



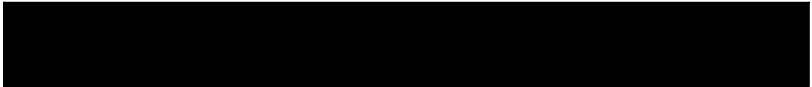
# AMC401-A

## Flux Controller Manual

AMC401-A-9xx01

- Multiple traffic given modes
- Dual PID regulation, capable of self diagnosis
- Support the establishment of a traffic monitoring system
- Support multiple feeding mechanisms and settings
- Single channel weightlessness controller module, convenient for expanding HMI
- Provide touch screen matching, easy and convenient to

use



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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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# 1. Basic Information

## 1.1. Characteristics and specifications

The loss-in-weight scale is a weight loss controller that uses weight loss methods to control material Flux and ensure that the material flows uniformly according to a set target. Instruments are widely used in industries such as rubber, grain, chemical, and printing and dyeing. Users can also use the touch screen interface developed by our factory to further enhance the usability of the product.

AMC401-A has the following basic characteristics:

- Installation method: Guide rail (or screw fastening);
- Volume: 120 × 80 × 61 (length, width, height, mm, excluding protruding parts);
- Working voltage: DC24V;
- Sensor: DC5V, supports 4-wire and 6-wire sensors;
- Switch quantity: 7 inputs/12 outputs, supports PWM/PFM outputs, customizable and testable functions;
- RS232/RS485 communication with 1 channel each and optional Ethernet, communication protocol: MODBUS-RTU;
- Two analog outputs (one of which is optional) and one analog input (optional);
- Supports four working modes: continuous standard, analog linkage, Flux display, and volume mode;
- Intelligent dual PID regulation to achieve fast response and precise control;
- The initial analog quantity and holding time can be preset

to prevent the host from blocking during startup;

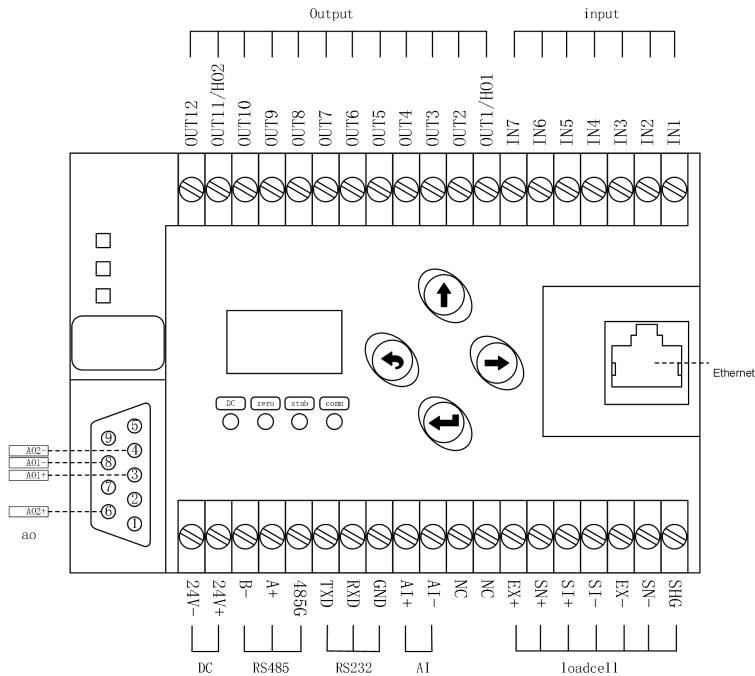
- Support multiple feeding mechanisms, with feeding timeout detection, feeding stabilization, and manual feeding function;
- It has traffic monitoring function, including traffic over/under difference alarm and traffic establishment timeout alarm;
- It has functions such as manual material cleaning, anti bridging mixing control square wave output, and frequency converter fault detection.

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 $\Omega$ 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 $\mu$ 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℃~45℃                        |
| Storage temperature       | -20℃~60℃                        |
| humidity                  | Within 90% RH (no condensation) |

1.2.front panel



The front panel of the instrument panel consists of a LCD display, 4 indicator lights, and 4 buttons. The explanation is as

follows:

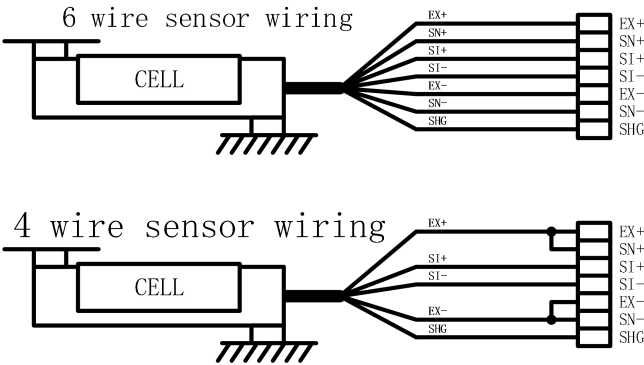
| indicator light                                                                                      |                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>comm</b>                                                                                          | When the serial port receives a command and responds, the indicator light will light up once                                                                                                                                                                                                     |
| <b>DC</b>                                                                                            | Power indicator light, on for a long time when powered on                                                                                                                                                                                                                                        |
| <b>zero</b>                                                                                          | When the weight is zero, this indicator light is on                                                                                                                                                                                                                                              |
| <b>stable</b>                                                                                        | When the weight is stable, this indicator light is on                                                                                                                                                                                                                                            |
| button                                                                                               |                                                                                                                                                                                                                                                                                                  |
| <br><b>OPTION</b>   | 1. Switch the display of traffic and accumulation on the main interface;<br>2. When selecting the menu, choose upwards;<br>3. When selecting parameters, choose upwards;<br>4. When inputting numerical values, the number increases.                                                            |
| <br><b>MODE</b>     | 1. Enter the menu on the main interface;<br>2. When selecting the menu, choose downwards;<br>3. When selecting parameters, choose downwards;<br>4. Switch input positions when inputting numerical values.                                                                                       |
| <br><b>ZERO/ESC</b> | 1. Accumulate viewing time and clear accumulation;<br>2. When selecting a menu, return to the previous menu (long press to directly return to the main interface);<br>3. Cancel input when entering numerical values (long press to clear all inputs);<br>4. Deselect when selecting parameters. |
| <br><b>ENTER</b>  | 1. Enter the selected menu item;<br>2. Enter parameter modification;<br>3. Confirm and save parameter modifications;<br>4. Confirm.                                                                                                                                                              |

### 1.3.terminal port

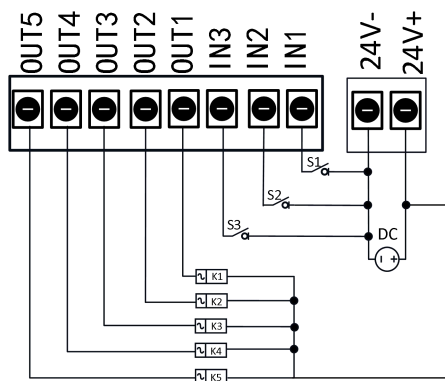
The wiring port instructions are as follows:

| interf           | Instructions        | interfac | Instructions        |
|------------------|---------------------|----------|---------------------|
| 24V+             | DC24V +             | 24V-     | DC24V-              |
| input            |                     |          |                     |
| IN1              | I1. Run/Stop (Pul)  | IN5      | I8. Clear alarm     |
| IN2              | I3. Clr zero        | IN6      | I10. Freq Cvt fault |
| IN3              | I4. Manual feed     | IN7      | I23. Cut in place   |
| IN4              | I5. Manual empty    |          |                     |
| output           |                     |          |                     |
| OUT1             | Q1. Run/Stop        | OUT7     | Q5. Feed full       |
| OUT2             | Q2. Freq Cvt on/off | OUT8     | Q10. Ration ok      |
| OUT3             | Q3. feed            | OUT9     | Q11.stir            |
| OUT4             | Q4. Feed lack       | OUT10    | Q12. Err collide    |
| OUT5             | Q9. Alarm           | OUT11    | Q13. Freq Cvt fault |
| OUT6             | Q6. Feed Low        | OUT12    | Q23. Cut off        |
| sensor interface |                     |          |                     |
| EX+              | excitation positive | EX-      | excitation negative |
| SN+              | sensing positive    | SN-      | sensing negative    |
| SI+              | signal positive     | SI-      | signal negative     |
| SHG              | shielding wire      |          |                     |

1.3.1.Sensor wiring method



### 1.3.2.Switching wiring method



The external circuit driven by input switch quantity should meet the following two points:

1. The external circuit should be grounded together with the controller;
2. When the external circuit input is low, it indicates that the input is valid; otherwise, it indicates that the input is invalid.

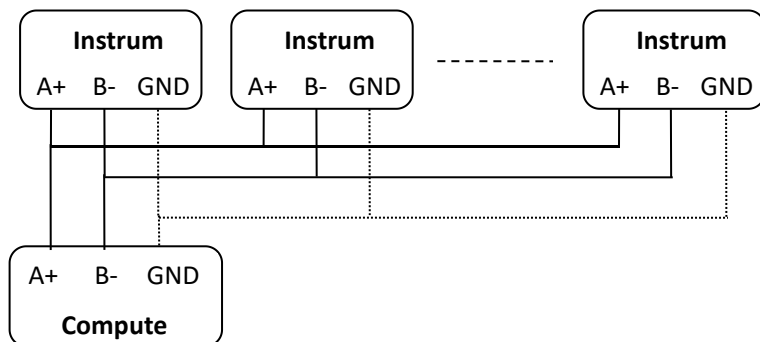
The external circuit driven by output switch quantity should meet the following two points:

1. The external circuit should be grounded together with the controller;
2. When the switch output is valid, it is at a low level.

