



AMC401-S

Bulk material ACC
controller module manual



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Company web site: <http://www.szamp.com.cn/>

This product carries out the standard:

GB/T 7724-2008 National standard of <electronic weighing instrument>

JJF1624-2017 Type evaluation outline of <digital weighing indicator (weighing indicator) >

JJG649-2016 Verification regulation of digital weighing indicator (weighing indicator)



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i. Basic information

1.1. Features and Specifications

AMC401-S is a bulk material accumulation controller module with flux control function, supporting collection and delivery modes. Automatically accumulate the weight value of each scale, and intelligently determine the target value of the last scale based on the total shipment volume setting and accumulation results. It has up to 13 digits of cumulative value storage, and 20 groups of recipes each have separate recipe cumulative data.

Users can also use the touch screen interface compiled by our Company to further increase the ease of use of the product.

AMC401-S has the following basic features:

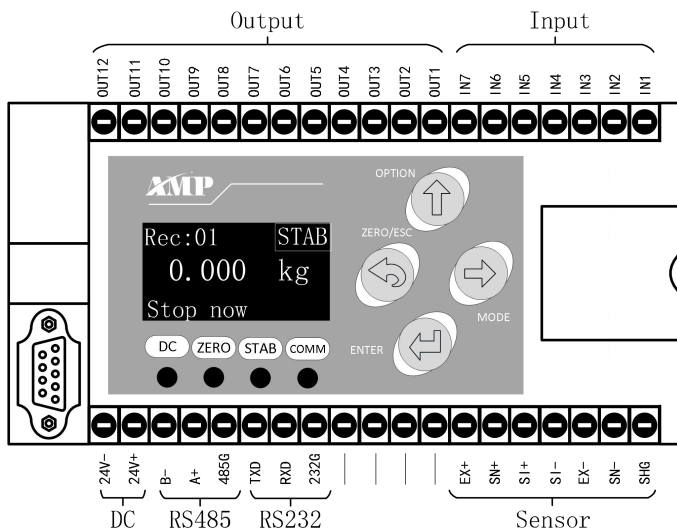
- Automatic reduction and quantitative control
- Working voltage: DC24V
- Weighing channel: Single channel
- Sensor: DC5V/4-6 wire resistance strain bridge load cell
- Switch quantity: 7 inputs /12 outputs
- Comm interface: RS485, RS232, supporting Modbus-RTU protocol.
- Installation: Guide rail (or screw fastening)

- Volume: $120 \times 80 \times 61$ (length, width, height, mm, excluding protruding parts)

The detailed technical specifications are as follows:

Sensor excitation	DC5V $\pm$ 10%/120mA driving current/can be connected in parallel with 8 sensors of 350 Ω specification
Adapt to sensor sensitivity	2mV/V or 3mV/V
Input signal range	0~15mV
Input sensitivity	0.5uV/d
nonlinear	0.02% FS (at 3mV/V)
zero drift	<0.5 μ V/°C
Gain drift	<10PPM/°C
AD conversion rate	960 times/second
Highest display resolution	1/999999
Product accuracy level	Ⓐ
Working Voltage	DC24V (compatible with 18V~30V)
Product power consumption	<5W
Operating Temperature	-10°C~45°C
Storage temperature	-20°C~60°C
humidity	Within 90% RH (no condensation)

1.1. Front panel



The front panel of the instrument is composed of a liquid crystal display, four indicator lights and four buttons.

The explanation is as follows:

Indicator light	
Comm	When the serial port receives an instruction and responds, the indicator light will light up once
DC	It remains bright when powered on.
Zero	The zero point of the controller's weight is always on
Stab	The controller's weight is stable and it often lights up
Key press	
	1. Press a key on the menu interface to exit the

 ZERO	upper-level menu at one time. 2. The standby state key performs a reset operation once. 3. Long press in standby mode to perform the zero calibration operation. 4. In the numerical input interface, long press to clear the input data. 5. The alarm can be cleared when alarm happened.
 OPTION	1. For the menu and selection interface, move the cursor upwards. 2. In the numerical input interface, increase the flashing number by 1.
 MODE	1. In the menu and selection interface, move the cursor down. 2. In the numerical input interface, move the cursor to the right to flash.
 ENTER	1. Menu and selection interface, confirm entry to the current option. 2. In the numerical input and option interface, confirm to save the current data.

1.2. Wiring port

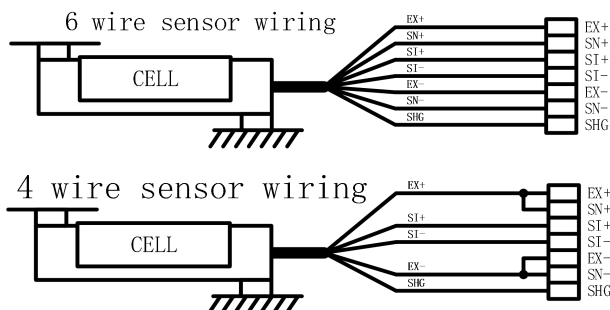
The wiring port description is as follows:

Category	Inter	Explanation
Power supply	24V	DC24V power supply positive
	24G	DC24V power supply negative
Sensor Interface	EX+	Sensor excitation positive
	EX-	Sensor excitation negative

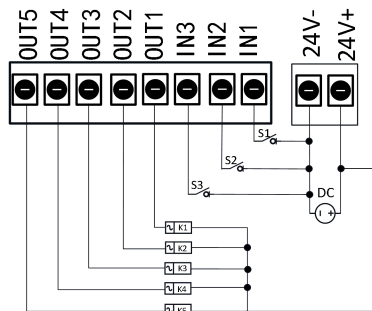
	SI+	Sensor signal positive	
	SI-	Sensor signal negative	
	SN+	sensor senses positive.	
	SN-	Sensor senses negative	
	SHG	Sensor shielding wire	
Serial port (RS485)	A+	RS485 A+	
	B-	RS485 B-	
	485G	RS485 GND	
Serial port (RS232)	TXD	RS232 TXD	
	RXD	RS232 RXD	
	232G	RS232 GND	
output	OUT1	output 1	Q1. Running
	OUT2	output 2	Q2. Stop
	OUT3	output 3	Q3. fast
	OUT4	output 4	Q4. Med
	OUT5	output 5	Q5. Slow
	OUT6	output 6	Q6. Disc open
	OUT7	output 7	Q7. Fixed
	OUT8	output 8	Q8. Over/under
	OUT9	output 9	Q9. Alarm
	OUT10	output 10	Q10. Batch done
	OUT11	output 11	Q11. Zero
	OUT12	output 12	Q12. last
input	IN1	input 1	I1. Running
	IN2	input 2	I2. Stop
	IN3	input 3	I3. Urgently Stop
	IN4	input 4	I4. Zeroing
	IN5	input 5	I5. Clear alarm

	IN6	input 6	I6. Switch Rec
	IN7	input 7	I7. Block

1.2.1. Sensor wiring method



1.2.2. IO wiring method



The external circuit driven by the following two points:

1. The external circuit should share with the controller;
2. When the external circuit is input at a low level, the input is valid, otherwise, the input is invalid.

The external circuit driven by the output switching quantity should

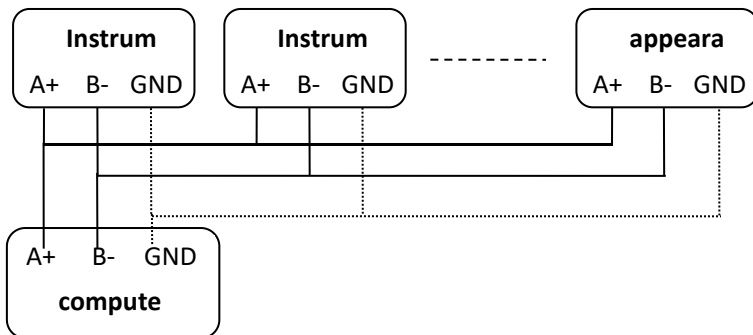
meet the following two main points:

1. The external circuit should share with the controller;
2. The switching output is low.

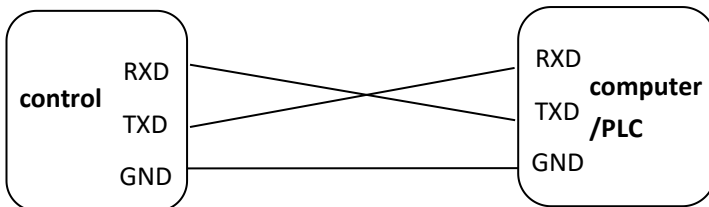
Note: The maximum driving capacity of each switching output port is 500 mA. Please pay attention to the power of the load when connecting the load. Over the driving capacity of the output port may cause damage to the switching output port.

1.2.3. Comm wiring method

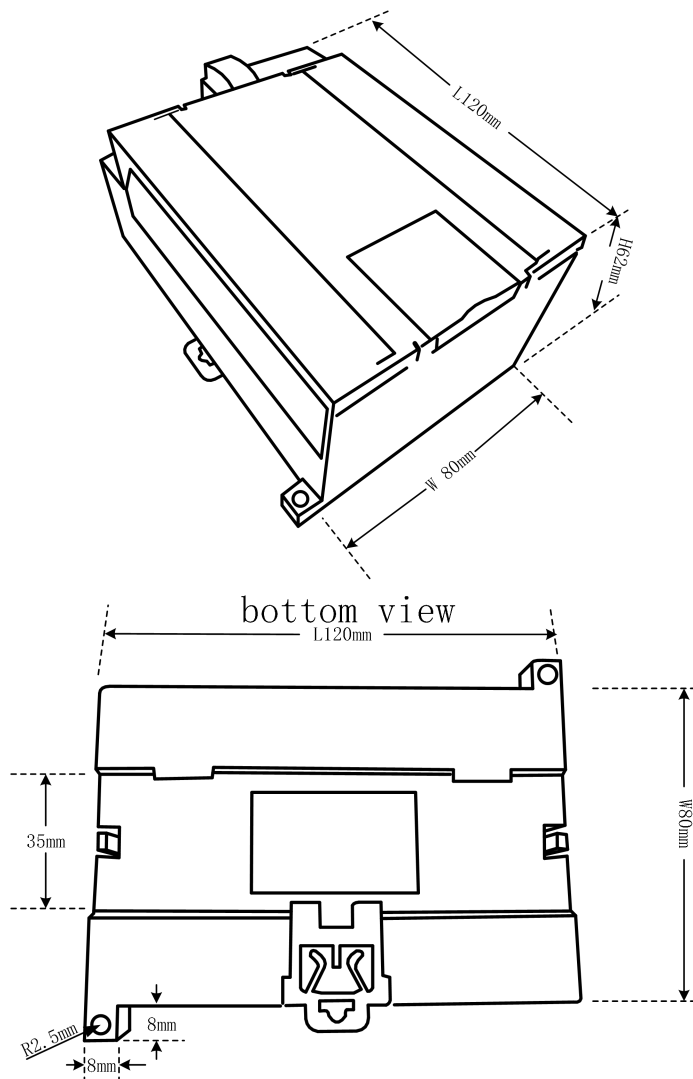
RS 485 Wiring signal:



RS232 wiring diagram:

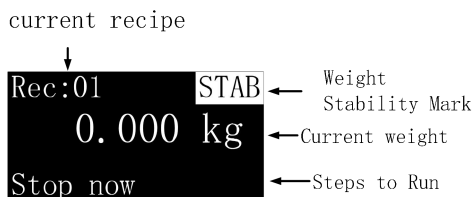


1.1. Installation dimensions



ii. Main interface

After the controller is powered on, the screen will display information such as the model and version date, and it will enter the main interface after 2 seconds, as shown below:



Operations can be performed in the main interface:

 : Enter the main menu.

