Touch Screen Filling Weighing Controller

4.3 inch touch screen for single scale

Instruction Manual

V1.1

Modification date：2021-1-16

Contents

1 Summary

1.1 Product introduction

Thank you for choosing our products. Before using this product, please read this manual carefully to make this product work to the maximum extent.

This product integrates the control part and touch screen operation part, with friendly interface and convenient operation.

This product uses 24 bit ∑-△ADC chip,and the analog signal of bridge load cell is converted into digital signal. It also have 4 DI and 8 DO,1 sensor inputs,In addition to the weighing signal transmission function, it can also achieve a large number of control functions.

Suitable for 18-30vdc power supply system.24 V power supply is recommended.

This product also has the function of sensor circuit detection, that is, when the sensor is not connected or the sensor is faulty (including the wiring falling off, etc.), the corresponding alarm will be given [effective when only one sensor is connected to each channel].

Product features:

1. Signal acquisition, control and touch screen operation are integrated, and the operation is convenient and fast;

2. It can prevent RFI / EMI interference and has strong EMC characteristics;
3. 18-30v DC supply;
4. High speed 24 bit ∑-△ADC sampling, each channel more than 500Hz sampling, control output and sampling interval synchronization;
5. Complete sensor fault detection function, such as signal overrun, module sampling fault, sensor line connection fault, etc;
6. Complete communication interface , Standard RS 232 and 485,Optional CAN, etc;
7. Mass storage, which can store more than 300000 pieces of data.

1.2 Safety tips

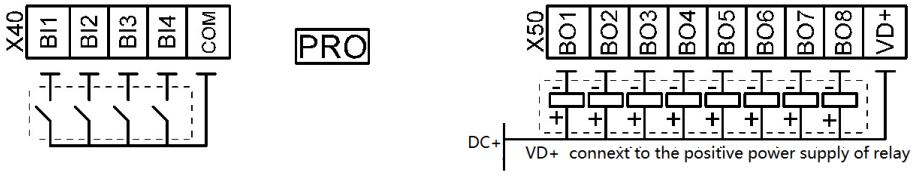
1. The instrument has anti-interference design. Be sure to ground the instrument reliably and separate it from the AC power supply ground wire;
2. Do not use in flammable gas environment;
3. Avoid direct sunlight;

1.3 Technical parameters and dimensions

Measurement signal	-20mV~20mV, Each can drive 6 load cells with 350 ohm

Sampling frequency	500Hz
Accuracy	III level
Resolution	1/500000
DI/DO	5 DI, 8 DO, Low level active
Communication	rs 232,rs 485。Optional with CAN
Nonlinearity	0.005%FS
Power	21-26V DC。Sensor voltage 5V。
Weight	About 0.7kg
Dimensions	135.9*88.5*24.5
Opening size	130.5*83
Power waste	< 10W
Temperature	-20~+65℃

1.4 I/O



Touch Screen Weighing Controller

Power	DC 24V
Sensitivity	1-4 mV / V
Accuracy	III **Level**

Explain

1：X40 is DI terminal，valid for COM,NPN type photoelectric junction；PRO is the programming button，Press and hold this button, and then power on the instrument to enter the download program；

2：X50 is DO terminal，The wiring is shown in the figure above；

3：X30 is a communication extension interface（CAL/CAH is CAN，TX/RX/G is RS232，A/B is RS485）；

