



T10

Weighing Display Controller

OPERATION MANUAL

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Chapter I Overview

1. Overview

The weighing instrument adopts advanced single-chip technology, 20-bit sigma-delta A/D converter design. It has benefits of high speed conversion, high precision, powerful and outstanding for its functions and long-term stability.

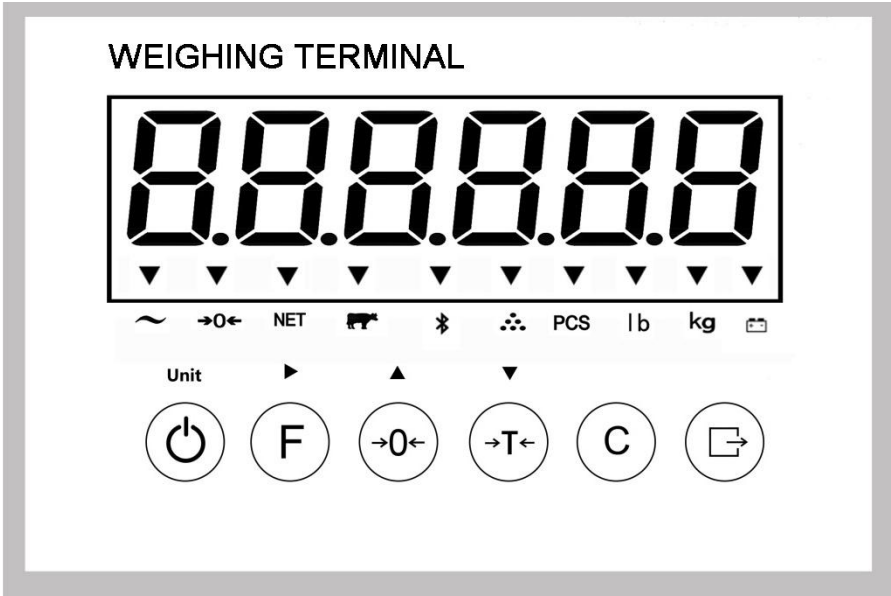
2. Characteristics

- 1-6 levels digital filtering combined with T3.0 version of stability program makes weighing fast and stable;
- With animal weighing function;
- With automatic counting function;
- With manual accumulative and automatic accumulative functions;
- Automatic detection of battery power, with low voltage alarm function.

3. Technical Performance

- Input signal range: $-19\sim+19\text{mV}$
- Nonlinear: $\leq 0.0015\%\text{F.S.}$
- Gain error drift: $1\text{ppm}/^{\circ}\text{C}$
- Excitation voltage: $\text{DC}5\text{V}/300\text{mA}$
- Minimum resolution: $0.1\mu\text{V/d}$
- Display divisions: $\leq 100000\text{d}$
- Display: 6-bit 1.2-inch word height LED/LCD display
- Serial communication interface: RS232
- Baud rate: 2400/4800/9600/19200bps optional
- Printer interface: insert thermal printer or label printer or needle printer
- Operating temperature: $-10\sim+40^{\circ}\text{C}$
- Relative humidity: $\leq 85\%\text{R.H}$
- Power supply: $\text{DC}12\text{V}/2\text{A}$, built-in $7.4\text{V}/4.0\text{Ah}$ lithium battery
- Overall dimension: $270\times 165\times 60\text{mm}$
- Weight: 1.8kg

4. The Front Panel



Unit Function1



Function2



Zero



Tare



Clear/Exit



Enter

Chapter II Interface Definition

1. Load Cell Interface (with 5-bit terminal block)

Connected to 4-wire sensor connection

-SIG	+SIG	-EXC	+EXC	SHLD
Signal negative	Signal positive	Supply bridge negative	Supply bridge positive	Shield wire

