01	Unit Selection	**Hg: kilogram; g: gram; n: newton; t: ton; nonE: Custom**	**Hg**	8.1.1
F1-02	Power-on reset range	External weight unit	000000	8.1.2
F1-03	Manual zeroing range	External weight unit	000500	8.1.3
F1-04	Stability range	0~9999, consistent with the real-time weight unit	000038	8.1.4
F1-05	Stabilization time	0.1~5.0 seconds, in increments of 0.1 second	1.5	8.1.4
F1-06	Zero-point range	0~99, consistent with the real-time weight unit	000038	8.1.5
F1-07	Automatic zero-position tracking range	0~9999, consistent with the real-time weight unit	000038	8.1.6
F1-08	Automatic zero-position tracking time	0~5.0 seconds	0.5	8.1.6
F1-09	Creep tracking range	0~9.999, unit: 0.001 division	0.050	8.1.7
F1-10	Creep tracking time	0~999.9, unit: 0.1 second	002.0	8.1.7
F1-11	AD conversion speed	**1040, 80, 120, 200, 400600, 800, 1200, 16002400, 4800 times/second**	**10**	8.1.8
F1-12	Filter Type	**0Do not use 1Compound filtering (recommended) 2Median filter 3: First-order filtering 4Moving average filtering 5Median Average Filtering 6Median Moving Average Filtering 7Average filtering + First-order filtering 8Median filtering + First-order filtering 9Sliding average filtering + first-order filtering 10Median average filtering + first-order filtering**		8.1.9
F1-13	First-level filtering intensity	0~50	06	8.1.9
F1-14	Number of first-level filtering	0~9 iterations	0	8.1.10
F1-15	Secondary filter intensity	0~9	0	8.1.10
F1-16	Stable filtering	**on: on; off: off**	**off**	8.1.10
F1-17	AD resolution	16~24 bits	24	8.1.11
F1-18	Whether negative numbers are displayed	**-1234Display positive and negative numbers; 1234Show only positive numbers**		8.1.12

6.2 Peak/Valley Parameters

F2 Peak/Valley Parameters				
Submenu	Parameter Name	Value range	Default value	Analysis
F2-01	Peak detection enables Can method	**nonE: Disable peak detection** **HrL: Start peak detection after the force value exceeds the peak threshold.** **EEr: Triggers upon external activation and when the peak threshold is met.** Peak detection **EEr: Start peak detection when an external signal is present (ignore threshold)** Value), end peak detection when there is no external signal.	**HrL**	8.2

F2-02	Peak threshold	99999~999999, consistent with the real-time weight unit	000000	8.2
F2-03	Peak hysteresis	0~999,999, consistent with the real-time weight unit	000000	8.2
F2-04	Valley detection enables Can method	**nonE: Disable valley detection** **HrL: Start valley detection after the force value falls below the valley threshold.** **EHr: Triggers upon external activation and when the valley threshold is met.** Valley detection **EEr: Start valley detection when an external signal is present (ignore threshold)** Value), end valley detection when there is no external signal.	**HrL**	8.2
F2-05	Minimum threshold	99999~999,999, consistent with the real-time weight unit	000002	8.2
F2-06	Valley hysteresis	0~999,999, consistent with the real-time weight unit	000000	8.2
F2-07	Peak/Valley Detection Measure interval time	0~2.55 seconds	0.50	8.2

5.3 Comparator Parameters

F3 Comparator Parameters		
Symbol	Instructions	Analysis
F3-1	Comparator 1 parameter	8.3
F3-2	Comparator 2 parameters	8.3
F3-3	Comparator 3 parameters	8.3
F3-4	Comparator, 4 parameters	8.3
F3-5	Comparator 5 parameters	8.3
F3-6	Comparator 6 parameters	8.3

Comparator N parameter (N refers to 1 or 2)				
Symbol	Parameter Name	Value range	Default value	Analysis
F3-1.1 **F3-2.1** **F3-3.1** **F3-4.1** **F3-5.1** **F3-6.1**	Compare enable method	**nonE: Comparator off** **By: The comparator starts immediately upon power-on.** **EEr: External Signal Start/Stop Comparator**	**nonE**	
F3-1.2 **F3-2.2** **F3-3.2** **F3-4.2** **F3-5.2** **F3-6.2**	Comparison judgment method	**0Force value ≥ upper limit** **1:Mid-range ≤ Force ≤ Upper limit** **2Lower limit < Force value ≤ Middle limit** **3Force value ≤ lower limit** **4Force value ≥ upper limit, lower limit < force value ≤ middle limit** **5Force value ≥ upper limit, Force value ≤ lower limit** **6Force value ≤ lower limit, middle limit < force value ≤ upper limit**	**0**	8.3.1
F3-1.3 **F3-2.3** **F3-3.3** **F3-4.3** **F3-5.3** **F3-6.3**	Compare data source	**Gross: Gross weight EAS: Measured value** **P-v: Peak-to-valley value vALLEy: Valley minimum** **PEAK: Peak nEt: Net weight**	**GroSS**	
F3-1.4 **F3-2.4** **F3-3.4** **F3-4.4** **F3-5.4** **F3-6.4**	Compare latency	0~25.5 seconds	00.1	8.3.2
F3-1.5 **F3-2.5** **F3-3.5** **F3-4.5** **F3-5.5** **F3-6.5**	Compare the upper limit	-99999~999999, with real-time weight unit one To	099999	
F3-1.6 **F3-2.6** **F3-3.6** **F3-4.6** **F3-5.6** **F3-6.6**	Comparison of median limits	-99999~999999, with real-time weight unit one To	000000	
F3-1.7 **F3-2.7** **F3-3.7** **F3-4.7** **F3-5.7** **F3-6.7**	Compare the lower limit value	-99999~999999, with real-time weight unit one To	-09999	
F3-1.8 **F3-2.8** **F3-3.8** **F3-4.8** **F3-5.8** **F3-6.8**	Comparison judgment condition on: Only perform the judgment when the weight is stable	**off: Compare judgments under any circumstances**	**off**	
F3-1.9 **F3-2.9** **F3-3.9** **F3-4.9** **F3-5.9** **F3-6.9**	Comparator threshold	-99999~999999, with real-time weight unit one To	000000	

5.4 Digital parameter

F6 Digital Input Parameters				
Submenu	Parameter Name	Value range	Default value	Analysis
F6-00	Output port test	OUT1:o1.on/o1.oFF OUT2:o2.on/o2.oFF OUT3:o3.on/o3.oFF OUT4:o4.on/o4.oFF OUT5:o5.on/o5.oFF OUT6:o6.on/o6.oFF OUT7:o7.on/o7.oFF	**o.1oFF**	8.4.1
F6-01	Output Port 1 Settings	**0Communication Control 1: Zero Point** **2Stable 3Overload 4: Alarm** **10Comparator 1 Result** **11Comparator 2 result** **12Comparator 3 results** **13Comparator 4 results** **14Comparator 5 results** **15Comparator 6 results**	**10**	8.4.2
F6-02	Output Port 2 Settings		**11**	
F6-03	Output Port 3 Settings		**12**	
F6-04	Output Port 4 Settings		**13**	
F6-05	Output Port 5 Settings		**14**	
F6-06	Output Port 6 Settings		**15**	
F6-07	Output Port 7 Settings		**15**	
F6-50	Enter valid time	0.01~2.55 seconds	**0.05**	8.4.3
F6-51	Input Port 1 Settings	**0Do not use 1Zero-CAPEel it.** **3Clear skin 4Start peak/valley detection** **5: Clear peak/valley values** **10Start comparator 1** **11Enable Comparator 2** **12Start comparator 3** **13Start comparator 4** **14Start comparator 5** **15Start comparator 6**	**0**	8.4.4
F6-52			**0**	
F6-53			**0**	
F6-54			**0**	

5.5 Communication Para meters

F7 Communication Parameters		
Symbol	Instructions	Submenu
F7.485	For RS485 interface	**F7.101~F7.114**
F7.232	For RS232 interface	**F7.201~F7.214**

