iFC TECHNOLOGY

МОДУЛЬ СИГНАЛА ТЕНЗОДАТЧИКА

MES-250LC

Двухканальный модуль сигнала тензодатчика

Технический/Операционный мануал

iFC

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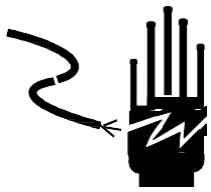
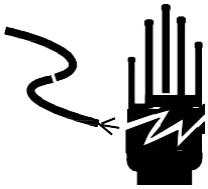


WARNING

NON-PROFESSIONALS THAT ARE NOT ALLOWED DEBUG, TEST AND REPAIR THE CONTROLLER.



WARNING

ENSURE GOOD GROUNDING WHEN USING.

WARNING

DISCONNECT ALL POWER BEFORE MAKING THE ELECTRICAL CONNECTION TO THE CONTROLLER

WAIT 30 SECONDS BEFORE PROCEEDING TO THE NEXT STEP.

WARNING

THIS CONTROLLER IS AN ELECTROSTATIC SENSITIVE EQUIPMENT, PAY ATTENTION TO TAKE ANTI-STATIC MEASURES IN USE AND MAINTENANCE.

IFC RESERVES THE RIGHT TO MODIFY THIS MANUAL

Introduction

Congratulations on choosing our product.

This manual contains the technical specifications of the product, installation and wiring, functional operation and other aspects. In order to keep this product in the best working condition for a long time, please read this operation manual carefully before use, and keep it properly for reference at any time.

Due to the technical update, function enhancement and quality improvement of the product, there may be some differences between this operation manual and the actual product, please understand at that time.

The MES-250LC weight transmitter are high quality products specially designed for various industrial applications, using Delta-sigma analog-to-digital conversion and digital filtering processing technology. Through digital processing of the weak weight signal output by the load cell (group), output the corresponding analog signal to the user's upper system, through RS232/485 serial port communication, it is easy to form a weighing system with touch screen or PLC.

Order model:

Model	Functional Remarks
MES-250LC	RS232, RS485 output, dual channel weight transfer

Contents

1. Safety Tips

- **Do not use in hazardous environments**

Avoid using this product in an environment with flammable gases and explosive dust. If you have this need, please choose our explosion-proof products.

- **Avoid use in excessively hot environments**

Avoid working in an overheated environment for optimal performance and service life.

Avoid direct sunlight on this product. When installing this product in a cabinet, install a cooling fan on the top of the cabinet.

- **Weighing controller grounding protection**

This product is a weak current equipment, and it should be isolated from strong current equipment when installed.

In order to prevent personal injury caused by electric shock accidents and to isolate this product from strong interference sources, be sure to connect the ground terminal of the weighing controller to the ground separately, and the ground resistance is required to be less than 4Ω.

- **Cable laying**

Weighing signals, analog signals and communication signal cables should be laid through pipes, and it is forbidden to lay them together with power cables.

- **The weighing controller is powered**

Before powering up, make sure that the input power supply voltage is correct.

- **Environmental protection**

Although this product is manufactured with lead-free components, there is a high risk of contamination after use in an industrial environment. Therefore,

when the whole machine is scrapped, please dispose of it legally as lead-containing industrial waste to avoid polluting the environment.

- **Other matters**

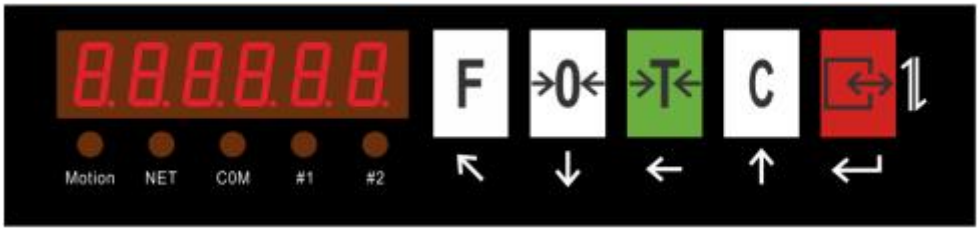
Personnel with appropriate professional knowledge and safe operation should be responsible for the installation, wiring and maintenance of this product. For safety matters not described in this operation manual, please follow the corresponding safety operation procedures and standards.