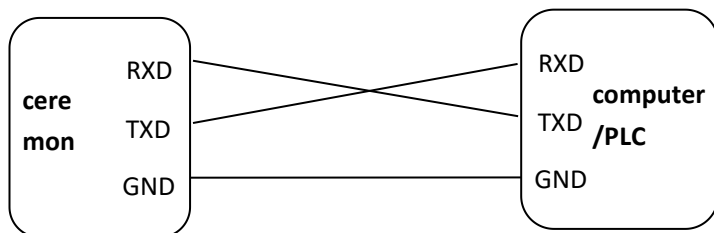
**Attention: The maximum output capacity of each switch output port is 500mA. When connecting the load, please pay attention to the power of the load. Using the switch output port beyond its driving capacity may cause damage to the switch output port.**

### 1.3.3. Serial port wiring method

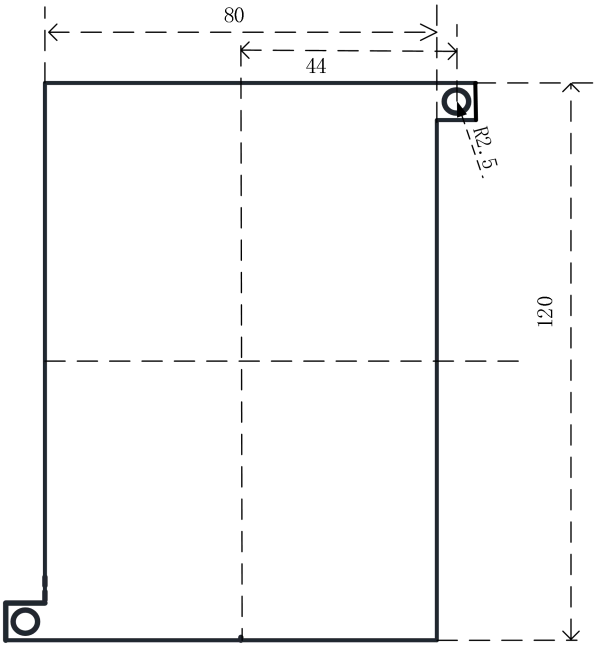
RS485 wiring diagram:



RS232 wiring diagram:



# 1.4.installation dimensions



The above picture is the bottom view of the product,  
Unit: mm

## 2. Function Menu

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

| num | project       | Instructions                                                    |
|-----|---------------|-----------------------------------------------------------------|
| 1   | Wt calib      | Weight calibration related operations.                          |
| 2   | Basic Wt para | Basic parameters for weight collection and processing.          |
| 3   | IO            | Definition of switch function and port testing.                 |
| 4   | module para   | Communication parameter settings and analog quantity settings   |
| 5   | Fu Para       | Parameters related to mixing and feeding mechanism              |
| 6   | recipe        | Parameters related to Flux control process                      |
| 7   | Logic         | Logic programming related parameters.                           |
| 8   | system        | Parameter reset, system language selection, and version viewing |

Each project has a password function, and you can choose whether to open the entry password for that project.

**All passwords default to '000000' at the factory.**

### 2.1. weight calibration

The relevant operations for weight calibration in this project

should be carried out once for the first installation and use of this product or any changes to the scale structure, such as replacing sensors or weighing platforms, to ensure accurate weight display.

| num | parameter | Instructions                                                                                                                               | initial |
|-----|-----------|--------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1.1 | Wt unit   | ①g<br>②kg<br>③t<br>Select the unit for displaying system weight.                                                                           | ②kg     |
| 1.2 | Wt point  | ①0<br>②0.0<br>③0.00<br>④0.000<br>⑤0.0000<br>Select the decimal place for displaying system weight.                                         | 0.000   |
| 1.3 | Wt MSD    | ①1d = 1<br>②1d = 2<br>③1d = 5<br>④1d = 10<br>⑤1d = 20<br>⑥1d = 50<br>Select the minimum division value that the system weight can display. | ①1d = 1 |
| 1.4 | Max range | Set the maximum weighing range.<br>If the displayed weight exceeds the maximum range set, the weight overFlux "OFL" will be displayed      | 500.000 |
| 1.5 | Zero Clb  | Clear the weighing platform and confirm                                                                                                    |         |

|     |              |                                                                                                                                                                                                                                            |  |
|-----|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|     |              | the calibration zero point.                                                                                                                               |  |
| 1.6 | Gain Clb     | Place an object of known weight on the weighing platform for gain calibration.<br><br>Enter the accurate  weight of the placed object after confirmation. |  |
| 1.7 | Wt snr mv/V  | Set the actual sensitivity of the sensor.<br>After setting the sensor sensitivity and sensor range, perform weight free calibration.                                                                                                       |  |
| 1.8 | Wt snr range | Sensor full-scale value                                                                                                                                                                                                                    |  |

### 2.1.1. Weight calibration process

1. Set the weight decimal point, unit, minimum division, maximum range and other parameters for the system to use.
2. Zero point calibration.

Enter the "1.5 Zero Clb " interface, as shown in the following figure:

```

1.5 Zero Clb
Abs:          0.591 mV
Gain:         0.590 mV
  
```

The main display shows the current voltage level of the sensor. At this time, clear the scale and wait for the displayed sensor voltage value to stabilize. Press  to complete the zero calibration and calibrate the current sensor voltage signal to zero.

### 3. Gain calibration and weight free calibration.

#### **Gain calibration:**

Enter the "1.6 Gain Clb " interface, as shown in the following figure:

```
1.6 Gain Clb
Abs:      0.591 mV
Gain:     0.590 mV
          1.998 kg
```

The main display shows the voltage level of the current sensor relative to zero. At this point, place the weight on the scale and wait for the displayed voltage value to

stabilize before pressing the confirm button .

```
1.6 Gain Clb
Abs:      0.591 mV
Gain:     0.590 mV
          000002.000
```

After entering the weight of the weight in the pop-up interface, press the confirm button  to complete the gain calibration. The relative zero voltage and the input weight will be automatically calibrated for gain.

#### **Weight free calibration:**

Enter **【1.7 Wt snr mv/V】**, as shown in the following figure:

```
1.7 Wt Snr mv/V
          2.0000mv/v
          0.0000~99.9999
```

After setting the sensitivity, set the actual range of the sensor, confirm the point, and complete the weight free calibration.

## 2.1.2. Calibration precautions

1. When calibrating the zero point and gain, if the sensor voltage displays ADOFL, it indicates that the current sensor signal is abnormal. It is necessary to check whether the sensor's wiring connection and installation are normal, and whether the sensor is damaged.
2. When calibrating the zero point and gain, the displayed sensor voltage must be stable and not jump before calibration can be performed. If abnormal voltage jumping is found in the sensor, the sensor circuit connection and installation should be checked for normal operation, and the sensor should be checked for damage.

## 2.2. Basic weighing parameters

Set parameters for weight signal acquisition and processing related functions in this project.

| num | parameter    | Instructions                                                                                                                                                                                                                                                                                                                                            |                                                         | initial |
|-----|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------|
| 2.1 | Filter depth | 0~9; The strength level of software digital filtering is determined by setting appropriate filtering level parameter values based on the actual debugging effect of the device.<br><br>0: Weakest filtering, fast weight response, poor anti vibration effect;<br><br>9: The strongest filtering, slow weight response, and good anti vibration effect. |                                                         | 7       |
| 2.2 | stable range | 1~9d                                                                                                                                                                                                                                                                                                                                                    | These two parameters work together to determine whether | 1d      |

|     |                      |                                                                                                                                                                                        |                                                                                                                                                                                                                                                                     |             |
|-----|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 2.3 | stable time          | 0.01~9.9s                                                                                                                                                                              | the weight is stable.<br>If the difference between the maximum and minimum values of all weight values within the "stability judgment time" is less than or equal to the "stability judgment range", it is considered that the weight value is stable at this time. | 0.5         |
| 2.4 | Track Zero range     | 0~9d; only works in the stopped state, and the weight value stabilizes within the positive and negative range of this set value x d (minimum division value), automatically resetting. |                                                                                                                                                                                                                                                                     | 0           |
| 2.5 | Clear zero range     | 0~99%; When performing a zeroing operation, the weight must be less than or equal to the "maximum range x zeroing range" to allow zeroing.                                             |                                                                                                                                                                                                                                                                     | 10%         |
| 2.6 | Power up<br>Clr Zero | ① Closed/② Opened<br>After opening, the controller will automatically perform a reset operation every time it is turned on.                                                            |                                                                                                                                                                                                                                                                     | ①<br>Closed |

## 2.3.IO

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

### 2.3.1. Input

Define the functions corresponding to the switch input ports

IN1~IN7. Select the switch port to be set and choose the function to be defined in the option box list.

| num   | parameter | Instructions                                                                                               | initial value       |
|-------|-----------|------------------------------------------------------------------------------------------------------------|---------------------|
| 3.1.1 | IN1       | Definition of switch input port function.<br>Please refer to the list below for a detailed list of options | I1. Run/Stop (Pul)  |
| 3.1.2 | IN2       |                                                                                                            | I3. Clr zero        |
| 3.1.3 | IN3       |                                                                                                            | I4. Manual feed     |
| 3.1.4 | IN4       |                                                                                                            | I5. Manual empty    |
| 3.1.5 | IN5       |                                                                                                            | I8. Clear alarm     |
| 3.1.6 | IN6       |                                                                                                            | I10. Freq Cvt fault |
| 3.1.7 | IN7       |                                                                                                            | I23. Cut in place   |

#### List of switch input functions

| num | Function Name    | description                                                                                                                                                                                             |
|-----|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0   | None             | No functions are assigned.                                                                                                                                                                              |
| IN1 | Run/Stop (Pul)   | If it is currently in a stopped state, it will start running after being pulsed;<br>If the current state is running, it will stop running after being pulsed.                                           |
| IN2 | Run/Stop (Level) | Start running when input is valid, stop running when input is invalid.                                                                                                                                  |
| IN3 | Clr zero         | Give one pulse to clear the weight to zero.                                                                                                                                                             |
| IN4 | Manual feed      | Only effective when in a stopped state<br>If the feeding valve is closed, open the feeding valve after giving a pulse;<br>If the feeding valve is open, close the feeding valve after giving the pulse. |
| IN5 | Manual empty     | Operates in a stopped state<br>When there is no cleaning material, start cleaning after giving a pulse;                                                                                                 |

|      |                 |                                                                                                                                                                                                                              |
|------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                 | When cleaning the material, stop cleaning after giving a pulse.                                                                                                                                                              |
| IN6  | Feed open loc   | Effective only when using the motor feeding method                                                                                                                                                                           |
| IN7  | Feed close loc  | Effective only when using the motor feeding method                                                                                                                                                                           |
| IN8  | Clear alarm     | When there is an alarm currently, it can be cleared after one valid alarm;                                                                                                                                                   |
| IN9  | IO feed         | The input level signal only takes effect during operation<br>When the input is valid, notify the instrument to enter the feeding state;<br>When the input is invalid, notify the instrument to exit the feeding state.       |
| IN10 | Freq cvt fault  | When the input is valid, it indicates that the frequency converter has malfunctioned. At this time:<br>If it is in a stopped state, it cannot start running;<br>If it is in operation, it will sound an alarm and shut down. |
| IN11 | Analog target   | When the input is invalid, disable the function of setting the target Flux rate for the input analog quantity                                                                                                                |
| IN12 | Logic trigger 1 | Logic programming function 1.                                                                                                                                                                                                |
| IN13 | Logic trigger 2 | Logic Programming Function 2                                                                                                                                                                                                 |
| IN14 | Logic trigger 3 | Logic Programming Function 3                                                                                                                                                                                                 |
| IN15 | Logic trigger 4 | Logic programming function 4                                                                                                                                                                                                 |
| IN16 | Logic trigger 5 | Logic programming function 5                                                                                                                                                                                                 |
| IN17 | Logic trigger 6 | Logic programming function 6                                                                                                                                                                                                 |

|      |                |                                                                                                                                                                                                                                                                                                                     |
|------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IN18 | Run enable on  | <p>Input level signal</p> <p>When the input is valid, it can start running; when the input is invalid, it is prohibited from starting running;</p> <p>If it becomes invalid during runtime, stop running immediately;</p> <p>If multiple signals are defined, as long as one input is valid, it can run.</p>        |
| IN19 | Run enable and | <p>Input level signal</p> <p>When the input is valid, it can start running; when the input is invalid, it is prohibited from starting running;</p> <p>If it becomes invalid during runtime, stop running immediately;</p> <p>If multiple signals are defined, all signal inputs must be valid to start running.</p> |
| IN20 | Run (pulse)    | <p>When in a stopped state, giving a pulse will start running;</p> <p>2. In operation, the pulse is invalid and will be ignored.</p>                                                                                                                                                                                |
| IN21 | Stop (pulse)   | <p>During operation, the pulse will stop running;</p> <p>In the stopped state, the pulse is invalid and will be ignored.</p>                                                                                                                                                                                        |
| IN22 | OD close loc   | Only used in pulse controlled motor mode                                                                                                                                                                                                                                                                            |
| IN23 | Cut in place   | Cut off valve closing origin                                                                                                                                                                                                                                                                                        |
| IN24 | To fixed stat  | <p>1. Only used for "continuous standard" working mode</p> <p>2. Pulse input, giving one pulse to enter the volume discharge state (i.e. constant</p>                                                                                                                                                               |

|      |            |                                                                                                                                                                                                                                                                                  |
|------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |            | frequency state); Give another pulse to exit the volumetric discharge state and return to the weightlessness state                                                                                                                                                               |
| IN25 | Remote Loc | 1. Only all-in-one machine<br>2. The level input is valid, indicating that it is local; Invalid input, indicating remote<br>3. When selecting local, remote cannot set target traffic and start stop; When selecting remote, target traffic and start stop cannot be set locally |