F7 Communication Parameters				
Submenu	Parameter Name	Value range	Default value	Analysis
F7.101 **F7.201**	**Protocol Type**	**RTU: Modbus RTU protocol FREE: Free protocol** **ASC: ASCII protocol**	**rtu**	
F7.102 **F7.202**	**Baud Rate**	1200, 2400, 4800, 9600, 19200, 38400 , 57600, 115200, 230400, 460800921600	9600	
F7.103 **F7.203**	Mailing address	1~247	001	
F7.104 **F7.204**	Data frame format	**8-n-2: 8 data bits; no parity; 2 stop bits** **8-n-1: 8 data bits; no parity; 1 stop bit** **8-o-1: 8 data bits; odd parity; 1 stop bit** **8-E-1: 8 data bits; even parity; 1 stop bit** **7-n-2: 7 data bits; no parity; 2 stop bits** **7-o-1: 7 data bits; odd parity; 1 stop bit** **7-E-1: 7 data bits; even parity; 1 stop bit**		
F7.105 **F7.205**	**Response Delay**	0~255 milliseconds	000	
F7.106 **F7.206**	**Verification**	**oFF: Disable CRC check** **on: Enable CRC check (Modbus RTU protocol invalid) oFF**		
F7.107 **F7.207**	High and low settings	**HH-LL: 32-bit data is stored with the high-order bits first, followed by the low-order bits.** **LL-HH: 32-bit data is first placed in the lower bits, then the higher bits.** （Only the Modbus RTU protocol is valid.	**HH-LL**	
F7.110 **F7.210**	**Continuous Transmission**	**oFF: Enable continuous sending on: Enable continuous transmission**	**oFF**	9.1.1
F7.111 **F7.211**	Send data continuously Source	**Gross: Gross weight CAL: CAL value** **EAS: Measured value P-v: Peak-to-valley value** **vALLEy: Valley PEAK: Peak** **nEt: Net weight**	**GroSS**	9.1.1
F7.112 **F7.212**	**Data Update Method:**	**oFF: Send regardless of whether the data has changed.** **on: Send only when data is updated.**	**oFF**	9.1.1
F7.113 **F7.213**	**Interval Time**	0~60,000 seconds	00.000	9.1.1
F7.114 **F7.214**	**format**	**Std: Standard format** **SEP: Simple Format** **SEP2: Simple Format 2**	**Std**	9.1.1

5.6 Analog Parameter

F8 Analog Parameters				
Submenu	Parameter Name	Value range	Default value	Analysis
F8-01	Analog Output Type	**n-5v:0~±5V** **n-10u:0~±10V** **4-20E:4~20mA** **0-20E:0~20mA**	**n-10u**	8.5
F8-02	Analog Output Data Source	**Gross: Gross weight EAS: Measured value** **P-v: Peak Valley value vALLEy: Valley** **PEAH: Peak nEt: Net weight**	**GroSS**	
F8-03	First analog quantity	-9.999~25.000	00.000	8.5
F8-04	The second analog quantity	-9.999~25.000	10.000	8.5
F8-05	First point weight	-99999~999999, with real-time replay Units of measurement are consistent.	000000	8.5
F8-06	Second point weight	-99999~999999, with real-time replay Units of measurement are consistent.	010000	8.5
F8-07	Fine-tune the first analog signal	**S1 AdJ:0.001 V(mA);** **n1 AdJ:0.01** V(mA); **L1 AdJ:0.1** V(mA)	**n1 AdJ**	8.5
F8-08	Fine-tune the second analog signal		**n1 AdJ**	8.5
F8-09	Third analog signal	-9.999~25.000	00.000	8.5
F8-10	Third point weight	-999999~999999, with real-time replay Units of measurement are consistent.	000000	8.5
F8-11	Fine-tune the third analog signal	**S1 AdJ:0.001 V(mA);** **n1 AdJ:0.01** V(mA); **L1 AdJ:0.1** V(mA)	**n1 AdJ**	8.5

5.7 Other parameters

F9 Other parameters				
Submenu	Parameter Name	Value range	Default value	Analysis
F9-01	Display refresh rate	001~200 times/second	010	8.6.1
F9-02	TEDS scan	**oFF: Detect TEDS sensors only when power is applied.** **on: Scan the TEDS sensor every 1 second.** (Only supported by the TEDS version)	oFF	
F9-03	Sensor millivolt value	-39.000mV~39.000mV	Real-time value	
F9-04	Parameter menu password	000000~999999		
F9-05	Restore default parameters	Restore all parameters from F1 to F9		8.6.4
F9-06	Version number	Firmware version number		8.6.5
F9-09	Fault Prompt Type	**oFF: No prompt** **onE: Prompt only once** **YontEr: Interval Prompt**	**oFF**	8.6.6
F9-10	Fault notification interval	00001~34,463, unit: seconds	00010	8.6.7

7.Calibration and verification

When a user first uses this instrument, or when any part of the measurement system has changed, as well as when the calibration parameters of the current device are updated.

When the instrument fails to meet the user's requirements, it should be calibrated. Calibration can be performed using weight calibration or digital calibration (no need).

Weight calibration: The calibration can be performed by modifying any one or more of the calibration parameters.

πPress the 0key briefly or long-press the ENT key for more than 2 seconds to enter the calibration wizard. Follow the instructions in the calibration wizard to complete the calibration steps.

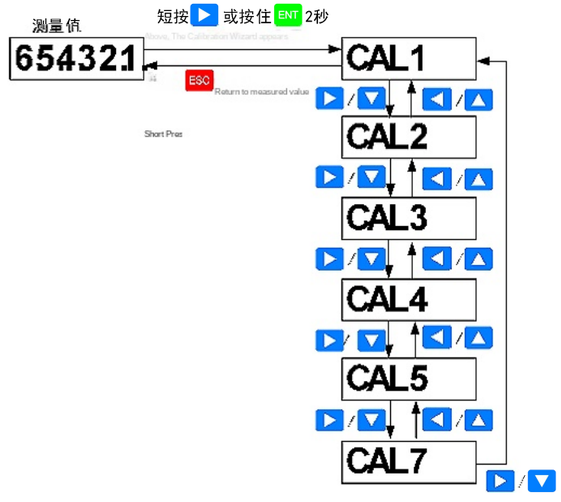
πThe instrument must be powered on for at least 15 minutes before calibration to allow the sensor and the instrument to stabilize.

Before calibrating the new equipment, the weighing body must first be pressed with a weight at full scale for at least 8 hours to stabilize its mechanical structure.

πThe angular difference must be checked before and after the device is calibrated.

7.1 Calibration parameters

Calibration Menu		
Name	Symbol	Content
CAL1	**CAL1**	Weight calibration
CAL2	**CAL2**	Digital calibration
CAL4	**CAL4**	Calibration password
CAL3	**CAL3**	Multi-point correction
CAL5	**CAL5**	Restore calibration parameters
CAL7	**CAL7**	Display correction parameters



7.2 Calibration Procedure

Calibration methods are divided into weighted calibration and weightless calibration (digital calibration).

πalibration with weights (**CAL1**): Calibrate the gain using weights

πCalibration without weights (**CAL2**): Instead of calibrating the gain, the gain is estimated based on the input sensor sensitivity.

ØWhen it is inconvenient to load weights on-site for system calibration, weightless calibration can be used. This applies when sensors or instruments are replaced.

Please recalibrate the scale or weighing system mechanism if there are any changes.

With calibration weights CAL1

Calibration parameters for weights (using weights to calibrate gain)

CAL1 Weighing Calibration				
Name	Submenu	Parameter Name	Value range	Default value
div	**Dev**	Degree setting	0.00010.0002, 0.0005, 0.001, 0.0020.005, 0.01, 0.02, 0.05, 0.1, 0.20.5, 1, 2, 5, 10, 20, 50	0.01
CAP	**CAP**	Maximum weighing value	0~999999, consistent with the real-time weight unit	10000
ZEro	**ZEro**	Calibrate the zero point	99999~999999, with real-time weight unit one To	
SPAn	**SPAn**	Calibration range	99999~999999, with real-time weight unit one To	10

dĒv(div):---Scale setting, i.e., the smallest graduation--the minimum value that the instrument can read. (For example, a weight of 1000g, when being

when divided into 10 equal parts, the graduation value is 100 g; when divided into 100 equal parts, the graduation value is 10 g; and when divided into 1,000 equal parts...

The decimal point displayed on the digital tube is related to the scale division; if you select a scale division of 0.1, the display will show up to...