 : ZERO/clear alarm (when there is an alarm).

Long press  : Quickly calibrate zero point.

iii. Function menu

Press the button in the  standby interface to enter the function menu selection interface, where you can set and view the various functional configurations of the controller. The main menu is shown in the table below:

num	Project	Description
1	calibration	Weight calibration related operations.

2	weighing para	Basic parameters for weight collection and processing.
3	Ctrl paras	Bulk material scale function process control related parameters.
4	Recipe setting	20 sets of product recipe parameters.
5	I/O	Switch function definition and port testing.
6	ACC data	View and set accumulated data and preset shipments.
7	Comm setting	Communication interface related parameter settings.
8	Password	Set an entry password for each project.
9	system	Parameter reset and system language setting, etc.
10	logic	Logic programming related parameters.
11	self-test	Bulk material Acc controller process self-test.
12	Step motor	Set the relevant parameters for the stepper motor.

Each project (except 11. Self-test) has a password function, and you can choose whether to open the entry password for the project.

All passwords are factory defaulted to "000000".

3.1. calibration

For weight calibration related operations in this project, if the product is installed and used for the first time or if there are any changes to the scale structure, such as replacing the sensor or weighing platform, a weight calibration operation should be

performed to ensure accurate weight display.

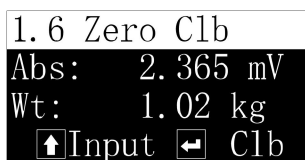
number	parameters	Description	initial
1.1	unit	①g/②kg/③t/④lb; select the unit for system weight display.	②kg
1.2	point	①0/②0.0/③0.00/④0.000/⑤0.0000 Select the number of decimal places for system weight display.	①0
1.3	Mini-Divi	Depending on the number of decimal places, the options for this item differ. The following options are for a decimal of 2 decimal places: ①0.01/②0.02/③0.05/④0.10/⑤0.20/⑥0.50 Select the smallest division value that the system can display for weight.	①0.01
1.4	Max Range	Set the maximum weighing range. If the displayed weight exceeds the set maximum range, a weight overflow message "OFL" will be displayed.	1000.00
1.5	Sensor Vol	Displays the current voltage signal magnitude input to the sensor. Absolute: The absolute voltage magnitude of the current sensor signal. Relative: The voltage magnitude of the current sensor signal relative to the zero-point calibration.	
1.6	Zero Clb	Empty the scale platform and press  to confirm the zero calibration. press  can manually input the empty scale	

		voltage for calibration.	
1.7	Gain Clb	Place a weight or object of known weight on the weighing platform for gain calibration. After pressed , enter the accurate weight of the placed object. Press  can manually input the gain voltage and corresponding weight for calibration.	

3.1.1. Weight Calibration Process

1. Set the system's decimal point, unit, minimum division, maximum range, and other parameters.
2. Empty Scale Calibration.

Enter the [1.6 zero Clb] interface, as shown in the following figure:



The main display shows the absolute voltage of the current sensor and the current weight. At this time, clear the scale platform.

After waiting for the displayed sensor voltage  to stabilize, press the confirmation key to complete the zero point calibration and calibrate the current sensor voltage signal to zero.

3. Weight calibration.

Enter the [1.7 Gain Clb] interface, as shown in the figure below:

1.7 Gain Clb	
Gain:	0.000 mV
Wt:	0.00 kg
Input	Clb

The main display shows the voltage of the current sensor relative to the zero point and the current weight. At this time, put the weight on the scale platform, and the relative voltage value of the sensor will

increase. After the displayed relative voltage value stabilizes, press .

After entering the weight of the placed weight in the input box below,

press to complete the gain calibration.

3.1.2. Quick zero calibration

In the stopped state, press and hold for about 3 seconds, release it after hearing a long beep from the buzzer, and quickly calibrate the current state to zero point.

Note: The weight needs to be stable when calibrating the zero point quickly.

3.1.3. Calibration precautions

1. During empty scale calibration and weight calibration, if the weight displays ADOFL, it means that the current sensor signal is abnormal. You should check whether the circuit connection and installation of the sensor are normal and whether the sensor is damaged.
2. When performing zero-point calibration and gain calibration, the displayed sensor voltage must be stable and not

fluctuating before calibration can proceed. If the sensor voltage fluctuates abnormally, check the sensor wiring connections and installation for proper function, and check for sensor damage.

3. Zero calibration and gain calibration support manual input of

sensor voltage values. press  Simply follow the prompts on the calibration interface.

3.2. Weighing Parameters

Parameters for weight signal acquisition and processing functions are set in this project.

Num	Parameter	Description		Initial
2.1	Basic Weighing			
2.1.1	Zeroing tracking	0~9d; Only effective in the stopped state. The weight value will automatically zero when stable within the positive and negative range of this set value × d (minimum division value).		0
2.1.2	Zero Range	0~99%; When performing a zeroing operation, the weight must be less than or equal to "maximum range × zeroing range" to be allowed to be zeroed.		50%
2.1.3	Stable Range	1~9d	These two parameters work together to determine whether the weight is stable. Taking all weight values within the "stable time", if	1d
2.1.4	Stable Time	0.01~9.9s		0.5

			the difference between the maximum and minimum values is less than or equal to the "stable range", the weight value is considered stable.	
2.1.5	Weighting Filter	0~9; Software digital filter strength levels. Set appropriate filter level parameter values according to the actual debugging effect of the equipment. 0: Weakest filter, fast weight response, poor vibration resistance; 9: Strongest filter, slow weight response, good vibration resistance.		5
2.1.6	Zero on startup	①Off/②On When on, the controller will automatically perform a zeroing operation every time the machine is powered on.		①Off

3.3. Bulk Scale Control Parameters

According to the function and control process of the bulk scale, these parameters are divided into 6 categories.

3.3.1. Feeding Process

Relevant functional parameters for the feeding process can be set.

Number	Parameters	Description	Initial
3.1	Feed Proc		
3.1.1	Feed Mode	1. [Combined]:	1.

		Fast, medium, and slow feed signals are valid during fast feeding. Med and slow feed signals are valid during med feeding. Slow feed signal is valid during slow feeding. 2. [Independent]: Fast feed signal is valid during fast feeding. Med feed signal is valid during med feeding. Slow feed signal is valid during slow feeding.	[Combined]
3.1.2	Feed Delay	0.0~99.9s; Delay time before feeding begins.	0.5
3.1.3	Fast No- Compared time	0.0~99.9s; Vibration elimination time at the start of fast feed. During this time, the fast feed signal remains valid and is unaffected by weight. Only after this time is the weight assessed to determine if the fast feed advance has been reached, thus ending the fast feed.	0.5
3.1.4	Med No- Compared time	0.0~99.9s; Vibration elimination time at the start of mid-feed. During this time, the mid-feed	0.5

		signal remains valid and is unaffected by weight. Only after this time is the weight assessed to determine if the mid-feed advance has been reached, thus ending the mid-feed.	
3.1.5	Slow No- Compared time	0.0~99.9s; Vibration elimination time at the start of slow feed. During this time, the slow feed signal remains valid and is unaffected by weight. Only after this time is the weight assessed to determine if the slow feed drop value has been reached, thus ending the slow feed.	0.5
3.1.6	Zero Interval	0~99; This refers to the zeroing operation performed before batching. For example, setting it to 2 will perform a zeroing operation every two scales before batching. 0 disables this function.	0.0
3.1.7	Tare Wt Limit Swt	[Off]: Turn off the tare weight limit switch. [On]: Turn on the tare weight limit switch.	[Off]
3.1.8	Tare Wt Limit Wt	Tare weight limit before feeding.	0

3.1.9	Tare Wt Limit Alarm Swt	1. [Only Alarm]: An alarm will be triggered if the tare weight limit function is enabled and the current weight before feeding exceeds the tare weight limit. 2. [Alarm and stop]: An alarm will be triggered and the machine will shut down if the tare weight limit function is enabled and the current weight before feeding exceeds the tare weight limit.	1. [Only Alarm]
3.1.10	Feed Control Mode	1 Air: The feeding door control mechanism is pneumatic. 2. Air one Limit: After feeding, the feeding door will be checked to ensure it is fully closed within the timeout period for closing detection. If it is not fully closed, an alarm will be triggered; if it is fully closed, the next process will proceed. 3. Motor one Limit: The feeding door control mechanism is motor-driven. The feeding door is opened based on time control, and the closing status is checked after disc. 4. Motor Four Limits: The feeding control mechanism is a motor,	1. [Air]

		using position signals to control the opening size of the feeding gate. After disc, it checks whether the feeding gate is fully closed. 5.Step Motor: feeding control mechanism is a step motor, using the number of pulses to control the size of the feeding opening.	
3.1.11	Feed close in Ps timeout	0.0~99.9s; valid when the feeding control mode selects pneumatic single limit or motor. After feeding is completed, it will be detected within this time whether the feeding door is closed in place.	0.0
3.1.12	Motor feed Sp1 time	0.0~99.9s; valid when the motor is selected in the feeding control mode. After this time, the feeding door reaches the fast opening position.	0.0
3.1.13	Motor feed Sp2 time	0.0~99.9s; valid when the motor is selected in the feeding control mode. After this time, the feeding door reaches the CIC opening position.	0.0
3.1.14	Motor feed Sp3 time	0.0~99.9s; valid when the motor is selected in the feeding	0.0

		control mode. After this time, the feeding door reaches the slow opening position.	
3.1.15	Feed open in Ps timeout	0.0~99.9s; valid when the feeding control mode selects 3.1.10 [motor four limits]. The fast, medium and slow in-position signals are used to control the opening size of the motor. If the feeding door does not open in place after this time, an alarm will be prompted until the door is opened in place.	0.0
3.1.16	Feed in Ps sensor type	1. [Valid in place]: The feeding gate is in position when the feeding gate position signal is valid. 2. [Invalid in place]: The feeding gate is in position when the feeding gate position signal is invalid.	1. [Valid in place]

3.3.2. Fixed Process

Setting parameters for each function during the setting process.

