TR700C

Multi-Material Batching controller

INSTRUCTION MANUAL

V02.05/2013.05

LONGTEC

Note：

- Observe the instruction manual carefully before using the weighing indicator for the first time, where you can find answers for many questions existing in the site operation.
- Check whether the other accessories of the weighing system match.
- Avoid being exposed in direct sun shine, splashing of water and physical shocks.
- Equip with the installation and repairing tools as possible: the mini-type minus screw driver, digital multimeter, load cell simulator (mV signal generator).
- The present security products in accordance with national standard GB/T 7724-1999 requirements, strict quality assurance.
- CE certification.

Notice

1. When using a four-wire sensor, short-circuit EX + and SEN +, EX- and SEN-.

CONTENT

Content

1. General Instruction

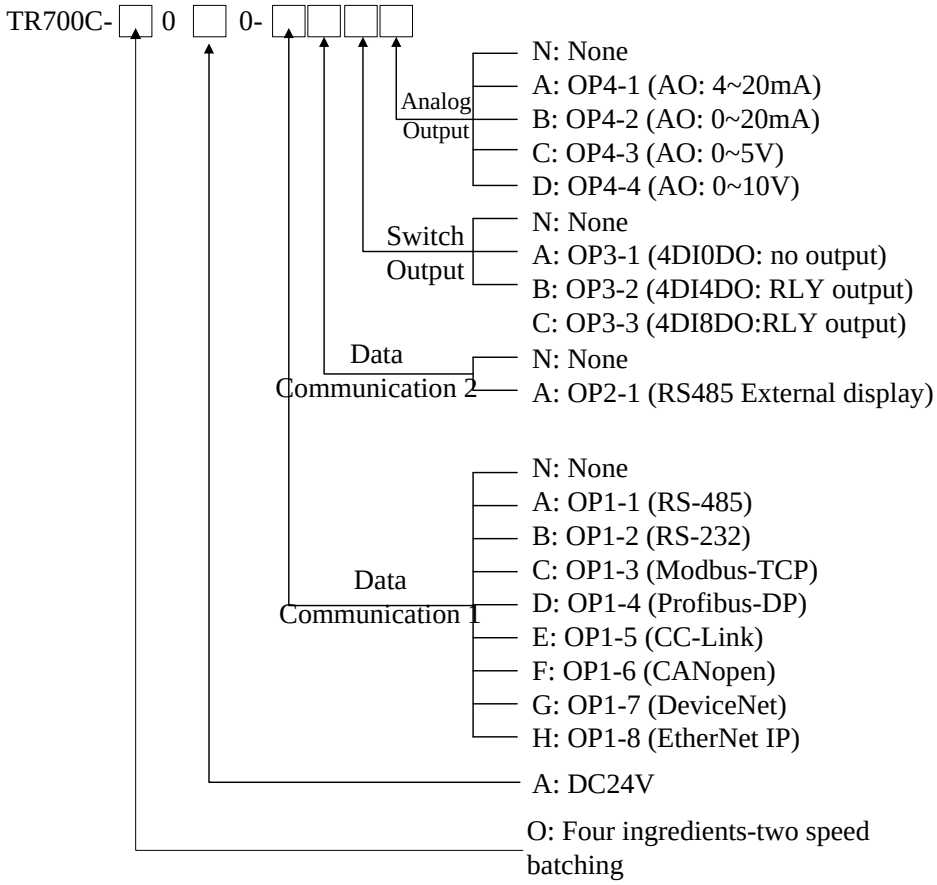
1.1. Instruction

TR700C Multi-material batching controller has four materials batching function at most. Rich communication interface types and analog output. Guide way installation. It is strictly tested by EMC, high reliability.

Terms Related	Definition
Scale Division	The change of the show value in unit; Only one of the numerical values (1, 2, 5, 10, 20, or 50) is optional.
Excitation Voltage	The voltage to drive the resistance strain gauge sensor, provided by the display
Resistance Strain Gauge Sensor	It is a kind a assembly, converting force or weight data to voltage signal One resistance Gauge sensor contains two parts: one is a kind of metal assembly called elastomer, deformed linearly via the force acting on it; the other is a kind of strain chip, the resistance of which will change via the magnitude of the elastomer's deformation.
Output Ratio of Resistance Strain Gauge Sensor	The ratio of output signal voltage and excitation voltage of resistance strain Gauge sensor, which is also called output sensitivity
Maximum Capacity	The maximum that the weighing display could display; It is preset before.
Resolution	The minimum signal the meter can differentiate
Tare Load	The weight of the carrying device which can make the resistance strain Gauge sensor output voltage
Weighing Division	The change of calibrating weight in unit, displayed on the weighing display
Overshoot	After close the valve, some material that leave the hopper and haven't reach the loader will increase the indicator, this is overshoot.

2. Technical Parameters

2.1. TR700 Production Code



2.2. TR700 Optional Part Specification

Code	Meaning	Specification
OP1-1-700C	RS-485	RS-485, support longtec protocol、Modbus RTU
OP1-2-700C	RS-232	RS-485, support longtec protocol、Modbus RTU
OP1-3-700C	Modbus TCP	Ethernet communication protocol
OP1-4-700C	Profibus-DP	Profibus-DP
OP1-5-700C	CC-Link	CC-Link
OP1-6-700C	CANOpen	CANOpen
OP1-7-700C	DeviceNet	DeviceNet
OP1-8-700C	EtherNet IP	EtherNet IP
OP2-1-700C	RS-485	Support for remote display

	External display	
OP3-1-700C	4DI0DO	4 channel switch input，0 channel switch output
OP3-2-700C	4DI4DO	4 channel switch input，4 channel switch output
OP3-3-700C	4DI8DO	4 channel switch input，8 channel switch output
OP3-4-700C	4DI6DO	4 channel switch input，5 channel switch output, 1 channel high speed pulse output (Only fit for three speed pulse batching system)
OP4-1-700C	AO:4~20mA	4~20mA analog output
OP4-2-700C	AO:0~20mA	0~20mA analog output
OP4-3-700C	AO:0~5V	0~5V analog output
OP4-4-700C	AO:0~10V	0~10V analog output

2.3. General Specifications

1. Power supply ： DC 24V (18V～30V)
2. Power consumption ： Max. 6W
3. Operating temperature ： -5℃～to 45℃（23℉～117℉）
4. Humidity ： ≤90% relative humidity（no condensation）

2.4. Digital

1. Digital display ： 6 digits LED
2. LED height ： 10 mm
3. Overload display ： Display “O.L”
4. Scale capacity ： 100～900,000

2.5. Analog

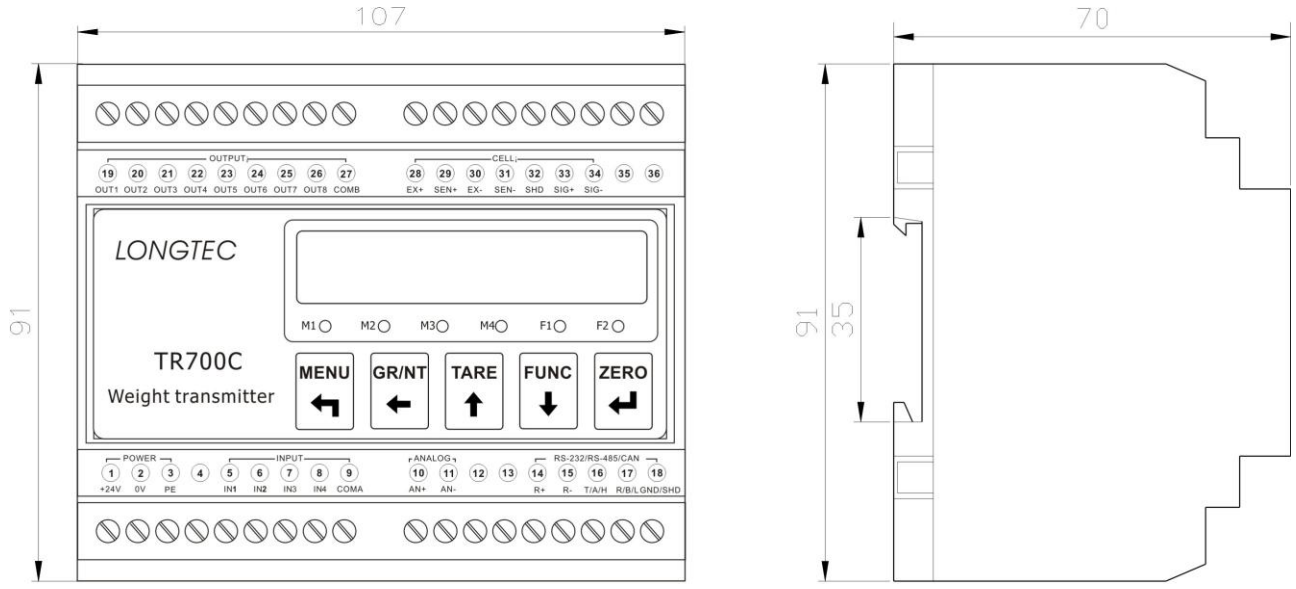
1. Load cell type ： All kinds of resistance strain gauge force and weighing load cell
2. Load cell in/output voltage ： DC 10V±5%，Maximum115mA
3. Output sensitivity ： 0.5μ V/D～200μ V/D
4. Input resistance ： The resistance between each terminal can’t be less than 100MΩ at DC 500V
5. Zero voltage adjustment ： 0.05mV～15.0mV
6. Input signal range ： 0mV～+31mV
7. Temperature coefficient ： ≤（0.0008% of the reading +0.3 division）/℃
8. Non-linear deviation ： ≤0.005% of F.S
9. Sampling speed ： Max. 200 times per second
10. Internal resolution ： 16,000,000
11. Maximum display division ： 50,000 divisions

3. Installation and Connection

3.1 Caution

- Avoid being exposed to direct sun shine, an abrupt change of temperature and vibration；
- The meter is in the best working state When temperature is approximate 20℃ or 68℉ and relative humidity is about 50%;
- It was tested by EMC, having the strong anti-interference ability. However, the analogue output of sensors and in/output of RS232/RS485 is very sensitive to electronic noise, so forbid connecting these signal cores with the power lines together, or the meter will be disturbed. Meanwhile, keep these signal wires away from meters and other equipments' AC power. And shorten the length of signal wires or coaxial cables at the same time.
- The ultimate accuracy of the weighing system is determined by the selection of weighing sensors, installation, weight, signal connection, power etc together, not just by one of them.;
- Analogue output is supported by single power, and the common terminal of the power can't be connected with other common wires or shielded wires together in case of short circuit or damaging the meter.
- The shielded wire of weighing sensor and signal wires or impulsive wires can't compose a circuit, or the input signal of the meter will not be stable.