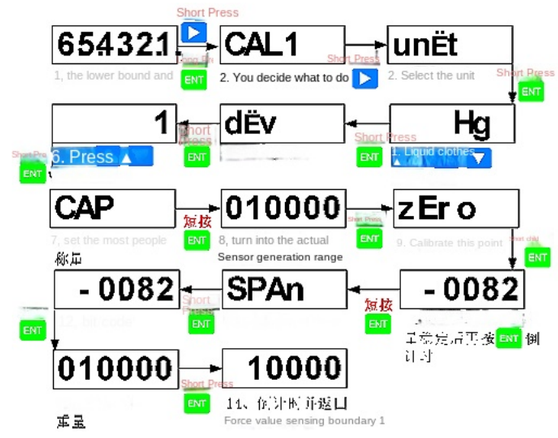
0.0If you select a graduation of 0.01, the display will show up to 0.00.

CAP(CAP):---Maximum weighing capacity, i.e., the sensor's maximum measurement range.

ZERO(Zero):---ZeroPointCalibration,thatistheweightofthesensorwhenitisempty.

SPAn(Span):---Gain calibration, i.e., the weight value input after loading weights onto the sensor (it is recommended to use 25% of the full scale range

The above weight).



πEnter weight calibration (**CAL1**): Press 0briefly or press and hold the ENT key for more than 2 seconds to enter **CAL1**.

πUnit Settings (**unĒt**): **CAL1** Short press ENT to enter **unĒt**, and you'll immediately jump to the settings interface. Use the π key to switch.

Change the unit, save using ENT, and switch to the indexing setting.

πScale Setting (**dĒv**): **CAL1** Short press ENT to enter **dĒv**, then press ENT again to enter the scale adjustment mode. Use the π keys

Switch the graduation value, press ENT to save, and then switch to the maximum weighing capacity.

πMaximum weighing (**CAP**): Briefly press ENT to enter the **CAP** modification mode; press πand υto shift, and press π to adjust the numerical value.

Press ENT to save and switch to **ZEro**.

πZero Calibration (**ZEro**): After setting **CAP**, briefly press ENT to enter **ZEro**. Immediately afterward, a weight value will appear—empty .

With sensor, a short press of ENT will start a 5-second countdown and switch to **SPAn**.

πGain Calibration (**SPAn**): Load weights (recommended weight exceeding 25% of the sensor's capacity), and briefly press ENT—this will display a real-time

value, then briefly press ENT and enter the weight of the loaded weights. Use πand υto shift, and use π to adjust the numerical value. Press ENT to save .

Save and return **CAL1**.

Calibration without weights

Digital calibration parameters (instead of calibrating the gain directly, the gain is estimated based on the input sensor sensitivity.)

CAL2 Digital Calibration				
Name	Submenu	Parameter Name	Value range	Default value
div	**Dev**	Degree setting	0.00010.0002, 0.0005, 0.001, 0.0020.005, 0.01, 0.02, 0.05, 0.1, 0.20.5, 1, 2, 5, 10, 20, 50	0.01
CAP	**CAP**	Maximum weighing value	0~999999, consistent with the real-time weight unit	10000
ZEro	**ZEro**	Calibrate the zero point	-99999~99999, with real-time weight unit one To	
SEn	**SEn**	Calibration sensitivity	1.000~6.000mV/V	2.000
SPAn	**SPAn**	Calibration range	-99999~999999, with real-time weight unit one To	

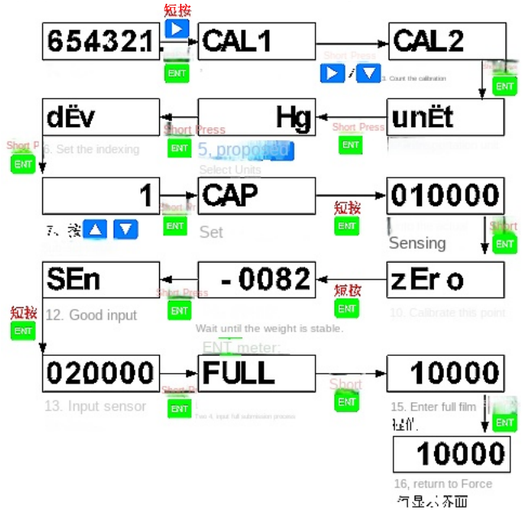
dĒv(div)----Resolution setting, i.e., the smallest scale division--the minimum value that the instrument can display. (For example, for a weight of 1000g: when divided into 10 equal parts, the resolution is 100g; when divided into 100 equal parts, the resolution is 10g; and when divided into 1000 equal parts, the resolution is 1g.) The decimal point displayed on the digital tube is related to the resolution setting. If you select a resolution of 0.1, the display will show up to 0.0; if you select a resolution of 0.01, the display will show up to 0.00.

CAP(CAP)--Maximum capacity, which is the sensor's maximum weighing range.

ZEro(Zero)--Zero calibration, which refers to the weight of the sensor when it is unloaded.

SEn(SEn)--Input sensitivity, which is the sensor's sensitivity value.

SPAn(Span)--Enter the sensor range, which is the sensor's inherent range.



- Enter weightless calibration (**CAL2**): Press briefly or long press the ENT key for more than 2 seconds to enter **CAL1**, then press or to proceed

Enter CAL2.

- Unit Settings (**unEt**): **CAL1** Short press ENT to enter **unEt**, and you'll immediately jump to the settings interface. Use the key to switch.

Change the unit, save using ENT, and switch to the indexing setting.

- Scale Setting (**dEv**): **CAL2** Short press ENT to enter **dEv**, then press ENT again to enter the scale adjustment mode. Use the keys

Switch the graduation value, press ENT to save, and then switch to the maximum weighing capacity.

- Maximum weighing (**CAP**): Briefly press ENT to enter the **CAP** modification mode; press and to shift, and press to adjust the numerical value.

Press ENT to save and switch to **ZEro**.

- Zero Calibration (**ZEro**): After setting **CAP**, briefly press ENT to enter **ZEro**. Immediately afterward, a weight value will appear--empty .

With sensor, a short press of ENT starts a 5-second countdown and switches to **SEn**.

- Sensitivity Input (**SEn**): Enter the sensor sensitivity value. Use and to shift, press to adjust the numerical value, and press ENT .

- Gain Calibration (**SPAn**): Enter the sensor range, use and to shift, and use to adjust the value magnitude. Press ENT to save.

Save and return **CAL2**.

Multi-point correction

Multi-point correction (When the displayed value exhibits a nonlinear relationship with the actual weight of the object on the weighing platform, the data needs to be corrected.)

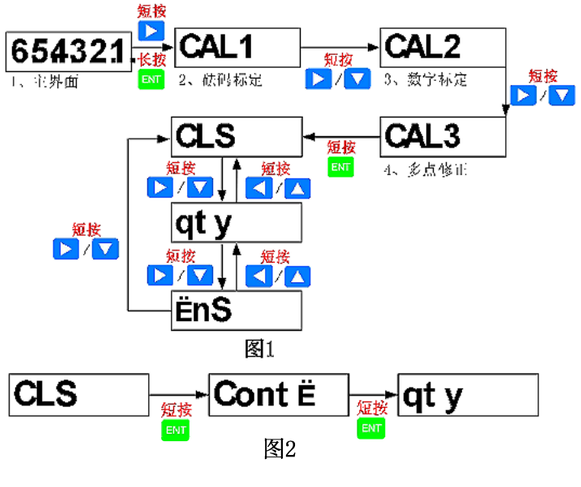
Up to 10 points can be corrected.)

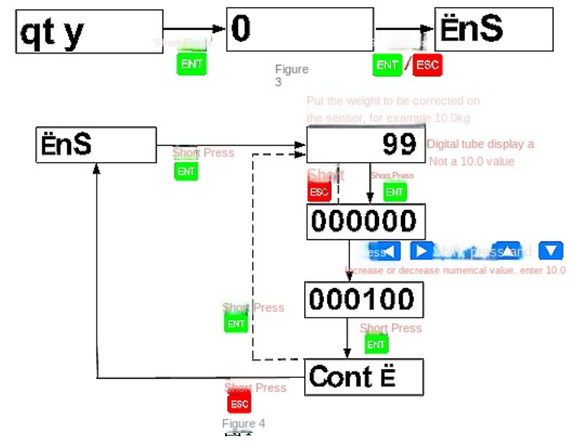
CAL3 Multi-point correction				
Name	Submenu	Parameter Name	Value range	Default value
CLS	**CLS**	Clear multipoint correction parameters	Clear multipoint parameters	
qty	**qty**	Display the number of multi-point corrections	0~10 (shows multi-point edits that have been written) Positive quantity)	0
inS	**YonS**	Insert multi-point correction data	-99999~999999, compared with the real-time weight Unit consistent	0.00

CLS(CLS)--Clear multi-point correction parameters, i.e., erase previously corrected data.

qty(qty)--Displays the multi-point correction quantity, i.e., the amount of multi-point correction that has already been written.