### 2.3.2. Output switch quantity

Define the functions corresponding to the switch output ports OUT1~OUT12. Select the switch port to be set and choose the function to be defined in the option box list.

| number | parameter              | Instructions                                                                                                | initial value       |
|--------|------------------------|-------------------------------------------------------------------------------------------------------------|---------------------|
| 3.2    | Output switch quantity |                                                                                                             |                     |
| 3.2.1  | OUT1                   | Definition of switch output port function.<br>Please refer to the list below for a detailed list of options | Q1. Run/Stop        |
| 3.2.2  | OUT2                   |                                                                                                             | Q2. Freq Cvt on/off |
| 3.2.3  | OUT3                   |                                                                                                             | Q3. feed            |
| 3.2.4  | OUT4                   |                                                                                                             | Q4. Feed lack       |
| 3.2.5  | OUT5                   |                                                                                                             | Q9. Alarm           |
| 3.2.6  | OUT6                   |                                                                                                             | Q6. Feed Low        |
| 3.2.7  | OUT7                   |                                                                                                             | Q5. Feed full       |
| 3.2.8  | OUT8                   |                                                                                                             | Q10. Ration ok      |
| 3.2.9  | OUT9                   |                                                                                                             | Q11.stir            |
| 3.2.10 | OUT10                  |                                                                                                             | Q12. Err collide    |
| 3.2.11 | OUT11                  |                                                                                                             | Q13. Freq Cvt fault |
| 3.2.12 | OUT12                  |                                                                                                             | Q23. Cut off        |

### List of switch output functions

| number | Function        | description                                                                                                                                                                                                                 |
|--------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0      | None            | No functional definition                                                                                                                                                                                                    |
| OUT1   | Run/Stop        | When the output is valid, it indicates that it is currently running;<br>When the output is invalid, it indicates that it is currently in a stopped state.                                                                   |
| OUT2   | Freq Cvt on/off | The gate signal of the frequency converter is used to control the start and stop of the frequency converter.                                                                                                                |
| OUT3   | feed            | Signal for opening and closing the feeding valve.                                                                                                                                                                           |
| OUT4   | Feed lack       | When the current weight is lower than the lower limit weight of the feeding material, output this signal;<br>When the current weight is equal to or higher than the lower limit weight of the feed, turn off the signal.    |
| OUT5   | Feed full       | When the current weight is equal to or higher than the upper limit weight of the material supply, output this signal;<br>When the current weight is lower than the upper limit weight of the feeding, turn off this signal. |
| OUT6   | Feed low        | When the current weight is lower than the warning weight for low feeding, output this signal;<br>When the current weight is equal to or higher than the low feed warning weight, turn off the signal.                       |

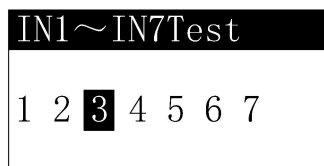
|       |                |                                                                                                                                                                               |
|-------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OUT7  | Feed overtime  | When a feed timeout alarm occurs, the signal output is valid.                                                                                                                 |
| OUT8  | Feed dir       | Effective only when using the motor feeding method                                                                                                                            |
| OUT9  | Alarm          | When an alarm occurs, output the signal;<br>When clearing the alarm, turn off the signal.                                                                                     |
| OUT10 | Ration ok      | After completing the quantitative analysis, output the signal;<br>2. Stopping operation, clearing alarms, and changing quantitative parameters will all turn off this signal. |
| OUT11 | stir           | Used to control the anti bridging mixing mechanism inside the measuring bucket.                                                                                               |
| OUT12 | Err collide    | When accidental touch interference occurs, output this signal;<br>When the interference disappears due to accidental touch, turn off the signal.                              |
| OUT13 | Freq Cvt fault | When the input frequency converter fault is valid, output this signal;<br>When the input frequency converter fails and becomes invalid, turn off the signal.                  |
| OUT14 | Sum pulse      | Failed to accumulate weight once, output this signal for 0.5 seconds.                                                                                                         |
| OUT15 | Logical out 1  | Logic programming 1 function output signal.                                                                                                                                   |
| OUT16 | Logical out 2  | Logic programming 2 function output signal.                                                                                                                                   |
| OUT17 | Logical out 3  | Logic programming 3 function output signal.                                                                                                                                   |
| OUT18 | Logical out 4  | Logic programming 4 function output signal.                                                                                                                                   |
| OUT19 | Logic out 5    | Logic programming 5 function output signal.                                                                                                                                   |
| OUT20 | Logic out 6    | Logic programming 6 function output signal.                                                                                                                                   |
| OUT21 | Custom Ctr     | The output and shutdown status of the                                                                                                                                         |

|       |               |                                                                                                       |
|-------|---------------|-------------------------------------------------------------------------------------------------------|
|       |               | signal are controlled by external devices through communication to achieve custom control functions.  |
| OUT22 | OD Dir        | Used in pulse controlled motor mode                                                                   |
| OUT23 | Cut off       | Control the cutting structure                                                                         |
| OUT24 | Custom analog | When the user communicates and controls the analog output, the signal will also be output effectively |

### 2.3.3. IO test

Switching test is used to test whether the input and output switching functions are normal.

Select 3.3 IO test, press  to enter input test, white background of numbers indicates invalid. The black background of the numbers indicates validity. The interface is shown in the following figure:



As shown in the figure on the right, IN3 is valid, while others are invalid

Press  on the input switch value test interface to switch to the output switch value test interface. A white background with numbers indicates invalidity. The black background of the numbers indicates validity

OUT1~OUT12Test

1

2

3

4

5

6

7

8

9

10

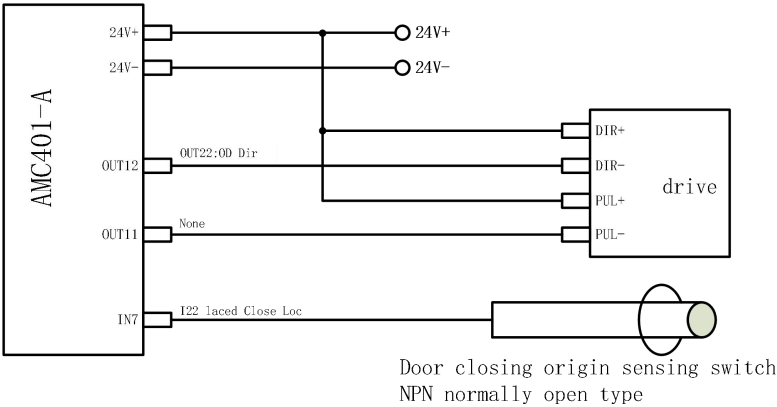
11

12

As shown in the figure on the right, OUT2 is valid, while others are invalid.

2.3.4. PWM/PFM

AMC401-A supports high-speed pulse output control for ordinary motors, stepper motors, servo motors, etc. The control methods include aperture size, PWM (pulse width modulation), PFM (pulse frequency modulation). The high-speed pulse wiring is as follows:



The high-speed pulse setting interface is as follows:

| number | parameter | Instructions                                                  | initial |
|--------|-----------|---------------------------------------------------------------|---------|
| 3.4.1  | Fn select | 0. closed;<br>1. PWM speed;<br>2. PFM speed;<br>3. Pulse open | Closed  |
| 3.4.2  | Run Freq  | 1.2KHz~60.0KHz                                                | 20. 0   |

|       |                 |                                                                                                                                                               |                  |
|-------|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 3.4.3 | Max open pulses | Only used for "pulse opening mode", used to set the number of pulses required when opening to the maximum                                                     | 0                |
| 3.4.4 | HO select       | 0:[Closed]/1:HO1/2:HO2/3:HO1,HO2, used to set whether high-speed pulses are output through OUT1                                                               | Closed           |
| 3.4.5 | open direction  | Only used for "pulse open " to set the polarity of directional signals                                                                                        | Valid- -<br>Open |
| 3.4.6 | Close overtime  | If the position switch is not detected to be effective after this time, it is considered a malfunction of the position switch and the motor action is stopped | 3.0              |

### ① PWM speed regulation mode

PWM speed regulation is a mode in which the frequency remains constant and the speed is adjusted by changing the duty cycle. To work in this mode, the following parameters need to be set:

1. [High speed mode] Set to "PWM speed regulation mode";
2. [Operating frequency] Set the frequency of the output pulse.

For example, if set to 20.0KHz, the output frequency will be 20.0KHz, and the motor speed can be adjusted by changing the duty cycle of 20.0KHz during operation.

### ② PFM speed regulation mode

PFM is a method of adjusting speed by changing the frequency with a fixed duty cycle of 50%. Set the 'High Speed Mode' to 'PFM Speed Control Mode'.

The output frequency range of PFM speed regulation mode is 1.2KHz to 60.0KHz. AMC501-A will automatically increase or decrease the output frequency based on the difference between real-time Flux and target Flux to adjust the motor speed and achieve the purpose of regulating Flux.

### ③ Pulse opening mode

The pulse opening mode is achieved by outputting the number and direction signals of pulses to control the forward and reverse rotation of the motor, and to increase or decrease the opening of the discharge door, in order to control the Flux rate. To work in this mode, the following parameters need to be set:

1. [High speed mode] Set to "pulse opening mode";
2. [Operating frequency] Set the frequency of the output pulse;
3. [Maximum number of pulse openings] Set the number of pulses corresponding to the maximum opening;
4. [Definition of Opening Direction] Set the polarity of the directional signal. 'OFF Open' indicates the opening direction when the output is invalid, and 'ON Open' indicates the opening direction when the output is valid;
5. [Door closing timeout] Set the time limit when closing the door to the origin switch position to prevent the motor from continuously rotating and overcurrent when the origin switch is damaged;
6. Enter a switch value to define a (discharge door fully closed) signal, and connect the door origin sensing switch.