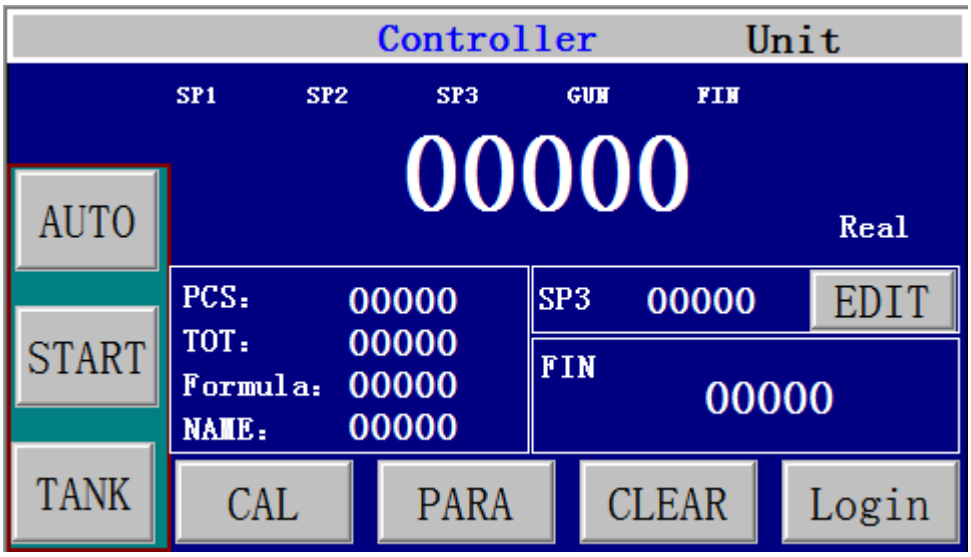
4：X11 is loadcell interface；

5：X10 is the power interface，DC + and DC - to connect the DC power, and 24 V DC is recommended; PE is shielded interface;

6: VD + must be connected to the positive power supply of relay.

2 Interface and operation method

2.1 Weighing interface



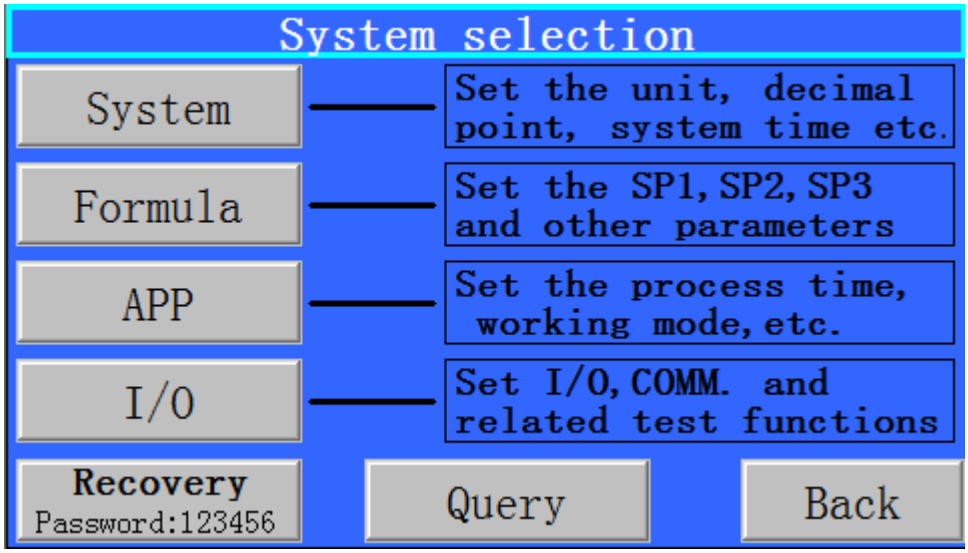
1. AUTO，It is used to make the controller switch between manual and automatic state. Double click to switch to manual state；

2. START，In the automatic state, it is used to start the filling process. Double click to stop；

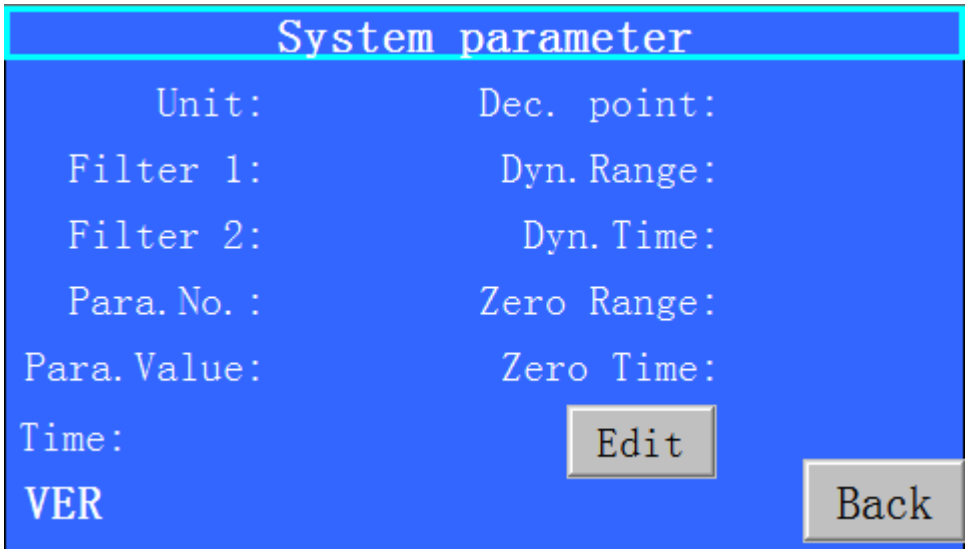
3. Other operations need to log in first. The password is 123. When the indicator light on the login button turns green, all parameters can be operated. Enter password 0, login will be cancelled.