Num	Parameters	Description	Initial
3.2	fixed Process		
3.2.1	Fixed keep	0.0~99.9s; After feeding is	1.0

	Time	completed, wait for this time before performing result accumulation, over/under deviation detection, and other functions.	
3.2.2	Fixed need stable	1. [off]: After the setpoint holding time ends, the weight does not need to stabilize before proceeding to the next process 2. [on]: After the setting hold time ends, the weight needs to stabilize before proceeding to the next process.	[Off]
3.2.3	Fixed Wt Hold	1. [On]: After the setpoint holding time ends, the weight remains unchanged until it reaches the zero zone and begins to change. 2. [Off]: After the setpoint holding time ends, the weight is displayed in real time.	[Off]
3.2.4	Over/Under Detect-Func	1. [Off]: Over/under detection is not performed. 2. [On]: Over/under detection is performed on the feeding result after each feeding. Over/Under is a collective term	[off]

		for either exceeding or falling short of the target value. During the packaging process, if the packaging result is higher than the target value by a certain range, it is considered exceeding the tolerance; if it is lower than a certain range, it is considered falling short of the tolerance. This range is set according to production needs.	
3.2.5	Over Value	During the quantitative process, if the weighing result is greater than the target value plus the excess value, it is judged as exceeding the tolerance.	0
3.2.6	Uder Value	During the quantitative process, if the weighing value is less than the target value minus the excess value, it is judged as falling short of the tolerance.	0
3.2.7	Over/Under Pause Switch	When both the over/under alarm switch and the over/under pause switch are turned on, if either the over or under tolerance	[off]

		occurs, the instrument will pause the quantitative process and sound an alarm, awaiting user intervention. Clearing the alarm will clear the alarm and allow the instrument to continue operating. Alternatively, a "I3. Stop" signal can be given to return to the stopped state.	
3.2.8	Wt Acc way	1. [ResHold Wt]: Weight after weight accumulation to the set value. 2. [decompre Def]: The difference between the weight after pressure relief from the weight accumulation to the weight after pressure relief from disc.	1. [ResHold Wt]
3.2.9	Fixed Relief	1. [on]: After feeding is completed, the fixed pressure relief output is enabled, and then the fixed weight is recorded. 2. [off]: The fixed pressure relief output is disabled.	[off]
3.2.10	Fixed REF before Dly	0.0~9.9s; When the fixed-value pressure relief function is	0.0

	time	enabled, the fixed-value pressure relief output becomes effective after this delay time.	
3.2.11	Fixed REF on time	0.0~9.9s; Effective time for fixed-value pressure relief output.	0.0
3.2.12	Fixed REF after Dly time	0.0~9.9s; After the effective time for fixed-value pressure relief output, the fixed-value pressure relief process ends after this delay time.	0.0
3.2.13	Fixed REF after stable Swt	1.. [off]: After the delay time after fixed-value pressure relief, the weight does not need to stabilize to proceed to the next process. 2. [on]: After the delay time after fixed-value pressure relief, the weight needs to stabilize before proceeding to the next process	[off]

3.3.3. Discharging

Set the relevant function parameters for the disc process.

Serial	Parameters	Description	Initial Value
3.3	Discharging Process		
3.3.1	Disc Delay	0.0~99.9s; This delay is	0.5

		activated when the weight in the weighing hopper is less than the near-zero zone value during the disc process. After the time expires, the instrument shuts off the disc signal.	
3.3.2	Dis relief	1. [Enabled]: After disc is completed, the disc pressure relief output is activated. 2. [Deactivated]: The disc pressure relief output is deactivated.	[Deactivated]
3.3.3	Disc REF before dly time	0.0~9.9s; When the disc and pressure relief function is enabled, the disc and pressure relief output will be effective after this delay time.	0.0
3.3.4	Disc REF on time	0.0~9.9s; Effective time for disc and pressure relief output.	0.0
3.3.5	Disc REF after dly time	0.0~9.9s; After the effective time for disc and pressure relief output, this delay time will complete the disc and pressure relief process.	0.0
3.3.6	Disc REF after	1. [on]: After the delay time after disc and pressure relief,	[off]

	stable Swt	the weight needs to be stable before proceeding to the next process. 2. [off]: After the delay time after disc and pressure relief, the weight does not need to be stable to proceed to the next process.	
3.3.7	Disc ctrl mode	1. [air]: The disc mechanism is controlled by a pneumatic device. 2. [air one Limit]: The disc mechanism is controlled by a pneumatic device. Within the timeout period for the disc gate to close completely, the system checks whether the disc gate is fully closed. If it is not fully closed, an alarm will sound; if it is fully closed, the next process will proceed. 3. [Motor one Dir]: The motor outputs the disc gate opening control after the disc motor opening time. 4. [Motor 2 Dir2]: The motor outputs an open signal to control the opening of the disc gate after the disc motor's	1. [air]

		opening time, and outputs a close signal to control the closing of the disc gate. 5. [motor 2 Dir2]: At the start of disc, an open signal is output to control the opening of the disc gate. If the disc gate has not opened to the correct position after the timeout period for detecting the gate's opening position, an alarm is triggered. The same applies when the disc gate is closing. 6. [Step Motor 1D]: At the start of disc, the motor outputs pulses according to the set number of pulses for opening; when performing the closing action, the motor outputs pulses in the same direction until a position signal is detected. 7. [Step motor2 D]: At the start of disc, the motor outputs pulses according to the set number of pulses for opening; when performing the closing action, the motor outputs	
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		pulses in the opposite direction until a position signal is detected.	
3.3.8	Disc Motor Open Time	0.0~99.9s; Disc motor opening time.	0.0
3.3.9	Disc close in Ps Timeout	0.0~99.9s; Effective when the disc control mode is selected as pneumatic single limit, the motor rotates one revolution, or the motor rotates forward or backward. After disc is completed, the disc door will be checked within this time to ensure it is fully closed.	0.0
3.3.10	Disc Open in Ps Timeout	0.0~99.9s; Valid when the disc control mode is selected [Motor Forward/Reverse Dual Limit], the disc gate opening signal is detected within this time. If the disc gate opening signal is not detected, an alarm will be triggered.	0.0
3.3.11	Disc in Ps sensor Type	1. [Valid in place]: The disc gate is in position when the disc gate opening signal is valid. 2. [Invalid in place]: The disc gate is in position when the	1. [Valid in place]

		disc gate opening signal is invalid.	
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3.3.4. flux control

Set the relevant parameters for the flux function.

Num	Parameters	Description	Initial
3.4	Flux Function		
3.4.1	Flux sample	0~10; The number of samples used to calculate real-time flux.	5
3.4.2	Flux Ctrl	1.[on]: open the flux control function. 2.[off]: close the flux control function.	[off]
3.4.3	Flux lack alarm	1.[on]: Alarms when flux is insufficient. 2.[off]: No alarm when flux is insufficient.	[off]
3.4.4	Flux lack alarm sample	0~99 indicates that during the flux control process, if the current disc interval exceeds the calculated disc interval time, the flux is considered insufficient. When the number of insufficient flux exceeds the set statistical number of insufficient flux alarms, the controller will output insufficient flux. Whether to alarm or not is related to the insufficient flux alarm switch.	3
3.4.5	Flux lack	1 [on] If insufficient flux occurs this	[off]

	auto adjust	time, the controller of the next few scales will try to shorten the disc interval appropriately within the controllable range, and finally offset the timeout time when the flux is insufficient. 2 [Off] Doesn't enable automatic adjustment.	
3.4.6	Stop clear flux	1.[on]: Clear the current traffic displayed on the main interface when stopping. 2.[off]: The current flux rate will not be cleared when stopping. You can set the [3.4.7 flux auto Clr time] parameter to clear it.	[off]
3.4.7	Flux auto Clr time	0.0~999.9s; if the next process is not entered after this time, the current flux will be cleared. It is valid when it is not 0.	0.0

3.3.4.1. Real-time traffic calculation function

The controller has a real-time flux calculation function. After startup, the controller will calculate the flux based on the weight of each discharge and the time used, record the most recent data and average it to obtain the current real-time flux value (the average number of flux calculations can be set).

The unit and decimal point of real-time flux rate change according to the unit and decimal point set by the system. The corresponding

relationship between different system units and decimal points and flux units and decimal points is as shown in the following table:

system system unit decimal point	ton t		Kilogram kg		Gram g	
	flux unit	flux decimal point	flux unit	flux decimal point	flux unit	flux decimal point
4	t/h	2	kg/h	2	g/h	2
3	t/h	1	t/h	2	kg/h	2
2	t/h	0	t/h	2	kg/h	2
1	t/h	0	t/h	2	kg/h	2
0	t/h	0	t/h	2	kg/h	2

You can also read addresses 17 (current flux unit) and 18 (current flux decimal point) through Modbus to obtain the unit and decimal point of the current flux rate.

Note: Real-time traffic data will be recalculated after each start of the run.

3.3.4.2. Flux control function

The controller has a flux control function. The user can set the target flux rate that needs to be achieved. The controller will automatically calculate the disc interval time based on the currently set target value of each scale to achieve the set target flux rate.

The parameter setting method and control principle related to the flux control function are as follows:

First, turn on the flux control function switch and set the target flux value. The controller will calculate

based on the target flux value and the target value of each scale to obtain the time required for a discharging process. Then the controller will wait for the response time before discharging the material before starting the discharging process. For example, if the target flux rate is set to 1.00t/h and the target value is 10.00kg, then 100 disc processes must be completed per hour to reach the flux rate of 1.00t/h. The time required for each disc is $3600 \text{ seconds} \div 100 = 36 \text{ seconds}$, then the controller will control the disc interval to 36 seconds.

The insufficient flux alarm function means that during the flux control process, it is judged that if the discharge interval exceeds the calculated discharge interval, the flux is considered insufficient. When the number of insufficient flux exceeds the set statistical number of insufficient flux alarms, the controller will output an insufficient flux alarm.

The automatic adjustment function after insufficient flux means that if there is insufficient flux this time, the controller of the next few scales will try to shorten the disc interval appropriately within the controllable range, and finally offset the timeout time when the flux is insufficient. If the disc interval in the example above is 36 seconds, and the actual disc interval is 40 seconds, exceeding the timeout by 4 seconds, the controller will adjust and shorten the disc interval for the next weigher. If possible, it will be adjusted directly to 32 seconds. If it can only be shortened by 2 seconds to reach 34 seconds, the controller will use two 34-second disc

intervals to offset the 4-second timeout.

Note:

1. When the controller starts, it internally calculates the number of disc operations per hour based on the target flux rate and the target value per weigher, thus calculating the disc interval. The number of disc operations is an integer, so the target flux rate and target value cannot be too close, otherwise there will be a fast error. For example, if the target **flux** rate is 300 kg/ **hand** the target value is 200 kg, then the re-**should** be 1.5disc operations per hour. However, the controller only stores integers, and rounding will result in calculating the number of disc operations per hour **as 2**. This leads to a fast error. Furthermore, the target flux rate setting cannot be less than the target value; otherwise, the controller will issue a corresponding alarm upon startup.

2. The controller only calculates the time required for the disc interval at startup; it will not adjust the disc interval based on the actual amount of material unloaded per scale during operation.

3.3.5. Monitoring

Set the relevant function parameters for operation monitoring.