ĒnS(inS)--Insert multi-point correction data: Place weights on the platform and then enter the corresponding weight values for correction.





- Figure 1. Entering Multi-point Correction Parameters (**CAL3**): Press briefly or long-press the ENT key for more than 2 seconds to enter **CAL1**, then press or

Enter **CAL2**, then press or to enter **CAL3**.

- Figure 2. Clearing Multi-point Correction Parameters (**CLS**): **CAL3** Press ENT to enter **CLS**, then press ENT again to display **ContĒ, and then**

Press ENT to clear data and switch to the **qty option.**

- Figure 3. Viewing the Multi-point Correction Quantity (**qty**): **CLS** Press or to enter **qty**, then press ENT to display the multi-point correction quantity,

Press ENT or ESC to switch to the **ĒnS option.**

- Figure 4. Inserting Multi-point Correction Data (**ĒnS**): **qty** Press or to enter **ĒnS**, and place the weights requiring correction onto

On the sensor, press ENT to display the current weight value, then press ENT again to enter edit mode. Use and to move the cursor, and to increase .

Subtract the value, modify it to the weight value you want to display, then press ENT to save and receive the prompt **Continue with the next correction?**

Point operation: Press ESC to return to **ĒnS**; press ENT to move to the next correction state.

Restore calibration parameters

CAL5 Multi-point Correction

Name	Submenu	Parameter Name	Value range	Default value
CAL5	**CLA5**	Restore calibration parameters	Restore CAL1-CAL7 parameters	

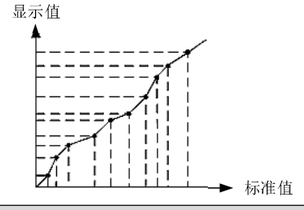
- Calibration parameter recovery steps: Briefly press or long-press the ENT key for more than 2 seconds to enter CAL1, then press the key to switch to CAL5.

Press ENT to prompt ContĒ, indicating whether to continue the operation; then press ENT again to restore the calibration parameters and restart the module.

Correct display parameters

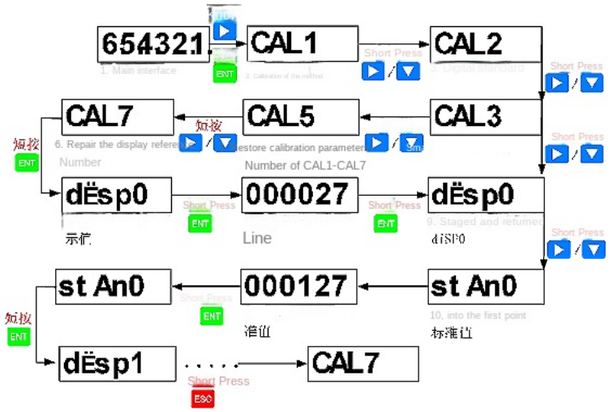
Correct display parameters (when the input signal exhibits a nonlinear, monotonically increasing relationship with the displayed data, corrections are required during calibration).

Monotonic increase means that as the input signal increases within its input signal range, the displayed data also increases.



CAL7 Corrected display parameters				
Name	Submenu	Parameter Name	Value range	Default value
diSP0 dĒSPO		First point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn0 StAnO		First standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP1 dĒSP1		Second point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn1 StAn1		Second standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP2 dĒSP2		Third point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn2 StAn2		Third standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP3 dĒsp3		Fourth point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn3 StAn3		Fourth standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP4 dĒSP4		Fifth point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn4 StAn4		Fifth standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP5 dĒSp5		Sixth point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn5 StAn5		Sixth standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP6 dĒSp6		Seventh point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn6 StAn6		Seventh standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP7 dĒSP7		Eighth point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn7 **StAn7**		Standard value for the eighth point	-9999~99999, consistent with the real-time weight unit	000.00
diSP8 **dĒSP8**		Ninth point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn8 **StAn8**		Ninth standard value	-9999~99999, consistent with the real-time weight unit	000.00
diSP9 **dĒSP9**		Tenth point display value	-9999~99999, consistent with the real-time weight unit	000.00
StAn9 **StAn9**		Standard value for the tenth point	-9999~99999, consistent with the real-time weight unit	000.00

The display correction must be performed after calibration is complete.



The number of inflection points must be greater than 2; otherwise, there will be too few correction points, and the algorithm won't take effect.

In the valid data entered, the displayed value and the standard value cannot both be 0

After entering the number of items that need correction, both the displayed value and the standard value for unused points will be set to 0.

- **Place the weights requiring correction on the sensor, arranged from smallest to largest, and record the displayed values at each breakpoint (placing the weights on**

The value displayed on the instrument and the standard value (the input value that needs to be corrected).

- Enter the display correction parameters (**CAL7**): Press briefly or press and hold the ENT key for more than 2 seconds to enter **CAL1**, then press or

Switch to **CAL7**.

- Enter the display value at the first point (**dĒSPO**): **CAL7** Press ENT to enter **dĒSPO**, then press ENT again to enter the adjustment mode

To change the status, press to shift; to adjust the numerical value, press ; after entering the displayed value, press ENT to save and return to **dĒSPO**.

- Enter the first standard value (**StAnO**): **dĒSPO** Press to enter **StAnO**, then press ENT to enter editing mode

Status: Press or to shift, press to adjust the value. After entering the correction value, press ENT to save and return to **StAnO** .

- Enter the display value for the second point (**dĒSP1**): **StAnO** Press to enter **dĒSP1** and fill in the corresponding display value.

- After entering the displayed value and the standard value, press ENT to save, then press ESC to return to **CAL7**.

8.Functions and Corresponding Parameter Description

8.1 Basic Parameter Description (F1

8.1.1 F1

Options	Unit	Options	Unit	Options	Unit
Hg	kilogram kg	**t**	ton t	**nonE**	Custom unit
g	gram g	**n**	Cow N		

8.1.2 F1-

The range for automatic zeroing upon instrument power-up is centered on the calibration zero point and is set as a percentage of the full-scale range.

For example, if the full-scale range is 100 kg, and the set zeroing range is 10, then the weight on the sensor will be within ±10 kg (i.e., ±

Within the range of 100kgX10%, the instrument is reset to zero immediately upon power-on. When performing the power-on reset, it must be done within the power-on reset range .

And the weight remains stable.

8.1.3 F1-

When the weight displayed on the scale is within the manual zeroing range, performing a manual zeroing operation will set the total weight display to zero. Power off and then power on again.

The post-zeroing value remains unchanged. The default zeroing range is 20, which corresponds to 20% of the full scale. The calibration zero point serves as the center .

When the full-scale range is 100 kg, the weight on the platform is considered to be within the range of ± 20 kg (i.e., ±100 kg × 20%), and manual clearing is performed .

At the moment, the instrument displays a weight of zero. If the weight is unstable or the zeroing range is exceeded, manual zeroing cannot be performed. If...

When the manual zeroing range is set to 100%, you can perform zeroing even under unstable weight conditions.

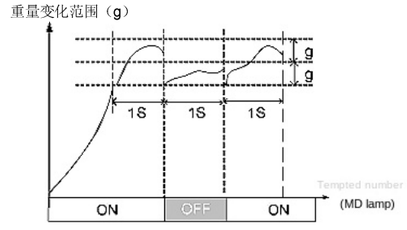
8.1.4 F1-

The MOT light on the front panel of the handheld terminal is lit, indicating that the weight is unstable. In a situation where the weight is unstable, calibration and zeroing cannot be performed.

Stability judgment includes the stability range and the stability duration. As long as the weight variation remains within the stability range during the stability duration, the system is considered stable once the duration elapses.

Set as weight stable.

ssume the unit of weight is g, set the stability judgment range to 1g, and the stability judgment time to 1s. F1-04 = 1g, F1-05 = 1s



- If the weight value varies by more than 1 g within 1 second, the Mot stability indicator light turns ON. When the weight value varies within 1 second...

The adjustment range is within 1 g. The Mot stability indicator light turns off (OFF), and tracking begins every 1 second.

8.1.5 F1

When the weight value fluctuates within the zero-point range, the instrument interprets it as zero.

