GENERAL MEASURE

GM7702

User Manual

GM7702-00180101

110607040003
VER01.00.13

Website: http://www.gmweighing.com

Implementation of standards: **GB/T 7724—2008**

Table of Contents

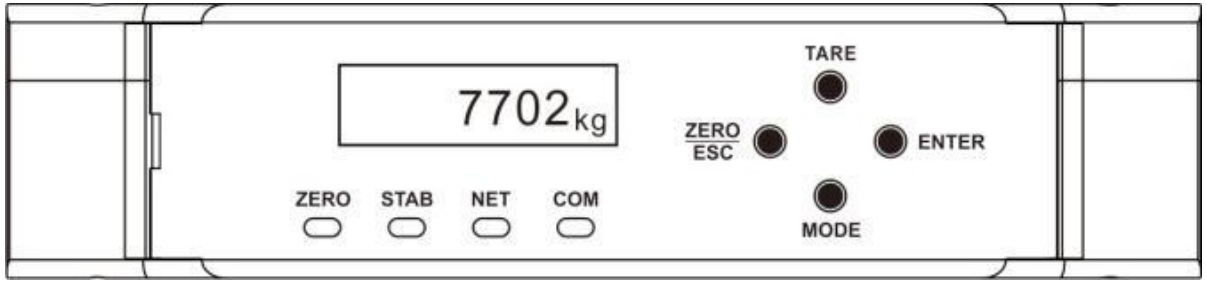
1 General Description

GM7702 weighing indicator is specially designed for weight transmitting in industrial fields. This indicator has the features of small volume, plenty communicating commands, stable performance, easy operation and practicability. It can be widely applied to concrete and bitumen mixing equipment, metallurgy furnace and converter, chemical industry and feed, etc..

1.1 Functions and Characteristics

- small volume, unique design and easy operation
- applicable to all kinds of resistance strain gauge bridge load cell
- front panel numerical calibration
- multilevel of digital filter
- automatic zero-tracking
- automatically zero when power on
- serial communication interface: RS232 or RS485
- calibration via serial interface (Serial interface sets ON)
- support 16-bit resolution **DA** output
- 2 In and 3 Out, support limit control output
- online upgrade via **RS232** serial port
- tare weight function

1.2 Front Panel Description



Status:

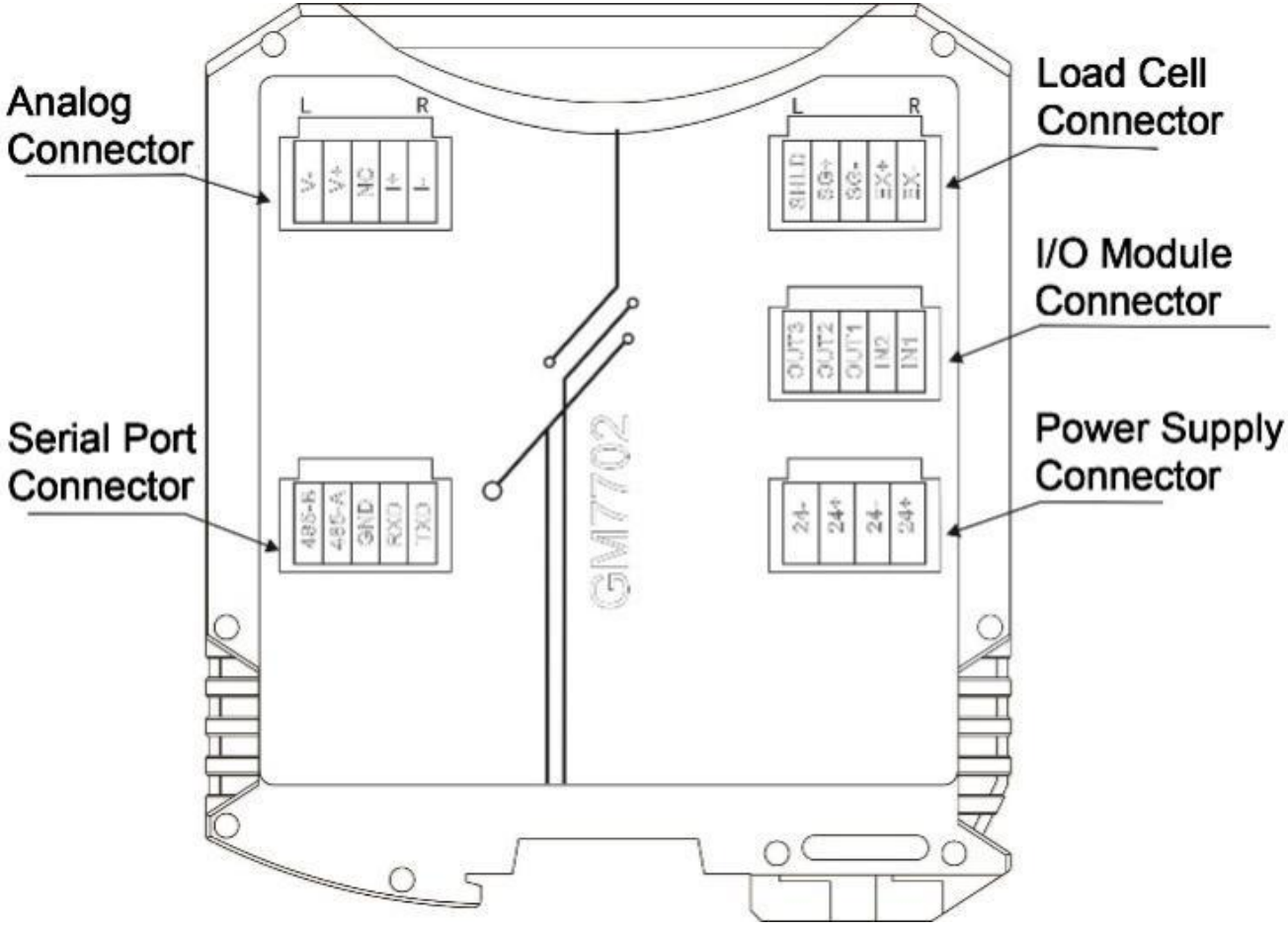
- **ZERO**: Light on when material weight is 0±1/4d.
- **STAB**: Light on when material weight is within stable range.
- **NET**: Light on when indicator is in net weight status.
- **COM**: Light on when in communication status.

Keypad:

- **ZERO/ESC**: Used to exit from current operation or go previous page.
  In the status of net weight, press this key will enter gross weight status.
- **TARE:** In the status of gross weight, press OPTION will tare and indicator show net weight value.
  When data input, the main display flash and the flash position will move.
- **MODE**： To make flashing position move to the right digit when data inputting.
- **ENTER**: Enter option when calibration or in parameter setting and can be used as

analog switching display.