Number	Parameter	Description	Initial
3.5	Monitoring		
3.5.1	Feed Monitor	1. [on]: Enables feeding timeout monitoring function	[off]

		2. [off]: Disables feeding timeout monitoring function	
3.5.2	Feed over Time	0.0~999.9s; The timer starts when feeding begins. If the feeding time exceeds this set time, it is considered a timeout.	5.0
3.5.3	Feed Timeout treatment	This switch is effective when the feeding timeout monitoring switch is on. 1. [Alarm Only]: When the feeding time exceeds the set feeding timeout time, the controller outputs a feeding timeout alarm and continues the subsequent process. 2. [Alarm stop]: When the feeding time exceeds the set feeding timeout, the controller automatically enters the stop state and outputs a feeding timeout alarm. 3. [stop Feed & Disc]: When the feeding time exceeds the set feeding timeout, regardless of whether the current feeding is fast or slow, the controller outputs a feeding timeout alarm and automatically ends the	1. [Alarm Only]

		feeding process and starts the disc process.	
3.5.4	Disc Monitor	1. [on]: Enables the disc timeout monitoring function. 2. [off]: Disables the disc timeout monitoring function.	[off]
3.5.5	Disc over Time	0.0~999.9s; If the weight value does not decrease below the disc zero zone value within this time period from the start of disc, disc is considered to have timed out.	5.0
3.5.6	Disc timeout treatment	This switch is effective when the disc timeout monitoring switch is turned on. : 1. [Alarm only]: When the disc time exceeds the set disc timeout, the controller outputs an disc timeout alarm and continues the subsequent process. 2. [Alarm stop]: When the disc time exceeds the set disc timeout, the controller automatically enters the stop state and outputs an disc timeout alarm. 3. [stop disc &feed]: When the	1. [Alarm Only]

		disc time exceeds the set disc monitoring time, the controller outputs an disc timeout alarm and automatically ends disc and proceeds to the next weighing cycle.	
3.5.7	Stable Monitor	1. [on]: Enables stability timeout monitoring. 2. [off]: Disables stability timeout monitoring.	[off]
3.5.8	Stable over time	0.0~999.9s; During operation, if a function requiring stability assessment fails to stabilize within this time, the stability assessment is considered to have timed out. Conditions requiring stability assessment include: over-detection switch on, setpoint requiring stability assessment switch on, zeroing interval reached, etc.	5.0
3.5.9	Stable Timeout treatment	This switch is effective when the stability timeout monitoring switch is turned on. 1. [alarm and go 0]: When the stability determination time exceeds the set stability determination timeout time, the	1. [alarm and go 0]

		controller skips the stability determination condition and outputs a stability determination timeout alarm, and continues the subsequent process. 2. [Alarm stop]: When the stability judgment time exceeds the set stability judgment timeout time, the controller automatically enters the stop state and outputs the stability judgment timeout alarm.	
3.5.10	Link mode	[on]: Enable coordinated control of multiple instruments. [off]: Close the coordinated control of multiple instruments. For details, see [4.4. Multi-device linkage instructions]	[off]
3.5.11	Link IO control	[Enabled]: After being turned on, [3.5.10 Link mode] is controlled by the switch I37. Linkage switch (level). [Close]: [3.5.10 Link mode] is determined by parameter settings.	[off]

3.3.6. Material level

Set the material level sensor signal input and material supply related functional parameters.

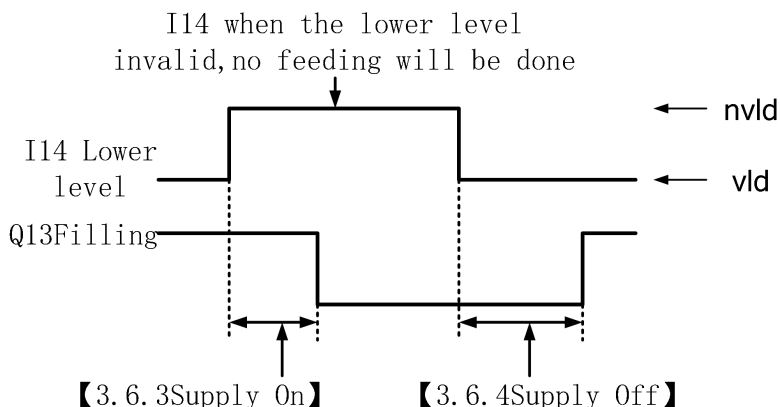
number	parameters	Description	initial
3.6	Material level		
3.6.1	Material level type	1. [NONE]: There is no material level indicator. 2. [only lower]: There is 1 material level device (lower position). 3. [upper & lower]: 2 position sensors (loading position, disc position). 4. [only upper]: 1 position sensor (loading position). Note: If the mode including the loading position is selected, feeding will not start if the loading position signal input is invalid.	1. [NONE]
3.6.2	supply Trigger	1. [Off]: Disables the feeding output function. 2. [lower Trigger]: Triggers the feeding function when the "I14 lower level" signal input is invalid. 3. [upper Trigger]: Triggers the feeding function when the "I13 upper level" signal input is invalid. Note: When the position mode is set to [feed/Disc Positions], the feeding function continues until the loading position signal becomes	1. [Off]

		valid.	
3.6.3	Supply Delay on Time	0.0~99.9s; After the feeding function is triggered, the “Q13 Feed” signal is output after a delay of this time.	0.0
3.6.4	Supply delay off time	After feeding ends, the “Q13 Feed” signal output is turned off after a delay of this time.	3.0
3.6.5	Supply work time	1. [run &stop]. 2. [only run].	1. [run &stop]

3.3.6.1. Detailed Description of Feeding Function

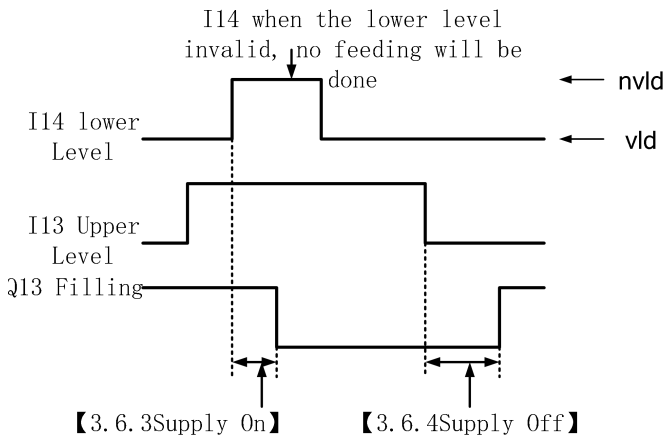
1. Material Level Mode: only lower; Feeding Trigger: Material level trigger.

Timing Diagram as follows:



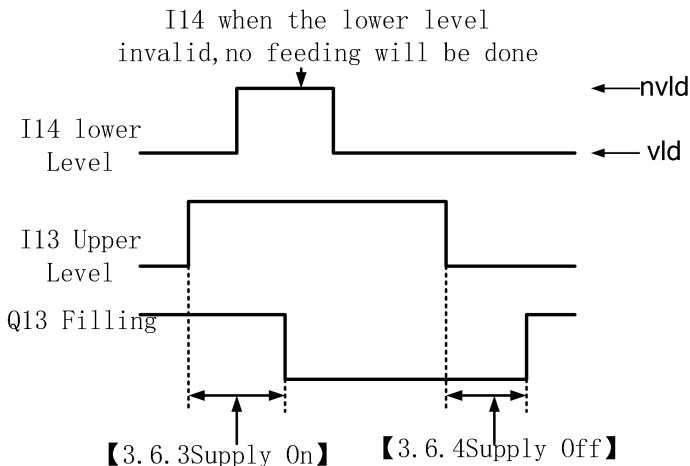
- Material level mode: upper & lower; Material supply trigger: Lower material level trigger.

Timing diagram as follows:



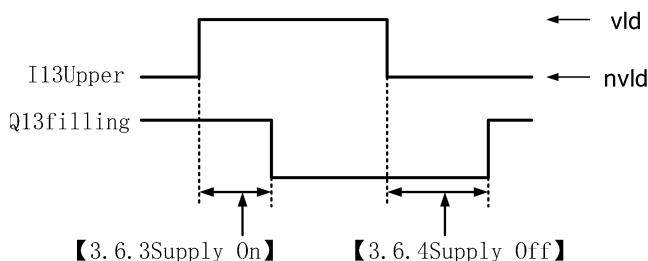
- Material level mode: upper & lower; Material supply trigger: Upper material level trigger.

Timing diagram as follows:



4. Material level mode: only upper; Material supply trigger: Upper material level trigger.

Timing diagram as follows:



3.4. Recipe setting

The controller has 20 sets of recipe parameters that can be set. Users can set commonly used recipe parameters in advance and switch to the corresponding recipe when using it.

3.4.1. Recipe number

number	Parameter	Description	Initial
4.1	Recipe		
4.1.1	Selected Recipe	1~20; Set the currently used recipe number.	1

3.4.2. Target Value

This interface sets the target value and other recipe parameters for this recipe number.

Number	Parameters	Description	Initial
4.2	Target Value		

4.2.1	Target	Set the target weight to be achieved for packaging.	0
4.2.2	Fast Feed	When feeding material, if the weight value is $\geq$ target value - fast feed lead time, shut down the fast feed;	0
4.2.3	Med Feed	When feeding material, if the weight value is $\geq$ target value - medium feed lead time, shut down the medium feed;	0
4.2.4	Slow Feed	When feeding material, if the weight value is $\geq$ target value - slow feed lead time, shut down the slow feed;	0
4.2.5	Zero area	When discharging, if the value is less than the zero zone value, start the discharge delay time. Discharging is considered complete when the discharge delay time expires.	0
4.2.6	Flux Target	If the flux control function is enabled, the meter controls the flux rate to be near the target flux rate value. This setting is invalid when the flux control function is disabled.	0
4.2.7	Motor Group	When using stepper motor parameters, this is the stepper motor group number	1

		used in the current recipe. When switching recipes, the size of the feeding and disc gate openings can change accordingly.	
--	--	--	--

3.5. IO

The functions corresponding to the switching input and output ports can be defined, and the switching test function can be used to test whether the external switching circuit is normal.

3.5.1. In setting

Define the functions corresponding to the switching input ports IN1~IN7. Select the switching port to be set, and then select the function to be defined from the option list.

Serial	Parameter	Description	Initial
5.1	Input Definition		
5.1.1	IN1	Function definition of digital input port. See detailed option list 3.5.1.1	I1. Running
5.1.2	IN2		I2. Stop
5.1.3	IN3		I3. Urgently Stop
5.1.4	IN4		I4. Zeroing
5.1.5	IN5		I5. Clear alarm
5.1.6	IN6		I6. Switch Rec
5.1.7	IN7		I7. Block

3.5.1.1. List of Switch Input Functions

Number	Function Name	Description
I0	No def	No function definition.

I1	Running	Start running.
I2	Stop	Entering a slow-stop process, immediately ending the current process and automatically stopping operation.
I3	Urgently Stop	Stop operation.
I4	Zeroing	Perform a reset operation.
I5	Clear Alarm	Clear alarm status.
I6	Switch Rec	Valid once, automatically switches to the next recipe with a non-zero target value.
I7	Block	Block input signal.
I8	Allow charging	Feeding can only begin when the feeding allow input signal is valid.
I9	Manual Slow	Slow feed is activated when valid, and deactivated when valid again.
I10	Manual Medium	Medium feed is activated when valid, and deactivated when valid again.
I11	Manual Fast	Fast feed is activated when valid, and deactivated when valid again.
I12	Manual Disc	Disc is activated when valid, and deactivated when valid again.
I13	Upper level	Loading position detection input signal. When valid, it is considered that the material has reached the loading position.
I14	lower level	Discharge Position Detection Input

		Signal. When valid, it indicates that the material has reached the discharge position. When invalid, it indicates that the material is below the discharge position and is in a material shortage state.
I15	Clear Acc	Clear Total Accumulation Data.
I16	Clear batch	Clear accumulated shipments.
I17	Clear Rec.	Clear accumulated current recipes.
I18	Run/slow Stop	Starts operation when valid. Enters stop operation when invalid.
I19	Run /Stop	Starts operation when valid. Stops operation when invalid.
I20	Manual Slow (L)	Turns slow projection on when valid, turns off slow projection when invalid.
I21	Manual Med (L)	Turns medium projection on when valid, turns off medium projection when invalid.
I22	Manual Fast (L)	Active fast discharge when valid, deactivate fast discharge when invalid.
I23	Manual Disc (Level)	Active disc when valid, deactivate disc when invalid.
I24	Print Acc	Print total cumulative data when valid.