8.1.6 Automatic Zero-Position Tracking and F1-08 Automatic Zero-Position Tracking Time

he automatic zero-tracking range refers to the range of values indicated by the sensor when it is unloaded or not subjected to any weight, achieved by adjusting the zero point.

The point tracking range ensures the accuracy and stability of weighing results.

During the automatic zero-tracking period, if the weight change remains within the automatic zero-tracking range, the system will automatically track to zero once the time limit is reached.

The point makes the weight 0.

1.Improve weighing accuracy: By adjusting the zero-point tracking range, you can eliminate potential errors inherent in the weighing equipment itself.

Such as sensor drift and mechanical wear, thereby improving the accuracy of weighing.

2.Stable weighing results--during dynamic weighing, environmental factors or fluctuations in the equipment itself may cause variations in the weighing

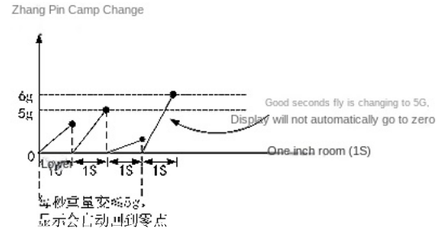
The stability of the results has declined. Adjusting the zero-point tracking range can, to a certain extent, offset these effects and ensure accurate weighing results.

Stability.

3.Easy to calibrate and maintain. By adjusting the zero-point tracking range, it's easier to determine the calibration status of the weighing equipment.

Promptly identify and address potential issues to ensure the equipment operates normally.

Assume that the automatic zero-tracking range for F1-07 is 5g, and the automatic zero-tracking time for F1-08 is 1 seconds.



The weight value fluctuated within 1 seconds and never exceeded 5g. The displayed weight value was 0, and tracking was initiated every 1 seconds.

The zero-position tracking automatically turns off during calibration and reactivates after calibration is complete.

he set zero-tracking range must be smaller than the manual zeroing range.

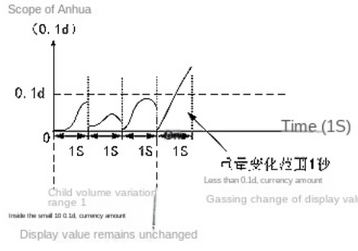
8.1.7 F1-

Creep refers to the phenomenon where, under constant environmental conditions (such as temperature and humidity), the sensor's output signal changes over time while the applied load remains unchanged.

It changes over time.

ssume F1-09 has a creep tracking range of 100, meaning 100 × 0.001 d = 0.1 d; F1-10 has a creep tracking time of 10,

That is, 10 × 0.1 s = 1 s.



If the weight variation within 1 seconds is less than 0.1d, the displayed weight value remains unchanged; if the weight variation within 1 seconds exceeds

After 0.1d, the displayed value changes, and tracking is performed every 1 seconds.

∅Creep tracking is valid only when the measurement state is stable.

8.1.8 F1-

he conversion of analog signals to digital signals, often referred to as AD conversion, has the faster the conversion speed, the lower the sampling accuracy.

8.1.9 F1-12 Filter Type and F1-13 Filter Intensity

iltering is the process of removing specific frequency bands from a signal. It's an important measure for suppressing and preventing interference. AD Sampling

After sampling, the data often contain various types of noise from different sources due to a variety of reasons. In order to obtain...

To obtain weighing data as close to reality as possible, the weighing equipment employs digital filtering for data signal processing.

Select different filter types according to the specific application scenario.

The lower the filtering intensity, the faster the signal response speed of the data output, but the poorer the noise suppression effect; whereas the filter ...

The greater the wave intensity, the slower the response speed of the output signal; however, the better the noise suppression effect will be. In terms of response speed...

Make a reasonable trade-off between degree and filtering effect.

8.1.10 Set the number of first-level filtering cycles / F1-15 Set the second-level filtering intensity / F1-**16** Enable the stable filtering function

he instrument features two-stage filtering: first, a primary filter is applied, followed by a secondary filter. F1-14 The setting configured is for the primary stage.

Number of filtering cycles, F1-15 Sets the filtering depth for the second-level filter. After both levels of filtering are completed, it will also determine whether is required.

To stabilize the filtering, perform another round of stabilization filtering if needed; otherwise, end the filtering. F1-16 Set whether

Stable filtering is required.

8.1.11 F1-

O The ability to distinguish the smallest quantized signal, expressed in the number of binary digits; the higher the resolution, the more can be distinguished.

The more sub-divisions you create within the full-scale range, the more precise the resulting measurement will be. The digital signal obtained is then converted back to using a DAC.

The closer you get after the conversion, the more closely you'll approach the original simulated value that was input. Don't confuse resolution with accuracy--specifically, "accuracy" ...

"Accuracy" is used to describe the degree of precision of a physical quantity, while "resolution" is used to describe the granularity of scale divisions.

8.1.12 F1-16

O1234: Displays both positive and negative numbers (default)

O234: Only positive numbers can be displayed; when a negative signal is input, 0 is displayed.

3.2 Peak/Valley Parameter Description (F2)

On the display screen, you can view peak/valley values by switching the display mode. When you switch to peak display, the Peak indicator light is activated.

Bright—when switching to valley display, the Valley indicator light turns on; when switching to peak-valley display, the Peak and Valley indicators turn on.

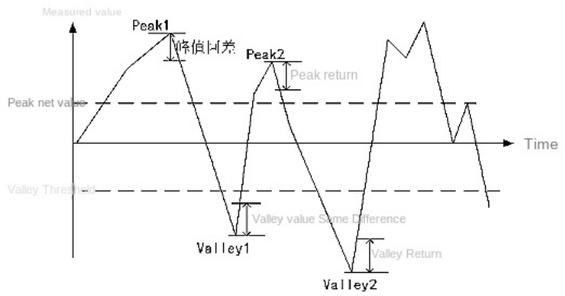
The indicator light illuminates simultaneously. When the next peak or trough value appears, the displayed data is overwritten.

OPeak threshold: Peak detection is initiated when the measured value exceeds the peak threshold.

Oeak Hysteresis: When the measured value drops back to the peak hysteresis setpoint, peak detection stops.

• Valley threshold: When the measured value falls below the valley threshold, valley detection is initiated.

OValley hysteresis: When the measured value returns to the valley hysteresis setpoint, valley detection stops.



🡻As shown in the figure above, once the measured value exceeds the "peak threshold," the meter starts detecting the peak. When the measured value begins to drop,

After exceeding the "peak hysteresis," the instrument completes peak detection and obtains the peak value.

🡻fter a peak is detected, only when the measured value drops below the "peak threshold" and then rises again above the "peak threshold" ...

Only then can the peak be re-detected. To acquire the peak, the value must exceed the "peak threshold" and the subsequent drop must surpass the "peak hysteresis."

🡻Valley detection is similar to peak detection and will not be described separately.

Maximum value&Minimum value detection:

To obtain the maximum measured value: Set the "Peak Threshold" according to actual needs and set the "Peak Hysteresis" to 0.

To obtain the minimum measured value: Set the "valley threshold" according to actual needs and set the "valley hysteresis" to 0.

3.3 Comparator Parameter Description (F3)

OComparator 1 Setup Steps

a.F3-1.1 Turn on the comparator∅.F3-1.2 Select the comparison judgment method∅.F3-1.3 Select the comparison data source∅

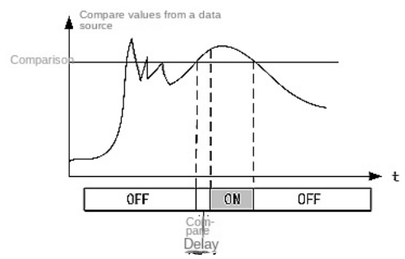
d.F3-1.4 Set comparison delay∅. According to the comparison judgment method: **F3-1.5** Set the comparison upper limit**/F3-1.6 Set**

Set the upper limit in the comparator **F3-1.7** Set the lower limit in the comparator∅.**F3-1.8** Set the comparison condition∅.**F3-1.9**

Set the comparator threshold (comparison is performed only when the force value exceeds the comparator threshold.)

Oomparator 2 The setup steps for this comparator are identical to those for the comparator 1, so we won't describe them separately here.

3.3.2 F3-1.4/F3-2.4 Delay Comparison



3.4 Digital Input/Output Parameters (F

3.4.1 F6-00 Output Port Test

Onter **F6-00**, and test whether the port output is normal. When **o1.on** is displayed, the Ch1 light turns on; when **o2.on** is displayed, the CH2 light turns on.