2. Standard Features

- 24VDC power input, the maximum power consumption is less than 6W.
- 2 load cell interface, support up to 6 *350 ohm load cells
- Communication interface:
  - 1 RS232 and 1 RS485 double serial port communication port, support Modbus RTU communication protocol.
  - Multiple optional A/D weight update speed
  - Configure parameters and read results via Modbus-RTU
  - Standard Industrial rail (DIN) mounting
- Temperature and humidity:
  - Operating temperature : -10^{0}C~50^{0}C, humidity : 10%~ 95%, non-condensing.
  - Storage temperature: -60^{0}C~80^{0}C, humidity : 10% ~95%, non-condensing.

3. Operation interface

3.1 Interface Diagram



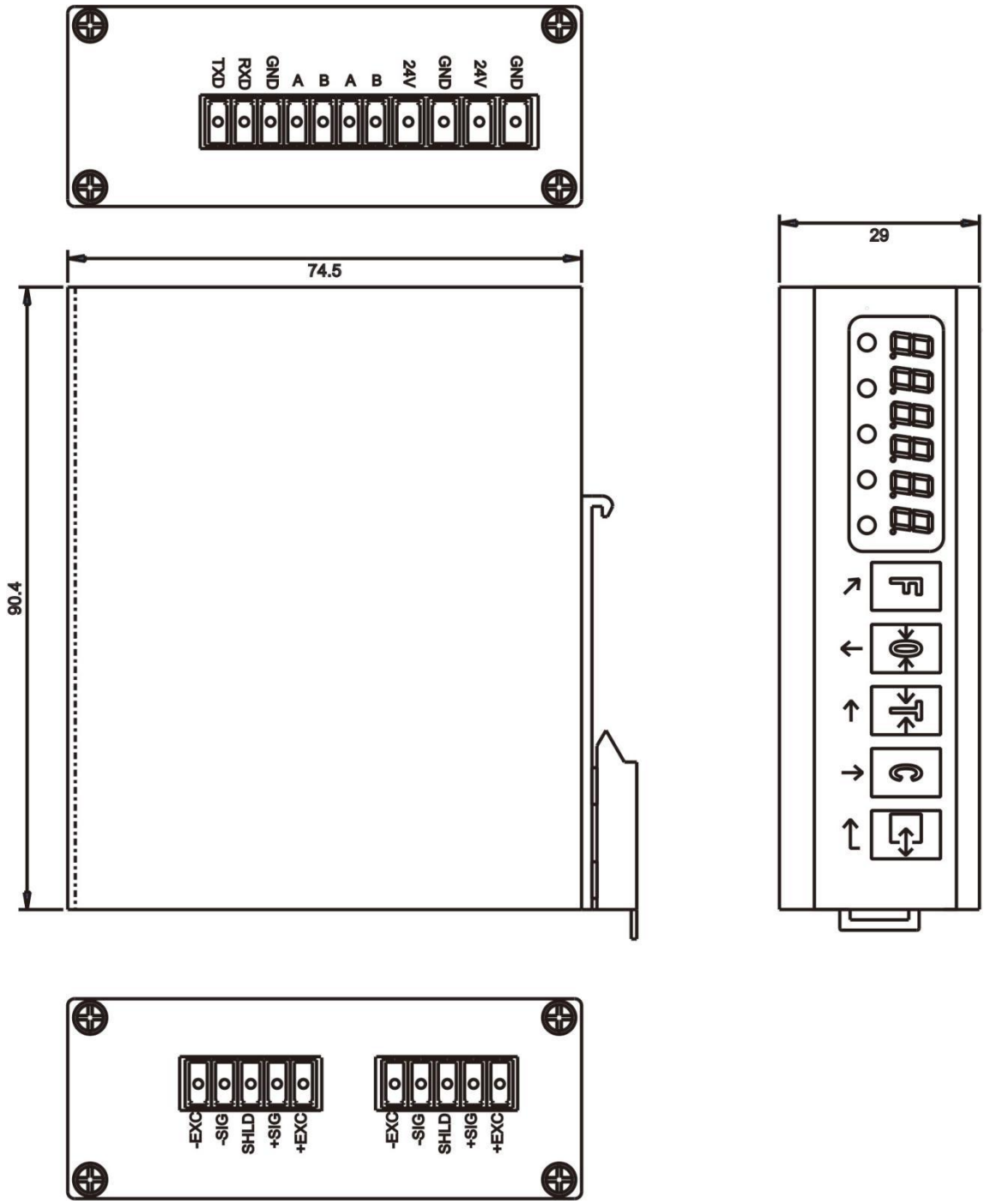
3.2 Status indication & key operation

Indicator	Description
Motion	Motion (Light on when weighing is in motion)
NET	Net weight (Light on when weight is net)
COM	Communication light (the light flashes while communicating)
# 1	Display channel 1
# 2	Display channel 2

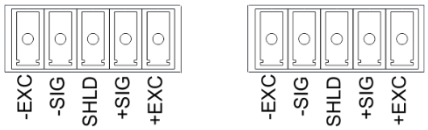
Keys	Description
F ↖	Setup mode: ESC(Exit) menu Weighing mode: Node address can be viewed
→0← ↓	Weighing mode: Zero
→T← ←	Weighing mode: Tare Setup mode: Left switch
C ↑	Weighing mode: Clear Setup mode: Up switch / increase digit