4. EDIT is used to manually correct the SP3。CLEAR used to clear the TOT,PCS, etc., need to log in to operate.

2.2 Parameter display and setting



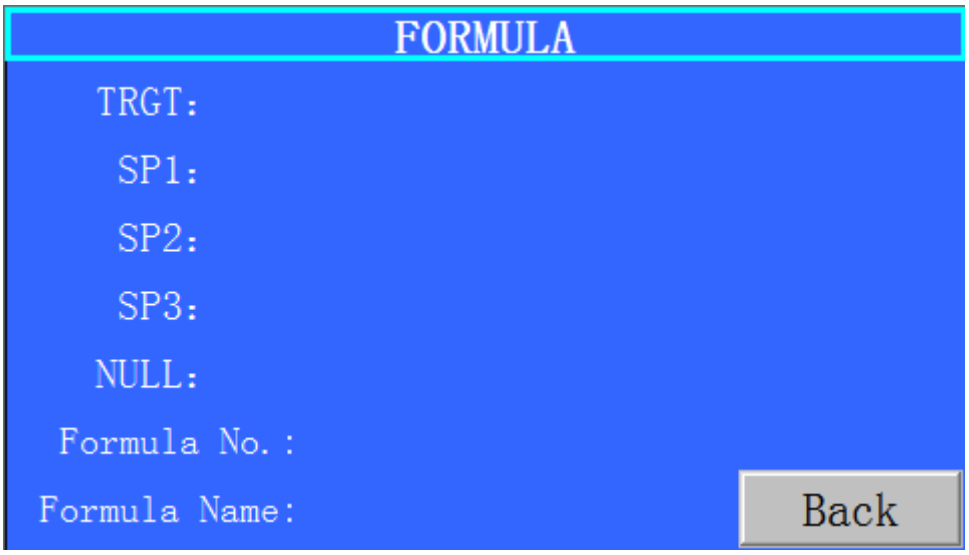
2.2.1 System parameter



Name	Default(Range)	Describe
Unit	g(g,kg,t,N,kN,lb)	
Dec.Point	1(0-4)	Decimal point setting
DIV	0(0-5)	Division. 0:1 1:2 2:5 3:10 4:20 5:50。

Filter 1	10(0-19)	The larger the value is, the better the filtering effect is, but the weight display lags behind.For SP1 and SP2.
Filter 2	15(0-19)	The larger the value is, the better the filtering effect is, but the weight display lags behind.For weight display and SP3.
Para. No.		The register number of the parameter can be queried in 3.1.(the number should bigger than 1000)
Para. Value		The parameter value corresponding to the register number.
Dyn.Range	0.01(0.00-99.99)	When this value is greater than 0, it starts to judge whether it is stable.
Dyn.Time	0.30(0.00-9.99)	During this time, if the weight change is within the stable range, it will be stable.
Zero Range	0.00(0.00-99.99)	When the value is greater than 0, the auto zero operation is performed.
Zero Time	1.00(0.00-9.99)	During this time, if the weight is within the range and is stable all the time, it will be automatically set to zero. Continuous stability is set to zero only once.