## 2.4. module parameters

### 2.4.1. RS232 settings

RS232 is the RS232 communication serial port of the controller, with the following parameters:

| serial | parameter | Instructions                                              | initial |
|--------|-----------|-----------------------------------------------------------|---------|
| 4.1.1  | Address   | 1~99; Set the communication address (slave number) of the | 1       |

|              |           |                                                                                                                                                                                                       |                |
|--------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
|              |           | device.                                                                                                                                                                                               |                |
| <b>4.1.2</b> | Baud rate | ① 4800/② 9600/③ 19200/④ 38400/<br>⑤ 57600                                                                                                                                                             | ④ 38400        |
| <b>4.1.3</b> | format    | ① 7-E-1/② 7-O-1/③ 8-N-1/④ 8-E-1/<br>⑤ 8-O-1                                                                                                                                                           | ③ 8-N-1        |
| <b>4.1.4</b> | protocol  | ① [Modbus RTU-H]: Modbus RTU communication protocol (with high byte data before double byte).<br>② [Modbus RTU-L]: Modbus RTU communication protocol (with the low letter of the doublet data first). | ① MODBUS-RTU-H |

## 2.4.2. RS485 settings

Refer to RS232 settings for the setup method.

## 2.4.3. Analog Output 1

| num          | parameter  | function                                                                                                                                                                                                                 | initial |
|--------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>4.3.1</b> | Out range  | 0-5V<br>0-10V<br>4-20mA<br>0-20mA<br>0-24mA<br>Voltage customization<br>Custom current                                                                                                                                   | 0~24 mA |
| <b>4.3.2</b> | Def bottom | When the 'Output Analog 1 Range' is set to 'Voltage Custom', this parameter sets the lower limit of the custom voltage; When the 'Output Analog 1 Range' is set to 'Custom Current', this parameter sets the lower limit | 0       |

|              |         |                                                                                                                                                                                                                                                |   |
|--------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|              |         | of the custom current                                                                                                                                                                                                                          |   |
| <b>4.3.3</b> | Def top | When the 'Output Analog 1 Range' is set to 'Voltage Custom', this parameter sets the upper limit of the custom voltage; When the 'Output Analog 1 Range' is set to 'Custom Current', this parameter sets the upper limit of the custom current | 0 |
| <b>4.3.4</b> | Calib   | Current calibration: Input the actual current output after entering each point.<br>0mA, 4mA, 8mA, 12mA, 16mA, 20mA, 24mA<br>Voltage calibration: Input the actual voltage output after entering each point<br>0V, 2V, 4V, 6V, 8V, 10V          |   |

#### 2.4.4. Analog Output 2 (optional)

Please refer to Analog Output 1 for parameter settings and calibration methods

#### 2.4.5. Input analog quantity (optional)

When optional, the input analog quantity has been set according to the user's needs at the factory, but users can also set it themselves when needed. The inner side of the dip switch wiring terminal needs to be recalibrated after changing the input method.

| number | parameter            | function                                                                                              | initial |
|--------|----------------------|-------------------------------------------------------------------------------------------------------|---------|
| 4.5.1  | In analog fun set    | When there is an optional analog input, the setting is valid.<br>① Close, ② Target set                | Close   |
| 4.5.2  | In analog filt depth | When there is an optional analog input, the setting is valid.<br>0-9, with 9 being the optimal filter | 5       |

|       |                 |                                                                                                                                                                                                                                                                                                           |        |
|-------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 4.5.3 | In analog range | When there is an optional analog input, the setting is valid. optional 0-5V、0-10V、4-20mA、0-20mA、0-24mA、Customized voltage and current                                                                                                                                                                     | 0~24mA |
| 4.5.4 | Def bottom      | When there is an optional analog input, the setting is valid.<br>When the 'Input Analog Range' is set to 'Voltage Custom', this parameter sets the lower limit of the custom voltage; When the 'Input Analog Range' is set to 'Custom Current', this parameter sets the lower limit of the custom current | 0      |
| 4.5.5 | Def top         | When there is an optional analog input, the setting is valid.<br>When the 'Input Analog Range' is set to 'Voltage Custom', this parameter sets the upper limit of the custom voltage; When the 'Input Analog Range' is set to 'Custom Current', this parameter sets the upper limit of the custom current | 0      |
| 4.5.6 | Calib           | Used for calibrating analog quantities                                                                                                                                                                                                                                                                    |        |
| 4.5.7 | In analog Msd   | When there is an optional analog input, the setting is valid<br>Used to set the resolution of input analog, the larger the division value, the more stable the input analog, but the lower the resolution                                                                                                 | 3      |

## 2.4.6. Ethernet (optional)

AMC401-A can be optionally equipped with an Ethernet interface that supports Modbus TCP, using the same Modbus address table as RS232/RS485. The parameter settings are as follows:

| num   | parameter  | function                                                                             | initial           |
|-------|------------|--------------------------------------------------------------------------------------|-------------------|
| 4.6.1 | IP addr    | Used to set the IP address for Ethernet, only supports IPV4.                         | 0.0.0.0           |
| 4.6.2 | port num   | 0-65535                                                                              | 0                 |
| 4.6.3 | MAC Addr   | The MAC address is fixed and can only add an offset value on top of the fixed value. | 00-00-00-00-00-00 |
| 4.6.4 | Hi-low set | High in front, low in front                                                          | High-first        |

## 2.5. Functional Parameters

| num | para           | function                                                                                                                                            | initial        |
|-----|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 5.1 | Feed mode      | 3 control modes,<br>0: solenoid valve,<br>1: motor cycle,<br>2: motor Go-back.<br>Please refer to the detailed explanation below the table.         | solenoid valve |
| 5.2 | Feed open time | 0.0~99.9s, After the feeding door leaves the origin of closing, after this time, it is considered that the feeding door has been opened completely. | 0.5            |
| 5.3 | Feed open      | 0.0~99.9s, When opening the door, if the                                                                                                            | 2              |

|      |                       |                                                                                                                                                                                                                                                                                   |               |
|------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|      | alarm time            | origin of the door remains valid after this time, it is considered a failure to open the door and an alarm is triggered.                                                                                                                                                          |               |
| 5.4  | Feed close alarm time | 0.0~99.9s, When closing the door, if it still hasn't reached the starting point after this time, and it is considered that the door is closed, an alarm will be triggered.                                                                                                        | 2             |
| 5.5  | Feed open Dir Def     | ① Open the door when the output is valid<br>② Invalid output to open door                                                                                                                                                                                                         | ①             |
| 5.6  | Empty analog          | The speed of clearing materials;<br>Set the cleaning speed to 100%, the fastest cleaning speed is achieved                                                                                                                                                                        | 50%           |
| 5.7  | Test Vave on/off      | Used to superimpose an interference waveform on the weight value, causing weight fluctuations, for testing purposes.                                                                                                                                                              |               |
| 5.8  | Test Vave range       | The amplitude of the interference waveform superimposed on the weight value.                                                                                                                                                                                                      |               |
| 5.9  | Test wave period      | The period of the interference waveform superimposed on the weight value.                                                                                                                                                                                                         |               |
| 5.10 | Stir mode             | ① invalid-valid, then ineffective: When outputting the stirring waveform, first output the effective signal, and then output the ineffective signal.<br>② valid-Invalid, effective later: When outputting the stirring waveform, output invalid first, and then output effective. | invalid-valid |
| 5.11 | Stir front time       | Output the duration of the previous stage of the stirring waveform                                                                                                                                                                                                                | 0             |
| 5.12 | Stir front time Unit  | Second (s), minute (m), hour (h)                                                                                                                                                                                                                                                  | s             |

|      |                     |                                                                                                                                |           |
|------|---------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------|
| 5.13 | Stir back time      | Output the duration of the stirring waveform in the later stage                                                                | 0         |
| 5.14 | Stir back time unit | Second (s), minute (m), hour (h)                                                                                               | s         |
| 5.15 | ME                  | 1~999, dedicated for Flux filtering in metering mode, the larger the value, the better the filtering effect.                   | 250       |
| 5.16 | PE                  | 1~999, dedicated for Flux filtering in metering mode, the smaller the value, the better the filtering effect.                  | 750       |
| 5.17 | Manual empty to sum | Is the weight manually cleared included in the total accumulation.<br>Not included/included                                    | not count |
| 5.18 | Cut off on/off      | Cutting function on/off;<br>Closed/Opened                                                                                      | Close d   |
| 5.19 | cut-off Dly close   | 1~600s; the cut-off valve signal is only closed after this time has passed since the operation stopped.                        | 0         |
| 5.20 | Cut off close shift | 1~600s; After the signal to close the cut-off valve, after this time, it is considered that the cut-off valve has been closed. | 0         |
| 5.21 | Custom Init percent | When [Analog Function] is set to [User Control], this parameter is used to set the initial value output after power on startup | 0         |

### 2.5.1. feed method

There are three control methods for the feeding mechanism: ① solenoid valve, ② motor turnover, ③ motor forward and reverse rotation. The following is a detailed explanation:

#### 1. solenoid valve

In this mode, a switch signal is output, which outputs a signal when feeding and stops when feeding is turned off

## **2. motor cycle**

The feeding method for controlling a regular motor to rotate once:

2.1. The IN7 feeding door must be defined as the motor door closing origin switch when it is fully closed;

2.2. After the system is powered on, if the feeding door is not at the closing origin position, the motor will be controlled to rotate to the closing origin position;

2.3. When the door is closed, the motor will stop rotating when the material door reaches the closing origin. If the 【5.4Feed close alarm time 】 has not yet reached the door closing origin, the motor will stop rotating and an alarm will be triggered, with the alarm content being 'feeding door closing origin fault'. If "5.4 Door Opening Alarm Time" is set to 0, the alarm will not work and the motor will continue to rotate until the door closing origin is detected;

2.4. When opening the door, the timing starts only after the material door leaves the origin of the door. When the timing reaches the 【 5.2Feed open time 】 , it is considered that the material door is completely open and the motor rotation stops;

2.5. When opening the door, if the material door still does not leave the door closing origin after the 【 5.3 Feed open alarm time 】 , it is considered that the door opening has failed, and the motor rotation is stopped and an alarm is triggered, with the alarm content being 'material supply door opening failure'. If the '5.3 Feed open alarm time' is set to 0, the alarm will not work and the motor will continue to rotate until it leaves the door closing origin;

2.6. If there is an IN6 feed door open position switch

defined, open position detection is used, and the motor rotation is stopped only after the open position is detected. [5.2 Feed door opening time] does not work;

2.7. If the IN6 feeding door is defined to be fully opened, after outputting the motor rotation signal, if the door opening position is still not reached after [5.3 Feed open alarm time], the motor rotation will stop and an alarm will be triggered, with the alarm content being "feeding door opening origin fault". If the '5.3 Feed open alarm time' is 0, the alarm will not work and the motor will continue to rotate until it reaches the door opening position;

2.8. If it is detected that the current position is at the origin of closing the door, no closing command or action will be responded to;

2.9. If there is a definition of "IN6 feeding door fully open" and it is detected that it is currently in the open position, no open door command or action will be responded to;

2.10. Because it is a control method where the motor rotates once, the output direction signal is the same regardless of whether the door is closed or opened. However, the direction signal can be defined. 'Invalid - Open Door' indicates the corresponding opening direction when the output is invalid, while 'Valid - Open Door' indicates the corresponding opening direction when the output is valid.