I25	Print Rec Acc	Print all recipe cumulative data when valid.
I26	Rec 1	Select Recipe 1.
I27	Rec 2	Select Recipe 2.
I28	Rec 3	Select Recipe 3.
I29	Rec 4	Select Recipe 4.
I30	Feed off ok	Feeding gate closure status input signal, valid indicates the feeding gate is closed.
I31	Disc off ok	Disc gate closed position input signal: A valid signal indicates the disc gate is fully closed.
I32	Sp1 On in ps	Fast-scale gate opening position input signal: A valid signal indicates the fast-scale gate is fully open. Valid when the feeding control mode is motor limit four.
I33	Sp2 On in ps	Medium-scale gate opening position input signal: A valid signal indicates the medium-scale gate is fully open. Valid when the feeding control mode is motor limit four.
I34	Sp3 On in ps	Slow-scale gate opening position input signal: A valid signal indicates the slow-scale gate is fully open. Valid when the feeding control mode is motor limit four.
I35	Disc on ok	Disc door opening position input

		signal. A valid signal indicates the disc door is fully open.
I36	Link Mode In	Multi-device linkage signal input control.
I37	LinkSW(L)	When [3.5.11 Link IO control] is enabled, the [3.5.10 Link mode] parameter is configured according to the switch status. A valid value indicates it is enabled, and an invalid value indicates it is disabled.

3.5.2. Out Setting

Define the function corresponding to the switch output ports OUT1~OUT12. Select the switch port to be set, and then select the function to be defined in the option list.

Number	Parameter	Description	Initial Value
5.2	Output Switch Values		
5.2.1	OUT1	Switch Output Port Function Definitions. See Option List3.5.2.1	Q1. Running
5.2.2	OUT2		Q2. Stop
5.2.3	OUT3		Q3. fast
5.2.4	OUT4		Q4. Med
5.2.5	OUT5		Q5. Slow
5.2.6	OUT6		Q6. Disc open
5.2.7	OUT7		Q7. Fixed
5.2.8	OUT8		Q8. Over/under
5.2.9	OUT9		Q9. Alarm

5.2.10	OUT10		Q10. Batch done
5.2.11	OUT11		Q11. Zero
5.2.12	OUT12		Q12. last

3.5.2.1. List of Switch Output Functions

Number	Function Name	Description
Q0	No def	No function definition.
Q1	Running	Output valid in running state.
Q2	Stop	Output valid in stopped state.
Q3	Fast	Fast Feeding Control Signal.
Q4	Med	Medium Speed Feeding Control Signal.
Q5	Slow	Slow Speed Feeding Control Signal.
Q6	Disc Open	Disc gate opening control signal.
Q7	fixed	Output valid when feeding is complete, indicating that feeding is now complete. The duration can be set by parameter [3.2.1 Settlement Holding Time].
Q8	Over/Under	Over/Under Pressure function enabled. This output is valid when an over/under pressure alarm occurs during feeding.
Q9	Alarm	Output valid when the controller has an alarm.
Q10	Batch done	Output valid after shipping is completed.
Q11	Zero	Output valid after weight falls below

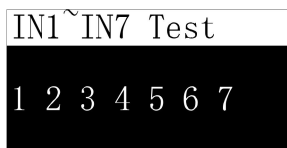
		the disc zero zone value.
Q12	Last	Output valid during the last weighing.
Q13	Filling	Feeding control output signal. When the signal is valid, the feeding device is started to feed material into the storage hopper.
Q14	starving	Material shortage status output signal. When the "Discharge Position" signal input is invalid, the material shortage status is reached.
Q15	Block	Block output is valid when the block input is valid.
Q16	Disc finish	Output valid after disc is completed.
Q17	Stable	Output valid when the weight is stable.
Q18	Logic 1	Logic Programming 1 Function Output Signal
Q19	Logic 2	Logic Programming 2 Function Output Signal
Q20	Logic 3	Logic Programming 3 Function Output Signal.
Q21	Logic 4	
Q22	Logic 5	Logic Programming 4 Function Output Signal.
Q23	Logic 6	Logic Programming 5 Function Output Signal.
Q24	Rec 1	Logic Programming 6 Function Output Signal.
Q25	Rec 2	Output signal when Recipe 1 is selected.
		Output signal when Recipe 2 is selected.

Q26	Rec 3	Output signal when Recipe 3 is selected.
Q27	Rec 4	Output signal when Recipe 4 is selected.
Q28	Decompression	Output signal when setpoint pressure relief or disc pressure relief is activated.
Q29	Disc Closed	This output is required when the disc control mode is selected for motor forward and reverse rotation. This signal is valid when the disc gate is closed.
Q30	Feed Open	This output is required when the feeding control mode is selected for motor operation. This signal is valid when the feeding gate is open.
Q31	Feed Closed	This output is required when the feeding control mode is selected for motor operation. This signal is valid when the feeding gate is closed.
Q32	Link Mode Out	Multi-device linkage output control signal.
Q33	Feed Motor Direction	When the stepper motor controls the feeding, this signal serves as the direction signal for the stepper motor driver.
Q34	Discmotor direction	When the stepper motor controls disc, this signal is used as the direction signal of the stepper motor driver.
P0	none	There is no function definition in high-

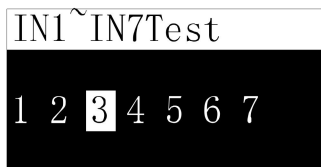
		speed mode (only OUT1 and OUT11 are available)
P1	Flow pulse	High speed mode feeding pulse output For details, see 3.13.2 Feeding step (only OUT1 and OUT11 are available)
P2	Disc pulse	High speed mode discharge pulse output For details, see 3.13.3 Discharging step (only OUT1 and OUT11 are available)

3.5.3. IO test

The switch value test is used to test whether the switch value function is normal, and is divided into input switch value test and output switch value test. After entering the interface, the first step is to enter the switch value test, as shown in the figure below:

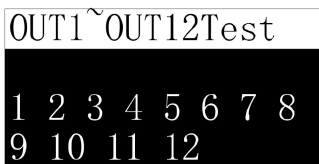


Numbers 1 to 7 represent IN1 to IN7. When the input is valid, it will be displayed in reverse. For example, when the IN3 input is valid, the display will be as shown below:



Press  to switch to the output switching test. In the output

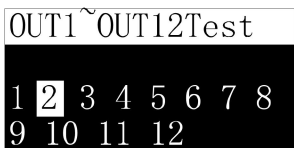
switching test, you can manually set the opening and closing of each OUT port output. The display interface is as shown in the figure below:



Numbers 1 to 12 represent OUT1 to OUT12. A flashing number 1

indicates  that you can manually turn OUT1 output on and

off, press  to switch to other OUT ports, and press  again to switch to input switch quantity testing. When an OUT output is enabled, the display is reversed. For example, when OUT2 output is enabled, the display is as shown in the image below:



3.6. Cumulative Data

View the controller's shipment and cumulative data, as well as the recipe cumulative data.

3.6.1. Acc Data

View the controller's total cumulative value and

shipment cumulative value, etc. You can set the total shipment volume. The relevant parameters are as follows:

Number	Parameter	Description	Initial
6.1	Bat & Acc		
6.1.1	Bat Wt	After setting the total shipment volume, if the current cumulative value is greater than the total shipment volume parameter, the shipment is considered complete. When the total shipment volume is set to 0, it is in receiving mode.	0
6.1.2	Batch Acc Clr mode	1. [Manual]: When the total shipment volume is reached, the accumulated shipment volume must be manually cleared before continuing; otherwise, an alarm will be triggered, requiring the accumulated shipment volume to be cleared. 2. [Auto]: When the total shipment volume is reached, the accumulated shipment volume will be automatically cleared upon restarting.	2. [Auto]
6.1.3	Manual Disc Acc	This refers to whether manually unloaded materials are included in the accumulation.	1.NO

6.1.4	Batch Time	0~999999s; Used to calculate target flux rate in delivery mode.	0
6.1.5	Total Acc	View total cumulative data. Press the  button to clear the cumulative data and restart the accumulation process.	
6.1.6	Batch Acc	View delivery cumulative data. Press  to clear the cumulative data and restart the accumulation process.	
6.1.7	No Clr Acc	View non-clearable cumulative data.	
6.1.8	Acc correct	0.5000~1.5000; After each feeding, the value obtained by multiplying the feeding result by the cumulative correction coefficient is included in the cumulative calculation.	1.0000

3.6.2. Recipe Cumulative

You can view the cumulative data for each recipe and clear its cumulative data.

Number	Parameters	Description	Initial
6.2	Rec Acc		
6.2.1	Rec 1	View the cumulative data for each recipe. Press  the key to clear its accumulation.	
6.2.2	Rec 2		
6.2.3	Rec 3		
6.2.4	Rec 4		
6.2.5	Rec 5		

6.2.6	Rec 6		
6.2.7	Rec 7		
6.2.8	Rec 8		
6.2.9	Rec 9		
6.2.10	Rec 10		
6.2.11	Rec 11		
6.2.12	Rec 12		
6.2.13	Rec 13		
6.2.14	Rec 14		
6.2.15	Rec 15 >		
6.2.16	Rec 16		
6.2.17	Rec 17		
6.2.18	Rec 18		
6.2.19	Rec 19		
6.2.20	Rec 20		

3.7. Comm setting

3.7.1. RS232

RS232 is the controller's RS232 serial communication port.

Relevant parameters are as follows:

Num	Parameters	Description	Initial
7.1	RS232 Settings		
7.1.1	Slave ID	1~99;Set the device's communication address (slave number).	1

7.1.2	Protocol	1. [Modbus-RTU-H]: double-word data, high word first. 2. [Modbus-RTU-L]: double-word data, low word first. 3. print	1. [Modbus-RTU-H]
7.1.3	Baud Rate	Set the baud rate for serial communication	38400
7.1.4	Data Format	1. [7-E-1]: 7 data bits, even parity, 1 stop bit 2. [7-O-1]: 7 data bits, odd parity, 1 stop bit 3. [8-N-1]: 8 data bits, no parity, 1 stop bit 4. [8-E-1]: 8 data bits, even parity, 1 stop bit 5. [8-O-1]: 8 data bits, odd parity, 1 stop bit	3. [8-N-1]

3.7.2. RS485

For setting instructions, refer to RS232 settings.

3.7.3. Print set

When the protocol in 7.1.2 or 7.2.2 is set to ③ Print, the parameter settings take effect.

Num	Parameters	Description	Initial
7.3	Print setting		
7.3.1	Print Language	Chinese/English Optional	① Chinese

7.3.2	Print Width	24 Columns/32 Columns Optional	②24 列
7.3.3	Auto Print	①off ② on : Enable automatic printing of packaging results	38400
7.3.4	Print blank lines	0~9 Number of Blank Lines Between Each Print	1
7.3.5	Print Dir(Brighte k)	1. [default]: Select and click the default settings for printing. Typically, this is forward printing. 2. [obverse]: The content selected in the right box will be printed in forward font. 3. [reverse]: The content selected in the right box will be printed in upside-down font.。	① default

The manually printed style content is as follows.:

Acc Data		Acc Data	
Time:	2026/02/03 17:26	Time:	2026/02/03 17:26
Total:	0kg	Total:	0kg
Batch:	0kg	Batch:	0kg
Rec 1:	0kg	Rec 1:	0kg
Flux:	0.00 t/h	Flux:	0.00 t/h

or

When [7.3.3 Auto Print] is on, the relevant data for each weighing process will be automatically printed upon its completion. Here is the print template for completing 5 weighing processes consecutively, with the style as follows:

Details		Details		
Unit:kg		Unit:kg		
Rec 1		Rec 1		
Acc Num	Result	Acc Num	Target	Result
1	1000	1	1000	1000
2	1000	2	1000	1000
3	1000	3	1000	1000
4	1000	4	1000	1000
5	1000	5	1000	1000

OR

3.8. Password Management

Individual passwords and password switches can be set for each item in the main menu and each menu item.

The factory default password for all items is: 000000.

Passwords must be entered twice to change them.