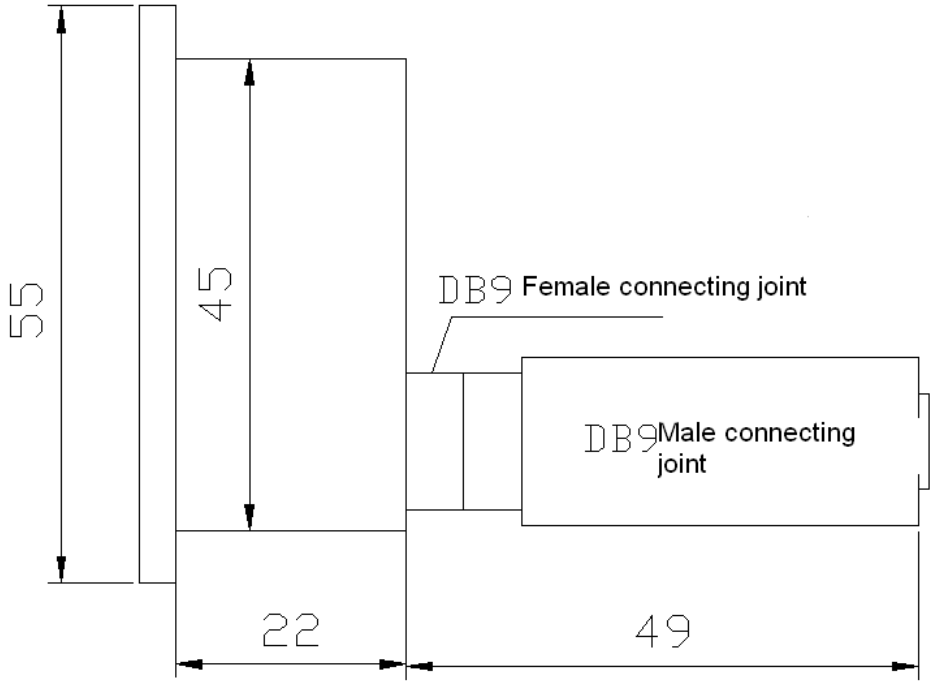
3.2 Dimensions



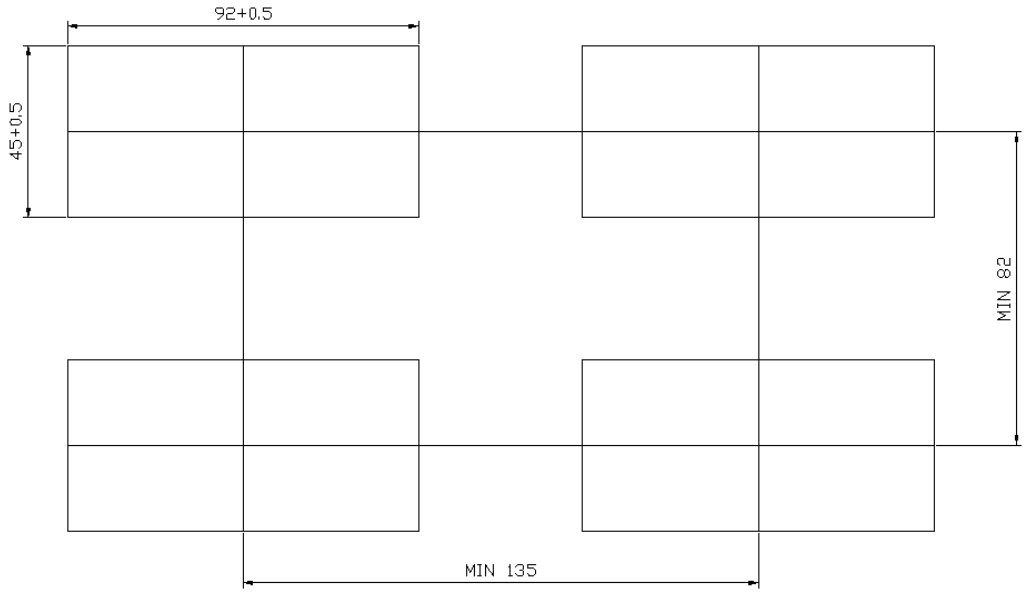
Vertical view Side view

P3-1 Dimension

Guide rail type installation

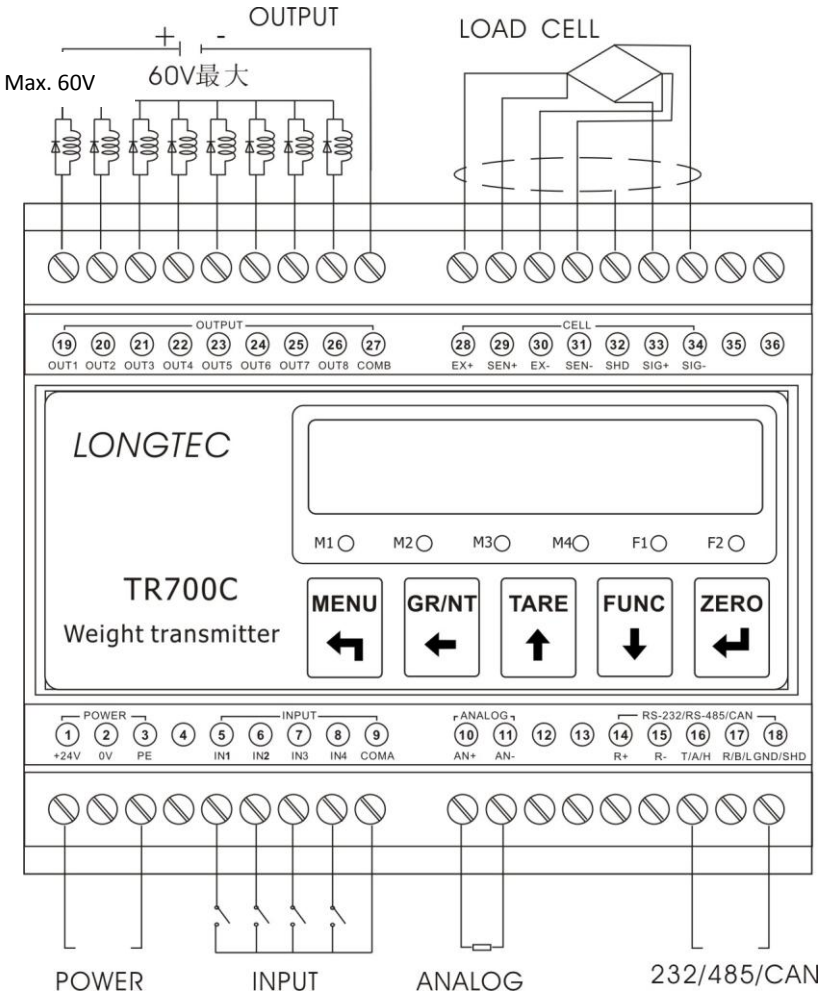


P3-2 Side view of external display



P3-3 Size of hole

3.3 Wire Connection and Interfaces



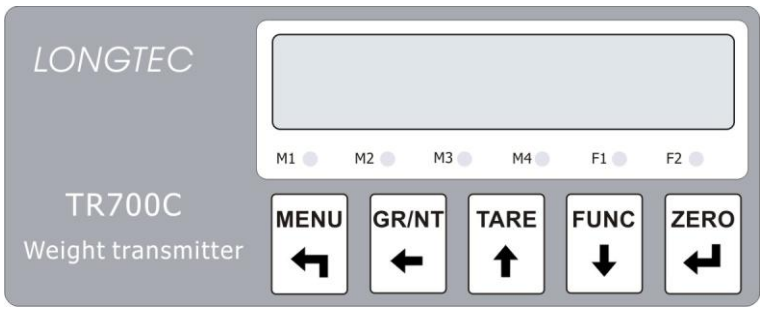
Charm 3-2 TR700C Wire Connection

Table 3-1 the List of Terminals

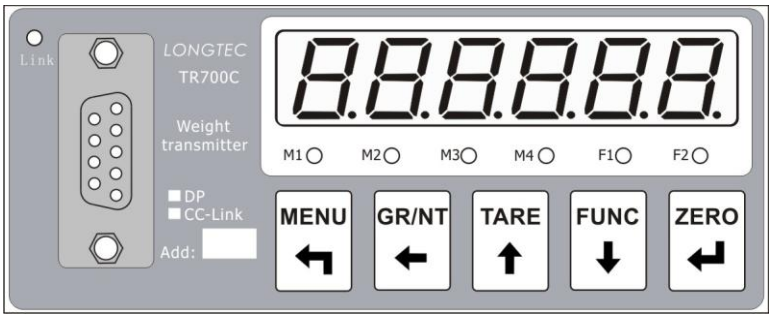
Number	Definition	Description
1	＋24V	The positive polarity of the module's power supply，24V(18V-30V), switch power supply
2	0V	The ground of the module's power
3	PE	The protection of the module, for ground
4	Reservation	
5	IN1	Digital input 1, Passive Connection Point
6	IN2	Digital input 2, Passive Connection Point
7	IN3	Digital input 3, Passive Connection Point
8	IN4	Digital input 4, Passive Connection Point
9	COMA	Digital input for ground
10	AN+	Analog output+
11	AN-	Analog output-
12		NC

