



# **REFLEX FAST FORM GX616** **CNC REBAR STIRRUP** **BENDING MACHINE**

**Model No.: REFLEX-FASTFORM- GX616**



**OPERATION MANUAL**  
**ORIGINAL INSTRUCTION**

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**Tips:** Thank you for purchasing our products. Please read the Instructions carefully before use.

#### **CHARACTERISTICS:**

### **1.Product description**

#### **1.1. Features of this product:**

- ★ Integrated automatic feeding mechanism to ensure high dimensional accuracy.
  - ★ The external design of the air compressor ensures good heat dissipation and convenient transportation and installation.
  - ★ Split, multi-purpose blade design reduces consumption costs.
  - ★ Two-wire bidirectional bending, with more bending shapes and higher efficiency.
  - ★ The power of the feeding servo motor is increased to ensure the accuracy when bending the rebar.
  - ★ Intelligent fault identification and alarm system makes maintenance more convenient.
  - ★ Pneumatic design of the observation door makes adjustment and maintenance convenient, safe and fast.
  - ★ The design of the pay-off frame with brake can prevent the line of the pay-off frame from being disorderly caused by the shutdown.
  - ★ 400 kinds of processing graphics can be input in advance, and it can be used immediately during processing, which has a high degree of automation.
  - ★ Straightening wheels, traction wheels, and meter wheels are made of special steel materials, which have longer service life and lower operating costs.
  - ★ The touch screen operation console is convenient and quick to operate.
  - ★ Optional automatic material receiving device, material receiving is more efficient and safe.
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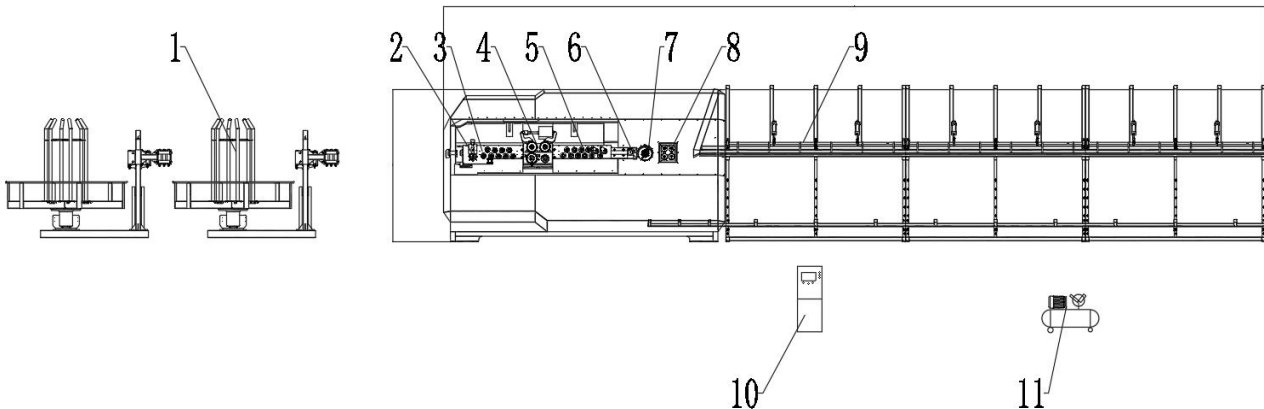
## 1.2. Main purpose and scope of use

The automatic CNC steel bar bending machine REFLEX-FASTFORM -GX616 is mainly used for mass production of steel bar stirrups, hook bars, slab bars, etc. in infrastructure construction such as highways, railways, bridges, tunnels, and housing construction

## 2. Structural features and working principle

### 2.1. Mechanical structure features and working principle:

**Mechanical structure features:** This product consists of 1 disc wire rack, 2 pre-feeding mechanism, 3 pre-adjusting mechanism, 4 traction ns. The raw materials used are 6-16 discs and snails. mechanism, 5 straightening mechanism, 6 shearing mechanism, 7 bending mechanism, 8 return mechanism, 9 plate ribs It is composed of material rack, 10 consoles, 11 air compressors and other parts.