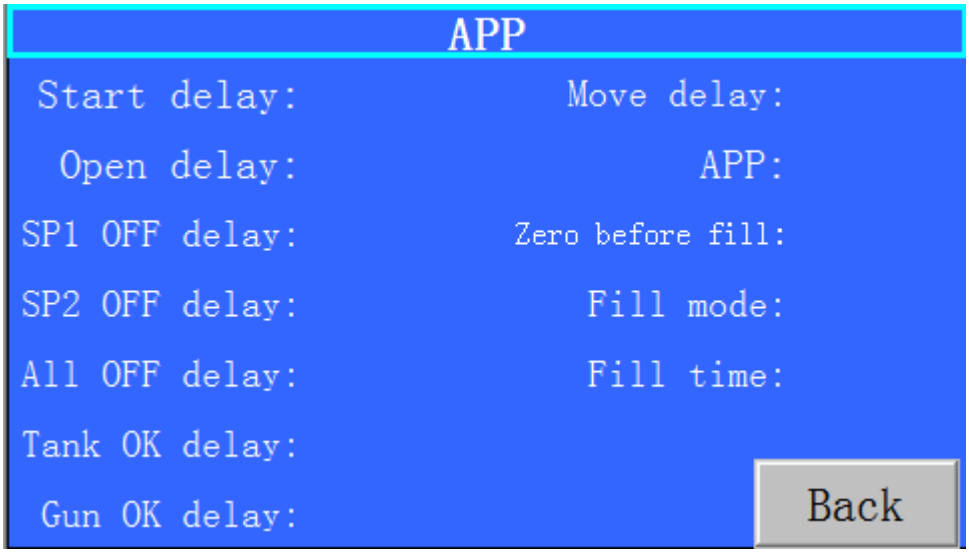
2.2.2 Formula parameter



1：When the target value is set to 0, the scale will not start；

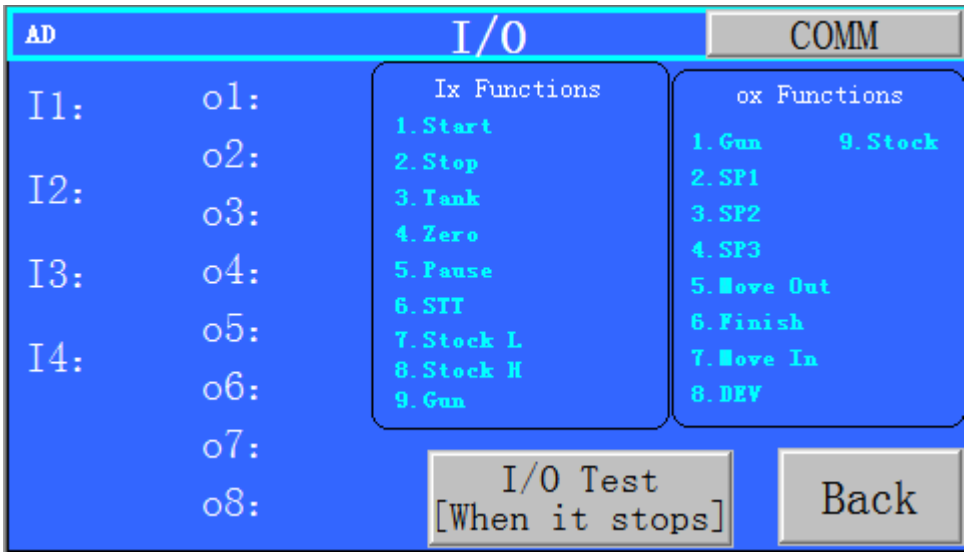
2：The current weight is greater than zero zone, the scale does not start；

2.2.3 APP parameter



Name	Default(Range)	Describe
Start delay	2.50(0-500.00)	The time delay before starting feeding is set to zero automatically after this time delay.
Open delay	0.30((0-500.00)	After opening the SP1,SP2,SP3 door, it starts to weight after this delay
SP1 OFF delay	0.50((0-500.00)	When closing SP1, delay to compare the weight.
SP2 OFF delay	0.50((0-500.00)	When closing SP2, delay to compare the weight.
All OFF delay	1.00((0-500.00)	When closing All SP, delay to compare the weight.
Tank OK delay	2.00((0-500.00)	After the barrel is in place, it is judged that the gun is in place at this time
Gun OK delay	0.50((0-500.00)	After the gun is in place, start filling at this time
Move delay	0.00(0.00-99.99)	After the end, the signal of moving barrel is output and delayed
APP	0(0-0)	0：Filling;
Fill Mode	0(0-1)	0，Meanwhile；1，Order。
Zero before fill	1(0-99)	After this start number is set to zero.
Fill time	0.00(0.00-99.99)	If the setting is greater than 0, the maximum filling time function will be turned on, and when the time is up, it will end in advance