3.4.2 F6-01 Output Port 1 Settings and F6-02 Output Port 2 Settings

OTransistor output activation steps:

A: Connect the wires according to the discrete output wiring diagram.

B: Set the output conditions and output ports OUT1 corresponding to F6-01 Set the conditions, output port OUT2 corresponding to F6-02 Set

Set the condition, output port OUT3 corresponds to F6-03 Set the condition, OUT4 corresponds to F6-04 Set the condition, OUT5 corresponds to

Should F6-05 set the conditions, OUT6 corresponds to F6-06 set the conditions, OUT7 corresponds to F6-07 set the conditions. If you need to...

Compare and output the force values—please select **10~15**; comparator 1 results—comparator 6 results, refer to menu F3 and

3.4.3 F6-50 Enter valid time

OSet the hold time for the input signal; the larger the setting, the longer the input signal needs to be held, enhancing anti-interference performance.

The better the fruit, the better; the smaller the setting, the faster the response.

3.4.4

Ohe instrument is activated by an external signal fed through the input port, enabling one of the functions selected from F6-51 to F6-54.

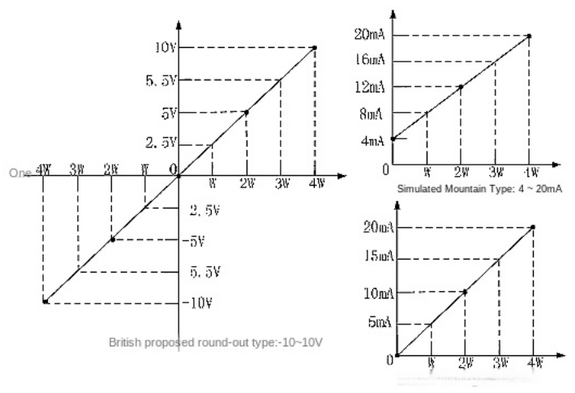
The most commonly used function among them is external signal reset.

3.5 Analog Parameter (F8)

e instrument, if you need to output an analog signal, you must enter the F8 menu to configure the analog

Set the quantitative parameters.)

OThe analog output has a linear relationship with the weight value.



✒. Set the analog output type (F8-01): 0~20mA/4~20mA/0~±10V.

✒. Select the analog data source type (F8-02): Measured value / Gross weight / Net weight / Peak value / Valley value / Peak-to-valley value.

✒. Set the analog values (F8-03) and (F8-04): Set the corresponding first point according to the analog output type selected in F8-01.

Analog input and second analog input (if 0–20mA is selected: the first analog input is 0.000, and the second analog input is

20,000; If you select 4~20mA: The first analog value is 4.000, and the second analog value is 20.000; If you select

Select -10~10V: The first analog value is 0.000, and the second analog value is 10.000.

✒. Set the weight values (F8-05 and F8-06): Enter 0 for the zero-point weight value in F8-05, and enter the full-scale weight value in F8-06.

✒. Fine-tune the first analog point (F8-07) and the second analog point (F8-08): When the first and second analog points...

When the output value deviates, you can make fine adjustments using F8-07 and F8-08 to ensure precise output.

✒. The third analog signal (F8-9) and the third weight (F8-10) can be set selectively. For example, when setting the output to 4-20mA,

Simply set the first analog output to 4mA, and the second analog output to 20mA. If you need to set

At the three points—4mA, 12mA and 20mA—set the analog value for the first point as 4mA, and set the analog value for the second point as .

12mA, the third analog setting is 20mA. The three analog settings must be configured in ascending order.

✒. Fine-tune the third analog output (F8-11): When there is a slight deviation in the third analog output, you can use F8-11 for fine adjustment.

After the simulation parameters are set, don't go back to F8-01 to confirm the output type. If you do go back to F8-01, press Confirm again

If you press the key, the voltage or current setting parameters within F8 will revert to their default values. If you want to access F8-01, please exit .

Press the Back key when outputting; the simulated parameters—whether voltage or current—depend on the output. ±10V, ±5V, 0~10V, 0~5V,

4-20mA, 0-20mA Automatically switches; the third-point parameter is not used by default.

3.6 Other parameters (F9)

F9-01 Display refresh rate

OThe frequency at which the digital tube display is refreshed.

3.6.2 F9-02 TEDS Scan

OFor instruments equipped with TEDS, if the TEDS function is unavailable, the F9-02 menu will also be absent.

OEDS Function: Information such as the sensor's sensitivity and measurement range is imported into the TEDS chip, and the chip is then bonded to .

On the sensor, the instrument can eliminate the need for calibration by recognizing chip data, enabling the on-site measurement system to have automatic calibration functionality.

3.6.3 F9-03 Sensor millivolt signal

Ontering the F9-03 menu will display the millivolt value output by the sensor to the instrument; this millivolt value is proportional to the weight reading shown on the instrument.

The sensor's normality can be determined by the millivolt value.

3.6.4

05 Restore default parameters (F9-05 can restore the parameters set using F1~F9 to their factory-default values.)

Oa. F9-05 ∅. 8**ContËnt**∅. 8

(For instruments equipped with a tactile switch, press and hold the zeroing button on the instrument, then power it on. The communication parameters can be reset after 3 seconds.

To the default value)

3.6.5 F

OProducts of the same model are distinguished by different version numbers as their functions increase, decrease, or change.

F9-09 Fault Notification Type

OIn case of an error—for example, when the sensor cable is disconnected—selecting **oFF** does not trigger an error; selecting **onE** triggers an error only once; select

SelectËntEr keeps reporting an error.

F9-10 Fault notification interval

OElected **SelectËntEr** When the error keeps occurring, you need to set the interval between two error reports.

9.Communication paramete

9.1 Continuous Transmission Function Setting

By enabling the continuous transmission function, the meter can continuously and uninterruptedly send data to... Position machine.

9.1.1 Free protocol continuous transmission setting

✒. Enter F7.101/F7.201 Select protocol type **FrEE**.

✒. Go to F7.110/F7.210 and select the "Enable Continuous Transmission" function **on**.

✒. Enter F7.111/F7.211 Select the continuous data transmission source; generally, choose Gross Weight **GroSS**

✒. Enter F7.112/F7.212 Select the data update method according to customer requirements.

✒. Enter F7.113/F7.213 to select the interval for data transmission.

🡻When setting the interval for continuous transmission, be sure to note that the set time must not be shorter than the time required for one frame. For example:

Okay, if the set baud rate is **9600**, then the speed is **9600** bits per second. Since 1 byte **= 10** bits, the speed is

is 960 bytes per second, meaning that 1 seconds can transmit **960** bytes. If the continuously sent back format is **FE 01 50 00**

00 00 00 06 CF FC CC FF, which means that **12** bytes constitute one frame. Therefore, one frame (**12** bytes) requires

The time for is **12/960 = 0.0125** seconds **= 12.5** milliseconds. Therefore, when setting the interval for continuous transmission, we must make it sufficiently large .

At 12.5 milliseconds. Of course, you can also increase the baud rate to shorten the interval time.

✒. Enter F7.114/F7.214 Select the format for data transmission.

For example, the resolution is 0.01, and the digital tube displays 0.82. The data returned varies depending on the selected format.

Std: Standard format: FE 01 50 00 00 00 00 52 CF FC CC FF**SËP**: Simplified format: 0.82 (If the instru ment does not support the ASCII protocol, select the **SËP** format; data is transmitted in ASCII

Send in HEX format to the host computer; note that the host computer must be set to display in HEX.) **SË P2**: Simple Format 2: FE 01 50 00 00 52 CF FC CC FF (data length is only 2 bytes)

9.2 Modbus RTU Protocol

ata format: 8 data bits, 1 stop bit, odd parity

8 data bits, 1 stop bits, even parity

8 data bits, 1 stop bits, no parity (default)

One data bit, one stop bit, no parity

aud Rate: 1200, 2400, 4800**, 9600** (default), 19200, 38400, 57600, 115200, 230400 460800921,600 bps

Read register data format (read internal instrument data)

1.Sending format

Module address	Function code	Register start address		Number of registers		CRC16 Check	
Addr	03	High 8 bit	Low 8 bit	High 8 bit	Low 8 bit	Low 8 bit	High 8 bit

2.Return format

Module address	Function code	Number of bytes	Register data		CRC16 checksum	
Addr	03	N	High 8 bits	Low 8 bits	Low 8 bits	High 8 bits

OTake gross weight reading as an example

Name	Address	Category	Description	Attribute	Default value
Gross weight	40081 (080)	32 position (Signed integer)	Actual gross weight; negative numbers are represented using the standard two's complement method	Read-only	--

The register addresses are 080 and 081 (if it's a Siemens PLC, please use register addresses 40081 and

40082), then the register starting address is 0**80** (the hexadecimal representation of 80 is **50**), and the number of registers is **2** units. Default

The module address is **01** (when connecting two or more meters in parallel, you must assign different module addresses— 2—so that the host computer can recognize them .