The pay-off rack with brake disc can effectively prevent the equipment from starting and stopping during fast operation, which may cause problems such as disordered feeding of steel bars.

The pre-feeding mechanism can assist the rebar to penetrate the equipment for the first time and reduce the labor intensity of workers.

The pre-adjustment mechanism pre-adjustment wheel is made of alloy tool steel, which is resistant to abrasion and impact.

The traction mechanism is equipped with a high-power servo motor to ensure the smooth operation of the traction. The square-head transition connection is adopted, and the strength is more than ten times that of the traditional flat key connection. The traction wheel and the straightening wheel are made of alloy tool steel, which is resistant to wear and impact.

The straightening wheel of the straightening mechanism is made of alloy tool steel, which is resistant to abrasion and impact.

The shearing mechanism adopts a split thick blade design and is bolted to the blade seat. At the same time, the thickness reaches 40mm, which is quick to replace and easy to maintain, which greatly reduces the maintenance cost of the equipment.

The bending mechanism adopts the forming wheel to bend to make the bending steel bar pattern more standard. At the same time, it adopts double-stroke bending and expansion, which can meet the production and production of the plate and hook bars of the long hook plate.

The return mechanism adopts double-stroke return expansion and contraction, which can meet

the production and production of the plate ribs and hook ribs of the long hook plate.

The heightened design of the slab bar rack and the rack box can meet the production of slab bar and hook bar of long hook plate. The auxiliary material hook design can realize the non-stop operation of the finished slab bar hook bar packaging and handling.

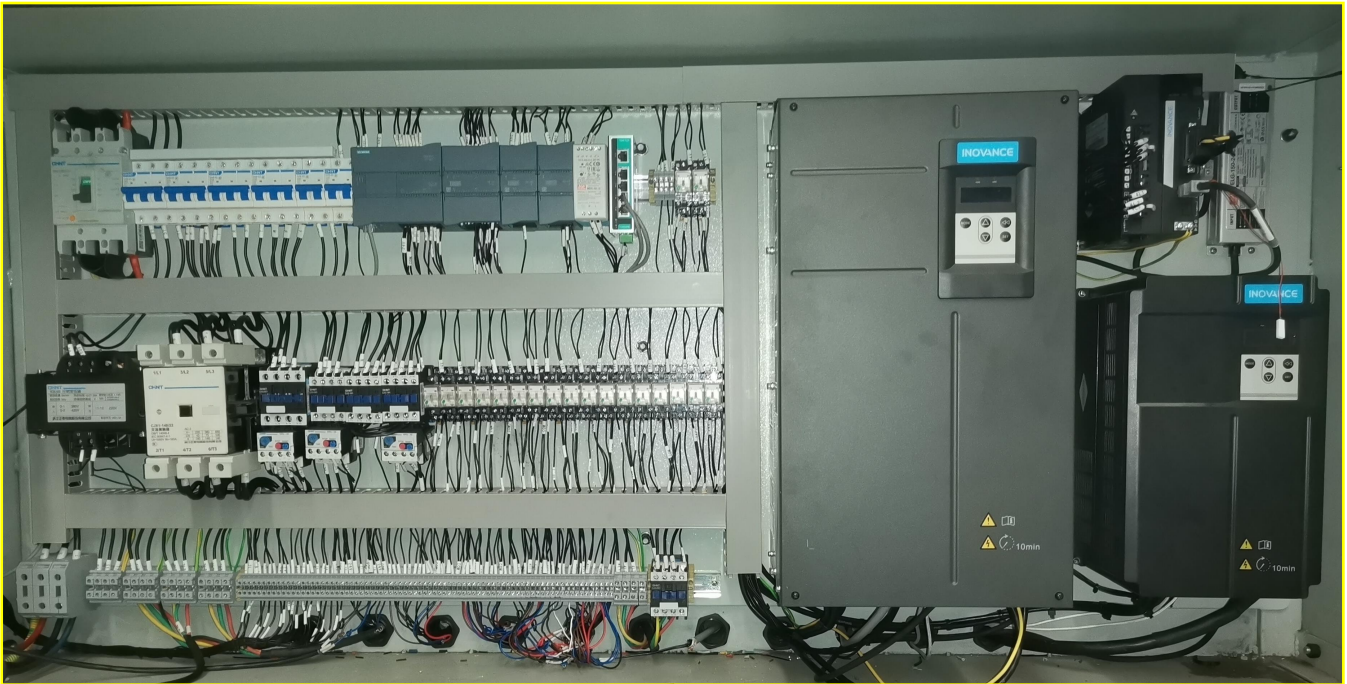
The operation table adopts touch screen operation, which is convenient and intelligent.