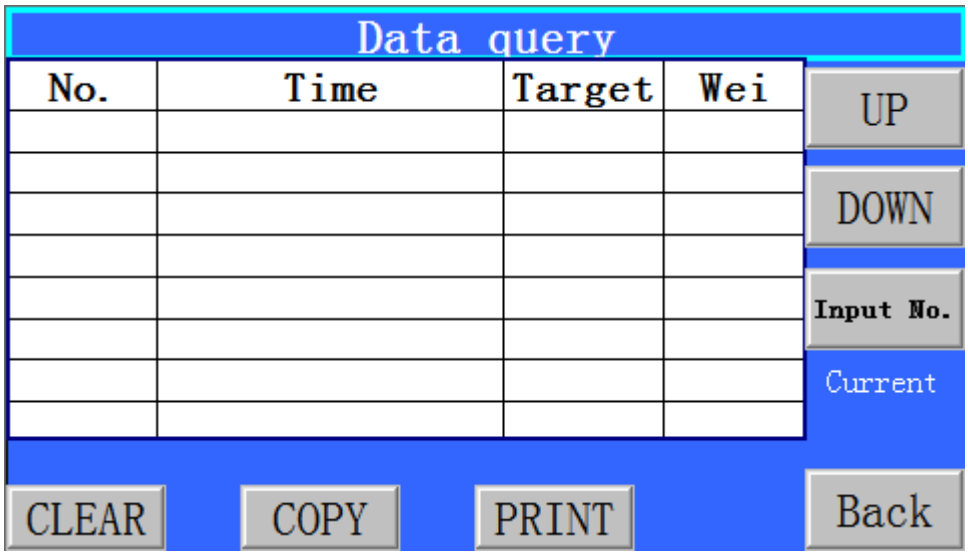
2.2.4 I/O parameter



2.2.5 COMM parameter

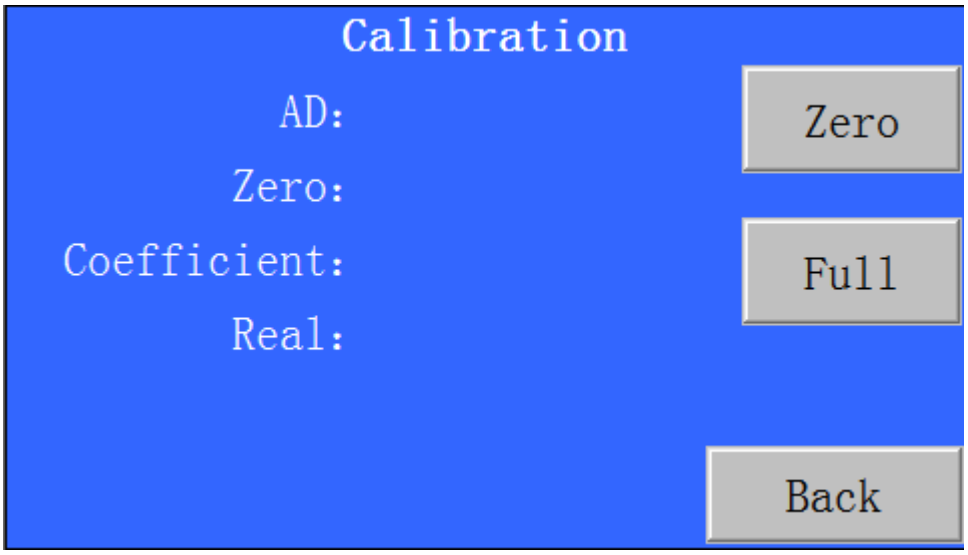
In the I/O parameter interface, click COMM button to enter the communication setting interface.