### **3. Motor go-back**

Control the feeding method of normal motor forward/reverse rotation

3.1. The IN7 feeding door must be defined as the motor door closing origin switch when it is fully closed;

3.2. After the system is powered on, if the feeding door is not at the closing origin position, the motor will be controlled to

rotate to the closing origin position;

3.3. When the door is closed, the motor will stop rotating when the material door reaches the closing origin. If the 【5.4 Feed close alarm time】 has not yet reached the door closing origin, the motor will stop rotating and an alarm will be triggered, with the alarm content being 'feeding door closing origin fault'. If the '5.4 Door Opening Alarm Time' is set to 0, the alarm will not work and the motor will continue to rotate until the door closing origin is detected;

3.4. When opening the door, the timing starts only after the material door leaves the origin of the door. When the timing reaches the 【5.2Feed open time】, it is considered that the material door is completely open and the motor rotation stops;

3.5. When opening the door, if the material door still does not leave the door closing origin after the 【5.3 Feed open alarm time】, it is considered that the door opening has failed, and the motor rotation is stopped and an alarm is triggered, with the alarm content being 'material supply door opening failure'. If the '5.3 Feed open alarm time' is set to 0, the alarm will not work and the motor will continue to rotate until it leaves the door closing origin;

3.6. If there is an IN6 feed door open position switch defined, open position detection is used, and the motor rotation is stopped only after the open position is detected. [5.2 Feed door opening time] does not work;

3.7. If the IN6 feeding door is defined to be fully opened, after outputting the motor rotation signal, if the door opening position is still not reached after [5.3 Feed open alarm time], the motor rotation will stop and an alarm will be triggered, with the alarm content being "feeding door opening origin fault". If the '5.3 Feed open alarm time' is 0, the alarm will not work and the

motor will continue to rotate until it reaches the door opening position;

3.8. If it is detected that the current position is at the origin of closing the door, no closing command or action will be responded to;

3.9. If the IN6 feeding door is fully opened and detected to be in the open position, it will not respond to any open door commands or actions;

3.10. The opening direction can be defined, with "Invalid Open Door" indicating the corresponding opening direction when the output is invalid, and "Valid Open Door" indicating the corresponding opening direction when the output is valid.

## 2.5.2. Cutting function

If the discharge port needs to cut off the material, the parameter item 5.18 Cut off on/off should be set to on. When starting the frequency converter, it will output a cut-off signal to open the cut-off valve; When stopping the frequency converter, the cut-off signal will be turned off to close the cut-off valve. The cut-off valve can also be equipped with an origin switch: the cut-off valve is closed in place. The control process of the cut-off valve is shown in the following table:

| In23 Cut in place | 5.19cut-off Dly close | control Flux                                                                                                                                                                                                                                                                     |
|-------------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| have              | >0                    | After the cut-off signal is turned off and the origin switch is detected, it is considered that the cut-off valve is closed in place;<br>After the cut-off signal is turned off, if the duration of the shutdown reaches the 【cut-off Dly close】, it is considered that the cut- |

|         |     |                                                                                                                                                                                |
|---------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         |     | off valve is closed in place.                                                                                                                                                  |
| have    | =0  | Close the cut-off valve signal and wait for the origin signal to be valid. If the origin signal remains invalid, it is considered that the valve has not been closed properly. |
| Nothing | >0  | After the cut-off signal is turned off, if the duration of the shutdown reaches the [cut-off Dly close], it is considered that the cut-off valve is closed in place.           |
| Nothing | = 0 | Close the cut-off signal and assume that the cut-off valve is immediately closed in place.                                                                                     |

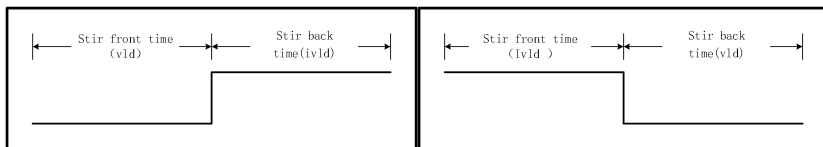
### 2.5.3. Bridge stirring

If it is necessary to output a signal to control stirring at regular intervals and to output waveforms, the bridging stirring function can be used. Continuous stirring does not require the use of this function, simply connect the wiring to keep the signal continuously conductive to achieve continuous stirring. The stirring function is only effective during operation and does not output when stopped. The parameter description is as follows:

There are two ways to Stir :

- ① invalid-valid. When outputting waveforms, first output invalid, then output valid;
  - ② valid-Invalid. When outputting waveforms, output valid first and then invalid.
2. [5.11 Stir front time]. When the mixing mode is set to " invalid-valid ", this time is the output invalid time; When the stirring mode is " valid-Invalid ", this time is the output effective time;
4. [5.14 Stir back time unit]. When the stirring mode is set to " invalid-valid ", this time is the output effective time; When the mixing

mode is " valid-Invalid ", this time is the output invalid time;



## 2.5.4. User controlled analog quantity

The output analog can be controlled by user communication. When the 'Analog Function' is set to 'Custom Control', the parameter 'Custom Init percent' can be set to the initial value of the analog when powered on.

## 2.6.recipe

### 2.6.1. Formula Id.

| number | parameter   | function                                    | initial |
|--------|-------------|---------------------------------------------|---------|
| 6.1    | Formula Id. | 1~10; Set the currently used recipe number. | 0       |

### 2.6.2. Mode Selection

| number | parameter       | function                                                                                                                                 | initial    |
|--------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 6.2.1  | work mode       | Continuous, Analog cmb, Measurement, Fixed.                                                                                              | Continuous |
| 6.2.2  | Given flux      | Set Flux rate                                                                                                                            | 0          |
| 6.2.3  | Given flux unit | g/m (g per minute), g/h (g per hour), kg/m (kilograms per minute), kg/h (kilograms per hour), t/m (tons per minute), t/h (tons per hour) | Kg/h       |

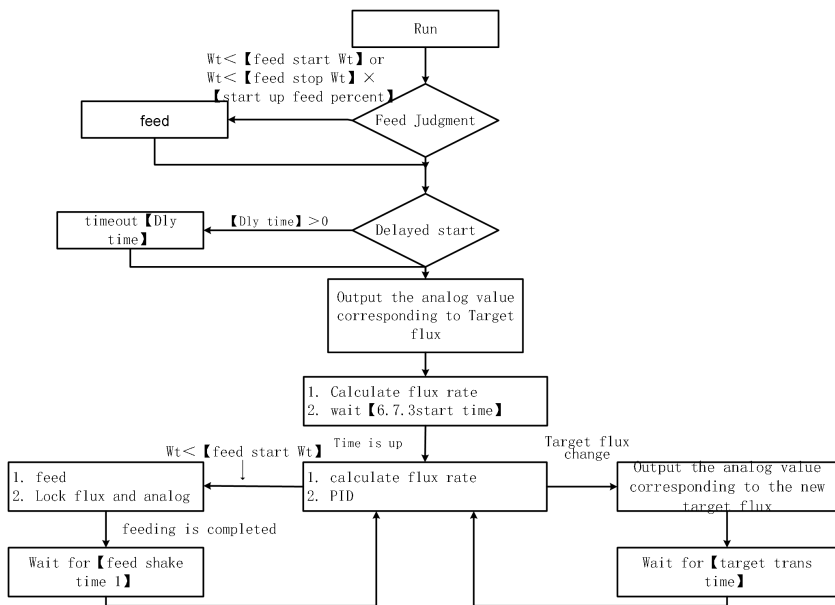
|        |                     |                                                                                                                                                                                                                                             |        |
|--------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 6.2.4  | Given flux point    | 0-4 digits                                                                                                                                                                                                                                  | 0      |
| 6.2.5  | Shunt percent       | Target flux= Given flux x Shunt percent                                                                                                                                                                                                     | 100    |
| 6.2.6  | Cmb Sync on off     | Used for synchronization of multiple channels. When multiple channels require all channels to complete feeding before discharging uniformly, this switch is used for synchronization                                                        | Closed |
| 6.2.7  | Ration Wt           | Used to automatically stop after setting the discharge quantity, and turn off the quantitative weight function when set to 0.                                                                                                               | 0      |
| 6.2.8  | Ration Wt unit      | g,kg,t                                                                                                                                                                                                                                      | Kg     |
| 6.2.9  | Ration Wt point     | 0-4 digits                                                                                                                                                                                                                                  | 0      |
| 6.2.10 | Ration prep Wt      | When the weight of the outflow material is equal to or greater than the quantitative weight minus the quantitative advance, switch to the low-speed operation set by the 'Quantitative Advance Simulation Quantity'.                        | 0      |
| 6.2.11 | Ration prep percent | For example, assuming the quantitative weight is 5kg and the quantitative advance quantity is 1kg, when the weight of the material flowing out reaches 4kg, switch to the quantitative advance simulation quantity for low-speed operation. | 0      |
| 6.2.12 | Ration fall Wt      | When the weight of the discharged                                                                                                                                                                                                           | 0      |

|        |                  |                                                                                                                                                                     |   |
|--------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
|        |                  | material is equal to or greater than the quantitative weight minus the quantitative drop value, the quantitative process is completed and the operation is stopped. |   |
| 6.2.13 | Ration time      | Used to set how long it will automatically stop running and turn off the quantitative time function when set to 0                                                   | 0 |
| 6.2.14 | Ration time unit | Second (s), minute (m), hour (h)                                                                                                                                    | s |

There are three options for working modes, namely continuous standard, analog linkage, and analog master control.

### 1. Continuous standard mode

The workflow is shown in the following figure:



### 2. Analog linkage mode (requires optional analog input)

This mode is a working mode in which the target Flux rate is set in real time by inputting analog signals.

For example:

If the input analog range is 0-10V, the Flux rate corresponding to the minimum input analog value is set to 0kg/h, and the Flux rate corresponding to the maximum input analog value is set to 100kg/h, then when the input analog value is 5V, the target Flux rate is 
$$is = \frac{5V \times 100\%}{10V} = 50\% \frac{50\% \times 100kg/h}{100\%} = 50kg/h$$
 During operation, PID adjustment will be automatically performed to stabilize the real-time Flux rate around 50kg/h.

When the input analog quantity is 2V, the target Flux rate is 
$$is = \frac{2V \times 100\%}{10V} = 20\% \frac{20\% \times 100kg/h}{100\%} = 20kg/h$$
 During operation, PID adjustment will be automatically performed to stabilize the real-time Flux rate around 20kg/h.

### 3. Traffic display mode

This mode does not control or adjust, only measures and displays Flux rate. Process the displayed Flux values using the measurement coefficient and control coefficient.

### 4. Volume mode

Volume mode, also known as fixed frequency mode, has a fixed output analog quantity and a fixed display Flux rate, without adjusting the PID.