The air compressor adopts a 7.5KW red five-ring high-power, large-tank air compressor to ensure a stable and sufficient air source for the equipment.

**Working principle:** Bundles of coils and snails are placed on the disc wire rack and pass through the guide wheel. The pre-feeding mechanism sends the steel bars into the host for the first time (the pre-feeding mechanism is not used during normal work), and the pre-adjusting mechanism removes the steel After pre-straightening, the traction mechanism is sent to the straightening mechanism to straighten the steel bars, and the steel bars are sent to the bending part for bending. After bending and forming, the shearing mechanism cuts the steel bars into shape. When making slab bars and hook bars, the bending part bends the first hooks of the slab bars and hook bars, and then traction continues to feed the material to the slab bar rack. When the set length is reached, the shearing mechanism cuts the bars and passes The return mechanism clamps and provides power for reverse feeding, and the second head hook is bent into shape by the bending mechanism again, and the plate rib material rack box is opened to put down the finished plate ribs and hook ribs.

## 2.2. Electrical structural features and working principles

### 2.2.1 Real shot diagram of electrical control cabinet electrical system structure layout



described as follows:

"1": indicates the main power switch; "2": indicates the control power switch;

"3": Means the intermediate relay for control. The PLC realizes the control of the solenoid valve of the equipment by turning on and off the power supply of the intermediate relay coil;

"4": Represents the isolation transformer for control, which provides 220v single-phase power supply for PLC, switching power supply, and control cabinet cooling fan.

"5": Represents the main contactor of AC power supply. When the key switch of the operating console is closed, the main contactor coil of the AC power supply will be energized and closed, and all loads and control power circuit breaker switches will be energized.

"6": indicates the forward rotation AC contactor of the shearing motor; "7": indicates the AC contactor of the shearing motor brake coil;

"8": indicates the pre-feeding forward rotation AC contactor; "9": indicates the pre-feeding reverse AC contactor;

"10": Represents the programmable logic controller PLC, the core component of the equipment. It can communicate with the touch screen/servo driver to realize the size and angle control of the production steel bars.

"11": Represents the PLC expansion module, which mainly realizes the control of the equipment speed by sampling the potentiometer.

"12": indicates the control power signal wiring terminal; "13": indicates the traction motor servo driver;

"14": indicates the servo driver of the return motor; "15": indicates the servo driver of the bending motor.

"16": Represents the main power incoming wiring board. "17": Represents the motor wiring board.

"18": Represents the console control circuit wiring board

### 2.2.2 Working process and principle of equipment and electrical appliances:

Manually feed the steel bars into the pre-feeding rollers and press them by cylinders; click "Pre-feeding motor

forward" if safety is confirmed, the steel bars are fed into the upper and lower traction wheels, and click the "cylinder compression" button. The steel bars are compressed; select the processing required Set the production quantity, click the "download" button to download the production graphics data to the PLC controller; set the "manual/automatic" button to the middle position and press it, the bending axis will automatically return to the original position, select "encoder valid", " Bending limit is valid", "potentiometer is valid" and the traction and bending speed are set through the potentiometer; select "single action/continuous"; set the "manual/automatic" button to the "automatic" position, press the "start" button, at this time , The equipment will automatically execute and complete the set production tasks.