2. RS232C Serial Communication Port (with 5-bit terminal block)

232T	GND	232R	232T	GND
RS232 interface 1		RS232 interface 2		

3. MODBUS Communication Protocol (F2.4-9)

Serial communication data format: 1 start bit, 8 data bits, 1 stop bit

MODBUS-RTU Communication method

Register address	Function code	Instruction	Remark
4000H	03H	Gross weight	4 bytes signed read only
4002H	03H	Tare weight	4 bytes signed read only
4004H	03H	Net weight	4 bytes signed read only
4006H	06H	Zero	FF01H
4006H	06H	Tare	FF02H
4006H	06H	Clear	FF03H

4. Bluetooth communication protocol(optional configuration)

Baud rate: 9600

1 start bit, 8 data bit, 1 stop bit

The ASCII code contains 19 bytes consecutively

It is defined as follows:

Bytes 1-2: US/ST US- unstable; ST-stabilization

Bytes 3 : ,

Bytes 4-5: GS/NT GS- gross weight; NT- Net weight

Bytes 6 : ,

Bytes 7 : $\pm$

Bytes 8-14: Weight value of 7 digits with decimal points

Bytes 15 : Space

Bytes 16-17: kg/lb

Bytes 18 : CR (0DH)

Bytes 19 : LF (0AH)

Example: Weight value with 7 decimal places

300.0 = 20H 20H 33H 30H 30H 2EH 30H

3000 = 20H 20H 20H 33H 30H 30H 30H

Chapter IV Basic Operation

1. Power On and Shutdown

Under the shutdown state, hold on  for 1 second, the instrument enters into the self-testing procedure, the display successively shows [000000] to [999999] and the voltage of built-in battery, and then the screen displays [-----]. After a few seconds, the instrument enters into the weighing state and automatically executes the boot reset procedure.

In the boot state, hold on  for a few seconds and display [OFF] for 3 seconds, the instrument will automatically shut down.

when the battery is about to run out, the battery symbol light on the instrument display screen will turn to blank. At this time an external power supply need to be connected as soon as possible , and the instrument will charge the built-in battery at the same time, the battery symbol indicator light will flash. When it finishes the charging, the battery symbol light remains on, otherwise the instrument will automatically shut down when the battery is exhausted.

2. Zero

◆ Automatically set to zero when power on

After the instrument is turned on, it will automatically execute the boot zero-setting procedure. If the weight is within the zero-setting range, the instrument will be automatically zeroed; otherwise, the automatic zero-setting procedure will be skipped.

◆ Press button to set zero

After pressing , if the weight is within the button zero-setting range, the instrument will be automatically zeroed; otherwise, the automatic zero-setting procedure will be skipped.

❖ **The boot zero-setting range and the button zero-setting range are set during the procedure of calibration debugging.**

3. Tared Operation and Clean Tare Weight

◆ Tared operation

In weighing state, the gross weight is greater than 0, press , the instrument will take the current gross weight value as the tare weight value, store it in the tare weight unit, and display the net weight value, and the [NET] indicator light will be on.

◆ Clean tare weight

Under the tared state, press , the instrument will automatically clean tare weight and display gross weight, the [NET] indicator light will be off.

4. Weight Unit Selection(effective if F1.7=1)

Press , The weight is displayed in kg with lb conversion and is automatically memorized.

5. Cumulative Weight (effective if F4.0=0)

◆ Manual accumulation (effective if F3.0=0)

Under weighing status, when the net weight value is greater than 0, press , the instrument will automatically accumulate the current net weight value to the net weight value accumulation unit for storage, and the instrument will return to the weighing state after displaying the number of accumulated times [n xxxx] for 1 second. One time weighing can only be accumulated once. The next accumulation can only be performed after the net weight returns to 0. When F2.0=1 or 2, the instrument will print the weight at the same time.

◆ Automatic accumulation 1 (effective if F3.0=1)

Under weighing status, when the weight is greater than 20d, the weight will be automatically accumulated to the accumulative unit for storage after the weight value is stable, the instrument will display the number of accumulated times [n xxxx] and the buzzer will beep at the same time, and it will return to the weighing state after 1 second. One time weighing can only be accumulated once. The next accumulation can only be performed after the weight returns to less than 20d. When F2.0=1 or 2, the instrument will print the weight at the same time.