1.3 Connector diagram



1.4 Technical Specifications

1.4.1 Common:

Power supply: **DC24V±5%**
Working temperature: **-10～40℃**
Max humidity: **90%R.H** without dew
Power consumption: about **0.8W**

1.4.2 Analog:

Load cell power: **DC5V　100mA（MAX）**
Input impedance: **10MΩ**
Zero steady range: 0.00~12mV (Load cell 3mV/V)
Input sensitivity: **0.1uV/d**
Input range: **0.00～15mV(**Load cell **3mV/V)**
Transfer mode: **Sigma - Delta**
A/D conversion speed: **120/240/480** times/sec.
Non-linearity: **0.01% F.S**
Gain drift: **10PPM/℃**
Display precision: **1/100000**

1.4.3 Digital:

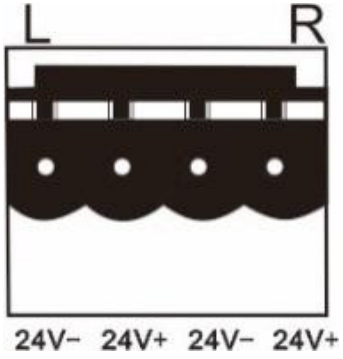
Weight display: **128*32　0.91″** White light **OLED**
Minus display: "-"
Overload display: Voltage overlimit/underlimit

Decimal point: **5** types (optional)
Function keys: **4** keys soniferous keypad

2 Installation and Wiring

2.1Connection of Power Supply

GM7702 weighing indicator connects with DC24V power supply as follows, which has two lines connecting ports. The correct wiring of the power terminal is shown in the figure below:



※ Please pay attention to the positive and negative polarity of the power supply, do not connect the reverse

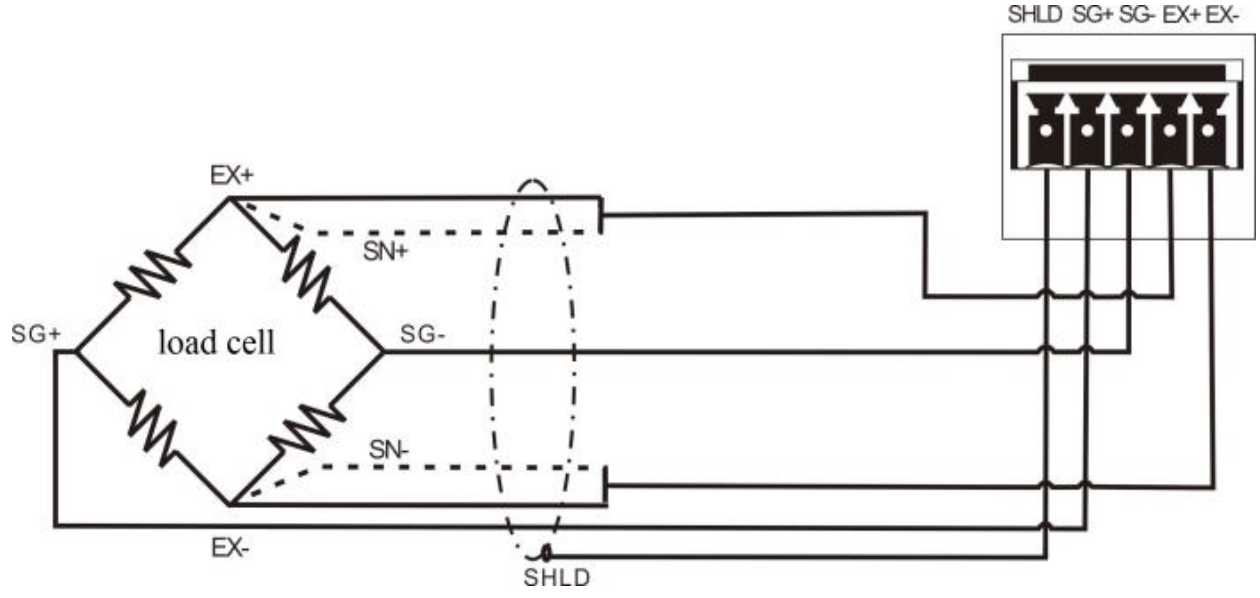
2.2 Connection of Load Cell

GM7702 weighing indicator connects with bridge type resistance strain gauge load cells by 4 wires. (When use 6-wired load cells, you must bridge the EX+ with SN+ and bridge the EX- with SN-.) It could connect with no more than 4 units load cell of 350**Ω .**

Each port of the load cell connection terminal is allocated as

4 wires	EX+	EX-	SG+	SG-	SHLD

2.2.1 Load Cell Connection



Note:

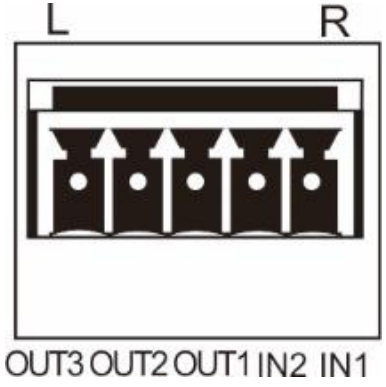
1. As load cell output signal is sensitive to electronic noise, the wiring should be shield cable and separate with other cables, especially AC power.

2. 4 wires connection is suitable for short distance and stable temperature or low precision field, otherwise use 6 wires connection.

3. For more load cells parallel connection, their sensitivity (mV/V) should be the same.

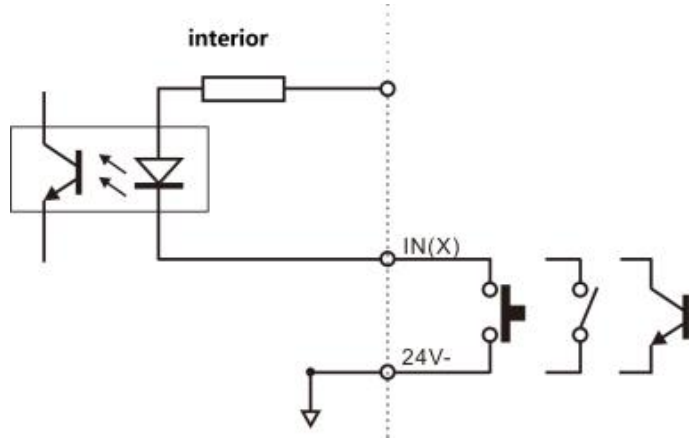
2.3 Connection of I/O Terminal

GM7702 weighing indicator has equipped with I/O module of 2 IN and 3 OUT. IN/OUT function user can self-define. To facilitate users wiring and some special applications, the default definition is as follows

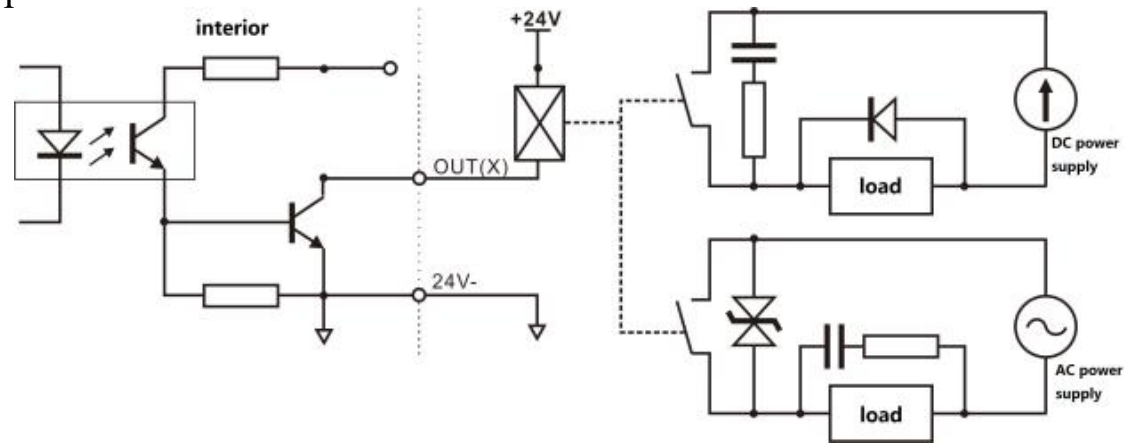


Output		Input	
OUT1	stable	**IN1**	zero
OUT2	overlimit	**IN2**	tare
OUT3	set point 1		

Indicator input terminal connection:



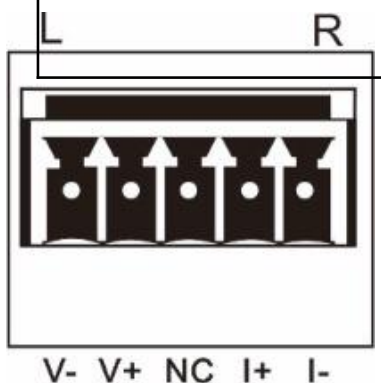
Indicator output terminal connection:



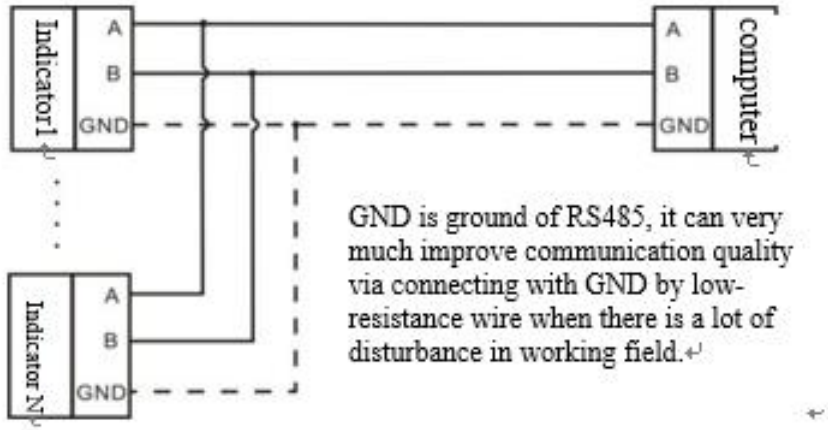
2.4 Serial Port Output

GM7702 weighing indicator possesses RS232 and RS485 serial port, which support Modbus-RTU protocol, r-SP1,r-Cont and Chi mei PT650D protocol.
Communication parameters:

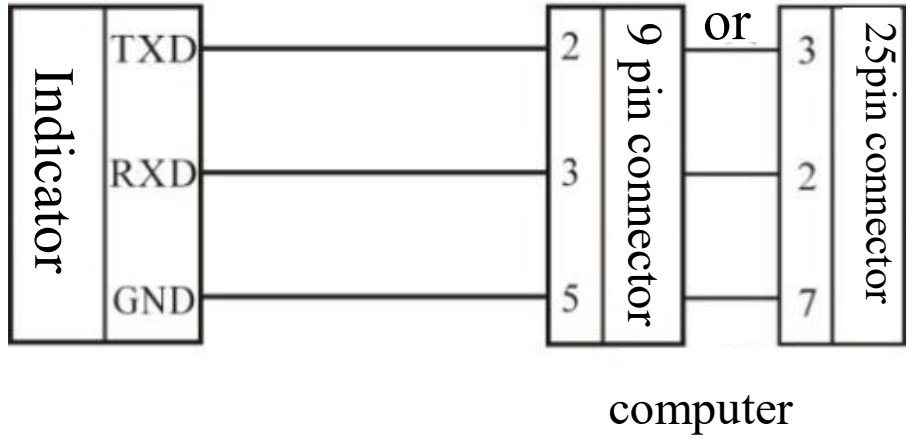
Item	Option	Description
1. serial port RS232 2. serial port RS485	ID No.	initial value: 01; range: 01-99.
	baud rate	initial value: 38400; option: 9600, 38400, 57600, 115200.
	data format	initial value: 8-E-1; option: 8-E-1, 8-O-1, 8-N-1, 7-E-1, 7-O-1.
	communication	Initial value: Modbus-RTU; option: Modbus-RTU, r-Cont, Modbus-RTU(2),Modbus-ASCII , PT650D.
	Modbus Hi-Lo	initial value: AB CD; option: AB CD(Hi-Lo), CD AB(Lo-Hi)
	sending interval	initial value: No interval; option: no interval, 10msec, 20msec, 50msec. data sending interval in r-Cont mode



The serial port interface definition diagram is shown on the left
RS485 Connection mode:



RS232 Connection mode:



2.5 Connection of Analog

There are two types of analog output:

1) Voltage output: 0-5V, 0-10V.

2) Current output: 4-20mA.

3) User-define function: user can define analog output type and output range.

Analog parameter

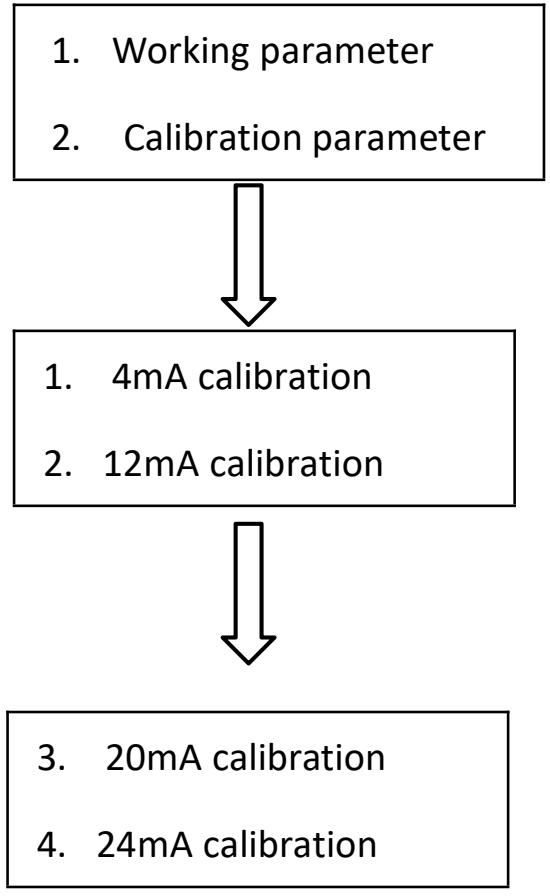
Item	Option	Description
Working mode	**4-20mA**	Weight value could be converted to current of 4-20mA.
	0-5V	Weight value could be converted to voltage of 0-5V.
	0-10V	Weight value could be converted to voltage of 0-10V.
	user-defined current	User can define the current or voltage.
	user-defined voltage	
Min. output value	initial value: **00.000**	To set min. analog output value. (The value will not change if the converted value smaller than set value.)

Zero output value	initial value: **00.000**	To set analog output value of zero point weight value.
Max. capacity output value	initial value: **00.000**	To set analog output value of max. capacity.
Max. output value	initial value: **00.000**	To set max. analog output value. (It will not change if converted value bigger than set value.)

Analog output ports defined as below:

V+: Positive voltage output； **V-**: Negative voltage output
I +: Positive current output； **I-**: Negative current output

The indicator has been calibrated on the analog output when it leaves the factory, user no need to calibrate the analog output. If the analog output is abnormal, user can calibrate the analog output by himself (it is recommended to calibrate under the guidance of a professional). Calibration method (use a multimeter to connect the analog interface):



※In parameter interface, pressing TARE and ENTER 3s to enter analog calibration.

※Select calibration point and press ENTER. Contact to multimeter and input the display value, finally press ENTER to complete.

※Analog calibration has 4 steps to complete. Change option by pressing MODE key.

3 Data Input and Parameters

3.1 Parameters List

In the status of weighing, user could enter parameter interface by MODE key, and change item by TARE or MODE, then press ENTER to edit parameter.