13		NC	
14		NC	
15		NC	
16	TX/A	RS232 send terminal, RS485 A signal terminal	
17	RX/B	RS232 receive terminal, RS485 B signal terminal	
18	GND	RS232 和 RS485 ground wire	
19	OUT 1	Solid relay output 1	If choose OP3-2 (4DI4DO), OUT1~4 is empty.
20	OUT 2	Solid relay output 2	
21	OUT 3	Solid relay output 3	
22	OUT 4	Solid relay output 4	
23	OUT 5	Solid relay output 5	
24	OUT 6	Solid relay output 6	
25	OUT 7	Solid relay output 7	
26	OUT 8	Solid relay output 8	
27	COMB	Solid relay output common point	When using a four-wire sensor, short-circuit EX + and SEN +, EX- and SEN-.
28	EX+	Excitation voltage output+	
29	SEN+	Solid relay feed up+	
30	EX-	Excitation voltage output-	
31	SEN-	Solid relay feed up-	
32	SHD	The shield of sensors	
33	SIG+	Signal input+	
34	SIG-	Signal output-	
35		NC	
36		NC	

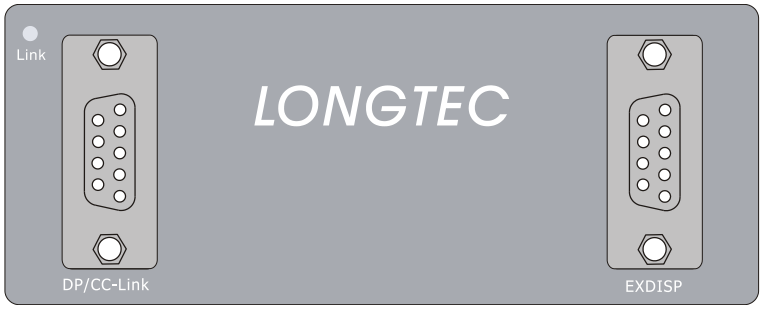
3.4 Display panel



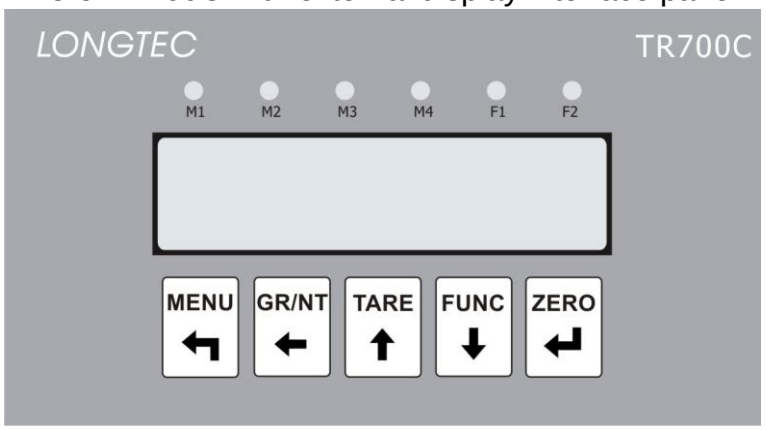
P3-3 TR700C Standard panel



P3-4 TR700C with Profibus-DP/CC-Link panel



P3-5 TR700C with external display interface panel



P3-6 TR700C External display panel

1. Display Window

It is six-bit LED display, mainly used to display weight data or the other functional parameters. After power on, it displays '8.8.8.8.8.8.'for about 5 seconds, and then automatically enters the weighing status.

The details are as follows.

Table 3-3

Display status	No batching	On batching	Parameter setting
Display contents	Current weight value	Current value of material weight or total material weight	Parameters or the other information

2. Status Lamp

Table 3-4

Light	ON	OFF

	On batching	No batching	On batching	No batching
M1	The No.1 material is on batching	Display the gross weight of the front panel.	The No.1 material is not on batching	Not on gross weight state
M2	The No.2 material is on batching	Display the net weight of the front panel.	The No.2 material is not on batching	Not on net weight state
M3	The No.3 material is on batching	Scale on motion	The No.3 material is not on batching	Scale on the stable state
M4	The No.3 material is on batching	The gross weight is zero.	The No.4 material is not on batching	The gross weight is not zero.
F1	Full flow	The unit is kilogram.	The unit is not kilogram	The unit is not kilogram
F2	Dribble flow	The unit is ton	The unit is not kilogram	The unit is not kilogram

3. Key

From left to right： 

Table 3-5

Key	Function	Description
	Menu	1） In the weighing status, enter the menu; 2） In the menu setting, quit the menu; 3） In the sub-menus, enter the next sub-menu without saving the parameters.
	Gross/ Net	1） In the weighing status, exchange the state of net weight or gross weigh; 2） In the state of inputting data，move left.
	Tare	1） In the weighting status, it is a key‘tare’（tare range：80% of the max capacity; 2） In the menu setting, enter the former menu; 3） In the state of inputting data, increase the value.
	Function	1） In the menu setting, enter the next menu; 2） In the state of inputting data，decrease the value.
	Zero	1）In the weighing status, clear zero; 2）In the menu setting, conform; 3）In the sub-menu，save the parameters and enter the next sub-menu .

4. Basic Operation Diagram

4.1 Function Block Diagram

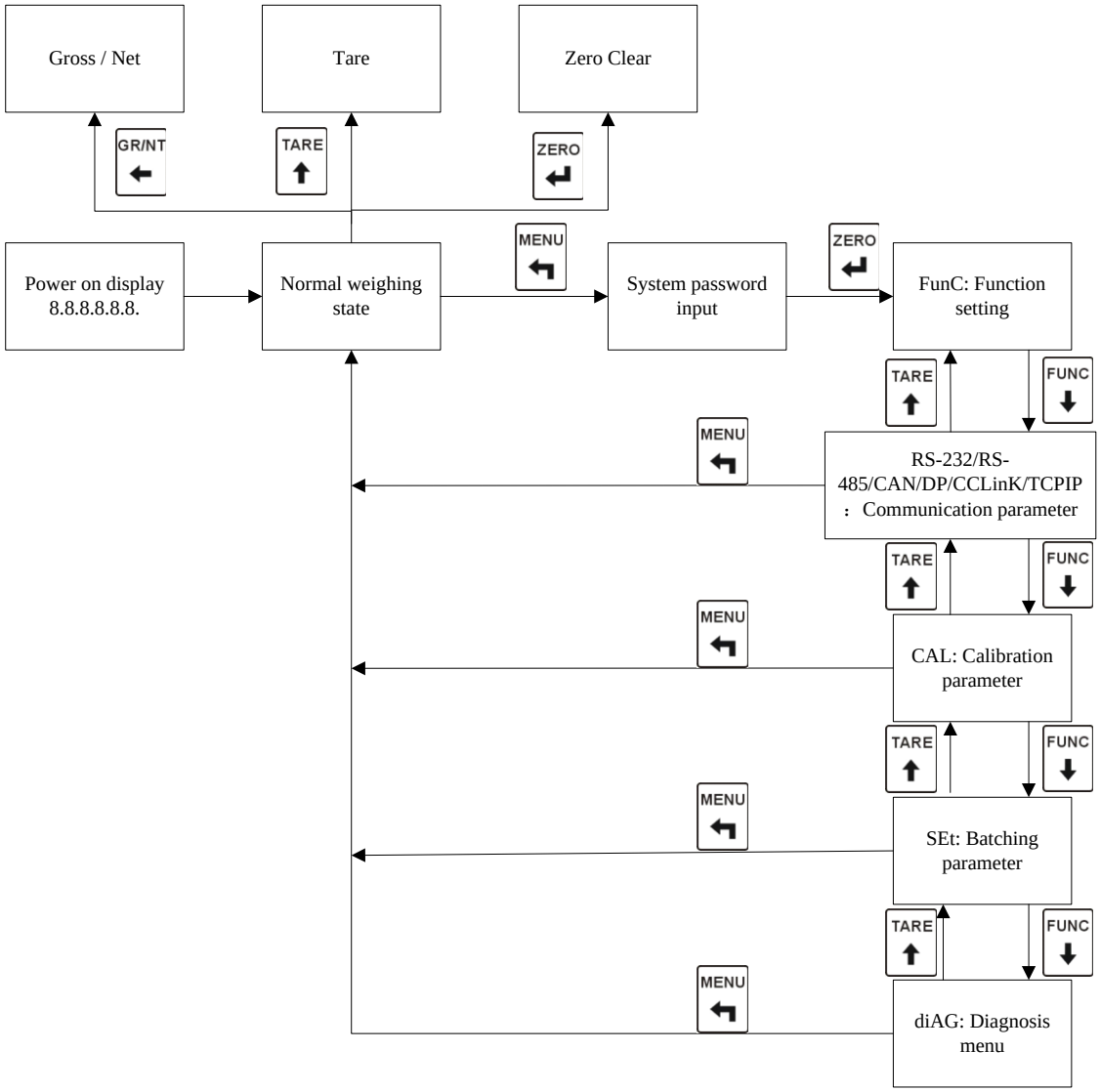


Diagram 4-1 Function Block Diagram

4.2 TR700C Operation Flow Chart

Step 1: Wiring, refer to the “charm 3-2 TR700C Wire Connection”;
Step 2: Calibration, refer to chapter 7. (Re-calibrate the instrument when you change the loadcell).
Step 3: Set external input and relay output function, refer to function setting menu.
Step 4: Set formula, refer to chapter 9.
Step 5: Set general parameters, refer to chapter 9.
This is all of the preparation working before batching.