Num	Parameters	Description	Initial
8.1	Main menu		
8.1.1	PW switch	1. [OFF] ; 2. [ON]	2. [ON]
8.1.2	PW Set		
8.2	calibration		
8.2.1	PW switch	1. [OFF] ; 2. [ON]	1. [OFF]
8.2.2	PW Set		
8.3	weighing parameters		
8.3.1	PW switch	1. [OFF] ; 2. [ON]	1. [OFF]
8.3.2	PW Set		
8.4	Ctrl parameters		
8.4.1	PW switch	1. [OFF] ; 2. [ON]	1. [OFF]
8.4.2	PW Set		
8.5	Recipe setting		

8.5.1	PW switch	1. [OFF]; 2. [ON]	1. [OFF]
8.5.2	PW Set		
8.6	I0		
8.6.1	PW switch	1. [OFF]; 2. [ON]	1. [OFF]
8.6.2	PW Set		
8.7	Acc data		
8.7.1	PW switch	1. [OFF]; 2. [ON]	1. [OFF]
8.7.2	PW Set		
8.8	Comm setting		
8.8.1	PW switch	1. [OFF]; 2. [ON]	1. [OFF]
8.8.2	PW Set		
8.9	Password		
8.9.1	PW switch	1. [OFF]; 2. [ON]	2. [on]
8.9.2	PW Set		
8.10	system		
8.10.1	PW switch	1. [OFF]; 2. [ON]	1. [OFF]
8.10.2	PW Set		
8.11	Logic		
8.11.1	PW switch	1. [OFF]; 2. [ON]	1. [OFF]
8.11.2	PW Set		
8.11	Step motor set		
8.11.1	PW switch	8.11.1	PW switch
8.11.2	PW Set	8.11.2	PW Set

3.9. System

View system language settings and system version information.

Number	Parameter	Description	Initial
9.1	Para. Reset	Resettable Controller Parameters	
9.2	BAC& RCV	Backup and Restore Controller Parameters (Except Weight Calibration Parameters)	
9.3	Language	Chinese English	Chinese
9.4	Boot screen	1. [Off]: Company logo not displayed on startup. 2. [On]: Company logo displayed on startup.	2. [On]
9.5	About	View controller model and version number.	
9.6	Screen save		
9.6.1	Screen save type	① lock screen: If no key is pressed within the screen saver time, the screen will turn off. ② Display weight: If no key is pressed within the screen saver time, only the weight will be displayed, and its position will change over time	② Display weight:
9.6.2	Screen save time	If no key is pressed during this period, the screen saver interface will be activated. Set to 0 to disable the screen saver.	30s

3.10. Logic Programming

The controller supports 6-channel logic programming. When the

controller's existing functions cannot meet the control requirements of the device, logic programming can be used to define auxiliary logic output signals outside the controller's operating flux to control the device's actions.

The following explains the function of each parameter using logic programming 1 as an example.

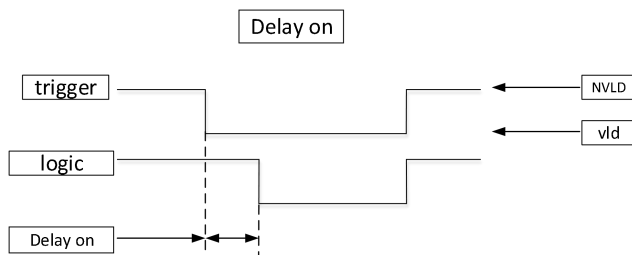
Number	Parameter	Description	Initial
10.1	Logic 1		
10.1.1	Logic Type	Select the type of logic programming. ① [Close]: Disables this logic output function. ② [Delayed On] ③ [Delayed Off] ④ [Delayed On and Delayed Off] ⑤ [Valid-Invalid Edge Trigger] ⑥ [Invalid-Valid Edge Trigger] ⑦ [Self-Latching] ⑧ [Pulse] For detailed descriptions of the corresponding functions, please refer 3.10.1 to the following chapters:	① Close
10.1.2	Trigger Types	① [Signal Trigger]: Triggers this logic output by a specific signal. ② [Condition Trigger]: Triggers this logic output by meeting a	① [Signal Trigger]

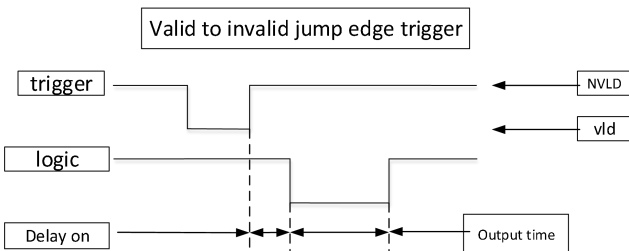
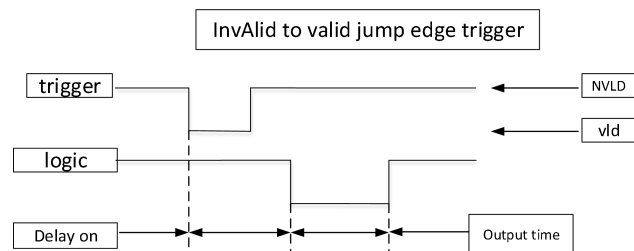
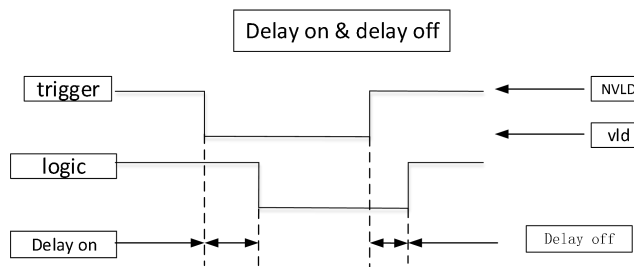
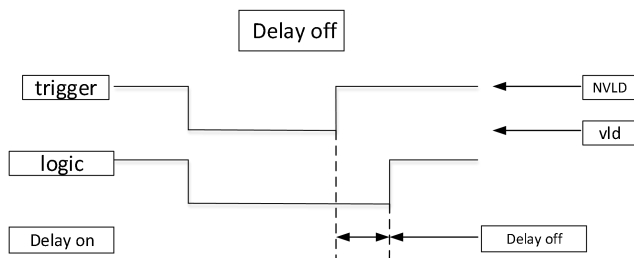
		specific condition. ③ [Communication Trigger]: Triggers this logic output by a communication command.	
10.1.3	Logic Signal Output Port	Select the logic output signal definition to a specific OUT output port.	Undefined
10.1.4	Delay On Time	The delay time for the logic output signal to be on.	0
10.1.5	Delay Off Time	The delay time for the logic output signal to be off.	0
10.1.6	Trigger Signal 1 Setting	Select signal 1 used to trigger the logic output.	None
10.1.7	Signal Logical	Select the logical relationship between trigger signal 1 and trigger signal 2 used to trigger the logic output. 1. [OR]: The logic output is triggered if either trigger signal 1 or trigger signal 2 is valid. 2. [AND]: Both trigger signals 1 and 2 must be valid to trigger the logic output. 3. [XOR]: Trigger signals 1 and 2 must not be valid to trigger the logic output.	1. [OR]

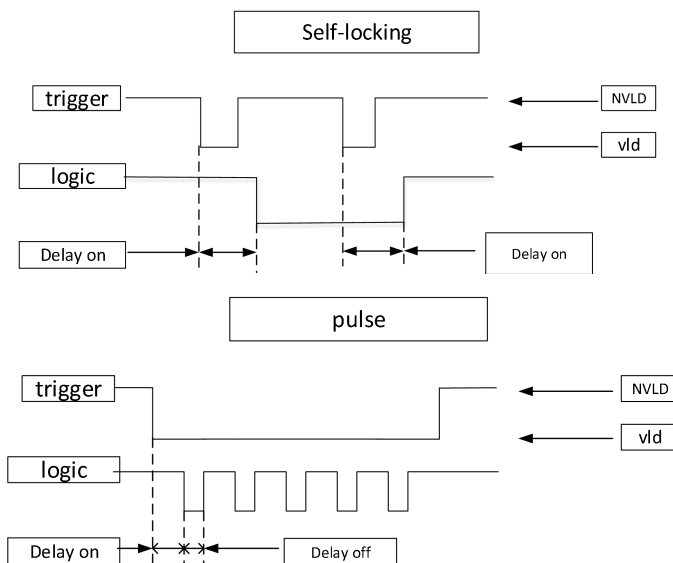
10.1.8	Output Time	This parameter can be set when [10.1.1 Logic Type] is set to item 5 or 6. The valid time for the output after the logic signal is triggered; the logic output ends after the time expires. When this time is set to 0, the logic output signal can only be terminated by the reset signal.	0
10.1.9	Init Signal	This parameter can be set when [10.1.1 Logic Type] is set to item 5 or 6. After the logic output is valid, the reset signal can reset the logic output, invalidating the logic output signal and ending the current logic output process.	None
10.1.10	Init Signal type	1. [on Init]: When the reset signal is valid, the reset logic outputs. 2. [off Init]: When the reset signal is invalid, the reset logic outputs.	1. [on Init]
10.1.11	Trigger Condition	Select the conditions for triggering the logic output. 1. [$>$ set value] 2. [$<$ set value]	1. [Weight greater than set

		3. [inside range] 4. [outside range]	value]
10.1.12	Set value 1	Used to set the weight value corresponding to the trigger condition.	0
10.1.13	Setting Value 2		0
10.1.14	Weight Stability Condition	1. [Off]: The logic output is triggered only after the weight meets the trigger condition and needs to be stable. 2. [On]: The logic output is triggered as soon as the weight meets the trigger condition, without needing to be stable.	1. [Off]
10.1.15	Trigger Signal 2 Setting	Select signal 2 used to trigger the logic output.	None

3.10.1. Logic Output Timing Diagram







3.10.2. Example

By combining different trigger signals, trigger conditions, and 5 sets of logic programming signals, highly flexible logic signals can be output.

For example, to implement the following logic: Real-time detection of a weight higher than 100kg, outputting OUT10 for alarm indication. After the alarm is valid, there is a 2-second delay, and OUT11 is output for 3 seconds to control the disc mechanism to unload the material.

Settings are as follows:

Logic Programming 1: Implement OUT10 output when the detected weight is higher than 100kg.

【Logic Type】: Delayed On

【Delay On Time】: 0s

【Trigger Type】: Conditional Trigger

【Trigger Condition Setting】: Weight greater than
set value

【Set Value 1】: 100kg

【Logic Signal Output Port】: OUT10

Logic Programming 2: Implement a 2-second delay
after OUT10 becomes valid, and output OUT11 for a
duration of 3 seconds.

【Logic Type】: Invalid-Valid Edge Trigger

【Delay On Time】: 2s

【Output Time】: 3s

【Trigger Type】: Signal Trigger

【Trigger Signal Setting】: Logic Output 1

【Logic Signal Output Port】: OUT11

3.11. Self-Test

The self-test function is used to test whether the various mechanical structures of the equipment are functioning normally. The self-test process is the same as the normal operation process; the relevant equipment is started according to the currently set parameters. The difference is that the self-test does not require actual feeding; the controller can automatically simulate the feeding process.

3.11.1. Self-test

Number	Parameters	Description	Initial
11.1	Self-test	Press  the button to start the self-test process. The controller will display the detailed steps currently in progress. Press the  button to exit the self-test process.	

3.12. Stepper Motor Parameters

3.12.1. Group Num

Set the parameter group number of the currently selected stepper motor.