↵	Setup mode: Confirm Change channel
F + ↵	Press F first, then press ↵ to enter the menu
F ↖	Long press to enter the Quick Calibration Menu CH1 C0: Scale 1 zero point calibration CH1 LD: Scale 1 capacity calibration CH2 C0: Scale 2 zero point calibration CH2 LD: Scale 2 capacity calibration

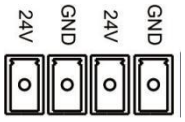
4. Installation/interface/wiring

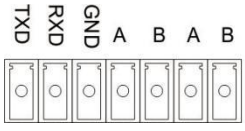
4.1 Installation



4.2 Interface

<table>
<tr><th colspan="4">Load cell interface(2 channels)</th></tr>
<tr><td>Diagram of terminal</td><td>Serial number</td><td>Pins</td><td>Description</td></tr>
<tr><td rowspan="5"> 

The picture shows a 4-wire sensor, if a 6-wire sensor is used, it is require to short-circuit+EXC and +SEN to +EXC, and short-circuit -SEN and -EXC to -EXC.</td><td>1</td><td>+EXC</td><td>Positive excitation terminal</td></tr>
<tr><td>2</td><td>+SIG</td><td>Positive signal terminal</td></tr>
<tr><td>3</td><td>SHLD</td><td>Shielded ground terminal</td></tr>
<tr><td>4</td><td>-SIG</td><td>Negative signal terminal</td></tr>
<tr><td>5</td><td>-EXC</td><td>Negative excitation terminal</td></tr>
<tr><th colspan="4">Power interface</th></tr>
<tr><td>Diagram of terminal</td><td>Serial number</td><td>Pins</td><td>Description</td></tr>
<tr><td rowspan="4"> 