### 3. Technical characteristics

#### 3.1 The main technical parameters of the equipment

Single wire bending diameter	6–16mm
Rebar double wire bending diameter	6–12mm
Processing material	Disc round, disc snail
Maximum towing speed	100 m/min
Maximum bending speed	1050 °/sec
Rib straightness error	0.02/1 meter
Total power of equipment	65KW
Average power consumption	10KW/H
Bending direction	Two-way
Stirrup length accuracy	±1mm
Rib length accuracy	±5mm
Angle accuracy	±1°
Maximum bending angle	±180°
Longest stirrup side	1000mm
Shortest stirrup side	90mm
The longest length of the rib	9 meters
Working temperature	-5~40 °C
Traction control method	Servo
Bend control method	Servo
Loopback control method	Servo
Total Weight	5.5T

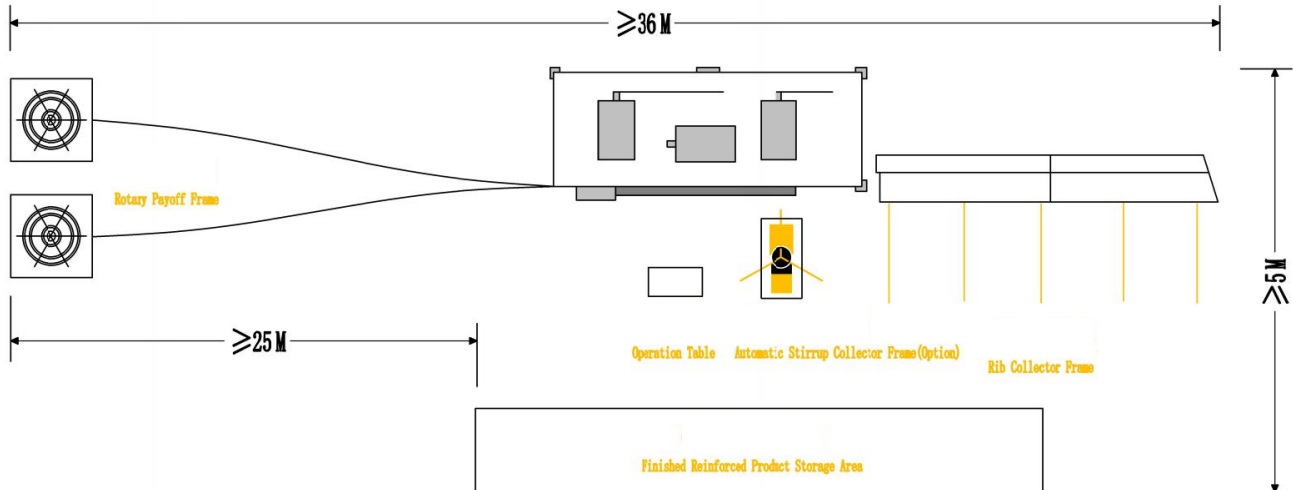


### 3.2. Overall dimensions and installation dimensions

Equipment dimensions: length, width and height: 14×1.53×2.6m

Installation size 36×5m

Equipment installation and placement plan:



### 3.3. Main features

It can automatically complete the straightening, sizing, bending and forming and cutting of steel bars. It can be bent in both directions and two lines, and the processing capacity is very comprehensive. At the same time, the return mechanism and the material rack can be used to complete the production of hook ribs and plate ribs, realizing multiple uses in one machine. The equipment uses a numerical control system, and controls the servo system through a touch screen and PLC. The finished stirrup has high processing precision, stable and reliable quality, and has a strong graphic storage capacity. It is simple to operate and convenient to set up, which can save a lot of labor and waste. Improving processing efficiency is an indispensable part of modern construction buildings, and it is also an intelligent equipment that meets national standards.



## 4. Installation and debugging

### 4.1 Equipment installation conditions, installation technical requirements

- ① A four-core copper-core cable with a long distance between the equipment provided by the user and the electrical box, with a specification of  $3 \times 16 + 1 \times 10 \text{mm}^2$  and above, and properly grounded as required;
- ② The switch specification in the user-supplied electrical box is a 3-phase 4-pole air switch with a rated current of 150A or more. If a leakage switch is used, the rated current should be more than 150A and the leakage action current should be more than 150mA. And must be reliably grounded;
- ③ The installation site is 5 meters wide and 36 meters long, and the cement level is on the ground. The main machine occupies  $14 \times 15.3$  meters, and the disc wire rack and steel bars occupies  $5 \times 25$  meters. The site is required to be sheltered from wind and rain to prevent the precision electronic components of the equipment from getting wet, which may cause damage to the equipment.