Number	Parameter	Description	Initial
12.1	Group Number	1~5	1

3.12.2. Feeding Step

Number	Parameter	Description	Initial
12.2	Feed motor		
12.2.1	Run Fre	1.0~60.0KHz; Pulse frequency controlling the stepper motor's rotation. A higher frequency results in faster movement.	20.0KHz
12.2.2	Fast Pls	0~250000; Number of pulses required for the feeding gate to rotate from the closed	9000

		position to the fast feed opening position.	
12.2.3	Mid Pls	0~250000; Number of pulses required for the feeding gate to rotate from the closed position to the medium feed opening position.	6000
12.2.4	Slow Pls	0~250000; Number of pulses required for the feeding gate to rotate from the closed position to the slow feed opening position.	3000
12.2.5	Dir Def	①on - Close:"Q33. Feed Motor Direction" signal Output is invalid when the gate is open, and valid when the gate is closed. ②off- Close: "Q33. Feed Motor Direction" signal Output is valid when the door is open, invalid when the door is closed.	②off - Close
12.2.6	Start Freq	1.0~60.0KHz;The frequency at which the stepper motor starts.	2.0KHz
12.2.7	Start Fn	0~250000; The number of pulses required for the stepper motor to accelerate from the [Starting Frequency] to the [Pulse Frequency].	1000
12.2.8	Stop Freq	1.0~60.0KHz;The frequency at which the stepper motor completes deceleration.	2.0KHz
12.2.9	Stop Fn	0~250000; the number of pulses required for the stepper motor to decelerate from [Run Fre] to [Stop Freq].	1000

12.2.10	Closet over	0~999000; after outputting the door closing pulse, if the feeding door in-position signal is not detected after this time, it will be considered that the feeding door in-position switch is damaged and the pulse output will be stopped directly.	5000
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2.13.2.1 Detailed description of stepper motor action control

The controller wiring refers to the feeding step, and the feeding step switch value is defined as follows:

OUT2	Q33. Feed Motor Direction
OUT1	P1. Feeding pulse
IN2	I30. Inspection of closing door when feeding materials

The pulse signal frequency of the stepper motor controls the rotation speed of the stepper motor. This frequency parameter needs to be coordinated with the subdivision parameters of the stepper motor driver. If the subdivision parameter of the stepper motor is set to 1000 pulses/revolution, then when using 2.0KHz pulses for control, the speed of the stepper motor is 2 revolutions/second.

When the stepper motor is in operation, in order to prevent problems such as loss of steps due to too much torque required when the load is fast, the stepper motor adopts a process of gradually accelerating when starting and gradually decelerating when stopping, so as to make the action smooth and stable and prevent problems such as losing steps. The following figure illustrates the actions of a stepper

motor when starting and stopping:

[12.2.1 Run Freq] is set to 20.0KHz.

[12.2.2 Fast Pls] is set to 9000.

[12.2.3 Mid Pls] is set to 5000.

[12.2.4 Slow Pls] is set to 2000.

[12.2.6 Start Freq] is set to 5.0KHz.

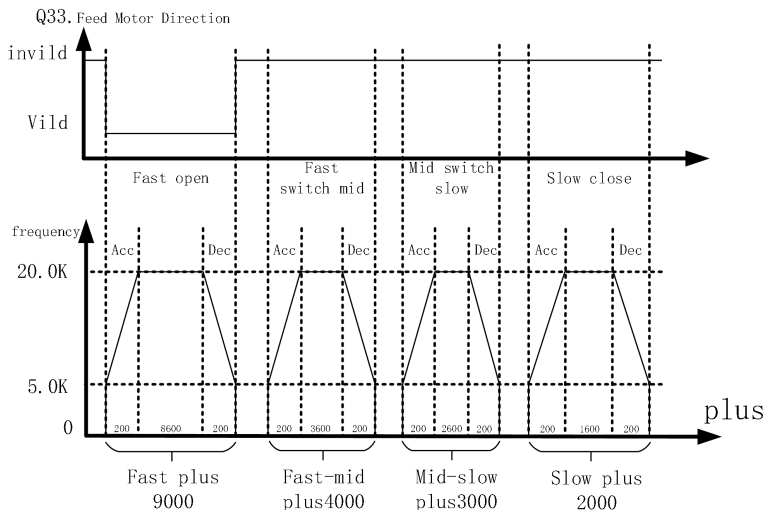
[12.2.7 Start Fn] is set to 200.

[12.2.8 Stop Freq] is set to 5.0KHz.

[12.2.9 Stop Fn] is set to 200.

【12.2.5 Dir Def】Set to ②off - close.

Based on the above parameters, the relationship between the frequency and the number of pulses when the feeding stepper motor is slow and medium is as follows:



3.12.3. Disc step

Set the relevant action parameters of the channel disc stepper

motor.

number	parameters	Description	initial
12.3.1	Discharging step		
12.3.1	Run Fre	1.0~60.0KHz; controls the pulse frequency of stepper motor rotation. The higher the frequency, the faster the action.	20.0KHz
12.3.2	Number of door opening pulses	0~250000; the number of pulses required to rotate the discharge door from the closed position to the open position.	10000
12.3.3	Number of closing pulses	0~250000; The number of pulses required for the disc gate to rotate from the open position to the closed position. This parameter can be set to 0, in which case the stepper motor will continue to rotate until the gate is fully closed.	0
12.3.4	Direction Signal Definition	①Valid - Close:"Q34. Disc Stepping Direction" signal Output is invalid when the gate is open, and valid when the gate is closed. ②Invalid - Close:"Q34. Disc Stepping Direction" signal Output is valid when the gate is open,	②Invalid - Close

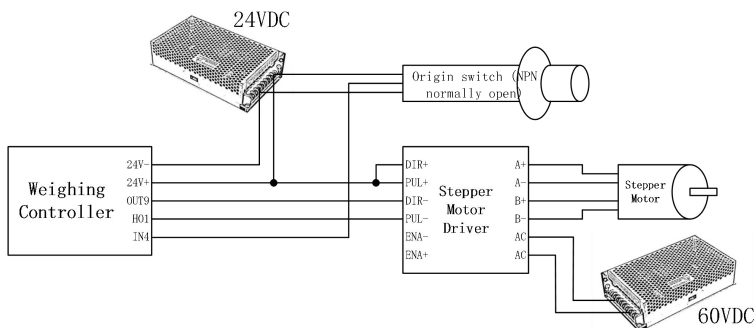
		and invalid when the gate is closed.	
12.3.5	Starting Frequency	1.0~60.0KHzThe frequency at which the stepper motor starts.	2.0KHz
12.3.6	Starting Pulse Count	0~250000; The number of pulses required for the stepper motor to accelerate from the [Starting Frequency] to the [Pulse Frequency].	1000
12.3.7	Stop Freq	1.0~60.0KHz;The frequency at which the stepper motor completes deceleration.	2.0KHz
12.3.8	Deceleration Pulse Count	0~250000; The number of pulses required for the stepper motor to decelerate from the [Running Frequency] to the [Stop Freq].	1000
12.3.9	Closing Timeout	0~99.9; If no disc door arrival signal is detected after this time following the output of the closing pulse, the disc door arrival switch is considered damaged, and pulse output will stop directly.	5.0s

2.13.3.1 Detailed description of stepper motor action control

This controller uses the "pulse" + "direction" signal control

method to control the rotation of the stepper motor. The "pulse" signal controls the rotation of the stepper motor, and the "direction" signal controls the rotation direction of the stepper motor. The following figure is a common stepper motor driver wiring reference:

Wiring for feeding



The controller switching value in the figure is defined as follows:

OUT9	Q34. Disc motor direction
OUT1	P2. Discharging pulse
IN4	I31. Discharging and closing door in place detection

The pulse signal frequency of the stepper motor controls the rotation speed of the stepper motor. This frequency parameter needs to be coordinated with the subdivision parameters of the stepper motor driver. If the subdivision parameter of the stepper motor is set to 1000 pulses/revolution, then when using 2.0KHz pulses for control, the speed of the stepper motor is 2 revolutions/second.

When the stepper motor is in operation, in order to prevent problems such as loss of steps due to too much torque required when the load is fast, the stepper motor adopts a process of gradually accelerating when starting and gradually decelerating when stopping,

so as to make the action smooth and stable and prevent problems such as losing steps. The following figure illustrates the actions of a stepper motor when starting and stopping:

[12.3.1 Run Fre] is set to 10.0KHz.

【12.3.2 Door Opening Pulse Count】 Set to 10000.

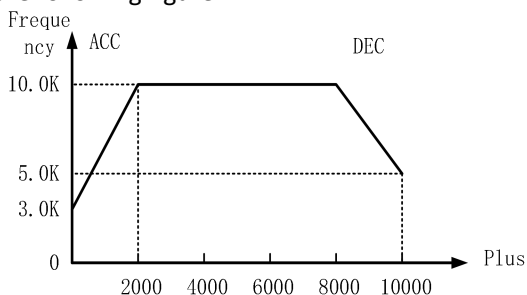
【12.3.5 Startup Frequency】 Set to 3.0KHz.

【12.3.6 Startup Pulse Count】 Set to 2000.

【12.3.7 Stop Freq】 Set to 5.0KHz.

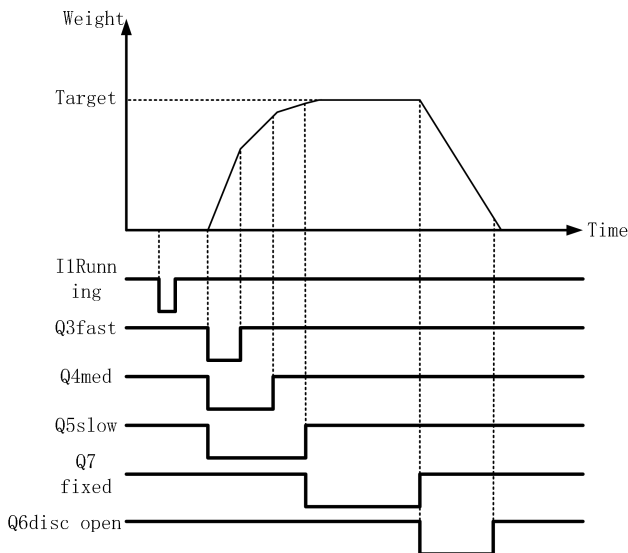
【12.3.8 Deceleration Pulse Count】 Set to 2000.

Based on the above parameters, the relationship between the frequency and pulse count of the disc stepper motor when opening the door is shown in the following figure:



iv.Process Description

4.1. Feeding Process



Now, the basic feeding process of the bulk material scale will be explained in conjunction with the above figure:

1. After starting operation, it will first wait for **【3.1.2 Pre-feeding Delay】**.
2. **【3.1.2 Pre-feeding delay】**After the time expires, if the automatic zeroing condition is met, an automatic zeroing will occur, and then the fast feed will start. If the condition is not met, the fast feed will start directly.
3. After the fast feed starts, it will wait for a **【3.1.3 Fast Feed Judgment Prohibition Time】**, after which weight comparison will

begin.