◆ Automatic accumulation 2 (effective if F3.0=2)

Under weighing status, when the weight is greater than 20d and then returns to less than 20d, the instrument automatically accumulates the last stable weight to the accumulative unit for storage, and the instrument will display the number of accumulated times [n xxxx] and the buzzer will beep at the same time, and it will return to the weighing state after 1 second. One time weighing can only be accumulated once. When F2.0=1 or 2, the instrument will print the weight at the same time.

6. About Number of Cumulative Times and Weight

◆ Number of cumulative times and weight display (effective if F2.0=0)

Under weighing status, press , the instrument will display number of weighing times [n xxxx] for 1 second and it will show cumulative weight. After 2 seconds, it will return to the weighing state.

◆ **Number of cumulative times and weight print (effective if F2.0=1 or 2)**

Under weighing status, press , the instrument will print number of weighing times [n xxxx] and cumulative weight.

◆ **Clear number of cumulative times/weight**

In the weighing state, press , the instrument will display [yorn] and jump into the clean procedure. Press  to clear the accumulated times and accumulated weight, and automatically return to the weighing state after clearing; or press  to exit the clean procedure and back to the weighing state.

7. Print operation (effective if F2.0=1、2)

Under weighing status, press  to print the weighing list when the weight of goods is stable

8. Power Saving Mode (effective if F3.1=1)

The weight will always be displayed under the dynamic mode, and it will enter the power saving mode after more than 20 seconds in the steady state. Once there is any key operation or changes of the weight value, the instrument will automatically exit the power saving mode.

9. Counting Function (effective if F4.0=1)

Counting sampling (when the counting indicator light and weight unit indicator light are on, and PCS indicator light is off)

NO.	Button	Display	Introduction
1	    	xxxxxx	In the weighing state, after loading weights and the displayed value is stable, press  for 2 seconds to input number of samples setting, the first digit on the left flashes, press    to input number E.G. the number of samples is 20
		PCS 00	
		PCS 20	

2		100	Back to the weighing state
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In the counting state, press , to switch the display between weight and quantity.

10. Date/Time Setting

NO.	Button	Display	Introduction
1	      	Set 0 **.*.*.* 22.09.01	Under weighing state, press and hold  for 2 seconds, release the button until displaying [Set 0] Display current date First digit on left side flicks, press    to input date E.G. 22.09.01
2	    	**.*.*.* 10.15.01	Display current time: First digit on left side flicks, press    to input time E.G. 10.15.01
3			Back to the weighing state

11. Function Setting

NO.	Button	Display	Introduction
1	     	Set 0 Set 1 F2.0 x F2.0 0	Under weighing state, press and hold  for 2 seconds, release the button until displaying [F2.0 x] External serial port printing selection: 0-2 F2.0=0-2; 0-not print 1-Record format (label printer) 2-Multiple format (1-3 optional) E.G. F2.0=0
2		F2.1 x	RS232 interface 1 baud rate selection:

		F2.1 3	F2.1=1-4; 1-2400bps, 2-4800bps, 3-9600bps 4-19200bps E.G. F2.1=3; baud rate is 9600bps
3		F2.2 x F2.2 0	RS232 interface 1 Communication format selection: F2.2=0-8; 0-Hengtian, 1-Toledo 8142-07, 2-Toledo Jinniao 17-bit, 3-Yaohua A9, 4- Keli ZXFS, 5-GSE, 6-EXCELL/FORMATI, 7-AD432, 8-Rice Lake (EVEN) E.G. F2.2=0; select Hengtian format
4		F2.3 x F2.3 3	RS232 interface 2 baud rate selection: F2.3 = 1-4 1-2400bps、2-4800bps、3-9600bps、4-19200bps E.G. F2.3=3
5		F2.4 x	RS232 interface 2 communication format selection: F2.2=0-9; 0-Hengtian, 1-Toledo 8142-07, 2-Toledo Jinniao 17-bit, 3-Yaohua A9, 4- Keli ZXFS, 5-GSE, 6-EXCELL/FORMATI, 7-AD4321, 8-Rice Lake (EVEN), 9-MODBUS-RTU When choose 9, please set communication address as ADR01-99 E.G. F2.4=0; select Hengtian format
6		F2.5 x F2.5 1	Bluetooth selection:(optional configuration) F2.5 = 0-1 0-Bluetooth off 1-Bluetooth on E.G. F2.5=0; turn off Bluetooth function
7		F2.6 x F2.6 1	Peak hold function Settings: F2.6=0-1; 0- Peak hold function off 1- Peak hold function on