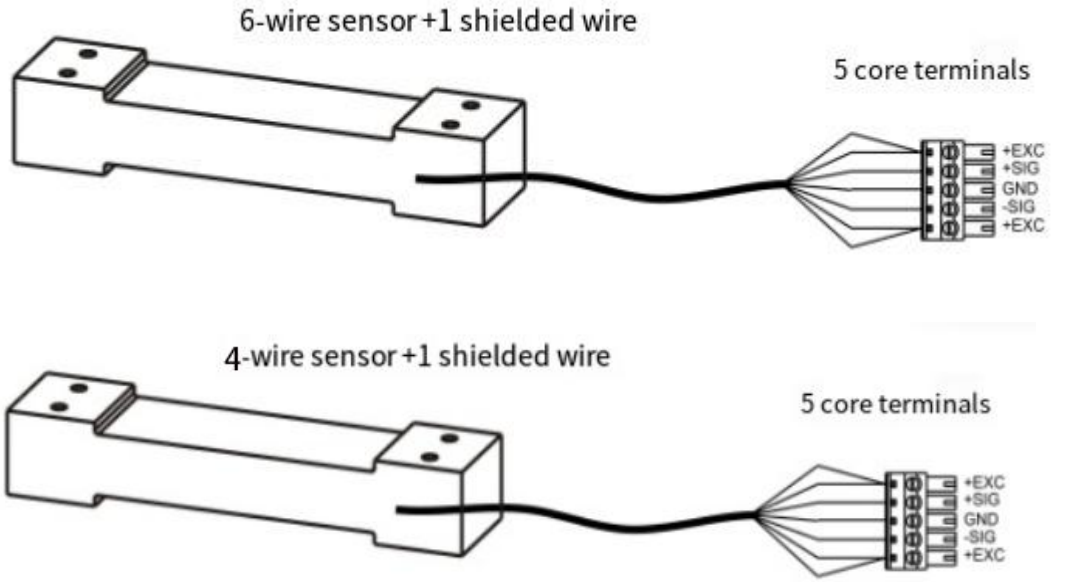
Use 2 sets of 2-core terminals</td><td>1</td><td>+24V (power positive)</td><td>DC power supply positive</td></tr>
<tr><td>2</td><td>GND (Power negative)</td><td>DC power supply negative</td></tr>
<tr><td>3</td><td>+24V (power positive)</td><td>DC power supply positive (junction combined)</td></tr>
<tr><td>4</td><td>GND (power supply negative)</td><td>Dc power supply negative (junction connected)</td></tr>
<tr><th colspan="4">Communication interface</th></tr>
<tr><td>Diagram of terminal</td><td>Serial number</td><td>Pins</td><td>Description</td></tr>
<tr><td rowspan="4"> 

Supports standard RS232 and RS485, and can configure communication parameters independently.
Note: RS485 requires grounding to increase</td><td>1</td><td>TXD</td><td>COM1 RS232 Sending end</td></tr>
<tr><td>2</td><td>RXD</td><td>COM1 RS232 Receiving end</td></tr>
<tr><td>3</td><td>GND</td><td>RS232/RS485GND</td></tr>
<tr><td>4</td><td>RS485A</td><td>COM2 RS485 +</td></tr>
</table>

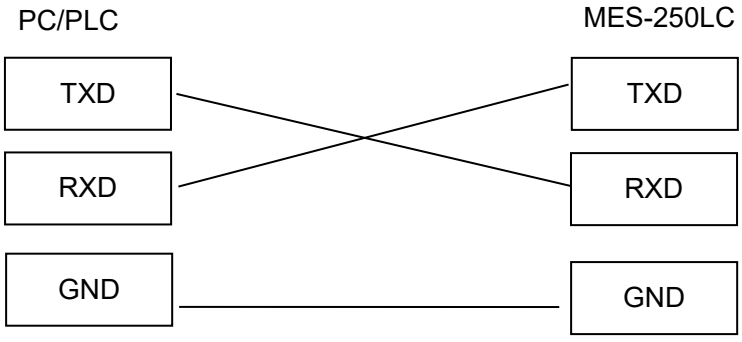
communication interference.	5	RS485B	COM2 RS485 -
	6	RS485A	COM2 RS485 (junction combined)
	7	RS485B	COM2 RS485 (junction combined)

4.3 Wiring

- **Diagram of load cell connection**

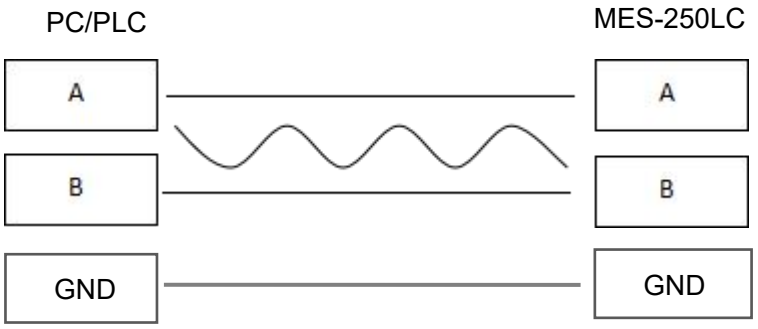


- **RS232 connection**



RS232 transmission distance does not exceed 15 meters

➢ **RS485 connection**



RS485 transmission distance does not exceed 600 meters.