Item No.	Parameter	Parameter item	Description
1	Working parameter	power-up zero	initial value: OFF (option: ON / OFF) To proceed zero judgment when power on.
		zero tracking range	initial value: 0. (range: 0~9d) Automatic judgment of zero point if weight value is within set time and range.
		zero tracking time	initial value: 1.0 (0.0~9.9s) Automatic judgment of zero point if weight value is within set time and range.
		stable range	initial value: 01. (range: 00~99d)

			Stable if weight value changes within set time and range.
		stable time	initial value: 1.0. (Range: 0.0~9.9s)
		zero range	initial value: 01 (1%~99% of full capacity) Zero range allowed.
		digital filter grade	initial value: 5 (Range: 0~9) Stronger filter grade, more stable weight value.
		stable filter grade	initial value: **0** (Range: 0~9) To proceed second filter on the base of digital filter.
		AD sample rate	initial value: 120 times /sec. (120/240/480 times/sec.)
		Tare memory ON/OFF	Initial value: OFF(ON/OFF optional) Restore the tare weight before the indicator is powered on

2	Calibration	unit	calibration parameters	
		decimal point		
		division		
		max. capacity		
		remote calibration ON/OFF		
		calibration with weight		
		calibration without weight		
3	Communication parameter	RS232	RS232/RS485 parameter setting: Including: ID no., baud rate, data format, communication protocol, MODBUS Hi-Lo, transfer interval (r-Cont mode)	
		RS485		
4	Control	control mode	weight control mode	

	parameter	parameter setting	control parameter setting	
5	Analog parameter	working mode	To set analog output mode	
		min. output value	The value is displayed if analog is below this value.	Can be set in user-defined mode
		zero point output value	Analog value when weight value is zero.	
		max. capacity output	The analog value matches with max. capacity value.	
		max. output value	The value is displayed if analog is over this value.	
6	I/O define		Define input and output ports.	
7	I/O test		Test input and output connecting ports	
8	Reset	reset working	Reset to factory defaults.	

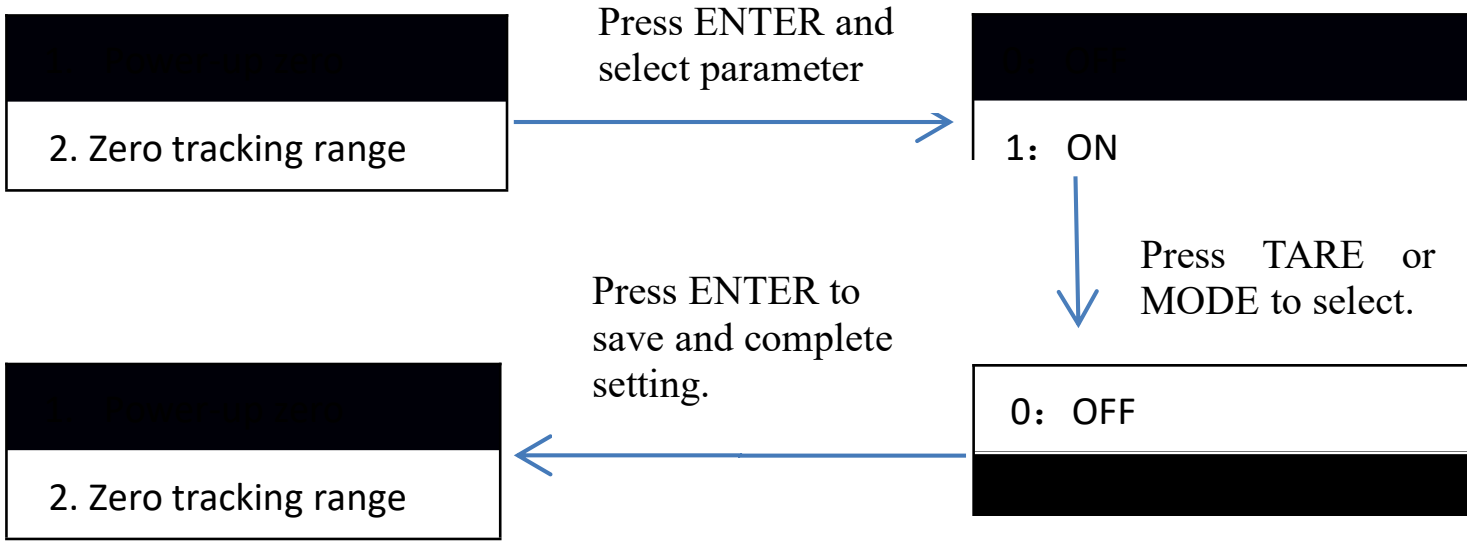
		parameter	
		reset serial port parameter	Reset to factory defaults.
		reset all parameters	Reset to factory defaults.(except analog parameters)
9	System info.	password	Password protection of all parameters or change password.
		language	Language version change. (Chinese / English)
		automatic lock screen	The indicator will lock screen automatically if there are not any operation during set time. (Option: OFF, 1 min., 2min., 5min. and 10min.)
		Indicator model	Set the indicator model (press ENTER to ENTER, adjust model with up and down selection keys.)
		version	Version information display

		compile information	Version compiles information display.
		test	Light on to check whether any damage on the screen or indicator light.

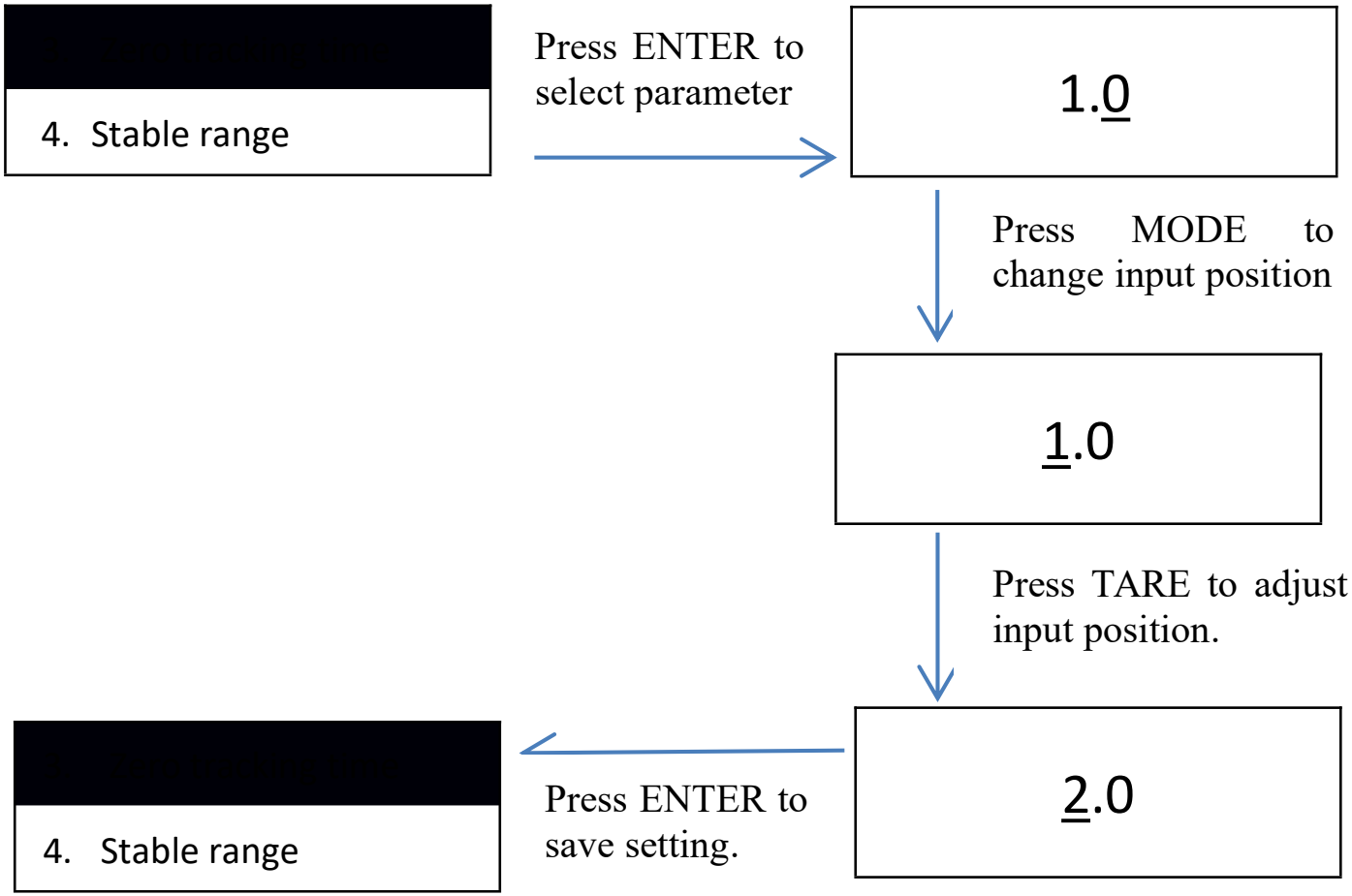
3.2 Data Input

Change or input of parameters value could be proceeding through 4 function keys.