For example:

Assuming that the calibrated Flux rate is set to 50kg/h and the calibrated analog quantity is set to 50%. So when the target Flux rate is set to 80kg/h, with a fixed output of 80% of the analog quantity, the displayed Flux rate is also fixed at 80kg/h.

## 2.6.3. PID setting

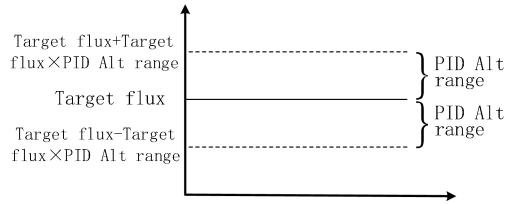
| number | parameter                 | function                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | initial       |
|--------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 6.3.1  | PID mode                  | <p>① Standard mode<br/>Using PID1 (proportional coefficient 1, integration time 1, differentiation time 1, control mid-term 1), the adjustment speed is conservative but stable.</p> <p>② Dual PID mode<br/>Adopt PID1 and PID2, and switch between PID1 and PID2 when conditions are met</p> <p>③ Automatic PID<br/>Automatically calculate PID parameters from the instrument</p> <p>④ Manual PID<br/>Using PID1 (proportional coefficient 1, integration time 1, differentiation time 1, control mid-term 1), the adjustment speed is relatively fast but may be unstable.</p> | Standard Mode |
| 6.3.2  | PID Alt range             | 0.0~100.0%; The percentage of target traffic, PID1 is used within the percentage range, and PID2 is used beyond the percentage range                                                                                                                                                                                                                                                                                                                                                                                                                                              | 30            |
| 6.3.3  | PID fast to slow Alt time | Assuming it is set to 10 seconds, when the real-time traffic reaches the switching range and continues for 10 seconds, PID1 will be used                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1.0           |

|        |                           |                                                                                                                                                   |      |
|--------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|------|
|        |                           | for fine-tuning                                                                                                                                   |      |
| 6.3.4  | PID slow to fast Alt time | Assuming it is set to 20 seconds, when the real-time traffic exceeds the switching range for up to 20 seconds, PID2 is used for coarse adjustment | 3.0  |
| 6.3.5  | PID1 Kp                   | Proportional coefficient of PID1                                                                                                                  | 20   |
| 6.3.6  | PID1 Ti                   | Integration time of PID1                                                                                                                          | 6.00 |
| 6.3.7  | PID1 Td                   | Differential time of PID1                                                                                                                         | 0.00 |
| 6.3.8  | PID1 Ts                   | Control cycle of PID1                                                                                                                             | 2.00 |
| 6.3.9  | PID2 Kp                   | Proportional coefficient of PID2                                                                                                                  | 2.00 |
| 6.3.10 | PID2 Ti                   | Integration time of PID2                                                                                                                          | 3.00 |
| 6.3.11 | PID2 Td                   | Differential time of PID2                                                                                                                         | 0.00 |
| 6.3.12 | PID2 Ts                   | Control cycle of PID2                                                                                                                             | 1.00 |

In order to stabilize the Flux rate near the set target Flux rate, AMC401-A will adjust the output of the analog signal in real time, that is, perform PID regulation. There are two sets of PID parameters, namely PID1 and PID2. When using standard mode, only PID1 parameters are used. When using dual PID mode, two sets of parameters, PID1 and PID2, are used, with PID1 corresponding to fine tuning and PID2 corresponding to coarse tuning.

The PID parameters can be found in the menu item "6.3 PID Set", with the following parameters:

1. [PID fast to slow Alt time] As shown in the following figure, when the real-time traffic enters between the two dashed lines in the graph and continues for [PID fast to slow Alt time], the PID switches to fine adjustment mode;



2. [PID slow to fast Alt time] As shown in the figure, when the real-time traffic is lower than the lower dashed line or higher than the upper dashed line and continues for [PID slow to fast Alt time], the PID switches to coarse adjustment mode;

3. [PID1 Kp]/[PID2 Kp] The proportional component of PID reflects the deviation signal of the control system in proportion. Once the deviation occurs, the controller immediately produces control action to reduce the deviation (the larger the proportion, the faster the control);

4. [PID1 Ti]/[PID2 Ti] The integration process of PID is mainly used to eliminate static errors and improve the system's accuracy. The strength of the integration effect depends on the integration time constant. The longer the Ti, the weaker the integration effect, and vice versa (the smaller the Ti, the faster the control);

5. [PID1 Td]/[PID2 Td] The differential stage of PID reflects the trend (rate of change) of the deviation signal and can introduce an effective early correction in the system before the deviation signal becomes too large, thereby accelerating the system's action speed and reducing adjustment time (the larger the Td, the faster the control);

6. [PID1 Ts]/[PID2 Ts] The time interval for updating the analog output of PID;

When the controller is running, if the dual PID function is turned on, coarse adjustment PID2 will be used when the controller starts running, so that the Flux rate quickly approaches the target value. If

the actual Flux rate has reached the set **range and maintained for the set time, the** controller will switch to fine adjustment PID1 control. When the user modifies the Flux target value or the Flux error exceeds the set range and is maintained for the set time, the controller will use coarse adjustment PID2 control again to quickly control the actual Flux around the target value.

## 2.6.4. Analog function

| number | parameter              | function                                                                                                                                                                                                                   | initial |
|--------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 6.4.1  | DA out1<br>func        | set function of output analog quantity 1<br>① Flux control<br>② Flux display<br>③ Wt display                                                                                                                               | ①       |
| 6.4.2  | DA out2<br>func        | set function of output analog quantity 2,<br>with the same parameter selection options<br>as 6.4.1                                                                                                                         | ②       |
| 6.4.3  | Display<br>flux bottom | When analog quantity is used for "Flux<br>display", the parameters are valid.                                                                                                                                              | 0.000   |
| 6.4.4  | Display<br>flux Top    | Assuming the analog output is 0-10V, the<br>lower limit of the displayed Flux rate is 0,<br>and the upper limit of the displayed Flux<br>rate is 100, then when the real-time Flux<br>rate is 50, the analog output is 5V. | 0.00    |
| 6.4.5  | Display Wt<br>bottom   | When analog quantity is used for "weight<br>display", the parameters are valid.                                                                                                                                            | 0.000   |
| 6.4.6  | Display Wt<br>top      | Assuming the analog output is 0-10V, the<br>lower limit of displayed weight is 0, and the<br>upper limit of displayed weight is 200, then<br>when the real-time weight is 100, the<br>analog output is 5V.                 | 0.00    |

|        |                     |                                                                                                                                                                                                                                  |        |
|--------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 6.4.7  | Ctrl Analog min out | During PID regulation, the output analog quantity will not fall below the lower limit value                                                                                                                                      | 0.00   |
| 6.4.8  | Ctrl Analog max out | During PID regulation, the output analog quantity will not exceed the upper limit value                                                                                                                                          | 100.00 |
| 6.4.9  | Analog max precent  | During PID regulation, the amount of adjustment each time will not exceed the set value.                                                                                                                                         | 100.0  |
| 6.4.10 | In flux bottom      | There is an optional analog input that is effective for setting the target Flux rate.                                                                                                                                            | 0.000  |
| 6.4.11 | In flux top         | Assuming the input analog quantity is 0-10V, the lower limit of the input analog quantity is 0, and the upper limit of the input analog quantity is 500, then when the input analog quantity is 2V, the target Flux rate is 100. | 0.000  |

## 2.6.5. Feeding function

| number | parameter             | function                                                                                                                                                                                        | initial |
|--------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 6.5.1  | Start up feed percent | When starting from 0 to 100%, if the current weight is less than the upper limit of feeding and the initial feeding ratio, feed first and then run discharge. Otherwise, run discharge directly | 75      |
| 6.5.2  | Feed start Wt         | Start feeding when the weight is below this value                                                                                                                                               | 0.000   |
| 6.5.3  | Feed stop Wt          | Stop feeding when the weight exceeds this value                                                                                                                                                 | 0.000   |
| 6.5.4  | Feed low              | If the weight is lower than this value,                                                                                                                                                         | 0.000   |

|        |                      |                                                                                                                                                                                                                                                 |       |
|--------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|        | warning Wt           | the OUT6 switch signal output is valid and a prompt is given                                                                                                                                                                                    |       |
| 6.5.5  | Feed over time       | If the feeding limit has not been reached by the specified time, it is considered a malfunction.                                                                                                                                                | 0.0   |
| 6.5.6  | Feed over time alarm | ①. Close: No alarm, keep waiting;<br>②. Alarm& continues: continue feeding while alarming<br>③ Alarm& stop: stop running and sound an alarm<br>④ . No alarm resume: No alarm is generated, restore PID regulation.                              | Close |
| 6.5.7  | Feed shake time 1    | After the feeding is completed, wait for this time before resuming Flux calculation and PID adjustment to avoid weight oscillation intervals.                                                                                                   | 3.0   |
| 6.5.8  | Feed shake time 2    | After the shaking time for feeding is 1 and the Flux calculation and adjustment are restored, wait for this time before displaying the Flux rate, during which the analog quantity will be adjusted normally. Set to 0 to disable the function. | 0.0   |
| 6.5.9  | Direct supp check Wt | 1. Used in situations where the feeding method is manual direct dumping;<br>2. When the weight rebounds to the level of "manual feeding discrimination weight", it is considered that manual direct feeding has begun;                          | 0.0   |
| 6.5.10 | Direct supp          | 1. Used in situations where the feeding                                                                                                                                                                                                         | 0.0   |

|        |                  |                                                                                                                                                                                                                                                                                  |        |
|--------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|        | tol time         | method is manual direct dumping;<br>2. When the weight begins to decrease and reaches the 'manual dumping tolerance time', it is considered that manual dumping has been completed;                                                                                              |        |
| 6.5.11 | No alarm resume  | In the case of 'no alarm and recovery adjustment', there will be no response to feeding during this time period, and only after this time will it be detected whether to start feeding again.                                                                                    | 20.0   |
| 6.5.12 | Supp optimize    | Used to turn on or off the feeding optimization function, which can provide the following two functions:<br>1 After the feeding is completed, the Flux rate becomes more stable;<br>2. Better discharge accuracy during the feeding process.                                     | opened |
| 6.5.13 | Supp stable time | If the real-time weight is unstable, it may cause fluctuations in the Flux rate after the feeding is completed. Setting this time can effectively reduce post feeding instability caused by unstable weight. If set to 0, the feeding stabilization function will be turned off. | 3.0    |

The controller supports three types of feeding functions: automatic feeding, switch feeding, and manual feeding.

#### 1. automatic feeding

Automatic feeding refers to the method in which the program automatically controls when to start and stop feeding during operation. The relevant parameters include starting feed ratio,

starting feed weight, stopping feed weight, etc.

If the initial feeding ratio is set to 70% and the upper feeding limit is set to 100kg, then when starting the operation, if the current weight value is less than 70kg ( $100\text{kg} \times 70\%$ ), the feeding will be started first, and the feeding will be completed before running. If the current weight value is higher than 70kg, no feeding will be provided and the machine will run directly;

## 2. Switching quantity feeding

Users can access the switch and define the switch input as "I9 IO feeding". When feeding is required, activate the switch quantity, and the controller will lock the Flux rate and analog quantity, entering the feeding state. When the switch value is invalid, the controller will exit the feeding state and return to the normal workflow.