4.3 TR700C Function Tree

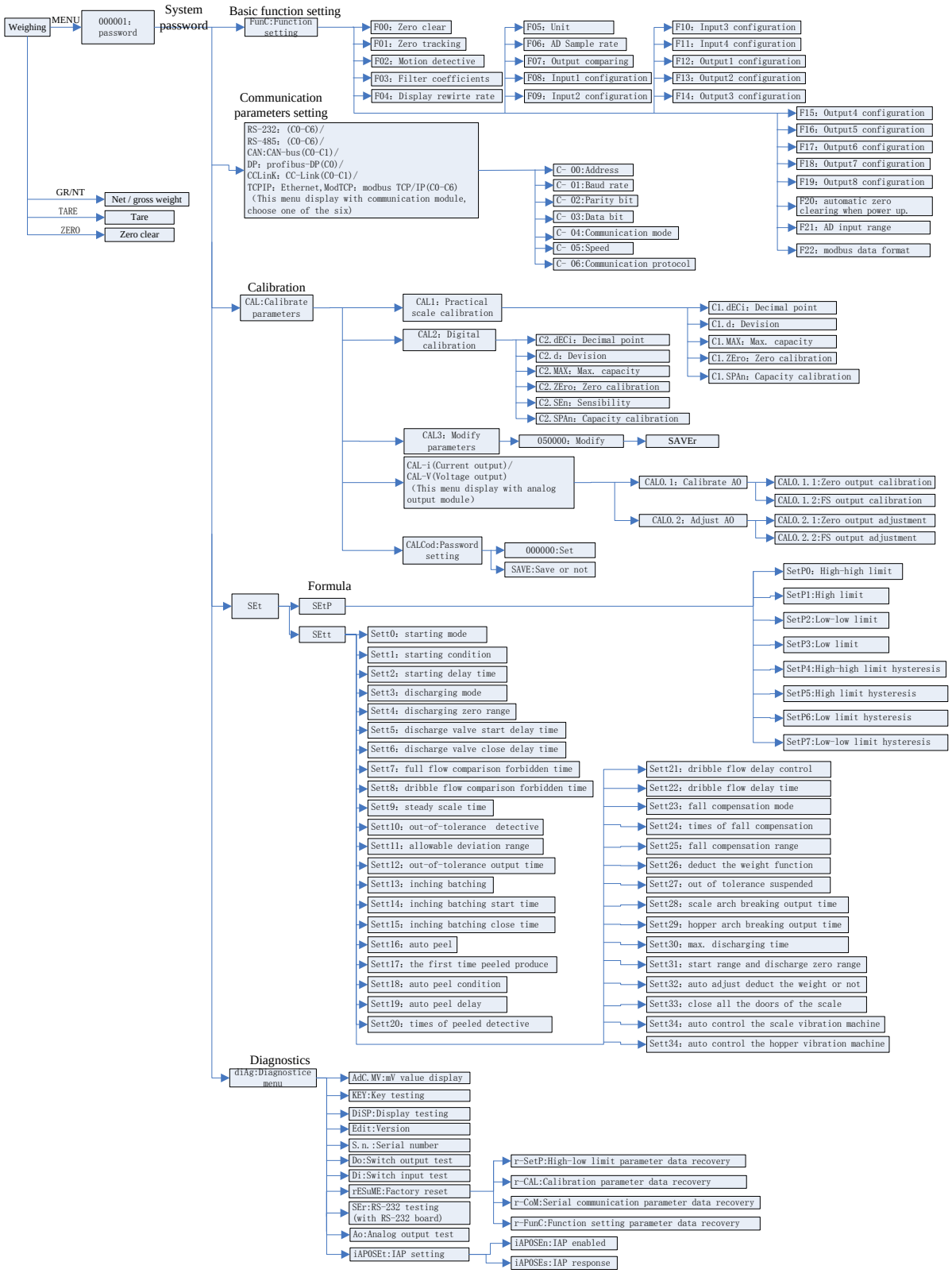


Chart 4-3 Function Tree

Password to enter the menu: Factory set 000001.

5. General Function Setting

5.1. Steps

- Step 1: In normal display, Press [MENU], input password by [GR/NT], [TARE], [FUNC], press [ZERO] to confirm and enter the menu. Press [TARE], [FUNC] to select“FunC”, and press [ZERO] to enter into function setting menu.
- Step2: Select parameters by pressing[TARE], [FUNC].
- Step3: Press [ZERO] to enter modify parameters, press [TARE], [FUNC] to change.
- Step4: Press [ZERO] to save this parameter, or press [MENU] to delete it and back to the last level of menu.
- Step5: Cycle for step2-step4, until you finish all the parameters’ modification. Press [MENU] to exit to “FunC”, and these parameters will be saved in the internal memory.
- Step6: Press [MENU] to back to the normal display window.

5.2. Function Table

Table 5-1

Number F XX	Name	Default	Setting	
			Parameters Range	Description
00	Zero clear	3	0-10	0 ：Zero function off; 1-10 ：It is 1％-10％ of the capacity.
01	Zero tracking range	0	0-10	0 ：Do not perform zero tracking; 1-10 ：Display division of zero tracking in 1s.
02	Motion detection range	3	0-10	0 ： Motion detection is off; 1-10 ： Display division.
03	Filter coefficient	3	0-9	0 ：No filtering; 1-9 ：The larger the figure is, the greater the filter is.
04	Display updating	3	0-4	0 1 times per second 1 4 times per second 2 8 times per second

	rate			3	16 times per second
				4	30 times per second
05	Unit conversion	0	0-1	0	kg
				1	t
06	Sampling rate	2	0-3	0	25 times per second
				1	50 times per second
				2	100 times per second
				3	200 times per second
07	Conditions of comparison output	0	0-2	0	Gross weight
				1	Net weight
				2	Display value
08	Distribution of external control input 1	0	0-9	0	Gross/net
09	Distribution of external control input 2			1	Tare
10	Distribution of external control input 3			2	Clear zero
11	Distribution of external control input 4			3	Peel
				4	Clear peel
				5	Net/gross weight
				6	Batching start
				7	Emergency Stop
				8	Batching pause
				9	Batching continue
				10	Start to discharge
				11	Lock out the keys
				12	All scale doors turn off signal
12	Distribution of relay output 1	0	0-10	0	None
13	Distribution of relay output 2			1	Communication control
14	Distribution of relay output 3			2	Full flow filling
15	Distribution of relay output 4			3	Dribble flow filling
16	Distribution of relay output 5			4	Blow-off valve
17	Distribution of relay output 6			5	Out-of-tolerance output
18	Distribution of			6	Batching finished

	relay output 7				
19	Distribution of relay output8			7	Ingredient 1
				8	Ingredient 2
				9	Ingredient 3
				10	Ingredient 4
				11	Bucket function output
				12	Scale arch breaker
				13	Hopper arch breaker
				14	Full flow filling ingredient 1
				15	Dribble flow filling ingredient 1
				16	Full flow filling ingredient 2
				17	Dribble flow filling ingredient 2
				18	Full flow filling ingredient 3
				19	Dribble flow filling ingredient 3
				20	Full flow filling ingredient 4
				21	Dribble flow filling ingredient 4
				22	Output the rest of discharge.
20	Auto zero clearing when power on	0	0-1	0：Forbidden 1：do	
21	AD input range	0	0-1	0: 0mV～+31mV 1: -31mV～+31mV	
22	Modbus data format	0	0-3	0(32 bit signed integer)：Low 16 in the former, high 16 bit behind 1(32 bit signed integer)；High 16 in the former, low 16 bit behind 2(32 bit floating number)：Low 16 in the former, high 16 bit behind 3(32 bit floating number)：High 16 in the former, low 16 bit behind	
23	Analog data source	0	0-3	0：Gross weight 1：Net weight 2：Display value 3：Communication control value	
24	Flow calculate time	1	1-10	1-10:1S-10S	

6. Communication Parameters Setting and Protocol

TR700C leave the factory without communication. Please confirm the interface mode when you order.

Note: Communication protocol, profibus-dp and CC-Link communication parts please refer to《TR700C communication instruction》

6.1. Communication Parameters Setting

Note: Communication parameters setting menu only display when there is a communication board.

- Step1: In normal display, Press [MENU], input password by pressing [GR/NT], [TARE], [FUNC]. Press [ZERO] to confirm the password and enter into the menu. Press [TARE], [FUNC] to choose “RS-232”、“RS-485”、“CAN”、“DP”、“CCLink”、“TCPiP”, enter into setting menu by pressing [ZERO].
- Step2: Select the corresponding parameter by pressing [TARE], [FUNC].
- Step3: Enter into parameters modification by [ZERO], press [TARE], [FUNC]to change.
- Step4: Save the modification by [ZERO], or or press [MENU] to delete it and back to the last level of menu.
- Step5: Cycle for step2-step4, until you finish all the parameters’ modification. Press [MENU] to exit to “RS-232”、“RS-485”、“CAN”、“DP”、“CCLink”、“TCPiP”, and these parameters will be saved in the internal memory
- Step6: Press [MENU] to back to the normal display window.