### 4.2 Installation and debugging methods and matters needing attention

- ① Use crane or forklift mainframe with a load-bearing capacity of  $\geq 5\text{T}$  to place it in the working position;
- ② Connect the console and the host well;
- ③ Connect the air compressor to the main engine;
- ④ Assemble the disk and round frame and place it in a reasonable position;
- ⑤ Run the equipment dry, if there is no fault, you can penetrate the steel bar for trial production;
- ⑥ After the test run is normal, fix the disc round frame, main machine, and plate reinforcement frame with anchor bolts firmly.

### 4.3 Before trial run, trial run

Before trial operation, check whether the power supply voltage is abnormal, whether it is within three-phase  $380\text{V} \pm 5\%$ , whether the wire ends of the connecting wires in the electrical box are off, especially the connection of the PE grounding wire, confirm that there is no abnormality, and then turn on the main power switch. During the trial run, the traction and bending speed should not be driven too fast to avoid collision. The test graphics range from simple to complex. When the trial run is correct, the speed can be gradually increased for normal production

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## 5. Use and operation

### 5.1 System operation



**Note: The operation can only be performed after ensuring that the circuit is normal and the grounding wire is tight.**

There is an obvious grounding point inside the electric control box of the equipment. The PE wire must be connected to the grounding point when the equipment is installed, but it is never allowed to connect the N (zero line) to the grounding point! For the first time, it is recommended that you run the main engine dry for 2 hours before entering the steel bar test machine!





- (1) First turn on the main power supply;
- (2) Install the operating platform, the direction is the same as the front of the machine, the operator faces the operating platform, and opens the pneumatic door of the automatic guard of the traction wheel.