## 3. Manual feeding

1) During operation, if it is necessary to manually add materials directly into the measuring hopper, the manual feeding function needs to be turned on, that is, setting the two parameters **【6.5.9 Direct supp check Wt 】** and **【 6.5.10Direct supp Tol time】** to non-zero values. As long as one parameter is 0, the manual feeding function will be turned off

### 2) Feeding in stopped state (prohibited start)

In the stopped state, the switch can be used to start feeding. Define the input switch I4 manual feeding. When the feeding output is invalid, give a pulse signal to start manual feeding; When the feeding output is valid, giving a pulse signal can stop feeding. If no pulse signal is given during feeding, the feeding will automatically stop when the material reaches the upper limit of 6.5.3 Feed stop Wt.

## 2.6.6. Flux Guard

| number | parameter             | function                                                                                                                                                                                                                       | initial |
|--------|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 6.6.1  | Flux over             | The target traffic plus traffic deviation is the upper limit of traffic deviation. Turn off the out of tolerance judgment function when set to 0                                                                               | 0.000   |
| 6.6.2  | Flux under            | Target traffic - traffic deficit, which is the lower limit of traffic deficit. When set to 0, turn off the under difference judgment function                                                                                  | 0.000   |
| 6.6.3  | Flux over Tol time    | If the continuous Flux exceeds the target Flux rate and the Flux rate exceeds the tolerance, it is judged as exceeding the tolerance                                                                                           | 0.0     |
| 6.6.4  | Flux under Tol Time   | If the continuous time is lower than the target Flux rate - Flux deficit, it is judged as deficit                                                                                                                              | 0.0     |
| 6.6.5  | Over/under alarm mode | ①. Alarm & stop;<br>② Alarm & continues                                                                                                                                                                                        | ①       |
| 6.6.6  | Flux setup low limit  | From the start of operation, after the time set by the 'Traffic Establishment Time Limit', the traffic must exceed this lower limit, otherwise an alarm will be triggered. If set to 0, the lower limit area will not be used. | 0.000   |
| 6.6.7  | Flux setup high limit | From the start of operation, after the time set by the 'Traffic Establishment Time Limit', the traffic must be below this upper limit, otherwise an alarm will be                                                              | 0.000   |

|        |                       |                                                                                                                                                                                                                                                                                        |       |
|--------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
|        |                       | triggered. If set to 0, the lower limit area will not be used.                                                                                                                                                                                                                         |       |
| 6.6.8  | Flux setup time limit | From the start of operation, after this time, the Flux must be within the range of [6.6.6 Flux Establishment Lower Limit] and [6.6.7 Flux Establishment Lower Limit], otherwise an alarm will be triggered.<br><br>If set to 0, turn off the traffic establishment monitoring function | 0.000 |
| 6.6.9  | collision range       | When the continuous interference stabilization time and weight exceed the interference stabilization range, it is determined that interference has occurred                                                                                                                            | 0.000 |
| 6.6.10 | Collision time        |                                                                                                                                                                                                                                                                                        | 0.5   |
| 6.6.11 | Collision no PID      | When it is determined that interference has occurred, the PID can be set to not be adjusted                                                                                                                                                                                            | Close |
| 6.6.12 | Collision Resume time | When the interference judgment condition disappears and lasts for this time, it is determined that the interference has indeed disappeared                                                                                                                                             | 3.0   |
| 6.6.13 | Collision filt depth  | The filtering used to determine interference must be set lower than the filtering level in the basic weighing parameters                                                                                                                                                               | 3     |
| 6.6.14 | Under Wt              | When the real-time weight is lower than this weight and lasts for 1 second, it is considered as underload and an alarm is triggered to stop the machine. Set to                                                                                                                        | 0.00  |

|        |                     |                                                                                                                                                                 |     |
|--------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
|        |                     | 0 to disable underload function                                                                                                                                 |     |
| 6.6.15 | Max out Tol<br>time | When the output analog reaches 100% and the real-time Flux rate is lower than the target Flux rate for a continuous period of time, an alarm will be triggered. | 0.0 |

### 2.6.6.1 Traffic establishment

Traffic establishment refers to the process of starting and running the target traffic. If it is necessary to monitor whether this process is normal, traffic establishment monitoring function can be used. ➔ When the Flux rate does not reach the set range within the set time, an alarm will be triggered.

Note: If both the "6.6 Flux setup low limit" and "6.7Flux setup high limit" are set to 0, the traffic establishment monitoring function will also be turned off.

### 2.6.6.2 Interference Identification and Handling

The touch function is used to detect interference from external forces and try to counteract the effects of such interference. This function has 5 related parameters: [6.6.9 collision range]~[6.6.13 Collision filt depth].

Its working principle is: during normal operation, if the weight value changes beyond 6.6.9 collision range and 6.6.10 Collision time, it is considered that interference has occurred. If the '6.6.11Collision no PID' switch is turned on, the Flux rate and analog quantity will be locked unchanged. After the interference disappears, after the [6.6.12Collision Resume time], the Flux calculation and analog adjustment will be restored. 6.6.13Collision filt depth "is a filtering level specifically designed for interference functions, and its setting should be smaller than the" Filter Level "on the basic weighing parameter interface, preferably less than 5.

After interference occurs, there will be a manual touch signal on the switch output OUT12. After the interference disappears, the manual touch signal on OUT12 will also disappear.

## 2.6.7. Process Settings

| serial | parameter         | function                                                                                                                                                                                                                                  | initial |
|--------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 6.7.1  | Dly analog        | <b>0.0~100.0%; The size of the analog quantity output first when starting the run</b>                                                                                                                                                     | 20.0    |
| 6.7.2  | Dly time          | 0.0~6000.0s; When starting up, output the duration of 'initial analog output'. When set to 0, do not output 'initial analog output' when starting up                                                                                      | 0.0     |
| 6.7.3  | Start time        | 0.0~6000.0s; after the initial analog holding time, output the analog corresponding to the target Flux rate, and then hold the linear analog holding time before starting PID regulation.                                                 | 20.0    |
| 6.7.4  | Target trans time | 0~60000s; during operation, if the target Flux rate is modified, the analog quantity corresponding to the new target Flux rate will be directly output and the 'Flux switching delay' will be maintained before restoring PID regulation. | 20      |
| 6.7.5  | Flux sample freq  | 0.00~99.99s; interval time for collecting weight to calculate Flux rate                                                                                                                                                                   | 0.10    |

|               |                   |                                                                                                                                                                                            |                  |
|---------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| <b>6.7.6</b>  | Flux calc<br>time | 0.00~99.99s; How long does it take to collect weight for calculating Flux rate                                                                                                             | 20.0             |
| <b>6.7.7</b>  | Flux Osc<br>range | 0.0~100.0%; Scope of action of Flux filter                                                                                                                                                 | 20.0             |
| <b>6.7.8</b>  | Flux Damping      | The filtering effect of 0.0~99.9dB Flux filter                                                                                                                                             | 97.0             |
| <b>6.7.9</b>  | Start Dly<br>time | After this time, the material is truly discharged. When multiple weight loss scales are fed side by side to the same conveyor, the materials at the beginning can also be evenly connected | 0.0              |
| <b>6.7.10</b> | Flux Clb<br>mode  | Track& Update, feed compensation, manual input, auto fix                                                                                                                                   | Track<br>&Update |
| <b>6.7.11</b> | Clb flux          | Flux value in the calibration point                                                                                                                                                        | 0.000            |
| <b>6.7.12</b> | Clb analog        | Analog quantity in the calibration point                                                                                                                                                   | 0.000            |
| <b>6.7.13</b> | Clb Wt            | The weight value in the calibration point is only valid in the 'Feed Compensation' mode.                                                                                                   | 0.000            |
| <b>6.7.14</b> | Clb analog2       | The analog quantity calibrated in the second point is only valid in the 'feed compensation' mode.                                                                                          | 0.000            |
| <b>6.7.15</b> | Clb Wt2           | The weight calibrated in the second point is only valid in the 'Feed Compensation' mode.                                                                                                   | 0.000            |
| <b>6.7.16</b> | Clb pro           | Used to initiate Flux calibration testing.                                                                                                                                                 |                  |
| <b>6.7.17</b> | Re auto fix       | Only used for the 'Auto Fix' mode, it                                                                                                                                                      |                  |

|               |                   |                                                                                |      |
|---------------|-------------------|--------------------------------------------------------------------------------|------|
|               |                   | will be re fixed every time it is set.                                         |      |
| <b>6.7.18</b> | Start trans time  | The migration time of traffic from 0 to the target traffic during startup.     | 2.5s |
| <b>6.7.19</b> | Start stab time   | The stabilization time after reaching the target traffic during startup.       | 2.5s |
| <b>6.7.20</b> | Change trans time | The time to migrate to the new target traffic during operation                 | 1.0s |
| <b>6.7.21</b> | Change stab time  | The stabilization time after reaching the new target traffic during operation. | 2.5s |
| <b>6.7.22</b> | Run Clb time      | At startup, if calibration is required, the time used for calibration.         | 10s  |

## 2.6.8. Other functions

| serial       | parameter    | function                                                                                          | initial |
|--------------|--------------|---------------------------------------------------------------------------------------------------|---------|
| <b>6.8.1</b> | Sum Pul Wt   | At runtime, every time this weight of material Flux out, a pulse is output                        | 0.000   |
| <b>6.8.2</b> | Sum Dly time | When stopping the operation, continue to maintain this time and accumulate weight before stopping | 0.0     |

## 2.7. Logic programming

The controller supports 6-way logic programming functions. When the existing functions of the controller cannot meet the control requirements of the device, the logic programming function can be attempted to define auxiliary logic output signals outside the controller's operating process to control device actions.

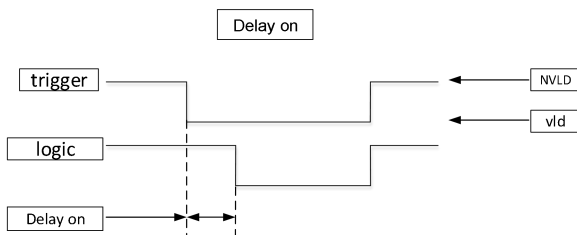
Taking logic programming 1 as an example, explain the functions of each parameter.