5. Parameter setting

5.1 Metrology calibration menu

➢ **F1 Channel 1 calibration**

First-level menu	Second-level menu			
Prompt	**Prompt**	**Factory setting**	**Setting**	**Description**
F1 Channel 1 calibration	(F1.1) Minimum Division	0.1	0.0001 ~ 50	0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1,2, 5, 10, 20, 50
	(F1.2) Capacity	3000	0~800000	Set the capacity of the scale
	(F1.3) Calibration mode	0	0~2	0：Weight calibration 1-Weight-free calibration 2：Three-point calibration
	(F1.4) Zero calibration	Calibration process		Clear the weighing platform, do the zero calibration
	(F1.5) Three-point calibration-second point calibration	Calibration process		The second point of the three-point calibration

	F 1.6 Capacity calibration	Calibration process		Enter the current weight of the weighing platform and do weight calibration
	F 1.7 Load cell sensitivity			
	F 1.8 Load cell capacity			

Calibration operating instructions:

This menu can set the minimum division,full scale,zero point calibration of the instrument.

- **F 1. 1 Minimum Division**

Press ↵ and ↖ enter F 1, press ↵ enter F 1. 1, press ↵ enter minimum division edit mode.Press ↑ or ↓ select division.Press ↵ save data and enter F 1.2,press ↖ exit.

- **F 1.2 Capacity**

Select F 1.2,press ↵ enter capacity edit mode.Press ↑ or ↓ select capacity range.Press ↵ save data and enter F 1.3,press ↖ exit.

- **F 1.3 Calibration mode**

Select F 1.3,press ↵ enter calibration mode selection,press ↑ or ↓ select calibration mode.

The selection of calibration mode is shown in the following figure:

Calibration mode	Parameter setting	Description
0- Weight calibration	F 1.3	Select F 1.3,press ↵ enter calibration mode selection.Press ↑ or ↓ select calibration mode.Press ↵ save data and enter F 1.4,press ↖ exit.

	F 1.4	Select F 1.4.press ↵ to display CAL 0 ,clean the weighing platform,press ↵ ,after 10 seconds countdown.CAL 0F is displayed.Press ↵ save data and enter F 1.6.press ↖ exit.
	F 1.6	Select F 1.6,press ↵ enter capacity calibration edit mode, press ↑ or → select capacity range and load corresponding weights.For example200,enter the 200 on terminal and then load 200g weights on weighing platform,press ↵ start capacity calibration,after 10 seconds countdown,CAL 0 is displayed. Press ↵ Save data.
1- Weight Free calibration	F 1.3	Same like weight calibration F 1.3
	F 1.7	Select F 1.7， press ↵ enter F 1.7,press ↑ or → adjust sensor sensitivity(see sensor manual for sensor sensitivity).Press ↵ save data and enter F 1.8.Press ↖ exit.
	F 1.8	Select F 1.8， press ↵ enter F 1.8,press ↑ or → enter sensor capacity (see sensor manual for sensor capacity).Press ↵ save data and enter F 1.8.Press ↖ exit.

Press ↖ exit menu, and then load the corresponding weights on the meter, if the output value of the meter is larger than the actual value, you need increase the sensitivity of the sensor; If the output value of the meter is smaller than the actual value, the sensitivity of the sensor needs to be reduced accordingly.

➢ F3 Channel 2 calibration

First-level menu	Second-level menu			
Prompt	**Prompt**	**Factory setting**	**Setting**	**Description**
F3 Channel 2 calibration	(F3.1) Minimum Division	1	0.0001 ～ 50	0.0001, 0.0002, 0.0005, 0.001, 0.002, 0.005, 0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1,2, 5, 10, 20, 50
	(F3.2) Capacity	3000	0～800000	Range： 0～800000
	(F3.3) Calibration mode	0	0～2	0：Weight calibration 1-Weight-free calibration 2：Three-point calibration
	(F3.4) Zero calibration	Calibration process		Clear the weighing platform, do the zero calibration
	(F3.5) Three-point calibration-second point calibration	Calibration process		The second point of the three-point calibration
	(F3.6) Capacity calibration	Calibration process		Enter the current weight of the weighing platform and do weight calibration
	(F3.7) Load cell sensitivity			
	(F3.8) Load cell capacity			

Note: Channel 1 operates the same as the channel 2 menu.