Change of parameters: TARE—Upturn, MODE—Downturn, Enter—Confirm.



Parameter value input: TARE—value plus one, MODE—change position, ENTER—confirm.



4. Calibration

4.1 Description

GM7702 indicator should proceed calibrated if the parameters can't meet users' requirement. Calibration can fix zero point and gain voltage.

User can make record of calibration parameter value, which could be used in calibration without weight.

4.2 Calibration Parameter

Calibration parameter	Parameter	Description
Unit	**g； kg； t； lb**	initial value: kg
Decimal point	**0； 0.0； 0.000.000； 0.0000**	initial value: 0.00
Division	**1； 2； 5； 10； 50**	initial value: 1
Max. capacity	≤division ***100000**	initial value: 10000
Remote calibration ON/OFF	OFF or ON	Calibration through serial port when set ON.
Calibration with weight	empty scale calibration	Press ENTER key and set present status as zero point.
	weight value 1	The weight value is base of the

	weight value 2	material.
	weight value 3	
	weight value 4	
Calibration without weight	zero calibration	Proceeding empty scale calibration and weight calibration if urgent.
	gain voltage calibration	
	gain weight calibration	

4.2.1 Empty Scale Calibration

To set empty scale as zero point

Weight:	**2.100kg**
Voltage:	1.**843mV**

Press confirm key

（to set present status as zero）

Weight:	**0.000kg**
Voltage:	**1.843mV**

Note:

※The scale must be empty before pressing ENTER key.

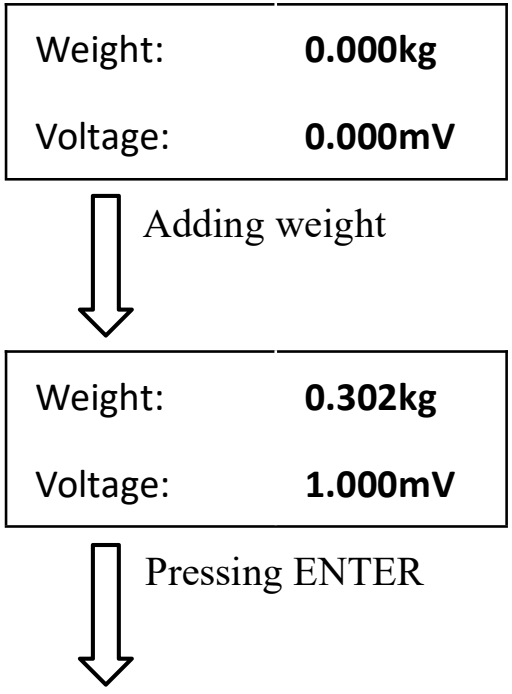
※ Empty scale calibration can only competed when stable.

※Please record voltage value displayed in empty scale status.

※ Long press TARE key for 3 seconds, can manually input millivolts for zero calibration without weight.

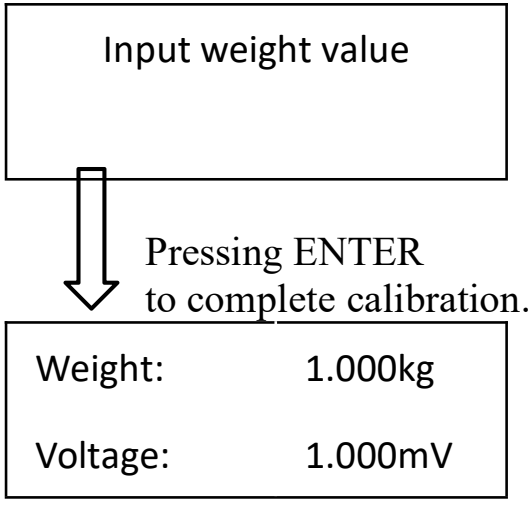
4.2.2 Weight Calibration

In order to meet the demands of multiple weight standards, user could set parameters of weight point 1, weight point 2, weight point 3, weight point 4, which are helpful to calibrate gain weight.



In status of empty scale, pressing confirm key to enter weight value 1, display weight and voltage will show 0.

Adding weights, also recording both weight value and voltage



Pressing MODE key could shift set point position. Press OPTION key could edit value.

Calibration completed.

4.2.3 Calibration without Weight

There is a certain error available for calibration without weight. If in urgent condition, please follow below operations.

Zero calibration	01.843	Press zero calibration to enter zero millivolt manually interface, then input the millivolt of calibration with weight record and press ENTER to complete

Gain voltage calibration	00.000	Press gain voltage calibration to enter manually interface, then input the calibration with weight record and press ENTER to complete.
Gain weight calibration	00.000	Press gain weight calibration to enter manually interface, then input the gain voltage calibration value and press ENTER to complete.

4.3 Calibration Record

For calibration of weights, please record zero millivolts, gain millivolts and weights in the attached table. When it is inconvenient to load weights on site for system calibration, the data in the attached table can be used for the calibration without weights

Table：

Times	Zero millivolts (**mV**)	Gain millivolts (mV）	Weight	Date	Remark
1					

2					
3					
4					

5 Control Parameter

GM7702 has equipped with controlling external ON/OFF state parameters .controlling mode: upper/lower limit mode and set point mode.

Controlling parameters:

<table>
<tr><th>Mode</th><th>Parameters</th><th colspan="3">Description</th></tr>
<tr><td rowspan="4">Upper/Lower limit</td><td>output stable judgment</td><td colspan="3">initial value: ON
Whether limit output proceeded when stable.</td></tr>
<tr><td>min. duration</td><td colspan="3">initial value: 0； range: 0-99.9S；</td></tr>
<tr><td>upper limit value</td><td colspan="2">initial value: 0. Valid when present weight value>upper limit value. (Define OUT port as upper limit)</td><td rowspan="2">Middle limit valid when lower limit<present weight<upper limit</td></tr>
<tr><td>lower limit value</td><td colspan="2">initial value: 0. Valid when present weight value<lower limit value. (Define OUT port as lower limit)</td></tr>
<tr><td>Set point mode</td><td>set point 1
set point 2
set point 3</td><td>output stable judgment</td><td colspan="2">initial value: ON
Whether set point output when stable.</td></tr>
</table>

	set point **4**	min. duration	initial value: **0**； Range: **0-99.9S**；	
		comparing conditions	initial value: greater than or equal to. Option: greater than or equal to, less than or equal to, in the range or out of range.	
		preset value 1	initial value: **0**；	※ The indicator will judge preset value 1 when the comparison condition is greater than or equal to, less than or equal to.
		preset value 2	initial value: **0**；	

※Upper limit value must be greater than lower limit value.

※For example,

1. Select parameter: Upper/lower limit setting mode, stable judgment when output: ON; min. duration: 2s. Upper limit: 1000. Lower limit: 500.

I/O module definition: OUT1: upper limit. OUT2: middle limit. OUT3: lower limit.

Load weight meter output: Before the weight is stable, the external switch quantity maintains the state before the weight change; when the weight is stable, if the current weight is greater than 1000, the output port 1 is valid. In the effective 2S time, if the weight is reduced to 800 in stable, the output port 1 will continue to remain valid for 2 seconds , and the output port 2 will be valid.

6 I/O Module

6.1 I/O Module Define

GM7702 has equipped with 2 input ports and 3 output ports and could be defined freely.