6.2. List of Communication Parameters

Table 6-1 RS-232、RS-485、Modbus TCP

Number C-XX	Name	Default	Setting	
			Parameter range	Description

00	Communication address	1	0-99	Communication address	
01	Baud rate	1	0-5	0	4800 bps
				1	9600 bps
				2	19200 bps
				3	38400 bps
				4	57600 bps
				5	115200 bps
02	Parity bit	0	0-2	0	8n(8 bit None)
				1	8o(8 bit Odd)
				2	8e(8 bit Even)
03	Stop bit	0	0-1	0	0.5 bit
				1	1 bit
				2	1.5 bit
				3	2 bit
04	Communication mode	1	0-1	0	Continuous mode
				1	Instruction mode
05	Communication rate	2	0-5	0	5 times per second
				1	10 times per second
				2	20 times per second
				3	50 times per second
				4	100 times per second
				5	200 times per second
06	Communication protocol	0	0-2	0	Longtec protocol
				1	Modbus protocol
				2	Zhimei protocol

Table 6-2 Profibus-DP

Number C-X XX	Name	Default	Setting		
			Parameter range	Description	
00	Communication address	1	3-99	Communication address	
01	Baud rate (TR700C)	3	3	3	38400 bps
02	Parity bit	0	0	0	8 bit None
03	Stop bit	1	1	1	1bit
04	Communication mode	1	1	1	Command mode
06	Communication protocol	0	0	0	Longtec protocol
07	DP protocol	0	0-1	0	Longtec protocol

				1	8 byte floating point protocol

Table 6-3 CC-Link

Number C-X XX	Name	Default	Setting		
			Parameter range	Description	
00	Communication address	1	1-64	Communication address	
01	Baud rate （CC-Link）	1	0-4	0	156 bps
				1	625 bps
				2	2.5M bps
				3	5M bps
				4	10M bps
02	Parity bit	0	0	0	8 bit None
03	Stop bit	1	1	1	1bit
04	Communication mode	1	1	1	Command mode
06	Communication protocol	0	0-2	0	Longtec protocol
07	CC-link protocol	1	1	0	Longtec protocol
				1	8 byte floating point protocol

Table 6-4 CANOpen and DeviceNet

Number C-X XX	Name	Default	Setting		
			Parameter range	Description	
00	Communication address	1	0－99	Communication address	
01	Baud rate	3	0-7	0	1000K
				1	800K
				2	500K
				3	250K
				4	125K
				5	50K
				6	20K
				7	10K

Table 6-5 Modbus-TCP and Ethernet/IP

Number C-X XX	Name	Default	Setting	
			Parameter range	Parameter range
nEttYp	Choose protocol	0	0-1	0:Modbus-TCP 1:Ethernet/IP
IP 1	IP address	192	1-255	xxx.000.000.000
IP 2		168	0-255	0000. xxx.000.00
IP 3		0	0-255	000.000. xxx.00

IP 4		200	0-255	000.000.000. xxx
Sub 1	Subnet mask	255	0-255	xxx.000.000.000
Sub 2		255	0-255	0000. xxx.000.00
Sub 3		255	0-255	000.000. xxx.00
Sub 4		0	0-255	000.000.000. xxx
dn 1	Default gateway	192	0-255	xxx.000.000.000
dn 2		168	0-255	0000. xxx.000.00
dn 3		0	0-255	000.000. xxx.00
dn 4		1	0-255	000.000.000. xxx

7. Calibration of the Meter

- Note: when the meter is calibrated, the function of zero tracking is not allowed to be performed. , that is to set F1 =0. Besides, the meter should be powered on for half an hour in advance before calibration, in order to make the weighing units of the load cells and the meters up to thermal stability.
- *Note: In the calibration, only when the instrument is stable, i.e. when the weighing detecting indicator motion is off, calibration is allowed. When the indicator motion is on for a long time, check the parameters setting of F2.
- *Note: If the parameters input are not correct, an error screen will be shown for about 2 seconds and then the screen gets back to where the parameters need to be input again.

7.1. Steps of the Calibration

7.1.1. Practical scale calibration

In the normal display，press MENU to enter the menu，press GR/NT、TARE、FUNC to input the password，press ZERO to confirm. And press TARE、FUNC to choose “CAL” ，and press ZERO to display “CA L1”. Press ZERO to enter calibration parameter setting.

- Step1: Decimal point

The window displays “C1.dECi”, press MENU to skip, press ZERO to enter. Select the decimal point position by TARE, FUNC. Press ZERO to save and do step2, or press MENU to do step2 directly without saving.

- Step2: Scale division

The window displays “C1.d”, press [MENU] to skip, press [ZERO] to enter. Select the division by [TARE], [FUNC]. Press [ZERO] to save and do step3, or press [MENU] to do step3 directly without saving.

- Step3: Maximum capacity

The window displays “C1.MAX”, press [MENU] to skip, press [ZERO] to enter. Set the Max. capacity by [GR/NT], [TARE], [FUNC]. Press [ZERO] to save and do step3, or press [MENU] to do step3 directly without saving.

- Step4: Zero calibration

The window displays “C1.Zero”, press [MENU] to skip. Press [ZERO] to enter, the window displays flashing numbers 000000. After the scale body is stable, press [ZERO] to calibrate and do step5. (If the motion detective opens, wait for the motion detective lights turn off.) Or press [MENU] to skip and do step5 directly.

- Step5: Weight calibration

The window displays “C1.SPAn”, press [MENU] to skip, press [ZERO] to enter. Select the weight value by [GR/NT], [TARE], [FUNC]. After the scale body is stable, press to calibrate and back to menu “CAL1”. (If the motion detective opens, wait for the motion detective lights turn off.) Or press [MENU] to skip and back to menu “CAL1” directly.

7.1.2. Digital Calibration

In the normal display，press [MENU] to enter the menu，press [GR/NT]、[TARE]、[FUNC] to input the password，press [ZERO] to confirm. And press [TARE]、[FUNC] to choose “CAL” ，and press [ZERO] to display “CAL1”. Then press [TARE], [FUNC] to choose ”CAL2”. Press [ZERO] to enter calibration parameter setting.

- Step1：Decimal Point Setting

“C2.dECi” is displayed，and press [MENU] to skip, press [ZERO] to enter the decimal

setting; press [TARE]、[FUNC] to select the position of the decimal point; press [ZERO] to save the position selected and enter the second step. Or press [MENU] to enter the next step directly without saving the position selected.

- Step 2：Division Setting

  "C2.d" is displayed，and press [MENU] to jump over the division setting；press [ZERO] to enter the division setting; press [TARE]、[FUNC] to select the division; press the [ZERO] to save the division selected and enter the third step, or press [MENU] to enter the next step without saving the division selected.

- Step 3: Capacity Setting

  "C2.MAX" is displayed，and press [MENU] to jump over the capacity setting；press [ZERO] to enter the capacity setting; press [GR/NT]、[TARE]、[FUNC] to input the capacity; press [ZERO] to save the capacity input and enter the next step, or press [MENU] to enter the next step directly without saving the capacity input.

- Step 4：Zero Calibration

  "C2.Zero" is displayed, and press [MENU] to jump over the zero setting; press [ZERO] to enter the zero calibration, and "000000"is displayed and all are flickering. If the motion detection is on, after the scale is stable and the dynamic indicator is off, press [ZERO] to perform zero calibration and enter the fifth step. Or enter the fifth step by [ZERO] without zero calibration.

- Step 5：Sensitivity Input（unit：mV）

  "C2.SEn" is displayed，and press [MENU] to jump over the sensitivity setting; press [ZERO] to enter the sensitivity input setting; press [GR/NT]、[TARE]、[FUNC] to input the sensitivity. Press [ZERO] to save the sensitivity input and enter the next step, or press [MENU] to enter the next step directly without saving the sensitivity input.

- Step 6： Capacity Calibration

  "C2.SPAn" is displayed，and press [MENU] key to jump over the capacity calibration setting; press [ZERO] to enter the capacity calibration setting; press [GR/NT]、[TARE]、[FUNC] to input the capacity; press [ZERO] to save the capacity input（If the sensitivity input setting is jumped over，the capacity will not be saved.）and get back to the "CAL2" screen，or press [MENU] to get back to the "CAL2" screen directly without saving the capacity input.

7.1.3. Coefficient Calibration

In the normal display，press [MENU] to enter the menu，press [GR/NT]、[TARE]、[FUNC] to input the password，press [ZERO] to confirm. And press [TARE]、[FUNC] to choose “CAL” ，and press [ZERO] to display “CAL1”. Then press [TARE], [FUNC] to choose ”CAL3”. Press [ZERO] to enter calibration parameter setting.

- Step 1: Input the Calibration Coefficient

Press [GR/NT]、[TARE]、[FUNC] to input the calibration coefficient; press [MENU] to get back to “CAL3”screen without saving the calibration coefficient input; or press [ZERO] to enter the next step.

- Step 2: Save the Calibration Coefficient

“SAVEr”is displayed, cluing to save the calibration coefficient input or not; press [MENU] to get back to “CAL3”screen without saving the calibration coefficient, or press [ZERO] to save it.

7.2. Parameter List of Calibration in Kind

7.2.1. List of practical scale calibration

Table 7-1

CAL1	Name	Default	Setting	
			Parameter range	Descriptions
C1.dECi	Position of decimal point	0	0-4	0：No decimal place 12345
				1：1 decimal places 1234.5
				2：2 decimal places 123.45
				3：3 decimal places 12.345
				4：4 decimal places 1.2345
C1.d	Division	1	1、2、5、10、20、50	The minimum weighing division can be any one of 1、2、5、10、20、50.
C1.MAX	Full capacity	10000	100-900000	The maximum range of weighing; While the weight exceeds the full capacity ＋9d（9 divisions），it displays OL.
C1.ZEro	Zero calibration	0.1mV	0.05uV-15mV	The voltage that is input from the load cell at zero is decided in the zero calibration. The unit is mV.

C1.SPAn	Capacity calibration	10000	100-900000	In the calibration in kind, the voltage input from the load cell is decided in the capacity calibration. It is the difference between weighing point and zero point. The unit is mV.