4. Weight is collected in real time and compared. When the weight value is $\geq$ target value - fast feed advance amount, the fast feed will be closed and the medium feed will be started.
5. After the medium feed starts, it will wait for a 【3.1.4 Medium Feed Judgment Prohibition Time】, after which weight comparison will begin.
6. Weight is collected and compared in real time. When the weight value is $\geq$ target value - mid-throw advance, the mid-throw is closed and the slow-throw is activated.
7. After the slow-throw is activated, it will wait for a [3.1.5 Slow-throw Prohibition Time] before starting weight comparison.
8. Weight is collected and compared in real time. When the weight value is $\geq$ target value - slow-throw drop value, the slow-throw is closed, and feeding ends.
9. After feeding, the system enters the setpoint process. After the [3.2.1 Setpoint Holding Time] expires, the setpoint ends. At this time, the cumulative total is recorded and the system enters the over/under-tolerance detection.
10. If the [3.2.4 Over/Under-Tolerance Detection Function] is enabled, the system will be judged to be stable before performing over/under-tolerance detection. If an over/under-tolerance or under-tolerance error is detected, an over/under-tolerance alarm will be output according to the settings, or the system will be paused directly.
11. After the over/under-tolerance detection is completed and the blocked input is detected as invalid, disc will be started.
12. During disc, if the weight is below the disc zero zone value, the disc delay is extended until then, at which point disc is considered

complete. This completes one feeding cycle, and the process returns to step 1 to begin the next cycle.

4.2. Stop and Delay

After the slow stop signal is input, if the controller is in the feeding state, it immediately turns off the feeding output, directly enters the setting process, records the current cumulative weight, starts disc, and ends the collection/delivery process after the disc is completed, and outputs a collection/delivery completion alarm. If the controller is in the fixed value or disc state, the collection/shipment process will end after the disc is completed, and a collection/shipment completion alarm will be output.

After the stop signal is input, the controller will immediately turn off the output signals related to feeding and disc and enter the stop state. After restarting, the feeding process will be restarted.

4.3. Accumulation function related

There are three types of accumulated data within the controller:

1. Receipt/shipment cumulative data: This accumulation starts from the beginning of a collection/shipment process. It stops accumulation after the current collection/shipment process is completed. It is

cleared when the next collection/shipment process starts and the accumulation starts again.

2. Recipe cumulative data: Each group of recipes has independent cumulative data, recording the completed cumulative data under this recipe. The controller has a total of 20 sets of recipes, which means it has 20 sets of independent recipe cumulative data. For example, when it is necessary to perform the accumulation function by shift or grouping, different recipes can be used for different shifts, so that the amount of data accumulated by different shifts can be distinguished.
3. Total accumulated data: records all completed accumulated data of the controller.
4. Unclearable accumulation: records all completed accumulated data of the controller and cannot be cleared.

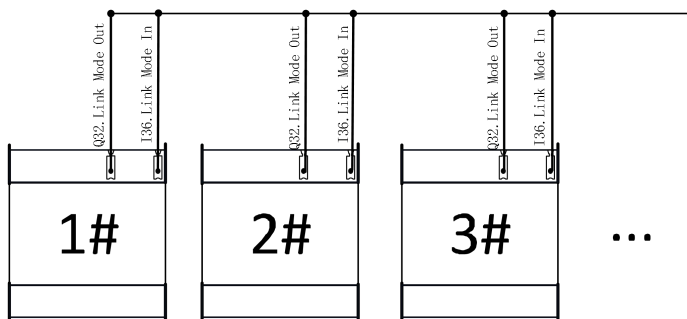
The recipe cumulative weight and total cumulative weight controller provide a 13-digit decimal number space for storage. The 13-digit cumulative weight data in the Modbus address is divided into high 6 bits and low 7 bits for storage respectively, occupying two double-word registers in total.

4.4. Multi-device linkage instructions

To use multi-device linkage mode, you need to turn on [3.5.10 Link mode]. The signals used are: I36. Link Mode In,

Q32. Link Mode Out. The connection diagram is as follows:

IN1	I36. Link Mode In
OU1	Q32. Link Mode Out



The connected instrument [3.5.1 Feeding timeout monitoring] needs to be turned on and [3.5.3 Feeding timeout post-processing] set to [① Alarm prompt only]. At this time, the feeding alarm linkage is on.

When any instrument inputs a start signal, all connected instruments will start simultaneously. If a stop signal is input, all connected instruments will stop simultaneously. If the 2# instrument has a feeding timeout alarm, the 2# instrument will send a stop signal to other instruments to stop them. When the 2# instrument resumes normal feeding and the alarm is automatically cleared, the 2# instrument will send a start signal to other instruments to restore other instruments to operating status.

For the disc alarm linkage configuration, refer to the above-mentioned feeding timeout monitoring.

v. Alarm information

When an alarm occurs in the controller, the alarm information will

be prompted in the bottom line of the display, as shown in the figure below:



Press  the key or input "I5 clear alarm" to clear the alarm.

Please refer to the table below for detailed descriptions of specific alarms:

number	content	Description
1	 Collection/delivery completed	Alarm when receipt/delivery is completed.
2	 Clear out of range	During the zeroing operation, the weight exceeds the zeroing range and cannot be reset. The [2.1.2 Clearing Range] parameter settings can be adjusted.
3	 Unstable when clearing	During the zeroing operation, the weight is unstable and cannot be reset. It is necessary to investigate whether the reason for the unstable weight jump is caused by mechanical vibration. You can also adjust [2.1.3 Stability Determination Range] and [2.1.4 Stability Determination Time] to adjust the determination of stable conditions.
4	 Target value is 0	At startup, the [4.2.1 Target value] parameter is not set correctly.

5	 Suspension of excess and deficit	[3.2.7 Over-under balance pause switch] is valid when turned on. The feeding result is out of tolerance and feeding is suspended, waiting for processing.
6	 Over and under deviation alarm	[3.2.7 Over-under balance pause switch] is valid when turned off. The feeding result is out of tolerance and an alarm will be given.
7	 Insufficient traffic	[3.4.3 Insufficient flux alarm] has been turned on and the number of consecutive times of insufficient flux has reached the set value of [3.4.4 Count of insufficient flux alarm statistics], indicating insufficient flux.
8	 The target traffic is unreasonable	[3.4.2 Flux control function] is turned on, and unreasonable setting of [4.2.6 Target flux] is detected during startup.
9	 Shipment accumulation has not been cleared	[6.1.2 Shipment accumulation clearing method] When 1. [Manual clearing] is selected, the last shipment accumulation is not cleared at startup.
10	 Feeding timeout alarm	[3.5.1 Feeding timeout monitoring] function is turned on, and if the feeding time exceeds [3.5.2 Feeding timeout time], an alarm will appear.
11	 Disc timeout alarm	[3.5.4 Discharging timeout monitoring] function is turned on, and if the discharging time exceeds [3.5.5 Discharging timeout time], an alarm will appear.

12	 OFL cannot start	Unable to start when the weight is overflowing.
13	 Stop input is valid	When starting, it is detected that the "I3 stop" signal is in a valid state and cannot be started, and an alarm prompts.
14	 IO test cannot start	It is currently in IO testing state and cannot be started.
15	 Clearing interval determines stability T.O	[3.1.6 Automatic clearing interval] is not set to 0, and the [3.5.7 Stability judgment timeout monitoring] function is turned on. When clearing, the stability judgment time exceeds [3.5.8 Stability judgment timeout time], and an alarm will appear.
16	 Fixed value judgment timeout	[3.2.2 Setting value needs to be determined to be stable] function is turned on and [3.5.7 Stability determining timeout monitoring] function is turned on. When the value is set, the stabilizing time exceeds [3.5.8 Stability determining timeout time], and an alarm will be prompted.
17	 Over/under difference judgment stable timeout	[3.2.4 Over-Under Defect Detection Function] is turned on and the [3.5.7 Stability Decision Timeout Monitoring] function is turned on. If the over-under-decision stability time exceeds [3.5.8 Stability Determination Timeout Time], an alarm will appear.
18	 The gap correction is stable	Alarm prompt for timeout when the gap correction is stable.

	T.O	
19	 Switching recipes is not allowed	Recipe switching is not allowed during runtime.
20	 Tare weight limit exceeded	[3.1.7 Tare limit switch] is turned on, and the tare weight is greater than [3.1.8 Tare limit weight], an alarm will appear.
21	 Timeout after fixed value pressure relief	Set pressure relief and stabilization timeout alarm.
22	 Feeding door not fully closed	【 3.1.10 Feeding control mode 】 is not 1. [Pneumatic]. During startup, the "I30 Feeding door closed detection" signal is detected as invalid; during operation, the feeding door closing time exceeds 【 3.1.11 Feeding door closed detection timeout 】 , triggering an alarm.
23	 Discharge door not fully closed	【 3.3.7 Discharge control mode 】 is not 1. [Pneumatic]. During startup, the "I31 Discharge door closed detection" signal is detected as invalid; during operation, the discharge door closing time exceeds 【 3.3.9 Discharge door closed detection timeout 】 , triggering an alarm.
24	 Feeding door not fully open	When 【 3.1.10 Feeding control mode 】 is set to 4. [Motor four-limit], and the feeding door opening time exceeds 【 3.1.15 Feeding door opening timeout 】 , an alarm will be triggered.
25	 Disc door not fully	When 【 3.3.7 Disc control mode 】 is set to

	open	5. [Motor forward and reverse dual-limit], and the disc door opening time exceeds 【3.3.10 Disc door opening timeout】 , an alarm will be triggered.
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vi. Common troubleshooting

When the controller is running, the bottom line of the display will prompt in real time the functions and processes currently being executed by the controller. This prompt can be used to determine the running process of the current controller and help troubleshoot faults. As shown in the figure below, the controller is in the process of rapid feeding:

Rec:01 STAB
0.202 kg
Fast

Some faults that may be encountered during the use of the controller and their troubleshooting methods are shown in the table below:

number	content	Description
1	ADOFL/-ADOFL	The sensor signal is abnormal. 1. The sensor circuit is wrongly connected and the contact is poor. (Pay attention to the connection methods of four-wire and six-wire systems) 2. The sensor is damaged. 3. The load on the sensor is out of range.
2	OFL/-OFL	Weight overflow, OFL will be prompted when the weight in the hopper exceeds the [1.4

		maximum range] setting value. If the empty scale displays OFL, please check: 1. [1.4 maximum range] is set correctly. 2. Calibration is abnormal, recalibrate. 3. Is the sensor damaged?
3	The weight of the equipment is abnormal and unstable when it is at rest.	1. Check whether the sensor circuit connection is correct and reliable, and whether the circuit is rusted and oxidized. 2. Whether the weighing mechanism is affected by external force or vibration. 3. Is the sensor damaged? 4. The sensor or controller is interfered by electrical equipment around the site, such as motors, frequency converters, etc. 5. [2.1.5 Filter Level] Is the setting appropriate?
4	Unable to start	1. Whether input lines such as external start buttons are properly connected to the controller (can be checked through switch test). 2. Check whether the input port to which the start signal is connected is correctly defined as start.
5	Adding results are inaccurate	1. After the feeding is completed, the results displayed by the controller are inaccurate: (1) Adjust the settings of the recipe parameters for fast, medium and slow dosing advance. Make sure that the slow casting process lasts long enough

		to ensure accuracy. (2) Check whether the feeding mechanism is normal, whether the lower feeding port is blocked, and whether the material flow is smooth. 2. The results displayed by the controller are accurate, but the actual re-weighing results are inaccurate. (1) If there is any deviation between the displayed weight and the actual weight, it needs to be calibrated. (2) It is best to use weights or materials with the same weight as the target value for calibration, and when calibrating, pay attention to the even force on the scale platform and avoid unbalanced loading.
6	Accumulation is not allowed	The controller records the cumulative value at the end of the setting process, so check whether the setting of [3.2.1 Fixed value holding time] is sufficient. Make sure that at the end of the fixed value holding time, the controller shows that the weight has stabilized and no longer jumps significantly, so that the accurate cumulative result of feeding can be recorded.