I/O module parameters

Parameter	Define item	Description
IN-**1** IN-**2**	**0**: no definition	When the input port is defined as the corresponding function, the trigger input port is valid and the function is executed.
	1: zero	
	2: tare	
	3: trigger set point 1	
	4: trigger set point 2	
	5: trigger set point 3	
	6: trigger set point 4	
	7: Clear Tare	
OUT-**1** OUT-**2** OUT-**3**	**0**: no definition	When the output port is defined as the corresponding function, the trigger output port is valid.
	1: stable	
	2: overlimit	
	3: set point 1 output	
	4: set point 2 output	
	5: set point 3 output	

	6: set point 4 output	
	7: upper limit	
	8: middle limit	
	9: lower limit	

6.2 I/O Module Test

The purpose of I/O module test is to check whether the connection is correct.

I/O module test parameters

Parameter		Description	
IN-**1**	OFF	connect external switch correctly (DC 24V) When external trigger switch is valid, and input port parameter sets on, means connection is already.	If the input and output status is not valid as preset, check whether the wiring and power connections are correct.
IN-**2**	OFF		
OUT-**1**	OFF	connect external switch correctly (DC 24V) To press ENTER and set parameter ON. Output indicator light is on at the same time, means connect already.	
OUT-**2**	OFF		
OUT-**3**	OFF		

7. Password Management

Password function can protect indicator parameters and could be edit in system information parameter.

Password must set ON and input correct password when enter.

Initial password: 000000.

Parameter	Description
Password ON/OFF	option: ON, OFF. User has to input password if set ON.
Change password	There is 3 steps: 1） input original password 2） input new password 3） input new password again ※ Password input must be in accordance.

8. Serial Port Communication

GM7702 has optional RS232 or RS485 to connect with computer. It supports **r-Cont** protocol, **r-SP1** protocol, **Modbus-RTU** protocol, Chi mei PT650D protocol.

8.1 **r-Cont** Mode

Indicator will transfer data to computer automatically.

STX	ID no.	Channel no.	Status	Weight value	**CRC**	**CR**	**LF**
02	**2** bytes	**31**	**2 bytes**	**7**bytes	**2bytes**	**0D**	**0A**

ID no.—— **2** bytes, range: 01~99

Status—— **2** bytes, High byte: 40H. Definition of low byte as below:

D6	**D5**	**D4**	**D3**	**D2**	**D1**	**D0**
null	null	G/N weight	positive/ negative	zero	OFL	stable
fix: 1	**fix: 0**	**0: G** **1: N**	**0**: P **1**: N	**0**: NZ **1**: Zero	**0**: Normal **1**: OFL	**0**: unstable **1**: stable

Weight value —— 7 bytes without symbol, if overweight or underweight and then return, indicator will show **OFL**.

CRC —— 2 bytes, check sum

CR —— 1 byte, **0DH**

LF —— 1 byte, **0AH**

For example,

Indicator is showing below data: **02 30 31 31 40 41 20 20 20 37 30 30 32 34 0D 0A**

Means present status: gross weight, stable, positive value, weight value is 700.

8.2 Modbus Protocol

The indictor communicates in RTU mode ,and each 8-bit byte is divided into 2 4-bit

hexadecimal character transmissions

Function code:

Function **code**	**Definition**	**Description**
03	read register	
06	write single register	
16	write multiple registers	Allow to write double registers only.
01	read coil	Unit: bit
05	write coil	

Exception code response

Code	Definition	Description
02	illegal data address	It means the data address received is illegal.
03	illegal data	The data wrote in is illegal.
04	indicator fault	Indicator fault when operation.
07	invalid	Order received is invalid.

8.2.1 Modbus Address

PLC addr.	Display addr.	Description	
Read only register (function code: 0x03)			
40001	**0000**	present weight value (4 bytes with symbol)	
40002	**0001**		
40003	**0002**	**D0**: stable **D1**: zero point **D2**: symbol **D3**: overflow **D4**: weight overlimit **D5**: weight underlimit **D6**: voltage overlimit **D7**: voltage underlimit	

		D8: stable millivolt **D9**: net weight **D10**:beat state, 0-1 alternate switch, 1Hz	
40004	**0003**	gross weight value	
40005	**0004**		
40006	**0005**	net weight value	
40007	**0006**		
40008	**0007**	tare value	
40009	**0008**		
40010	**0009**	current weight (floating-point data)	
40011	**0010**		
40012	**0011**	gross weight (floating-point data)	
40013	**0012**		
40014	**0013**	net weight (floating-point data)	
40015	**0014**		
40016	**00015**	**D0**: over range when zeroing **D1**: unstable when zeroing	

		D2: overflow when zeroing **D3**: zero calibration is unstable. **D4**: zero voltage is too high. **D5**: zero voltage is too low. **D6**: gain voltage is unstable. **D7**: gain voltage is too large. **D8**: gain voltage is too low. **D9**: weight input is wrong. **D10**: calibration resolution is too low. **D11**: previous gain has not calibrated. **D12**: non weights for calibration	
40017	**0016**	gross weight(floating-point data**)**	
40018	**0017**		
40019-40020	**0018-0019**	Reserved (Allow to read value: 0)	
Read & Write (write function code: 0x06, 0x10; read function code: 0x03.)			
40021	**0020**	unit: (**0:g, 1:kg, 2:t,3:lb)**	
40022	**0021**	decimal point (0: 0 digit, 1: 1 digit, 2: 2 digits, 3: 3 digits, 4: 4 digits)	
40023	**0022**	division(**1/ 2/ 5/ 10/ 20/ 50**)	
40024	**0023**	max. capacity, write range (max. capacity≤division*100000)	
40025	**0024**		

40026	**0025**	zero calibration with weight: write non-zero data and calibrate zero point with present weight value, read absolute millivolt of present load cell	
40027	**0026**		
40028	**0027**	gain point 1 calibration with weight, 0≤weight value≤max. capacity	
40029	**0028**		
40030	**0029**	gain point 2 calibration with weight, gain point 1≤weight value≤max. capacity	
40031	**0030**		
40032	**0031**	gain point 3 calibration with weight, gain point 2≤weight value≤max. capacity	
40033	**0032**		
40034	**0033**	gain point 4 calibration with weight, gain point 3≤weight value≤max. capacity	
40035	**0034**		
40036	**0035**	zero calibration without weight:input zero millivolt. write range (load cell: 3mV/V, range: 0-12.000mV): read zero point millivolt of calibration	
40037	**0036**		
40038	**0037**	gain calibration without weight, gain millivolt input (0.000<millivolt<15.000mV-zero point millivolt)	write in sequence to complete calibration
40039	**0038**		
40040	**0039**	gain calibration without weight; input gain weight value≤max. capacity	
40041	**0040**		
40042-40050	**0041-0049**	Reserved (allow to read value: 0)	

40051	**0050**	auto-zero when power-up ON/OFF(0: OFF, 1: ON)
40052	**0051**	zero point tracking range (0-9d)
40053	**0052**	zero point tracking time (0-9.9s)
40054	**0053**	stable range (1-99d)
40055	**0054**	stable time (0-9.9s)
40056	**0055**	zero range (0%-99%)
40057	**0056**	digital filter parameter (0-9)
40058	**0057**	stable filter level (0-9)
40059	**0058**	**AD** sample rate: 0: 120 times/sec., 1:240 times/sec., 2:480 times/sec.
40060	**0059**	control mode (0: upper and lower limit mode, 1: preset point mode)
40061	**0060**	Indicator model 1st unit （**“0”-“9”，“-”，“A”-“Z”**）
40062	**0061**	Indicator model 2nd unit（**“0”-“9”，“-”，“A”-“Z”**）
40063	**0062**	Indicator model 3rd unit（**“0”-“9”，“-”，“A”-“Z”**）
40064	**0063**	Indicator model 4th unit（**“0”-“9”，“-”，“A”-“Z”**）
40065	**0064**	Indicator model 5th unit（**“0”-“9”，“-”，“A”-“Z”**）
40066	**0065**	Indicator model 6th unit（**“0”-“9”，“-”，“A”-“Z”**）
40067	**0066**	Tare memory ON/OFF (0: OFF, 1:ON)