7.2.2. List of digital calibration

Table 7-2

CAL2	Name	Default	Setting	
			Parameter range	Descriptions
C2.dECi	Position of decimal point	0	0-4	0：No decimal place 12345
				1：1 decimal places 1234.5
				2：2 decimal places 123.45
				3：3 decimal places 12.345
				4：4 decimal places 1.2345
C2.d	Division	1	1、2、5、10、20、50	The minimum weighing division can be any one of 1、2、5、10、20、50.
C2.MAX	Full capacity	10000	100-900000	The maximum range of weighing; While the weight exceeds the full capacity ＋9d（9 divisions）, it displays OL.
C2.ZEro	Zero calibration	0.1mV	0.05uV-15mV	The voltage that is input from the load cell at zero is decided in the zero calibration. The unit is mV.
C2.SEn	Sensitivity Input	1mV/V	Max. 5mV/V	Input the sensor sensitivity.
C2.SPAn	Capacity calibration	10000	100-900000	The max. capacity of sensor.

7.3. Reminders of Calibration Error

Error Code	Description	Solution
DISP-L	If the input signal＜0.05mV or negative, maybe there is a wiring wrong, loose, didn't short-circle EX+ and SEN+, or EX- and SEN-.	Connect the sensor's wiring again or add an 50k-500k resistance with accuracy 1% between EX+ and SIG+.
DISP-H	If the input signal＞31mV, maybe there is a wiring wrong, loose, didn't short-circle EX+ and SEN+, or EX- and SEN-.	Connect the sensor's wiring again or add an 50k-500k resistance with accuracy 1% between EX+ and SIG-.
Error0	There's something wrong with AD convertor.	

Error1	“Max capacity/ Min scale "can not be divisible exactly, display resolution is more than 50000 or less than 300; the max. capacity is less than 100 or more than 900000; the last sensitivity or the division just modified is lesson 0.3uV/d.	Adjust the max. capacity, division. Or change a new sensor or reduce the calibration accuracy.
Error2	Zero voltage is too high.，exceeding 15mV.	Add an 50k-500k resistance with accuracy 1% between EX+ and SIG-.
Error3	Zero voltage is too low.，less than 0.05mV.	Add an 50k-500k resistance with accuracy 1% between EX+ and SIG+.
Error4	The weighing value input is larger than the max capacity	Re-input the weight value or max. capacity.
Error5	The input sensitivity of load cell is too low.，less than 0.3uV/d, or the weighing value is 0.	Change a new sensor or reduce the calibration accuracy.
Error6	The mV value of the weighing Calibration is less than the mV value of zero calibration.	Connect the sensor’s wiring again or calibrate the scale again.
Error7	The input of the load cell exceeds the range of input signal，more than 31mV.	Connect the sensor’s wiring again or change a new sensor.
Error8	The weighing value is less than 100 divisions in the weighing calibration.	Re-input the weight value.
Error9	The input weighing value / minimum scale in the weighing calibration can not be divisible exactly.	Re-input the weight value.

8. Diagnosis Function

8.1. Operation Procedure of Diagnosis Function

In the normal display state，press MENU to enter the menu, displays “FunC”; press TARE、FUNC to select “diAg”; press ZERO to display 000000 with the last bit (rightmost bit) flashing, input the password by GR/NT, TARE, FUNC, then press ZERO to display “AdC.mV”; press TARE、FUNC to select submenu; press ZERO to enter the submenu.

8.2. List of Diagnosis Function

Table 8-1

Menu display		Description
AdC.MV		Display of the mill volt value
KEY		Key-press testing
diSP		Display testing
Edit		Display the version number
S.n.		Display the serial number of airframe
di		External controlling input testing
do		Relay output testing
rESMuE	rE－FunC	Renew to the default of function setting
	rE－SEtt	Renew to the default of batching parameters.
	rE－SEtP	Renew to the default of formula parameters
	rE－CAL	Renew to the default of calibration parameters
	rE－CoM/CAn/nEt	Renew to the default of communication parameters
SEr		Serial port test
AO		Analog output test

8.3. Description of Diagnosis Function

Step1:

In the normal display, press MENU and input the password by GR/NT、TARE、FUNC, press ZERO to confirm and enter into the menu. Press TARE, FUNC and choose “diAG”, press ZERO to enter.

Step2:

Choose the corresponding parameter item by TARE , FUNC .

8.3.1. Display of the Mill volt Value

"AdC.MV" is displayed; press ZERO, and the voltage input from the load cell will be displayed. The unit is mV.

8.3.2. Key-press Testing

This function is to check whether the key-press can work properly. "KEY" is displayed; press ZERO to enter the key-press testing, and"KEY-00"is displayed; press MENU to get back to the"KEY"; press GR/NT, and "KEY-02"is displayed; press TARE, and "KEY-03"is displayed; press FUNC, and "KEY-04" is displayed; press ZERO, and"KEY-05"is displayed.

8.3.3. Display Testing

"diSP" is displayed, and press ZERO to enter the display testing; the bits of segment code a is lighted from the first bit to the seventh bit in turns, so is the segment b, c, d, e, f, g, dp.

8.3.4. Display the Version Number

"Edit"is displayed; press ZERO, and the version number will be displayed.

8.3.5. Display the Serial Number

"S.n."is displayed; press ZERO, and the serial number will be displayed, which is united by the plant and is accord with the transmitter's.

8.3.6. External controlling input testing

"di"is displayed; press ZERO to enter the input testing, and "diXXXX"is displayed. The "di" stands for input testing, and the latter four bits correspond to the four inputs. If there is an input, "1" will be displayed on the corresponding LED, otherwise "0" is displayed.

8.3.7. Relay Output Testing

“do”is displayed; press ZERO to enter the output testing, and“doXXXX” will be displayed. The “do” stands for output testing, and the latter four bits correspond to the four outputs.

Press TARE; there’s four outputs，and “1111” is displayed on the LED. Use a multi-meter to test the four circuits separately. If the circuit is on, it can work properly.

Press FUNC; there’s no output, and “0000” is displayed on the LED. Use a multi-meter to test the four circuits separately. If the circuit is not on, it can work properly.

8.3.8. Renew to the Default

“rEsuME”, and press ZERO to enter the default renewing setting.

Table 8-2

rE－CAL	Renew to the default of calibration parameters
rE－FunC	Renew to the default of function setting
rE－SEt	Renew to the default of upper/lower limit value
rE－CoM	Renew to the default of communication parameters

Select the corresponding parameter option of the default needed to be renewed and input correct password, and the default can be renewed.

8.3.9. Communication Port Testing

Note: This menu display only with RS232 communication board. Before test, short-circle T/A/H and R/B/L. Forbidden to plug the serial port lines when power on.

Display “SEr", press ZERO to test. Display “SEr-oK” if the communication port is OK. Code “SEr-Err” means the communication is abnormal.

8.3.10. Analog output testing

Display “Ao”, press to test the analog output, every 1s output cycle increasing output analog.

8.3.11. IAP upgrade

Display“iAPSEt”, press ZERO to enter into the menu, choose“iAPEn”、“iAPrES” by TARE、FUNC.

“iAPEn”：0 means IAP upgrade is unabled, 1 means IAP upgrade is enabled, enter into IAP state when exit the menu.

When CAN is upgrading, even more than 1 pcs of machine can be upgraded at the same time(That means set more than one slave “iAPEn” as 1 at this moment).When serial port is upgrading, only 1 machine can be upgraded at this time(That means set only one slave“iAPEn” as 1 at this moment).

“iAPrES”：0 means no reply to host computer, 1 means reply to host. When CAN is upgrading, there must be one slave machine “iAPrES” set as 1, the others are 0. When serial port is upgrading, upgrade one machine at one time, “iAPrES”is invalid.

9. Batching Parameters Setting

9.1. Procedure of Formula Parameter Setting

In the normal display status, press MENU to enter the menu, input the password by GR/NT、TARE、FUNC, press ZERO to confirm and enter. Press TARE、FUNC to select “SET”, and press ZERO to display “SEtP “ , press ZERO to enter the high/low limit value setting.

Step 1：Press TARE, FUNC to select the corresponding parameter.

Step2: Press ZERO to enter parameter modification, change the parameters by GR/NT、TARE、FUNC.

Step3: Press ZERO to save the modification, or press MENU to delete it. Then bake to the last level menu.

Step4: Cycle for step2-step4, until you finish all the parameters’ modification. Press MENU back to “SEtP”, and this parameter will be saved in the memory.

Step5: Press MENU back to “SET”, then press MENU back to the main menu.

9.2. List of Formula Parameter setting

Table 9-1

Function number SETP XX	Function name	Default	Description
SEtP00	Ingredient 1 target value	0	Ingredient 1

SEtP01	Ingredient 1 full flow filling advanced value	100	formula setting
SEtP02	Ingredient 1 dribble flow filling advanced value	20	
SEtP03	Ingredient 2 target value	0	Ingredient 2 formula setting
SEtP04	Ingredient 2 full flow filling advanced value	100	
SEtP05	Ingredient 2 dribble flow filling advanced value	20	
SEtP06	Ingredient 3 target value	0	Ingredient 3 formula setting
SEtP07	Ingredient 3 full flow filling advanced value	100	
SEtP08	Ingredient 3 dribble flow filling advanced value	20	
SEtP09	Ingredient 4 target value	0	Ingredient 4 formula setting
SEtP10	Ingredient 4 full flow filling advanced value	100	
SEtP11	Ingredient 4 dribble flow filling advanced value	20	
SEtP12	Deducting weight	0	
SEtP13	Advanced deducting weight	0	
SEtP14	Target value	1000	
SEtP15	Scale arch broken start flow rate	500	
SEtP16	Hopper arch broken start flow rate	500	
SEtP17	Max. start flow rate	1000	
SEtP18	Discharging zero weight value	100	
SEtP19	Discharging surplus value	100	
SEtP20	Range of drop modification	100	

Note：

1. When one of the ingredients target value is set “0”, this ingredient is invalid.

9.3. Steps of Batching Common Parameters

In the normal display status, press MENU to enter the menu, input the password by GR/NT、TARE、FUNC, press ZERO to confirm and enter. Press TARE、FUNC to select “SET”, and press ZERO

to display “SEtP “ , press [ZERO] to enter the high/low limit value setting.