			E.G. F2.6=1; Peak hold function on
8		F3.0 x F3.0 0	Accumulation method selection: F3.0=0-3; 0-continuous accumulation, 1-one time manual accumulation, 2-accumulate after stabilization, 3-accumulate after stabilization & zero
9		F3.1 x F3.1 0	Power saving mode selection: F3.1=0-1; 0-off, 1-on E.G. F3.1=0; turn off power saving mode
10		F4.0 x F4.0 0	Counting mode selection: F4.0=0-1; 0-general weighing mode(Press  , Cumulative weight can be displayed or printed), 1-counting weighing mode(Press  , Can switch display weight or quantity) E.G. F4.0=0; use general weighing mode
11			Back to the weighing state

Chapter V Calibration Mode

Before calibration debugging of the instrument, it is necessary to carefully check if the connection between the various parts is correct. If the connection has no problem, to open the back cover and press the calibration button on the circuit board. The instrument enters the calibration state for calibration operation:

1. Parameter Setting

NO.	Button	Display	Introduction
1		CAL 1	In weighing mode, press calibration button in the back cover for 2 seconds and enter into calibration state and displays [CAL 1] CAL=1 parameter setting CAL=2 weight calibration CAL=3 compensation calibration
2	  	d xx d 10	Weighing scope: d=01, 02, 05, 10, 20, 50 E.G. d=10; weighing scope is 10
3	  	dC x dC 0	Decimal point: dC=0-4; 0-0, 1-0.0, 2-0.00, 3-0.000, 4-0.0000 E.G. dC=0; reserved to single digits
4	   	xxxxxx 050000	Scale's range: The first digit on the left flashes, press  or  and  to input weight number E.G. scale's range is 50000kg
5	  	FLt x FLt 2	Filtering levels: FLt=1-4 (the higher the number, the better the filtering effect) E.G. FLt=2; filtering level is 2
6	 	F1.0 x F1.0 3	Zero point tracking speed: F1.0=1-9s E.G. F1.0=3s; zero point tracking speed is 3s

7	 	F1.1 x F1.1 2	Zero point tracking range: F1.1=0-9; 0-0.0d, 1-0.5d, 2-1.0d, 3-1.5d, 4-2.0d, 5-2.5d, 6-3.0d, 7-3.5d, 8-4.0d, 9-4.5d E.G. F1.1=2; zero point tracking range is 1.0d
8	 	F1.2 x F1.2 5	Boot zero-setting range: F1.2=0-5; 0-without zero, 1-2%, 2-4%, 3-20%, 4-50%, 5-100% E.G. F1.2=5; boot zero-setting range is 100%
9	 	F1.3 x F1.3 5	Button zero-setting range: F1.3=0-5; 0-without zero, 1-2%, 2-4%, 3-20%, 4-50%, 5-100% E.G. F1.3=5; button zero-setting range is 100%
10	 	F1.5 x F1.5 1	Calibration mode selection: F1.5=1; 1-5 stage nonlinear correction E.G. F1.5=2; select 2 stage nonlinear correction
11	 	F1.6 x F1.6 0	Weighing state selection: F1.6=0-1; 0-general weighing, 1-animal weighing E.G. F1.6=0; select general weighing
12	 	F1.7 x F1.7 0 CAL 1	kg/lb weight unit selection: F1.7=0-1; 0-kg/lb conversion is invalid 1-kg/lb conversion is effective E.G. F1.7=0; select kg
13			Back to weighing status

2. Weight Calibration

NO.	Button	Display	Introduction
1	 	CAL 1 CAL 2	In weighing mode, press calibration button for 2 seconds and enter into calibration state and displays [CAL 1] CAL=2 weight calibration