40068-40070	**0067-0069**	Reserved (allow to read value: 0)	
40071	**0070**	whether judge stable before output (0: OFF, 1: ON)	upper limit & lower limit mode
40072	**0071**	min. duration (0-99.9s)	
40073	**0072**	upper limit value (0-99999)	
40074	**0073**		
40075	**0074**	lower limit value (0-99999)	
40076	**0075**		
40077-40080	**0076-0079**	Reserved (allow to read value: 0)	
40081	**0080**	Preset point 1 judge stable? (0: No, 1: Yes)	
40082	**0081**	preset point 1 min. duration time (0-999:0-99.9s)	
40083	**0082**	preset point 1 comparison condition (0: greater or equal to, 1: smaller or equal to, 2: within the range, 3: outside the range)	
40084	**0083**	preset point 1, preset value 1	
40085	**0084**		
40086	**0085**	preset point 1, preset value 2	
40087	**0086**		
40088-40090	**0087-0089**	Reserved (allow to read value: 0)	
40091	**0090**	preset point 2 judge stable? (0: No, 1: Yes)	
40092	**0091**	preset point 2 min. duration time (0-999:0-99.9s)	

40093	**0092**	preset point 2 comparison condition (0: greater or equal to, 1: smaller or equal to, 2: within the range, 3: outside the range)
40094	**0093**	preset point2, preset value 1
40095	**0094**	
40096	**0095**	preset point 2, preset value 2
40097	**0096**	
40098-40100	**0097-0099**	Reserved (allow to read value: 0)
40101	**0100**	Preset point 3 judge stable? (0: No, 1: Yes)
40102	**0101**	preset point 3 min. duration time (0-999:0-99.9s)
40103	**0102**	preset point 3 comparison condition (0: greater or equal to, 1: smaller or equal to, 2: within the range, 3: outside the range)
40104	**0103**	preset point 3, preset value 1
40105	**0104**	
40106	**0105**	preset point 3, preset value 2
40107	**0106**	
40108-40110	**0107-0109**	Reserved (allow to read value: 0)
40111	**0110**	preset point 4 judge stable? (0: No, 1: Yes)
40112	**0111**	preset point 4 min. duration time (0-999:0-99.9s)
40113	**0112**	preset point 4 comparison condition (0: greater or equal to, 1: smaller or equal to, 2: within the range, 3: outside the range)

40114	**0113**	preset point 4, preset value 1	
40115	**0114**		
40116	**0115**	preset point 4, preset value 2	
40117	**0116**		
40118-40120	**0117-0119**	Reserved (allow to read value: 0)	
40121	**0120**	IN-1 define	If write 2 in address 0120 (IN-1), means to define IN-1 as tare function.
40122	**0121**	IN-2 define	
40123	**0122**	OUT-1 define	
40124	**0123**	OUT-2 define	
40125	**0124**	OUT-3 define	
40126	**0125**	test status	Write 1 in 0125 address to enter I/O module test.
40127	**0126**	input test	
40128	**0127**	output test	
40129-40150	**0128-0149**	Reserved (allow to read value: 0)	
40151	**0150**	zero / clear tare	read & write address write:1 (zero in gross weight status, clear tare in net weight status) read: 0
40152	**0151**	tare	
40153	**0152**	IN-1 status	read only address: 1: valid-status
40154	**0153**	IN-2 status	

40155	**0154**	OUT-1 status	2: invalid-status
40156	**0155**	OUT-2 status	
40157	**0156**	OUT-3 status	
40158	**0157**	preset point 1 status	
40159	**0158**	preset point 2 status	
40160	**0159**	preset point 3 status	
40161	**0160**	preset point 4 status	
40162	**0161**	upper limit status	
40163	**0162**	middle limit status	
40164	**0163**	lower limit status	
40165	**0164**	Clear Tare	Read & Write; Write :1:Clear tare;Read:0
Read & Write (function code of read: 0x01, function code of write:0x05)			
00000	**0000**	zero / clear tare	read & write address: write:1 (zero in gross weight status, clear tare in net weight status) read: 0
00001	**0001**	tare	
00002	**0002**	IN-1 status	read only address: 1: valid-status 2: invalid-status
00003	**0003**	IN-2 status	
00004	**0004**	OUT-1 status	

00005	**0005**	OUT-2 status	
00013	**0012**	OUT-3 status	
00014	**0013**	preset point 1 status	
00015	**0014**	preset point 2 status	
00016	**0015**	preset point 3 status	
00021	**0020**	preset point 4 status	
00022	**0021**	upper limit status	
00023	**0022**	middle limit status	
00024	**0023**	lower limit status	
00025	**0024**	Clear Tare	Read & Write; Write :1:Clear tare;Read:0
00025~00032	**0024~0031**	Reserved (allow to read value: 0)	

8.3 Modbus RTU、Modbus ASCII protocol

PLC Address	Protocol Address	Description	Remark
Four byte read-only region（Supported function code：03）			

40001	**0000**	Weight Value	Four byte sighed No.（As a complement） When **AD** is wrong：**0x7F455252** **（lower 3 bytes are E,R,R）** When the weight overflows： **0x7F4F464C**（lower **3**bytes are **O**,**F**,**L**）
40002	**0001**		
40003	**0002**	Status	**bit0**：**0** Unstable/**1** Stable **bit1**：**0** Normal /**1** OFL **bit2**：**0** None Zero/**1** Zero **bit3**：**0** positive/**1**Negative **bit4**：**0 AD** Normal /**1 AD** wrong **bit5~bit31**：**0**（standby）
40004	**0003**		
40005	**0004**	Reserved	The reserved bit data is fixed as **0x7F+'R'+'E'+'V'**
40006	**0005**		
40007	**0006**	Reserved	The reserved bit data is fixed as **0x7F+'R'+'E'+'V'**
40008	**0007**		

40009	**0008**	Reserved	The reserved bit data is fixed as **0x7F+'R'+'E'+'V'**
40010	**0009**		
40011	**0010**	Reserved	The reserved bit data is fixed as **0x7F+'R'+'E'+'V'**
40012	**0011**		
40013	**0012**	Reserved	The reserved bit data is fixed as **0x7F+'R'+'E'+'V'**
40014	**0013**		
40015	**0014**	Reserved	The reserved bit data is fixed as **0x7F+'R'+'E'+'V'**
40016	**0015**		
40017	**0016**	Weight value	Current Weight Value
40018	**0017**		
40019	**0018**	Reserved	The reserved bit data is fixed as

40020	**0019**		**0x7F+'R'+'E'+'V'**
40021	**0020**	Reserved	The reserved bit data is fixed as **0x7F**+'**R**'+'**E**'+'**V**'
40022	**0021**		
40023	**0022**	Reserved	The reserved bit data is fixed as **0x7F**+'**R**'+'**E**'+'**V**'
40024	**0023**		
40025	**0024**	Status bit	Symbol: **bit0**：**0** Unstable/**1** Stable **bit1**：**0** Normal /**1** OFL **bit2**：**0** None Zero/**1** Zero **bit3**：**0** positive/**1**Negative **bit4**：**0 AD** Normal /**1 AD** wrong **Bit5~bit31**：**0**（standby）
40026	**0025**		
Two byte read/write region（Supported function code：03, 06）			
40101	**0100**	digital filter grade	The initial value, range and specific

40102	**0101**	stable range	meaning of each parameter are explainedSee chapter 4
40103	**0102**	stable time	
40104	**0103**	zero-tracking range	
40105	**0104**	zero tracking time	
40106	**0105**	zero range	
40107	**0106**	unit	
40108	**0107**	decimal point digit	
40109	**0108**	division	
Four byte read/write region（Supported function code：03, 16）			
40201	**0200**	Max. capacity	write range≤division×**100000**
40202	**0201**		