2.2.6 Query data



2.2.7 System calibration

Press the CAL button at the main screen.



Zero： Calibrate the zero

Full： Input the weight on the current scale.

3 Supplementary notes

3.1 modbus Communication protocol

The data is 32-bit.

Nae	Default(Range)	Describe	address
Weight		Read：Weight Write 0, zero calibration Write more than 0, weight calibration	1
AD		Read：AD	3
Result		Read:Packaging results	5
State		See Note 1 after the table	9
Unused			11
DI State			13
DO State			15
Total 1	0-1000000000	Low value of total	17
Total 2	0-1000000000	High value of total。Total=Total 2*1000000000+Total 1	19
PCS			21
Loadcell'state		AD fault。0,1bit，The excitation line may break；2 bit，overflow,Maybe the sensor is broken or the signal wire is broken；3 bit，Module error.	23
Para. No.		The register number of the parameter can be queried in 3.1.(the number should bigger than 1000)	997
Para. Value		The parameter value corresponding to the register number.	999
Zero			1001
Coefficient			1009
Filter 1	10(0-19)	The larger the value is, the better the filtering effect is, but the weight display lags behind.For SP1 and SP2.	1019
Filter 2	15(0-19)	The larger the value is, the better the filtering effect is, but the weight display lags behind.For weight display and SP3.	1021
DIV	0(0-5)	0:1 1:2 2:5 3:10 4:20 5:50。	1023
Dyn.Range	0.01(0.00-99.99)	When this value is greater than 0, it starts to judge whether it is stable.	1025
Dyn.Time	0.30(0.00-9.99)	During this time, if the weight change is within the stable range, it will be stable.	1027
Creep Range	0.00(0.00-99.99)	When this value is greater than 0, creep correction is carried out.	1029

Creep Time	10.00(0.00-99.99)	In this time, the weight change is in the Creep Range and is stable, so the creep correction is carried out.	1031
Zero Range	0.00(0.00-99.99)	When the value is greater than 0, the auto zero operation is performed.	1033
Zero Time	1.00(0.00-9.99)	During this time, if the weight is within the range and is stable all the time, it will be automatically set to zero. Continuous stability is set to zero only once.	1035
Unit	g(g,kg,t,N,kN,lb)		1067
Dec.Point	1(0-4)	Decimal point setting	1069
Formula	0(0-49)		1075
Null	100(1-999999)	Threshold value used to judge empty scale bucket	1077
Target	5000(1-999999)		1085
SP1	2000(1-999999)		1093
SP2	1000(1-999999)		1101
SP3	500(1-999999)		1109
Start delay	2.50(0-500.00)	The time delay before starting feeding is set to zero automatically after this time delay.	1117
Open delay	0.30((0-500.00)	After opening the SP1,SP2,SP3 door, it starts to weight after this delay	1119
SP1 OFF delay	0.50((0-500.00)	When closing SP1, delay to compare the weight.	1121
SP2 OFF delay	0.50((0-500.00)	When closing SP2, delay to compare the weight.	1123
All OFF delay	1.00((0-500.00)	When closing All SP, delay to compare the weight.	1125
Tank OK delay	2.00((0-500.00)	After the barrel is in place, it is judged that the gun is in place at this time	1127
Move delay	0.00(0.00-99.99)	After the end, the signal of moving barrel is output and delayed	1129
Gun OK delay	0.50((0-500.00)	After the gun is in place, start filling at this time	1131
Move Null delay	0.00(0.00-99.99)	After unloading, the process ends on time	1133
I1 Functions	0(0-99)	See 2.2.4 interface parameters for details	1157
I2 Functions			1159
I3 Functions			1161
I4 Functions			1163
I5 Functions			1165
o1 Functions	0(0-99)	See 2.2.4 interface parameters for details	1173
o2 Functions			1175
o3 Functions			1177
O4 Functions			1179
O5 Functions			1181
O6 Functions			1183
O7 Functions			1185
O8 Functions			1187
Zero before fill	1(0-99)	After this start number is set to zero.	1213