Don't). The function code for reading the register is **03**, and the CRC16 checksum is calculated based on all the preceding data 01 03 00 05 00 02.

The calculated result is **C4 1A**; format the above data according to the read register transmission protocol and compile it into the following instruction: 01 03 00 50 00 02 C4 1A

Module address	Function code	Register start address		Number of registers		CRC16 Check	
01	03	00	50	00	02	C4	1A

The register data in the returned data is 00 00 00 84, which represents the gross weight value. The decimal equivalent of 84 is 132.

Module Address	Function Code	Number of Bytes	Register Data—Group 1	Register Data—Group 2	CRC16 Checksum

01	03	04	00	00	00	84	FA 50	

Register data 00 00 00 84 Converted to decimal is 132; if the data is FF FF FE C9, it represents a negative number: FF FF FE

C9-FF FF FF FF = (4294966985 - 4294967295) - 1 = -311. FF FF FF FF represents -1.

Write register data format (overwrite or set internal instrument data)

1.Sending format

Module Address	Function Code	Register Start Address		Number of registers		Byte count	register data		CRC16 Check	
Addr	10	High 8 bit	Low 8 bit	High 8 bit	Low 8 bit	N	High 8 bit	Low 8 bit	Low 8 bit	High 8 bit

2.Return format

Module address	Function code	Register start address		Number of registers		CRC16 Check	
Addr	10	High 8 bit	Low 8 bit	High 8 bit	Low 8 bit	Low 8 bit	High 8 bit

OTake setting the manual zero-range as an example.

Name	Address	Category	Description	Attribute	Default value
Zeroing range	40094 (093)	16 positio n Unsigned integer	Set the range for zeroing; the unit is a percentage of full scale; Write 0 The manual zero-clearing function is ineffect ive after	Just write	--

The register address is 093 (if it's a Siemens PLC, please use 40094). For a single register, the register starting address is .

is 0**93**(93 in hexadecimal is **5D**), and the number of registers is 1. The default module address is **01**(when connecting 2 units in parallel or using

When connecting to the instrument, you need to set it to 2 different module addresses so that the host computer can recognize them. The function code for writing to registers is **10**.

The register data assumption sets the range to 100%,100, which in hexadecimal is **64**. The CRC16 checksum is calculated based on all the preceding

Data 01 10 00 5D 00 01 02 00 64 The converted value is **AA F6**. Write the above data in register write format

The instruction is 01 10 00 5D 00 01 02 00 64 AA F6.

Module Address	Function Code	Register Start Address		Number of registers		Byte count	register data		CRC16 Check	
01	10	00	5D	00	01	02	00	64	AA	F6

Return format 01 10 00 5D 00 01 90 1B

Module address	Function code	Register start address		Number of registers		CRC16 Check	
01	10	00	5D	00	01	90	1B

The following are examples of some commonly used commands; for detailed protocol information, please refer to the relevant documentation!

9.2.1 Read Modbus RTU protocol

Send: 01 03 00 50 00 02 C4 1A (Address 80 in hexadecimal is 50)

Reply: 01 03 04 00 00 00 84 FA 50 (Data varies depending on the actual situation) Register data 00 00 00 84, when converted to decimal, is 132. If the data is FF FF FE C9, it represents a negative number. FF FF F EC9 - FF FF FF FF = (4294966985 - 4294967295) - 1 = -311. FF FF FF FF indicates -1

9.2.2 hing Calibration(Modbus RTU Protocol)

alibrate the zero point (clear the weighing platform before sending the zero-point command to ensure the sensor is unloaded)

Sent: 01 10 00 24 00 04 08 7F FF FF FF 00 00 00 00 8E 7A

Reply: 01 10 00 24 00 04 81 C1

alibrate the gain (add weights, filling at least the full scale **25%** or more in weight)

Send: 01 10 00 28 00 04 08 7F FF FF FF 00 00 07 D0 9D C6 (using **2000** as an ex ample) Send: 01 10 00 28 00 04 08 7F FF FF FF 00 00 0B B8 99 28 (using **3000** a s an example) Send: 01 10 00 28 00 04 08 7F FF FF FF 00 00 13 88 93 3C (using **5000** as an example) Send: 01 10 00 28 00 04 08 7F FF FF FF 00 00 27 10 84 56 (using **10000** as an example) Response: 01 10 00 28 00 04 41 C2

Weight Calibration(Modbus RTU Protocol)

Sensor sensitivity

Send: 01 10 00 2E 00 02 04 00 00 27 10 6A 07 (taking **1mV/V** as an e xample) Send: 01 10 00 2E 00 02 04 00 00 4E 20 44 43 (taking **2mV/ V** as an example) Response: 01 10 00 2E 00 02 21 C1Sensor range s end: 01 10 00 30 00 02 04 00 00 07 D0 F3 17 (taking **2000** as an exa mple) Send: 01 10 00 30 00 02 04 00 00 0B B8 F7 F9 (taking **3000** as an example) Send: 01 10 00 30 00 02 04 00 00 13 88 FD ED (taking **5 000** as an example) Send: 01 10 00 30 00 02 04 00 00 27 10 EA 87 (ta king **10000** as an example) Response: 01 10 00 30 00 02 41 C7

9.2.4 tion Parameters(Modbus RTU Protocol)

et the maximum weighing capacity

Send: 01 10 00 56 00 02 04 00 00 07 D0 75 15 (using **2000** as an example) Se nd: 01 10 00 56 00 02 04 00 00 0B B8 71 FB (using **3000** as an example) Send: 01 10 00 56 00 02 04 00 00 13 88 7B EF (using **5000** as an example) Send: 01 10 00 56 00 02 04 00 00 27 10 6C 85 (using **10000** as an example) Response: 01 10 00 56 00 02 A1 D8

Send: 01 10 00 58 00 01 02 00 00 AB 48 (using **0.001** as an example) S end: 01 10 00 58 00 01 02 00 06 2B 4A (using **0.01** as an example) Sen d: 01 10 00 58 00 01 02 00 09 6B 4E (using **0.1** as an example) Send: 0 1 10 00 58 00 01 02 00 0C AB 4D (using **1** as an example) Send: 01 10 0 0 58 00 01 02 00 0E 2A 8C (using **5** as an example) Response: 01 10 00 58 00 01 80 1A

9.2.5 anual Reset(Modbus RTU Protocol)

et the manual zeroing range

Send: 01 10 00 5D 00 01 02 00 0A 2B 1A (For example, sending wit h full scale **10%**: 01 10 00 5D 00 01 02 00 14 AB 12; for example, s ending with full scale **20%**: 01 10 00 5D 00 01 02 00 32 2A C8; for example, sending with full scale **50%**: 01 10 00 5D 00 01 02 00 50 AB 21; for example, sending with full scale **80%**: 01 10 00 5D 00 0 1 02 00 64 AA F6; the response for the above examples is: 01 10 0 0 5D 00 01 90 1Bo perform manual zero-setting, send: 01 10 00 5E 00 01 02 00 01 6A EE

Reply: 01 10 00 5E 00 01 60 1B

9.3 Free Protocol

ꩡata format: 8 data bits, 1 stop bit, no parity (default)

ꩡaud Rate: 1200, 2400, 4800**, 9600** (default), 19200, 38400, 57600, 115200, 230400 460800921,600 bps

1.Sending format

Frame header	Address	Instruction	Instruction parameter	CRC Check (optional)		Frame end
FE	Addr	1 Byte	0~255 byte	high 8 bit	Low 8 bits	CF FC CC FF

2.Handshake successful response

Frame header	Address	Instruction	CRC Check (optional)		Frame end
FE	Addr	F1	High 8 position	Low 8 bits	CF FC CC FF

Oinger-grip command (default address is 1)

Category Name	Instruction	Instruction Parameters		Instruction Description
System	handshake	0x00	None	After receiving the command, the module sends 0XF1 to the host to indicate successful handshake . Return format: FE ADDR F1 CF FC CC FF