40203	**0202**	weight zero calibration	Write non - zero value pair for zero calibration.Read as the current absolute millivolt number (fixed 3-bit Decimal point)	
40204	**0203**			
40205	**0204**	weight gain calibration	Write weight value to perform gain calibration.The number of millivolts (signed) read out as relative zero (for complement, fixed 3 decimal points)	
40206	**0205**			
40207	**0206**	No weight zero calibration	The number of millivolts written to the zero position.Read as the current zero millivolt number (fixed at 3 decimal places).	
40208	**0207**			
40209	**0208**	The number of millivolts of gain written when the gain is calibrated without weight	Read as (gain millivolt during calibration)(fixed 3 decimal points)Read as (gain weight value during calibration)	Both commands must be written to complete the gain calibration
40210	**0209**			
40211	**0210**	The weight value written when the gain is calibrated without weight		
40212	**0211**			

Byte only （Supported function code：01）			
00301	**0300**	Stable marker	**0**：Unstable；**1**：stable
00302	**0301**	OFL marker	**0**：Normal；**1**：overflow
00303	**0302**	Zero marker	**0**：Non-zero；**1**：zero
00304	**0303**	Positive and Negative marker	**0**：Positive；**1**：Negative
00305	**0304**	AD wrong marker	**0**：**AD** Normal ；**1**：**AD** Wrong
Byte read/write（Supported function code：01, 05）			
00401	**0400**	Zero calibration	Write operation: write 1, zero calibration;Write 0, no operationRead operation: read as 1, the device is in zero stateRead as 0, the device is in a non-zero state
00402	**0401**	Reserved	Write: invalid and returns address error messageRead operation: read as fixed 0

00403	**0402**	Reserved	Write: invalid and returns address error messageRead operation: read as fixed 0
00404	**0403**	Reserved	Write: invalid and returns address error messageRead operation: read as fixed 0
00405	**0404**	Zero	Write operation: write 1, zero calibration;Write 0, no operationRead operation: read as 1, the device is in zero stateRead as 0, the device is in a non-zero state
00406	**0405**	Reserved	Write: invalid and returns address error messageRead operation: read as fixed 0
00407	**0406**		
00408	**0407**		
00409	**0408**		
00410	**0409**		

00411	**0410**		
00412	**0411**		
00413	**0412**	System restart	Write operation: write 1, system restart;Write 0, no operationRead as: 0
00414	**0413**	Reset to defaults	Write operation: write 1, restore factory Settings;Write 0, no operationRead as: 0
00415	**0414**	Modbus Hi-Lo byte mode selection	Write operation: write 1, low byte mode Write 0, high byte mode Read operation: read as 1, currently in low byte modeRead 0, currently in high byte mode

8.4 Chi mei PT650D Protocol

Protocol descriptions as follow:

Protocol choose **PT650D**，data frame format adjusted to**7-E-1**，Baud rate adjusted to **9600**.

Under this protocol, data is output by **ASCII** code, data format is as follows:

Returns a description of the data frame format：

No.	1	2	3	4	5	6	7	8	9	10	11	122	13	14	15	16	17	18
	0	L	,	N	T	,	-	1	2	3	4	.	5	7	k	g	c	LF

Note：

No.1，2——Status **1**：

OL：overload；**ST**：stable display；**US**：unstable display

No.3—— “，” **2C**（**HEX)**

No.4，5——Status **2**：

NT：Net Weight；**GS**：Gross Weight

No.6—— “，” **2C**（**HEX)**

No.7—— “+”：positive；“-”：negative

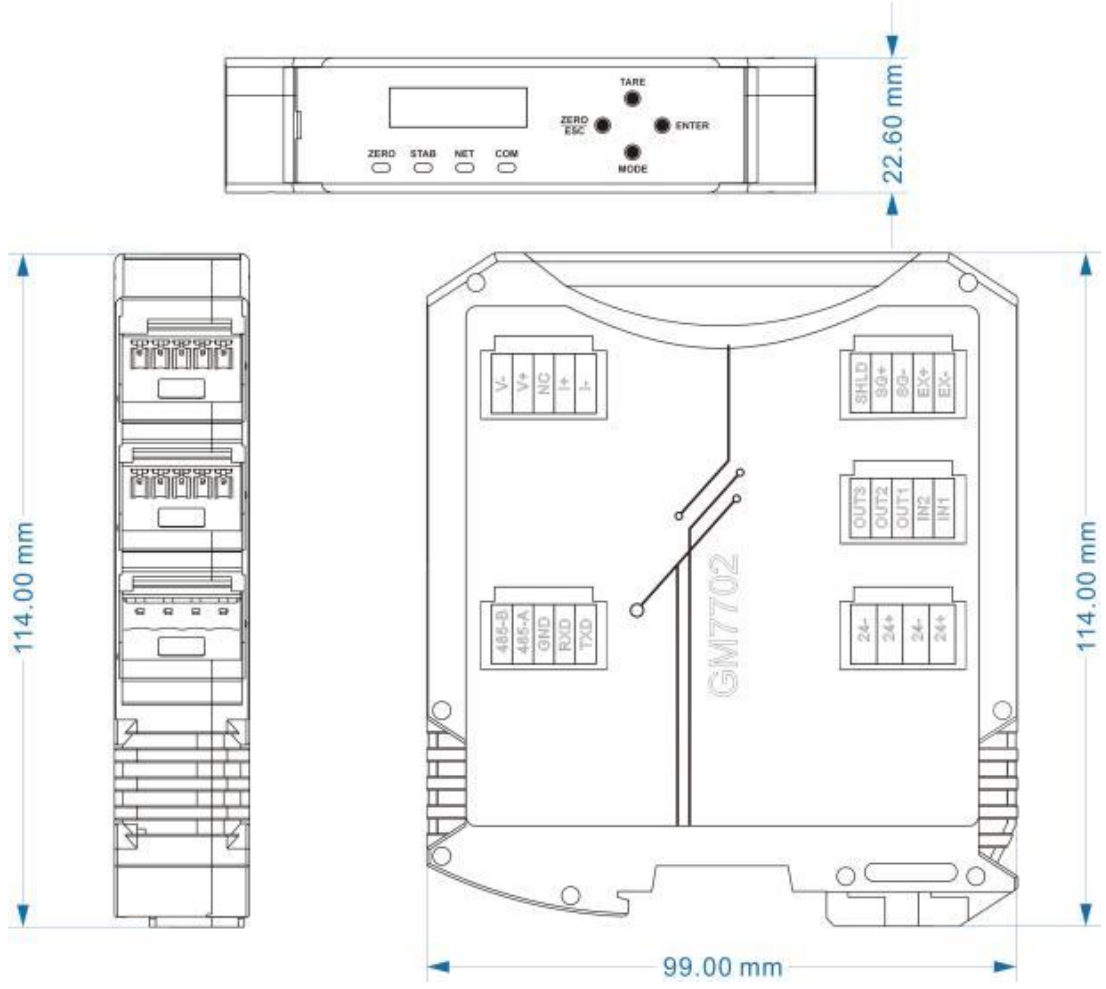
No.8-14——weight value：if no decimal point，**output a space at No.8**；overflow state readout

value is **999999**

No.15-16——Unit：**g，kg, t, lb**

No.17-18——control code：**CRLF**

9 Dimension


TARE
ZERO ESC
ENTER
MODE
ZERO
STAB
NET
COM
22.60 mm
114.00 mm
V-
V+
NC
I+
I-
SHLD
B0+
B0-
EX+
EX-
OUT3
OUT2
OUT1
IN2
IN1
485-B
485-A
GND
RXD
TXD
24-
24+
24-
24+
GM7702
114.00 mm
99.00 mm