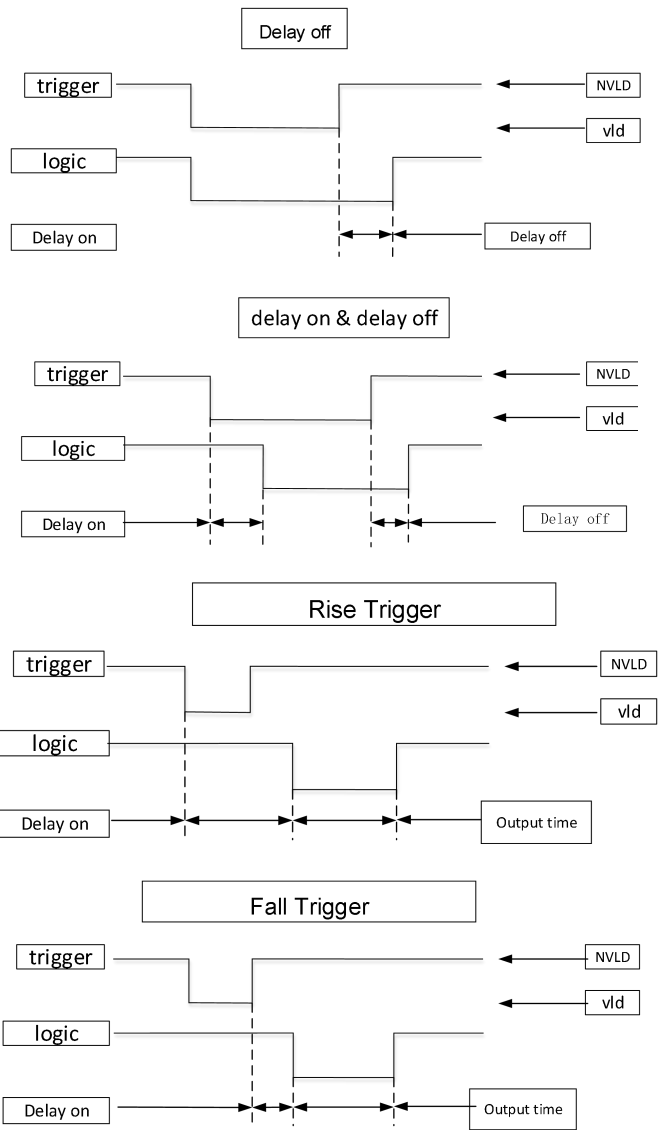
| serial | parameter | function | initial |
|--------|-----------|----------|---------|
|--------|-----------|----------|---------|

|       |                  |                                                                                                                                                                                                          |               |
|-------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| 7.1.1 | logic type       | Choose the type of logic programming.<br>① [Closed]: Turn off the logic output function.<br>② [Dly on]<br>③ [Dly off]<br>④ [Dly on& Dly off]<br>⑤ [rise Trigger]<br>⑥ [fall trigger]<br>Please refer to: | Closed        |
| 7.1.2 | Trigger Type     | ① [Signal]: Trigger the logic output through a certain signal.<br>② [Conditional]: Trigger the logical output by reaching a certain condition.                                                           | signal        |
| 7.1.3 | Trigger signal   | Select signal 1 to trigger the logic output.                                                                                                                                                             | Custom Def in |
| 7.1.4 | Trigger In port  | When the trigger signal is set to a custom logic trigger input, it is valid. Clicking on it directly selects to define the "logic trigger" signal to a certain input port (IN1~IN7)                      | No Def        |
| 7.1.5 | Trigger out port | Select the logic output signal to define to a certain OUT output port.                                                                                                                                   | No def        |
| 7.1.6 | Delay on time    | The delay time for the logic output signal to be turned on.                                                                                                                                              | 0.0           |
| 7.1.7 | Delay off time   | The time when the logic output signal is delayed and disconnected.                                                                                                                                       | 0.0           |
| 7.1.8 | Out hold time    | This parameter can be set when the logical type is set to item 5/6. The                                                                                                                                  | 0.0           |

|        |                   |                                                                                                                                                                                                                                                             |             |
|--------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
|        |                   | effective time of the output after the logic signal is triggered, and the logic output ends after the time expires. When this time is set to 0, the logic output signal will only end through a reset signal.                                               |             |
| 7.1.9  | Trigger condition | Select the conditions that trigger the logical output.<br>1. [Greater set]<br>2. [less set]<br>3. [in region]<br>4. out region]                                                                                                                             | Greater set |
| 7.1.10 | Condition date 1  | Used to set the weight value corresponding to the triggering condition.                                                                                                                                                                                     | 0           |
| 7.1.11 | Condition date 2  |                                                                                                                                                                                                                                                             | 0           |
| 7.1.12 | Condition stable  | 1. [opened]: After the weight meets the triggering conditions and needs to be stable, the logic output can be triggered.<br>2. [Closed]: Once the weight meets the triggering conditions, the logic output can be triggered without the need for stability. | Closed      |

The logic output timing diagram is shown in the following figure:





Illustrate with examples:

For example, to implement the following logic: real-time detection of weight above 100kg, output OUT10 for alarm

indication. And after the alarm is effective, there is a delay of 2 seconds, and the output OUT11 lasts for 3 seconds to control the mechanism to unload the material.

Set as follows:

**Logic programming 1: Implement the output of OUT10 when the detected weight exceeds 100kg.**

[7. 1. 1 Logic Type]: Delayed Connection

【7. 1. 4 Delay Connection Time 】: 0s

[7. 1. 2 Trigger Type]: Conditional Trigger

【 7. 1. 9 Trigger Condition Setting 】: Weight greater than the set value

[7. 1. 10 Setting value 1]: 100kg

[7. 1. 5 Logic signal output port]: OUT10

**Logic programming 2: Implement a delay of 2 seconds after OUT10 becomes effective, and output OUT11 for a duration of 3 seconds.**

[7. 1. 1 Logical Type]: Invalid - Valid Jump Edge Trigger

[7. 1. 6 Delay Connection Time]: 2s

[7. 1. 8 Output effective time]: 3s

[7. 1. 2 Trigger Type]: Signal triggered

【7. 1. 3 Trigger Signal 1 Setting 】: Logic Output 1

[7. 1. 5 Logic signal output port]: OUT11

## 2.8.system

View system language settings and system version information.

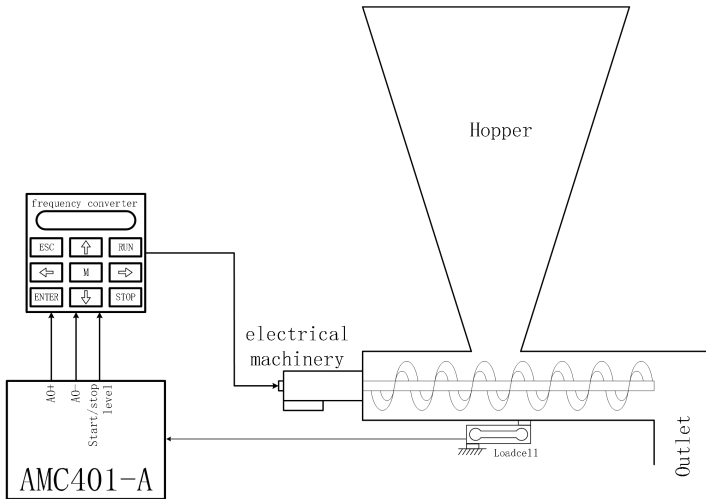
| serial | parameter  | Instructions                                                                                 |
|--------|------------|----------------------------------------------------------------------------------------------|
| 8.1    | Para reset | 1. All parameters<br>2. Weight calibration<br>3. Basic parameter<br>4. functional parameters |

|     |                   |                                                                                    |
|-----|-------------------|------------------------------------------------------------------------------------|
|     |                   | 5. Module parameter<br>6. Recipe parameters<br>7. IO parameter<br>8. logic Program |
| 8.2 | Modify admin pass | Enter the same password twice to complete the modification                         |
| 8.3 | Language          | Simplified Chinese/English                                                         |
| 8.4 | version           | Display the current version date                                                   |
| 8.5 | Screen protect    | 0.0~1000.0m, Initial value 3.0m                                                    |
| 8.6 | Start bmp select  | Default/User Settings                                                              |

## 3. Principle and functional description of system

### 3.1. Structural diagram and principle of system

The basic system structure of the weightlessness scale is shown in the following figure:



The working principle is as follows:

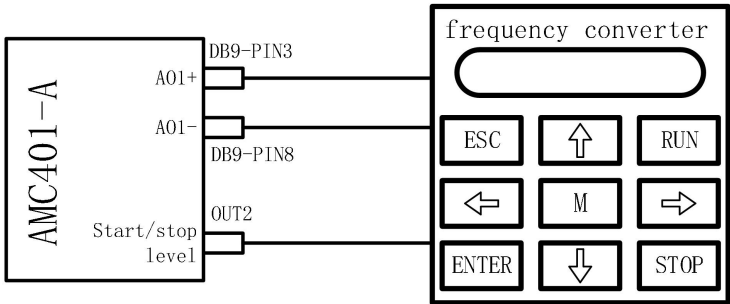
After starting up, AMC501-A outputs analog signals to the frequency converter, which controls the frequency converter to drive the motor to rotate. The motor rotates to drive the winch, causing the material to Flux out of the storage hopper and continuously reduce its weight;

2. AMC401-A calculates real-time Flux based on reduced weight;

3. Compare the real-time Flux rate with the target Flux rate. If the real-time Flux rate is greater than the target Flux rate, reduce the analog quantity, lower the motor speed, and reduce the material speed; If the real-time Flux rate is less than the target Flux rate, increase the analog quantity, increase the motor speed, and increase the material speed. By repeatedly adjusting in this way, the goal of achieving real-time Flux equal to the target Flux is achieved.

### 3.2. Inverter wiring

The schematic diagram of the analog output of the weightlessness instrument and the wiring of the frequency converter is as follows:



If a fault is detected during startup, it will prompt and cannot start running;

When a fault is detected during operation, it will automatically shut down and sound an alarm.

## 4. Common troubleshooting

When the controller is running, the main interface will display detailed running steps, indicating the functions and processes currently being executed by the controller. Through this prompt, the current running process of the controller can be determined, helping to troubleshoot faults.

The possible faults and troubleshooting methods that the controller may encounter during use are shown in the following table:

| serial number | content                  | Instructions                                                                                                                                                                                                                                                                                                                                   |
|---------------|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | ADOFL / - ADOFL          | <p>The sensor signal is abnormal.</p> <ol style="list-style-type: none"> <li>1. The sensor circuit is connected incorrectly and has poor contact. (Pay attention to the connection methods of four wire and six wire systems)</li> <li>2. The sensor is damaged.</li> <li>3. The load borne by the sensor exceeds the range.</li> </ol>        |
| 2             | OFL / -OFL               | <p>Weight overflow, when the weight exceeds the set value of 【 1.1.4 Maximum Range 】, it will prompt OFL. If the empty scale displays OFL, please investigate:</p> <ol style="list-style-type: none"> <li>1. Is the maximum range set correctly.</li> <li>2. Calibration exception, recalibrate.</li> <li>3. Is the sensor damaged.</li> </ol> |
| 3             | no response when running | <p>There is no response when running on startup, and the possible reasons are as follows:</p>                                                                                                                                                                                                                                                  |

|  |            |                                                                                                                                                                                                                        |
|--|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | on startup | <ol style="list-style-type: none"><li>1. No target traffic has been set;</li><li>2. (Inverter malfunction) Input is valid;</li><li>3. (Run Level) Input is invalid;</li><li>4. (Allow to run) Invalid input;</li></ol> |
|--|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|