2		xxxxxx 0	Display internal codes in empty scale, if display steady, press 
3		xxxxxx	Add standard weight G in weighing platform, if display steady, press
4	   	000000 010000	The first digit on the left flashes, press    to input weight number Input standard weight G E.G. G=10000kg
5		CAL 1	
6		10000	Back to weighing status

3. Compensation Calibration

(If the weight after calibration is not accurate, there is no need to remove the standard weight)

NO.	Button	Display	Introduction
1	  	CAL 1 CAL 3	In weighing mode, press calibration button for 2 seconds and enter into calibration state and displays [CAL 1] CAL=3 compensation calibration
2		xxxxxx	Add standard weight G in weighing platform, if display steady, press 
3	   	000000 010000	The first digit on the left flashes, press    to input weight, Input standard weight G E.G. G=10000kg
4		CAL 1	
5		10000	Back to weighing status

NOTE: in the above operation steps, users can press  at any time to exit and enter the next step.

4. Multi-stage Weight Calibration (effective if F1.5=2, 3, 4, 5)

NO.	Button	Display	Introduction
1	 	CAL 1 CAL 2	In weighing mode, press calibration button for 2 seconds and enter into calibration state and displays [CAL 1] CAL=2 weight calibration
2	 	xxxxxx 1P 0	Display internal codes in empty scale, after 2 seconds of the first stage weight calibration, it displays 0
3		xxxxxx	Add standard weight G1 in weighing platform, if display steady, press 
4	   	000000 010000	The first digit on the left flashes, press    to input weight number Input standard weight G1 E.G. G1=10000kg
5		2P 10000 xxxxxx	After 2 seconds of the second stage weight calibration, it displays weight value, add standard weight G2 in weighing platform, if display steady, press 
6	   	000000 020000	The first digit on the left flashes, press    to input weight number Input standard weight G2 E.G. G2=10000kg
7	...		
8		5P	After 2 seconds of the fifth stage weight

		40000 xxxxxx	calibration, it displays weight value, add standard weight G5 in weighing platform, if display steady, press 
9	   	000000 050000	The first digit on the left flashes, press    to input weight number Input standard weight G5 E.G. G5=10000kg
10		CAL 1	
11		050000	Back to weighing status

5. Print format under different working mode

◆ Record format (F2.0=1)

WEIGHING SHEET		

DATE	2022/09/27	

NO.	TIME	NET (kg)

0001	10:10:02	10000
0002	10:10:02	20000
0003	10:10:02	10000

COUNT	0003	
TOTAL	40000kg	

◆ Multiple format (F2.0=2)

WEIGHING SHEET	

NO.	0001
DATE	2022/09/27
TIME	10:12:21
GROSS	10000kg
TARE	0kg
NET	10000kg

F2.0 1

F4.0 0

F2.0 2

F4.0 0

◆ **Record format (F2.0=1)**

WEIGHING SHEET	

DATE	2022/09/25

NET (kg)	NO. (PCS)

2000	200
2000	200

F2.0 1

F4.0 1

◆ **Multiple format (F2.0=2)**

WEIGHING SHEET	

DATE	2022/09/25
TIME	15:53:49
GROSS	2000kg
TARE	0 kg
NET	2000kg
WEIGHT	10kg
COUNT	200PCS

F2.0 2

F4.0 1

Chapter VI Information Tips

1. Error Information

Display Content	Introduction
Err 01	no weights is loaded during calibration
Err 02	weight cannot be 0 when counting sampling

2. About Built-in Battery

The instrument is powered by a built-in 7.4V/4.0Ah lithium battery, and the instrument will automatically charge the built-in battery when using AC power. After using the built-in battery for power supply, immediately to use the external power supply to charge the built-in battery, otherwise the built-in battery will be damaged. Once charge time should not be less than 6 hours nor more than 10 hours. Since the built-in battery will self-discharge, if the instrument is not in use, the built-in battery should be charged once every two weeks with the external power supply, so as to avoid damage to the built-in battery and permanent failure to charge. The battery is a consumable item and is not covered by the warranty.