Step 1: Press [TARE], [FUNC] to select the corresponding parameter.

Step2: Press [ZERO] to enter parameter modification, change the parameters by [GR/NT]、[TARE]、[FUNC].

Step3: Press [ZERO] to save the modification, or press [MENU] to delete it. Then bake to the last level menu.

Step4: Cycle for step2-step4, until you finish all the parameters’ modification. Press [MENU] back to “SEtt”, and this parameter will be saved in the memory.

Step5: Press [MENU] back to “SEt”, then press [MENU] back to the main menu.

9.4. List of Batching Parameter setting

功能号 SEtt XX	功能名称	出厂值	设定	
			参数范围	说明
SEtt00	Starting mode	0	0～2	0：External input control starting 1: Communication control starting 2：Both are OK.
SEtt01	Starting condition	0	0～2	0：Can’t start except of on batching and parameters setting. 1：Net weight in the range of zero clear. 2：Gross weight in the range of zero clear.
SEtt02	Starting delay time	0.5	0.0～25.5S	There will be vibrating when start, delay can make sure its stable of zero.
SEtt03	Discharge mode	0	0～2	0：Auto discharge 1：Discharge when external device send signal to discharge. 2：Communication control discharge 3：Both are OK.
SEtt04	Discharge zero range	1.0	0.0% ～ 25.5%	0.0%～25.5% of max. measuring span.
SEtt05	Discharge valve open delay time	0.1	0.0～25.5S	Delay for a period of time to open the discharge valve after receiving the discharge command.
SEtt06	Discharge valve close delay	0.5	0.1～25.5S	In normal, delay for a period of time to close the valve when the feeding

	time			material reach to zero range. While using deducting weight function, material has been discharged to deducting weight, close discharge valve and delay for a period of time. Then calculate the next deducting advanced value.
SEtt07	Full flow comparison forbidden time	1.0	0.0～25.5S	At the beginning and ending of feeding, hopper vibrates because of shock and quick stop of material, instrument's reading is not stable. So adapt forbidden comparison control output time to improve the accuracy and stable.
SEtt08	Dribble flow comparison forbidden time	0.5	0.0～25.5S	
SEtt09	Time of stabilize the scale	0.5	0.0～25.5S	To avoid some interference, delay for period of time after it finishes the feeding. Record the value and detect the out-of-tolerance, make sure the instrument is stable. Set this time according to your on-site environment.
SEtt10	Out-of-tolerance detective	1	0～255	0：Forbidden. 1-255：Check once every 1 to 255 times.
SEtt11	Tolerance allowance	1.0	0.0% ～ 25.5%	0.1%～25.5% of target value
SEtt12	Out-of-tolerance output time	0.5	0.0～25.5S	Out-of-tolerance signal output time
SEtt13	Inching batching	0	0～255	0：Unavailable. 1～255：Times of inching feed While it is 0, dribble flow valve is closed. If the material is not enough, improve the accuracy by start inching batching.
SEtt14	Inching start time	0.1	0.0～25.5S	While inching batching, valve open time.
SEtt15	Inching end time	0.1	0.0～25.5S	While inching batching, valve close time.
SEtt16	Auto peel	0	0～255	0：Set reference tare weight as the first value when power on. 1～255：Peel once every 1 to 255 times.
SEtt17	First time to peel production	1	0～1	0：Don't peel for first time when power on. 1：Peel for first time when power on.
Sett18	Auto peel condition	1	0～1	0：No limit 1：Gross weight must be less than zero clear range
Sett19	Auto peel delay	0.1	0.0～25.5S	While auto peel is valid, delay for a

				period of time to peel, to make sure the scale is stable.
SEtt20	Peel detective time	5	1～255	1：Regard current gross weight as tare weight. 2～255：Tare weight is average of values from 2-255times.
SEtt21	Dribble flow delay control	0	0～100	0：Do full and dribble flow at the same time. 1～99：Net weight≥（target value－fast feed advanced value）×（1～99）/100， 100：After close full flow valve, open dribble flow valve.
SEtt22	Dribble flow delay delay	0	0.0～25.5S	After dribble flow control finish, delay for 0.0～25.5S.
SEtt23	Fall compensation mode	1	1～10	1～10： Compensation standard is average of 1～10 times error.
SEtt24	Fall compensation times	1	0～255	0：Forbidden 1～255：Times
SEtt25	Fall compensation range	5.0	0.0% ～ 25.5%	0：Ignore net weight, auto compensate. 0.1%～25.5%： 0.1%～25.5% of target value.
SEtt26	Deducting	0	0-1	0：Close this function. 1：Open this function.
SEtt27	Out-of-toleranc e suspension function	0	0-1	0: Do the next material batching after the times of out-of-tolerance up. 1: Do the next material batching when receive the continue batching signal.
SEtt28	Scale vibrating machine continuous time	1.0	1-25.5	Scale arch breaker signal continuous time
SEtt29	Hopper vibrating machine continuous time	1.0	1-25.5	Hopper arch breaker signal continuous time
SEtt30	The longest discharge time	0S	0-255S	0:Close this function 1-255S:Have not finished discharge in 1-255S, alarm.
SEtt31	Calculate start range and discharge reset range	0	0-1	0:The max. start value is the same as reset range, discharge zero range is decided by Sett04 and max. start value, fall modification range is decided by Sett25 and target value. 1:Max. start and discharge reset range is decided by SEP17 and SEP18 separately. Fall modification range is

				decided by SEP20.
SEtt32	Auto adjust deducting advanced value	0	0-1	0:Don't auto adjust. 1:Auto adjust deducting advanced value
SEtt33	All doors turn off	0	0-1	0:Close this function. 1:Open this function.
SEtt34	Auto control scale vibrating machine	1	0-1	0：Manual control 1：Automatic control
SEtt35	Auto control hopper vibrating machine	1	0-1	0：Manual control 1：Automatic control

10. Input/Output

10.1. Switch input

1） Input control ：IN1，IN2，IN3, IN4, four inputs in all. Optocoupler isolation input.
2） Input method ： switch without power
3） Input contact time ： not less than 50 ms

10.1.1. The Connection between Input Interface and External Switch

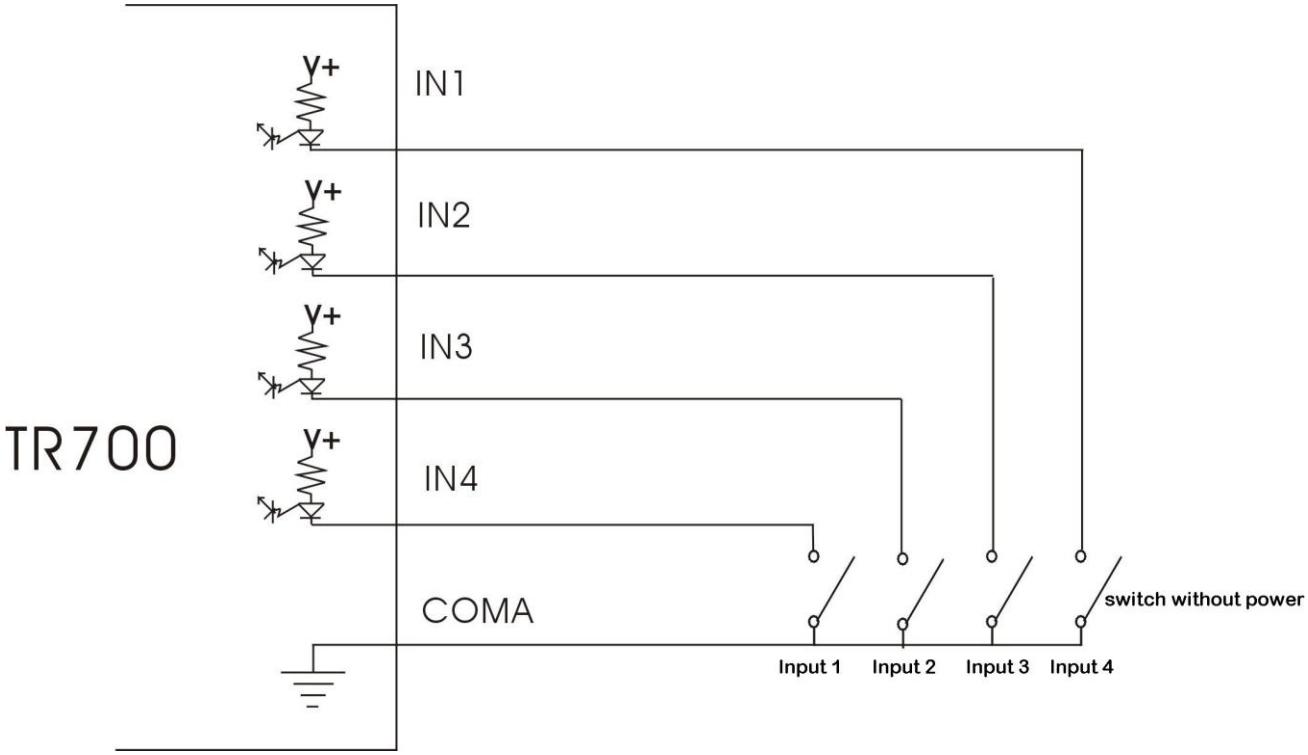


Chart 10-1 Connection Drawing of External Input and Switch Without Power

Note：Input contact adopts the switch without power, and the circuit can not be short for less than 50 ms.

10.1.2. Connection between Input Interface and PLC

In the charm, the DC V+ is provided by TR700C itself, and there is no need to add any power for the output.