(3) Insert the key and turn on the system power

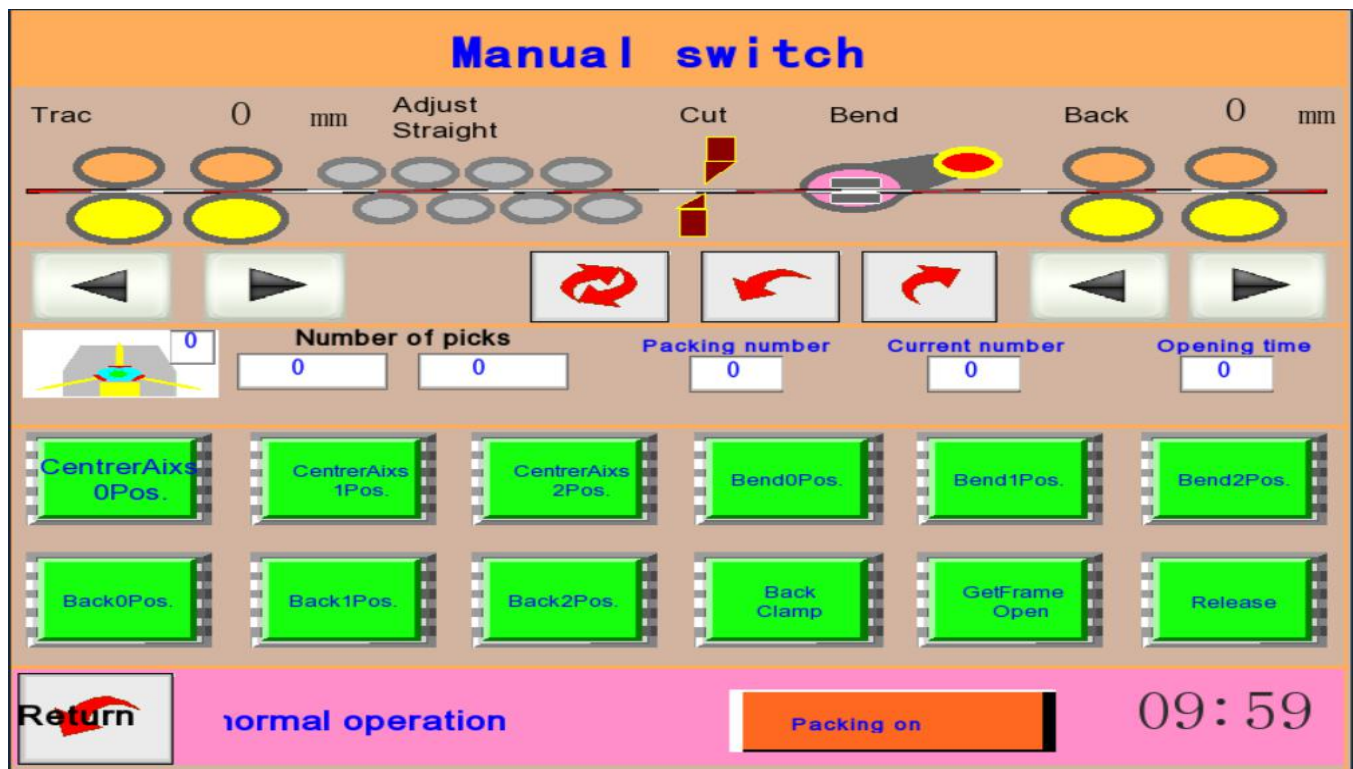


key switch

(4) Manual operation:

- a. If there is an alarm, press it once  reset the button to clear the alarm.
- b. Move the manual/automatic knob switch to the left  Manual gear, and then move the traction forward and reverse jog knob to the left or right, and observe whether the direction of the traction wheel is consistent with the direction of the traction. It is defined here as: to the left is the traction forward direction, and to the right is the traction backward direction.
- c. Move the bending forward  and reverse jog knob to the left or right, and observe whether the direction of the bending arm is consistent with the direction of pulling. This is defined as: when the operator faces the front of the machine, pulling to the left means that the bending arm rotates clockwise, and pulling to the right means that the bending arm rotates counterclockwise.
- d. The touch screen can also be operated  manually, the specific method is as follows:

Click the manual button in the running screen to enter the manual screen, and follow the instructions in the text.


















(5) Automatic simulation operation:


After debugging the traction, bending and jog, confirming the direction is correct, you can enter the automatic simulation operation.


- a. Open the Chinese running screen:

Name		NO: 0	
2021.09.26 10:07:05			
information			
Traction S	0	%	
Bend S	0	%	
BACKSPEED	0	%	
Last S	0	%	
ClearAll			
Setting N	0	pcs	
Finish N	0	pcs	
RACK1		PG OFF	
Sgle/Dble		Stl D	Para
Sample		Manual	InOut
Language		No. 99	
Length + -		Angle + -	Arc + -
0		0.0	0.0
Setting N		0	
New		Front Page	Next Page
Save		Download	ImgLib
Sample		BackClose	

b. Click the  template button in the running screen, and click the graphics to be processed

			
No. 1	No. 2	No. 3	No. 4
			
No. 5	No. 6	No. 7	No. 8
			
No. 9	No. 10	No. 11	No. 12
			
No. 13			

Take the rectangle as an example: click the  No. 7 button and the following screen will appear:


**VECTO**

**Head**

$\hat{A} =$


**B**


**Tail**


B

A

0	mm
0	mm
0	mm
0	mm












10:12

Set the first paragraph, the length of the two sides and the end.

c. Click the  save button to save into the system, and then click  download to confirm as the current job Service; finally click to return to the running  screen.



d. Click the button at  the bottom of the  touch screen to open the parameter setting screen

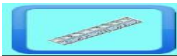
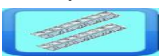




When you click  once to switch to  the state, you can simulate the stirrup feeding operation.

**Note: When the hoop is bent normally, it must be switched to the encoder effective (closed-loop feeding) state!**

- e. Move the manual/automatic knob switch to the middle, return to the reference gear, press the start button once, and the bending arm will return to the original position at 12 o'clock.

Move the  manual/auto knob switch to the right automatic gear, the single-step/continuous knob to the left single-step gear, press the start  button once, and the system will automatically perform a hoop bending simulation operation.