5.2 Weighing application menu

➢ **F2 Channel 1 Scale application**

First-level menu	Second-level menu			
Prompt	**Prompt**	**Factory setting**	**Setting**	**Description**
F2 Channel 1 Scale application	(F2.1) Rate	2	0～3	0: Low speed 1: medium speed 2: High speed 3: Highest speed
	(F2.2) Filter	1	0～4	4 : heaviest 0 : lightest The larger the value, the stronger the anti-interference, but the reading is slow, which needs to be set according to the actual situation on site
	(F2.3) Auto zero range	99	0～99	Press the ZERO key to reset the meter to zero. Percentage of capacity (F 1.2)
	(F2.4) Stable detection range (Dynamic monitoring)	20	0～99	Unit: 1d d is the minimum division (F 1.1) If the value is 2, the change of the scale platform within 2d is considered stable
	(F2.5) Stable detection time	0.1	0.0～5.0	Unit: seconds (minimum displayed value) For example, when the input is 2, the steady weight value given by the meter weighing data after at least 2 seconds. (The greater the value entered, the slower the stable value of the weighing data is given)
	(F2.6) Auto zero tracking range	3	0～9	Unit: 1d (minimum display division value) When the input is 0, there is no zero tracking; When the input is 3, the weight of the object is less than 3d, and it is displayed zero
	(F2.7) Auto zero tracking time	0.1	0～5.0	Units: seconds If it is 1.0, it automatically returns to zero within 1 second of the zero tracking range

	(F2.8) Weight units	2	0～3	0 : None 1 : g 2 : kg 3: t
	(F2.9) Motion clear and tare	1	1 or 0	1: Allowed 0: Forbidden
	(F2. 10) Tare with negative gross weight	1	1 or 0	1: Allowed 0 : Forbidden Whether to accept tare when the gross weight of the instrument is less than zero.
	(F2. 1 1) Over capacity	0	0-99	Unit: 1d (minimum display value) Upper overload detection range beyond full scale
	(F2. 12) Under zero	0	0-99	Unit: 1d (minimum display value) Lower overload detection range beyond zero.

➢ F4 Channel 2 scale application

First-level menu	Second-level menu			
Prompt	**Prompt**	**Factory setting**	**Setting**	**Description**
F4 Channel 2 Scale application	(F4.1) Rate	2	0～3	0: Low speed 1: medium speed 2: High speed 3: Highest speed
	(F4.2) Filter	1	0～4	4 : heaviest 0 : lightest
	(F4.3) Auto zero range	99	0～99	Full scale percentage,If it is set to 2 and the full scale is 1000 kg, the range is ±2%, specifically, it can be cleared within the range of 20 kg
	(F4.4) Stable detection range (Dynamic monitoring)	20	0～99	Unit: 1d (minimum displayed value)
	(F4.5) Stable detection time	0.1	0.0～5.0	Unit: seconds (minimum displayed value) For example, when the input is 2, the steady weight value given by the meter weighing data after at least 2 seconds. (The greater the value entered, the slower the stable value of the weighing data is given)
	(F4.6) Auto zero tracking range	30	0～9	Unit: 1d (minimum display division value) When the input is 0, there is no zero tracking; When the input is 3, the weight of the object is less than 3d, and it is displayed zero
	(F4.7) Auto zero tracking time	0.1	0～5.0	Unit: seconds If it is 2, it automatically returns to zero within 2 seconds of the zero tracking range
	(F4.8) Weight units	2	0～3	0 : None 1 : g 2 : kg 3: t
	(F4.9) Motion clear and tare	1	1 or 0	1: Allowed 0: Forbidden

	(F4.10) Tare with negative gross weight	1	1 or 0	1: Allowed 0 : Forbidden Whether to accept tare when the gross weight of the instrument is less than zero.
	(F4.11) Over capacity	0	0-99	Unit: 1d (minimum display value) Upper overload detection range beyond full scale
	(F4.12) Under zero blank	0	0-99	Unit: 1d (minimum display value) Lower overload detection range beyond zero.