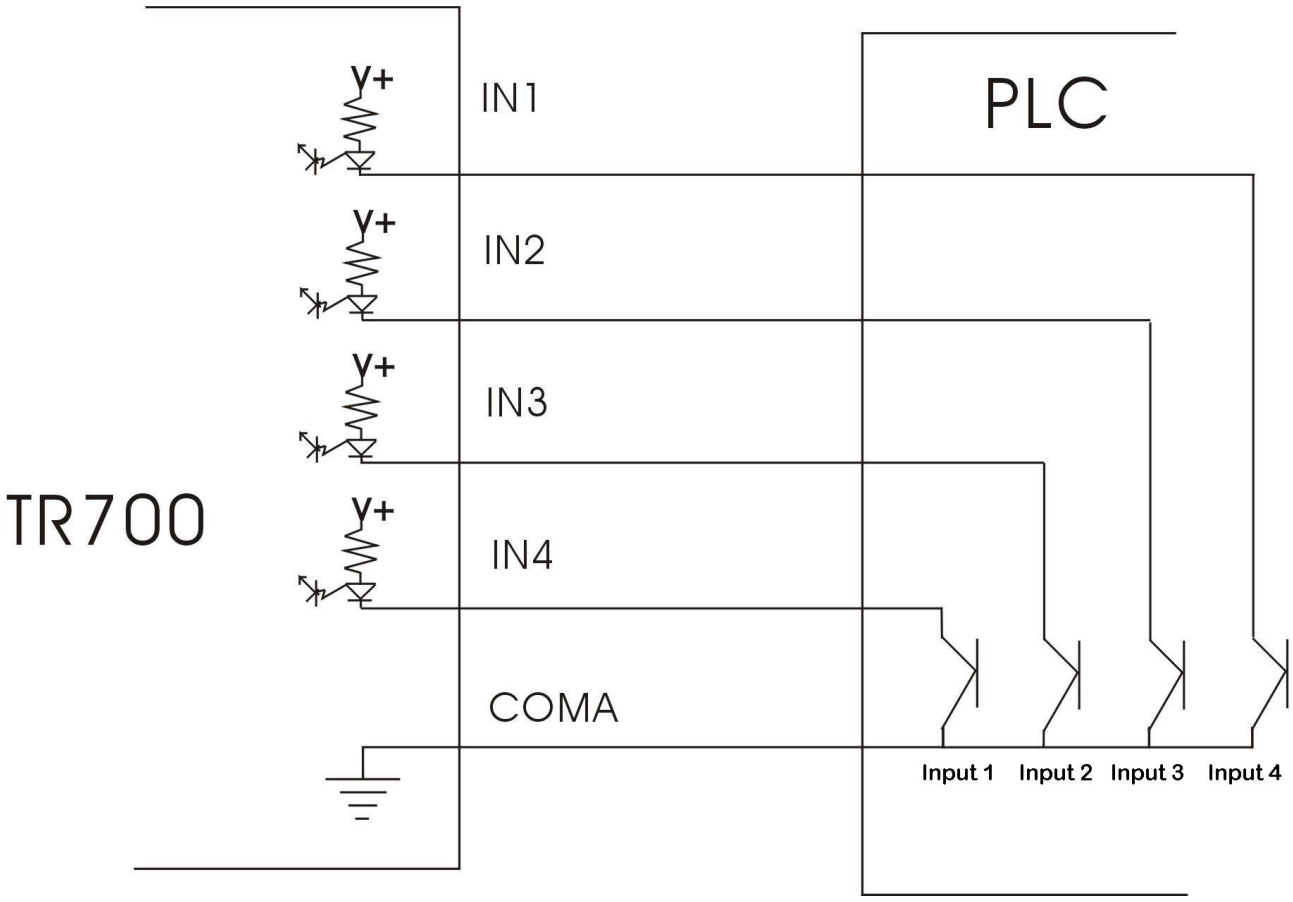
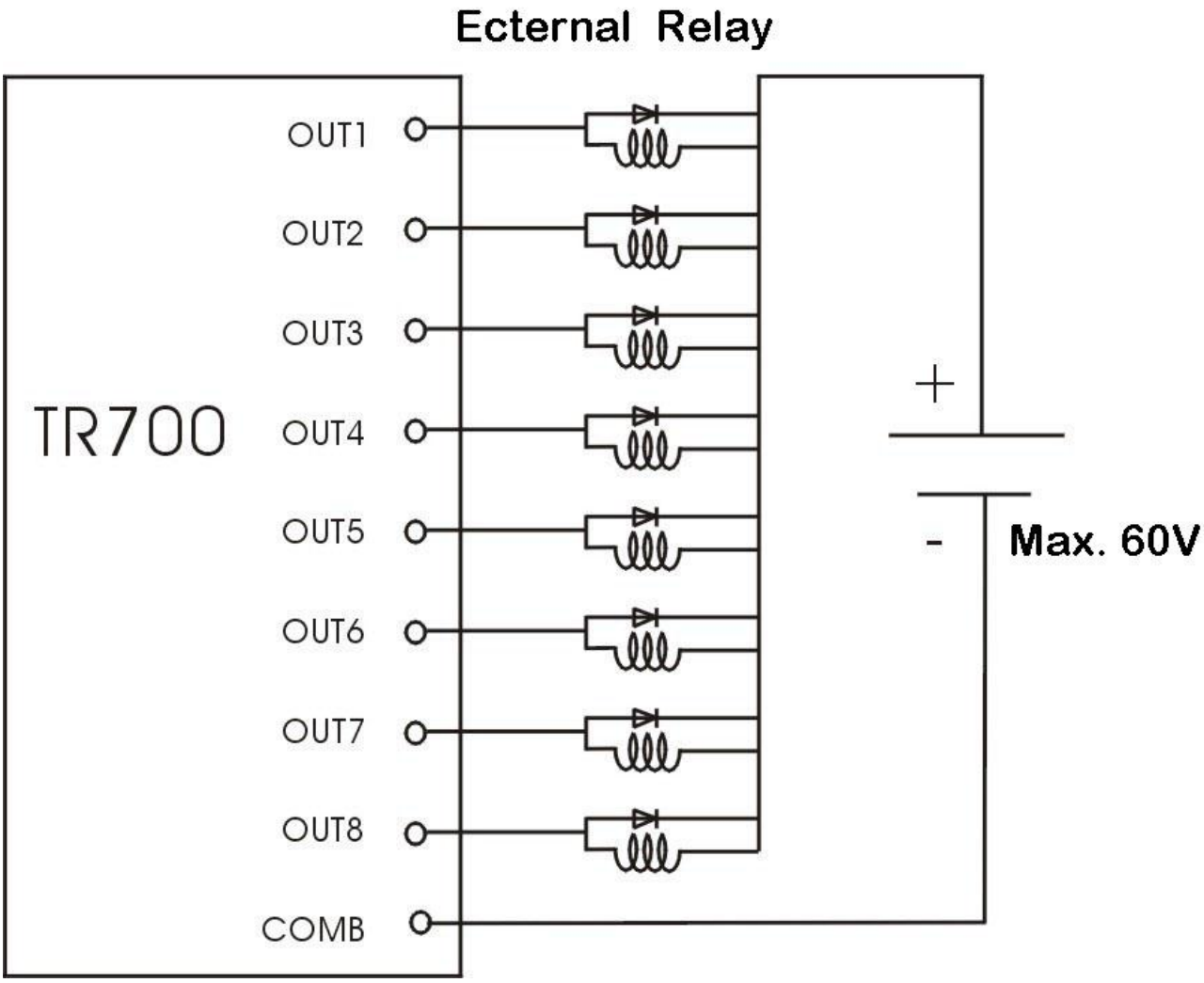


Chart 10-2 Connection Drawing of External Input and PLC

10.2. Switch Output

10.2.1. Wiring



10.2.2. Description of Output

Output method： Solid relay output，every output is individual.
Max capacity： 60V DC/AC，0.4A current

10.2.3. Description of Comparison Condition

10.3. Analog Output

10.3.1. Analog Calibration Steps

In the normal display status, press MENU to enter the menu, input the password by GR/NT、TARE、FUNC, press ZERO to confirm and enter. Press TARE、FUNC to select “CAL”, and press ZERO to display “CAL1 “. Press TARE、FUNC to select “4-20MA”/“0-20MA”/“0-5V”/“0-10V”, press ZERO to display “CAo “..

Step 1: Press ZERO to display “CAo.ZEr “, press ZERO to enter zero corresponding weight value input. Press GR/NT、TARE、FUNC to input the value, press ZERO to next step.

Step2: Display“CAo.SPA”,Press ZERO to enter F.S. corresponding weight value input. Press GR/NT、TARE、FUNC.to input value, press ZERO to confirm and back to “CAo “

10.3.2. Analog Default Calibration

In the normal display status, press MENU to enter the menu, input the password by GR/NT、TARE、FUNC, press ZERO to confirm and enter. Press TARE、FUNC to select “CAL”, and press ZERO to display “CAL1 “. Press TARE、FUNC to select “4-20MA”/“0-20MA”/“0-5V”/“0-10V”, press ZERO to display “CAo “. Press TARE、FUNC to choose“dAC”and enter into step 1.

Step 1: Press ZERO to display “dAC.ZEr “, press ZERO to enter zero AO calibration. Press ZERO to next step.

Step2: Display“dAC.SPA”,Press ZERO to enter F.S. AO calibration. Press GR/NT、TARE、FUNC.to input value, press ZERO to confirm and back to “dAC “

10.3.3. Specification

Resolution：1/50000　　Accuracy：0.5%FS

Table 10-1

Output	0～20mA	4～20mA	0～5V	0～10V
Load resistance	Max 500Ω	Max 500Ω	Min 10KΩ	Mix 10KΩ

12. Record

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