Transmission format: FE 01 00 CF FC CC FF

Frame header	Address	Instruction	Instruction parameters	Frame end
FE	01	00	None	CF FC CC FF

Return format: FE 01 F1 CF FC CC FF

Frame header	Address	Instruction	Frame end
FE	01	F1	CF FC CC FF

3. Write instruction response (overwrite or set internal instrument data)

Frame header	Address	Instruction	Content	CRC Checksum (optional)		Frame end
FE	Addr	F2	0: Failure; 1: Success	High 8 digits	Low 8 digits	CF FC CC FF

9.3.1 t the zeroing range (default address is 1)

Name	Instruction	Instruction parameters	Instruction Description
Set up Zero range	0x55	Channel+ ManualRange+ PowerRang	**Channel(1** bytes): Sensor channel number ; numbering starts from 0; for 0xFF Select all channels **ManualRange(1** bytes): Manually clear the range; **PowerRange(1** bytes): Power-on reset range ; Unit is expressed as a percentage of full scale; the parameter range is 0~100; if set Set to 0, then the corresponding function will be disabled

Transmission format: FE 01 55 00 32 64 CE FC CC FF(For example, the manual zeroing range is 50%, and the power-on zeroing range is

is 100%, the hexadecimal representation of 50 is 32, and the hexadecimal representation of 100 is 64. Instruction parameter: Channel number 00; Manual clear .

Zero range 32; Power-on reset range 64.)

Frame header	Address	Instruction	Instruction parameters	Frame end
FE	01	55	00 32 64	CF FC CC FF

Return format: FE 01 F2 01 CF FC CC FF (01 Success)

Frame header	Address	Instruction	Content	Frame end
FE	01	F2	01	CF FC CC FF

4.Read instruction response (read internal instrument data)

Frame header	Address	Read the corresponding instruction and its associated instruction parameter content		CRC Check (optional)		Frame end
FE	Addr	1 bytes+	1~253 bytes	High 8 bits	Low 8 bits	CF FC CC FF

9.3.2 s weight reading (default address is 1)

Name	Instruction	Instruction Argument	Instruction Description
Read Gross weight	0x50	Channel	The module returns the current gross weight value to the host; the high-order byte is sent first. **Channel(1** Bytes**):**Sensor channel number; numbering starts from 0; when set to 0xFF, Select all channels Return format: FE Addr 50 Channel Value1 Value2 Value3 Value4 CF FC CC FF

Transmission format: FE 01 50 00 CF FC CC FF (instruction parameter 00 is the channel number)

Frame header	Address	Instruction	Instruction parameters	Frame end
FE	01	50	00	CF FC CC FF

Return format: FE 01 50 00 00 00 00 46 CF FC CC FF(Corresponding instruction parameter content: Channel number) 0

The weight value read out 00 00 00 46.)

Frame header, address, read the corresponding instruction, and the corresponding instruction parameter content.				Frame end
FE 01		50	00 00 00 00 46	CF FC CC FF

9.3.3 commands continuously (default address is 1)

Name	Instruction	Instruction Argument	Instruction Description
Continuous Send	0x07	Channel+ Enable+ DataType+ SendType+ Intervals+ Style(Optional)	**Channel(1** bytes): Sensor channel number ; numbering starts from 0; when set to 0xFF, select Select all channels **Enable(1** Byte): Enable switch ; 0x01: Continuous transmission ; 0x00: Off; **DataType(1** Byte): Data Type;00:Measured Value;01:ADInternal Code Value;02:Gross Revalue;03:Net weight value;04:Peak;05:Valley;06:Peak-to-valley difference **SendType(1** Byte):0x00: Send regardless of whether the data has changed; 0x01:Send only when data changes **Intervals(1** bytes): The interval between consecutive transmissions; unit ms **Style(1** bytes): Instruction format; 0x00: Standard format; 0x01: Simplified format, see Number optional

Sent: FE 01 07 00 01 02 00 32 CF FC CC FF(Corresponding instruction parameter content: Channel number **00**; Enable

Switch **01**; Data type **02**; Send regardless of whether the data has changed **00**; Continuous transmission interval time 50ms, 50

The hexadecimal representation of is **32**.)

Frame header, address, read the corresponding instruction, and the corresponding instruction parameter content.				Frame end
FE 01		07	00 01 02 00 32	CF FC CC FF

FE 01 07 00 01 02 00 14 CF FC CC FF(Gross weight–send regardless of data changes, with an interval of 20ms)

FE 01 07 00 01 02 00 0A CF FC CC FF(Gross weight–send regardless of data changes, with an interval of 10ms)

FE 01 07 00 01 02 00 05 CF FC CC FF(Gross weight–send regardless of data changes, with an interval of 5ms)

Reply: FE 01 50 00 00 00 00 EA CF FC CC FF (The continuously occurring readings correspond to the gross weight; the instruction for gross weight is

For 50)

Frame header, address, read the corresponding instruction, and the corresponding instruction parameter content.				Frame end
FE 01		50	00 00 00 00 EA	CF FC CC FF

.4 ASCII Protocol

ꩡNumber Format: 7 data bits, even parity, 1 stop bit

7 One data bit, odd parity, 1 stop bit

7 1 data bit, no parity, 2 stop bits

8 1-bit data, 1-bit stop bit, odd parity

8 1-bit data, 1-bit stop bit, even parity

8 1-bit data, 1-bit stop bit, no parity (default)

8 1-bit data, 2-bit stop bits, no parity

ꩡaud Rate: 1200, 2400, 4800**, 9600** (default), 19200, 38400, 57600, 115200, 230400 460800921,600 bps

1.Sending format

Frame header	Address	Instruction	Content	LRC Check (optional)	Frame end
:	3 Byte	1~20 bytes	0~255 bytes	2 Byte	CR LF

2.Handshake successful response

Frame header	Address	Content	LRC Verification (optional)	Frame end
:	3 Byte	OK(2 bytes)	2 Byte	CR LF

Oinger-grip command (default address is 1)

Name	Instruction	Instruction Description
Handshake	CONNECT	The module sends OK to the host after receiving the command, indicating successful handshake. Return format: : ADDR OK CR LF

Sending format: :001CONNECT

Return format: :001OK

Frame header	Address	Content
:	001	OK

3. Write instruction response (overwrite or set internal instrument data)

Frame header	Address	Content	LRC Check (optional)	Frame end
:	3 bytes	OK:Success;ER:Failure	2 bytes	CR LF

9.4.1 he zeroing range (the default address is 1)

Name	Instruction	Instruction Description
Set to zero Scope	ZERORANGE=Channel ,Manual,Power	**Channel: Sensor channel number; numbering starts from 0; for...** 255 Select all channels at once. **Manual: Manual zeroing range;** **Power: Power-on reset range;** The unit is a percentage of the full scale; the parameter range is: 0~100; if set to 0, the corresponding function will be disabled. Can (incompatible with version 1.X protocol)

Transmission format: :001ZERORANGE=00,50,80 (Assuming the manual zeroing range is 50%, and the power-on zeroing range is

80%)

Return format: :001OK

4.Read instruction response (read internal instrument data)

Frame header	Address	Instruction	Content	LRC Check (optional)	Frame end
:	3 Byte	1~20 bytes	0~255 bytes	2 Byte	CR LF

9.4.2 s weight reading (default address is 1)

Name	Instruction	Instruction Description
Read gross weight	RDGROSS=Channel	The module returns the current gross weight value to the host; **Channel: Sensor channel number; numbering starts from 0; up to 255** Time selection: All channels return format: Addr GS=Channel,VALUE CR LF (Incompatible with Protocol Version 1.X)

Sending format: :001RDGROSS=R 00
eturn format: :001GS=0.46

10. Code hint

Use the digital tube to indicate a wrong judgment.

Serial number	Compliant	Content	Reason
1	**Err01**	Power-on zeroing error	1The zero-setting range is set too small, and the weight exceeds the zeroing range. 2.Zero the scale when the weight is unstable.
2	**Err02**	Manual zeroing error	
3	**Err06**	Steady yet unstable	
4	**Err20**	Data exceeds the range.	
5	**Err21**	The weight value is unreasonable.	
6	**Err22**	The weights were not placed during calibration.	Weight calibration: When calibrating the gain, no weights were placed.
7	**Err25**	Password entered incorrectly.	
8	**Err90**	Sensor failure	
9	**Err91**	AD chip failure	

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