Note: Channel 1 operates the same as the channel 2 menu.

5.3 Communication Interface menu

➢ **F6 Communication interface**

First-level menu	Second-level menu			
Prompt	**Prompt**	**Factory setting**	**Setting**	**Description**
F6 Communication interface	F6.1 COM1	2-rtU	0～2	0: None 1: Continuous output 2: Modbus - RTU (division)
	F6.2 COM1 continuous output mode	2-Ct-y	1～2	1: Continuous output format 1 (no check) See appendix for output format
				2: Continuous output format 2 (with check) See appendix for output format
	F6.3 COM1 Modbus address	1	0～255	Modbus-Rtu node address This change requires a reboot
	F6.4 COM1 Baud rate	38400	1200 ～ 57600	Unit: bit/s 1200、2400、4800、9600、19200、38400、57600、115200
	F6.5 COM1 Data format	2	0～5	0--7E1：7 data bits, 1 stop bits, even check
				1--7O1：7 data bits, 1 stop bit, odd check
				2--8N1：8 data bits, 1 stop bit, no check
				3--8N2：8 data bits, 2 stop bits, no check
				4--8E1：8 data bits, 1 stop bit, even check
				5--8O1：8 data bits, 1 stop bit, odd check
	F6.6 COM1 Continuous output frequency	6	0～100	If it is 0, do not send

	(F6.7) COM2	2-rtU	0～2	0: None 1: Continuous output 2: Modbus - RTU (division)
	(F6.8) COM2 Continuous 0utput mode	2-Ct-y	1～2	1: Continuous output format 1 (no check) See appendix for output format
				2: Continuous output format 2 (with check) See appendix for output format
	(F6.9) COM2 Modbus address	1	0～255	Modbus-Rtu node address This change requires a reboot
	(F6.10) COM2 Baud rate	38400	1200 ～ 57600	Unit: bit/s 1200、2400、4800、9600、19200、38400、57600、115200
	(F6.11) COM2 Data format	2	0～5	0--7E1：7 data bits, 1 stop bits, even check
				1--7O1：7 data bits, 1 stop bit, odd check
				2--8N1：8 data bits, 1 stop bit, no check
				3--8N2：8 data bits, 2 stop bits, no check
				4--8E1：8 data bits, 1 stop bit, even check
				5--8O1：8 data bits, 1 stop bit, odd check
	(F6.12) COM2 Continuous output frequency	6	0～50	If it is 0, do not send

Standard support RS232 and RS485 independent can work at the same time serial port communication, COM1 for RS232, COM2 for RS485, both support continuous output, Modbus - RTU and command mode.

❖ Modbus - RTU must select 8 data bits

5.4 Maintaining the test menu

- **F10 Restore default values**

First-level menu	Second-level menu	
Prompt	**Prompt**	**Description**
F10 Restore default values	F10.1	Restore default values
	F10.2	Restore default values
	F10.3	Restore default values

- **F11 System Information**

First-level menu	Second-level menu	
Prompt	**Prompt**	**Description**
F11 System Information	F11.1 AD inner code	Display the conversion value for channel 1 A/D
	F11.2 AD inner code	Display the conversion value for channel 2 A/D
	F11.5 Display program version	Displays program version information such as UT0 1.05
	F11.6 Test serial output	Terminal displays Snd 123 (default) ,press confirm and terminal sends 123 to device connected to serial port of terminal
	F11.7 Test channel 1 load cell signal	Display the millivolt value of the load cell signal
	F11.8 Test Channel 2 load cell signal	Display the millivolt value of the load cell signal

Appendix A Modbus

Modbus is a network communication protocol in the form of master and slave. The instrument is called by the upper system as a slave in Modbus network.

Data format is RTU mode, support "03" and "06" function code.

To use Modbus communication protocol, "Communication mode" under the menu of "Communication parameters" should be set to Modbus.