Fill Mode	0(0-1)	0，Meanwhile；1，Order。	1215
Stop numbers	1(0-999999)	Stop the machine after passing the run number	1221
Point close time	0.00(0.00-99.99)	The closing time and opening time should be greater than 0 when the SP3 inching function is needed.	1225
Point open time	0.00(0.00-99.99)		1233
Supplementary materials	0(0-1)	0，OFF；1 ON	1241
Supplementary materials Time	0.00(0.00-99.99)	SP3 ON time when supplementary materials.	1243
A Deviation	0(0-999999)	The weight error is acceptable within this range.	1245
Total set	0(0-999999999)	If the setting is greater than 0, the cumulative control mode is adopted. Reach the set cumulative shutdown	1253
Fill time	0.00(0.00-99.99)	If the setting is greater than 0, the maximum filling time function will be turned on, and when the time is up, it will end in advance	1255

Explain 1： .00bit Run；.01bit Tank in place；.02bit SP1；.03bit SP2；.04bit SP3；.05bit Final；.06bit gun in place；

3.2 Other communications

3.2.1 Active sending protocol

START	[+/-]	DATA	DEC[0-3]	XOR	END
0x02	0x2B/0X2D	6 chars	0x30-0x33	2 chars	0xFF

1:The data is transmitted in ASCII code. For example, if 1234 is displayed, hexadecimal 30 31 32 33 34 will be passed.

2:The XOR operation is performed on all data[not contain a start character] before the XOR check bit， and can get a byte of data， Then the byte is converted into two ASCII codes. For example, the computed check is 0x4a, and the corresponding hexadecimal ASCII is 34 41.

3.3 Process description

Filling：Power on→Tank input OK→Tank OK delay→Gun input OK→Gun OK delay→Start→Delay then Zero→SP1/SP2/SP3 Out→Open delay→Achieve (Target-SP1)SP1 OFF→SP1 OFF delay→Achieve (Target-SP2)SP2 OFF→SP2 OFF delay→weight check(Target-SP1)→All OFF delay→Fill finish→Tank move signal out→delay→Weight below null→delay→wait next loop;

3.4 Other functions

If you need the function of Ethernet network, please contact the manufacturer in advance. The configuration and testing tools of Ethernet can be obtained from the manufacturer.

3.5 MODBUS RTU Communication examples

The address of the company adopts Siemens system address description rules, and the actual instruction is sent. The instruction is hexadecimal, and the address needs to be reduced by 1.

Master to slave read data operation

The host reads 32 bits of register 1，the order is：

01	03	00 00	00 02	C4 0B
Slave	Function number	Data address	Data number	CRC check

Then the MCU receives the data, calculates CRC according to the data, and judges whether the data is correct, if the data is correct，The back data order like this：

01	03	04	00 01 E2 40	E2 A3
Slave	Function number	Data number	data	CRC Check

The four hex data are converted to decimal , which is 123456.

Master to slave write data operation

The host write 32 bits of register 1，the order is

Write the weight 123456，the order is：

01	10	00 00	00 02	04	00 01 E2 40	EB 3F
Slave	Function No.	Data Addr.	Reg.No.	Char No.	Data	CRC Check

Do Zero，the order is：

01	10	00 00	00 02	04	00 00 00 00	F3 AF

Back：

01	10	00 00	00 02	41 C8
Slave	Function No.	Data Addr.	Reg.No.	CRC Check

Modbus RTU CRC check code calculation method

```
//modbus CRC16
publicvoid  CRC16Calc(byte[] dataBuff,  int  dataLen)
{
    int  CRCResult = 0xFFFF;
    if  (dataLen < 2)
    {
         return;
    }
    for  (int  i = 0; i < (dataLen - 2); i++)
    {
           CRCResult = CRCResult ^ dataBuff[i];
            for  (int  j = 0; j < 8; j++)
            {
                    if  ((CRCResult & 1) == 1)
                    CRCResult = (CRCResult >> 1) ^ 0xA001;
                    else  CRCResult >>= 1;
            }
    }
    dataBuff[dataLen - 1] =Convert.ToByte(CRCResult >> 8);
    dataBuff[dataLen - 2] =Convert.ToByte(CRCResult & 0xff);
}
```