This instrument is written according to the standard Modbus protocol of Modicon company. The bits of each byte or character are as follows:

- **Read only address description**

Address	Position	Description
40001	L	1 scale current net weight (display value) (32-bit signed integer)
40002	H	
40003	L	2 scale current net weight (display value) (32-bit signed integer)
40004	H	
40005 1 scale terminal status	Bit0	Reserved
	Bit1	Reserved
	Bit2	Reserved
	Bit3	Reserved
	Bit4	Reserved
	Bit5	Reserved
	Bit6	Reserved
	Bit7	Reserved
	Bit8~Bit9	Decimal place: 0=0 decimal places; 1=1 decimal place; 2=2 decimal places; 3=3 decimal places
	Bit10~Bit12	Reserved
	Bit13	Motion
	Bit14~Bit15	Reserved
40006		Reserved
40007 2 scale terminal status	Bit0	Reserved
	Bit1	Reserved
	Bit2	Reserved
	Bit3	Reserved
	Bit4	Reserved
	Bit5	Reserved
	Bit6	Reserved
	Bit7	Reserved
	Bit8~Bit9	Decimal place: 0=0 decimal places; 1=1 decimal place; 2=2 decimal places; 3=3 decimal places
	Bit10~Bit12	Reserved
	Bit13	Motion

	Bit14~Bit15	Reserve
40518-40519		The weight value calibrated on the scale 1,is a 32-bit signed integer.
40520-40521		The weight value calibrated on the scale 2,is a 32-bit signed integer.

- **Read only address description**

Read only address return 0 when receiving the read command.

Address	Position	Description	
Scale 1			
40511 1 scale Control	Bit0	1 = Zero	The priority judgment level of bit0 to bit 2 is progressively reduced. It is only available when production is stopped
	Bit1	1 = Tare	
	Bit2	1 = Clear	
	Bit3~15	Reserved	
40512		1= Zero calibration	
40513		Weight value of calibration. It is a 16-bit signed integer.	
40514		Reserved	
Scale 2			
40515 2 scale Control	Bit0	1 = Zero	The priority judgment level of bit0 to bit2 is progressively reduced. It is only available when production is stopped
	Bit1	1 = Tare	
	Bit2	1 = Clear	
	Bit3~15	Reserved	
40516		1= Zero calibration	
40517		Weight value of calibration. It is a 16-bit signed integer.	
40518-40519		The weight value calibrated on the scale 1,is a 32-bit signed integer.	
40520-40521		The weight value calibrated on the scale 2,is a 32-bit signed integer.	

Appendix B Continuous output format

Continuous Output (1) (no checksum)

Data	STX	SWA	SWB	SWC	XXXXXX	XXXXXX	CR
Note	A	B	C	D	E	F	G

Continuous output (2) (Checksum)

Data	STX	SWA	SWB	SWC	XXXXXX	XXXXXX	CR	CHK
Note	A	B	C	D	E	F	G	H

Interpretation of each data item:

A -- STX: ASCII 02H

B -- SWA: Status Byte A

C - SWB: Status Byte B

D - SWC: Status Byte C

E - Net weight, 6 digits, no decimal point included

F - Gross weight, 6digits, no decimal point included

G -- CR: ASCII 0DH

H - CHK: checksum Checksum

CHK plus the lower 7 bits of the other data in each row add up to 0

SWA: Status Byte A

Bit	
0 1 2	

Bit2	Bit1	Bit0	Weight Decimal Position
0	0	1	XXXXX0
0	1	0	XXXXXX
0	1	1	XXXXX.X
1	0	0	XXXX.XX
1	0	1	XXX.XXX
1	1	0	XX.XXXX

3 4	

Bit4	Bit3	Increment Size Factor
0	1	X1
1	0	X2
1	1	X5

5	Always 1
6	Always 0
7	Always 0

SWB: Status Byte B

Bit	
0	0 - Gross weight, 1 - Net weight
1	0 - Positive weight 1 - Negative weight
2	1 - Under zero or over capacity
3	1 - Motion
4	Always 0
5	Always 1
6	0 - Normal operating status, 1 - The meter is being powered on and initialized
7	Always 0

SWC: Status Byte C

Bit	
0	Always 0
1	Always 0
2	Always 0
3	Always 0
4	Always 0
5	Always 1
6	Always 0
7	Always 0