- f. Enter the value in the box of planned output on the touch screen, Set the number of bending steel bars to  one or  two

- g. Move the  single step/continuous knob to the continuous gear on the right and press the start  button once. At this time, the system will automatically execute the planned number of hoop bending simulation operations until the output is completed.

- i. Clear the current output:

Click to complete the output   pcs , Or click  Clear the already produced quantity.

- j. When there is an emergency or wrong action, the emergency stop button must be pressed in time.

- k. Remove the error according to the alarm prompt on the display screen, and press the reset button to restore the ready-to-work state.

## information

### normal operation

1. When pressing the emergency stop button or switching from another state to the automatic state, it needs to return to the reference (the bending arm returns to the origin).

Note: When a failure occurs during automatic operation and the structure cannot be returned to the initial position of work, press the emergency stop and reset it in the manual gear to return to the reference.

(6) Parameter setting

1) When performing a new production task, mechanical adjustment is required, which may produce several unqualified samples. Please make a single-step adjustment when debugging.

2) Please select the appropriate mold after changing the diameter of the steel bar. There are two standard molds for this model, the specific parameters are as follows:

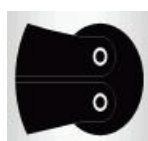


Click the icon,

3) The mold parameters have been preset before leaving the factory, please do not adjust



for hooks,

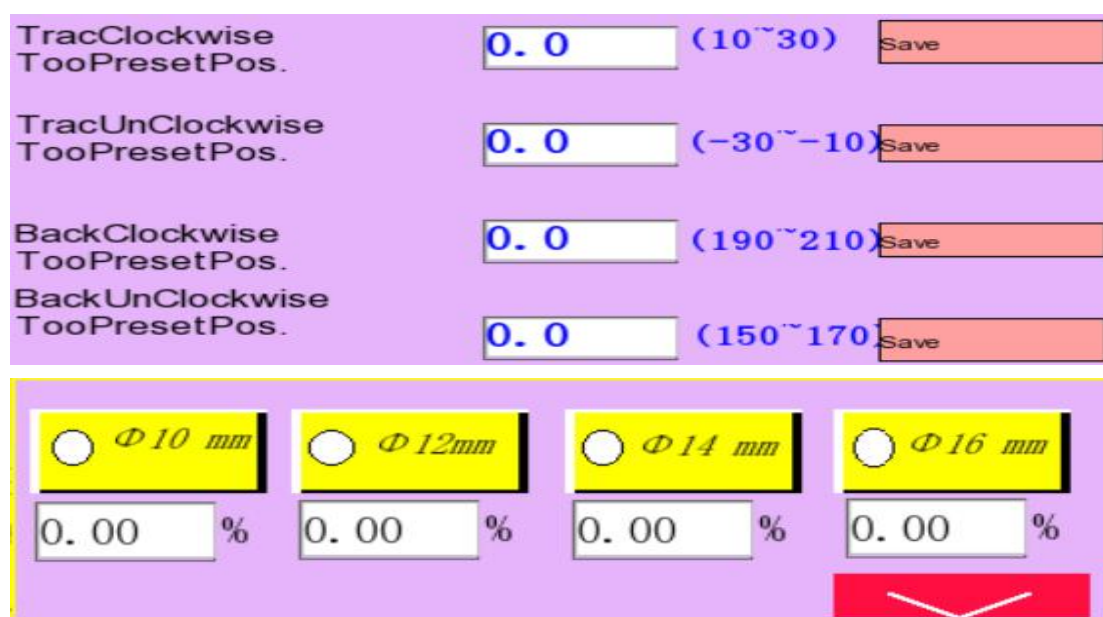


for stirrups

**Please confirm whether the mold is correct when making steel bars!**

**Note: The steel bars of the same batch and the same diameter cannot be changed at will! Otherwise, the angle will be inaccurate!**

4) The angle adjustment corresponds to the diameter of the steel bar



When working, the speed will have some influence on the length and angle. Please fine-tune the length and



angle of the machine after the speed is fixed.

5) The internal programs and key parameters of the servo drive, touch screen and PLC have been set before leaving the factory, and we need to designate professional and technical personnel to modify the operation, and other personnel are not allowed to modify it privately!

6) Speed setting

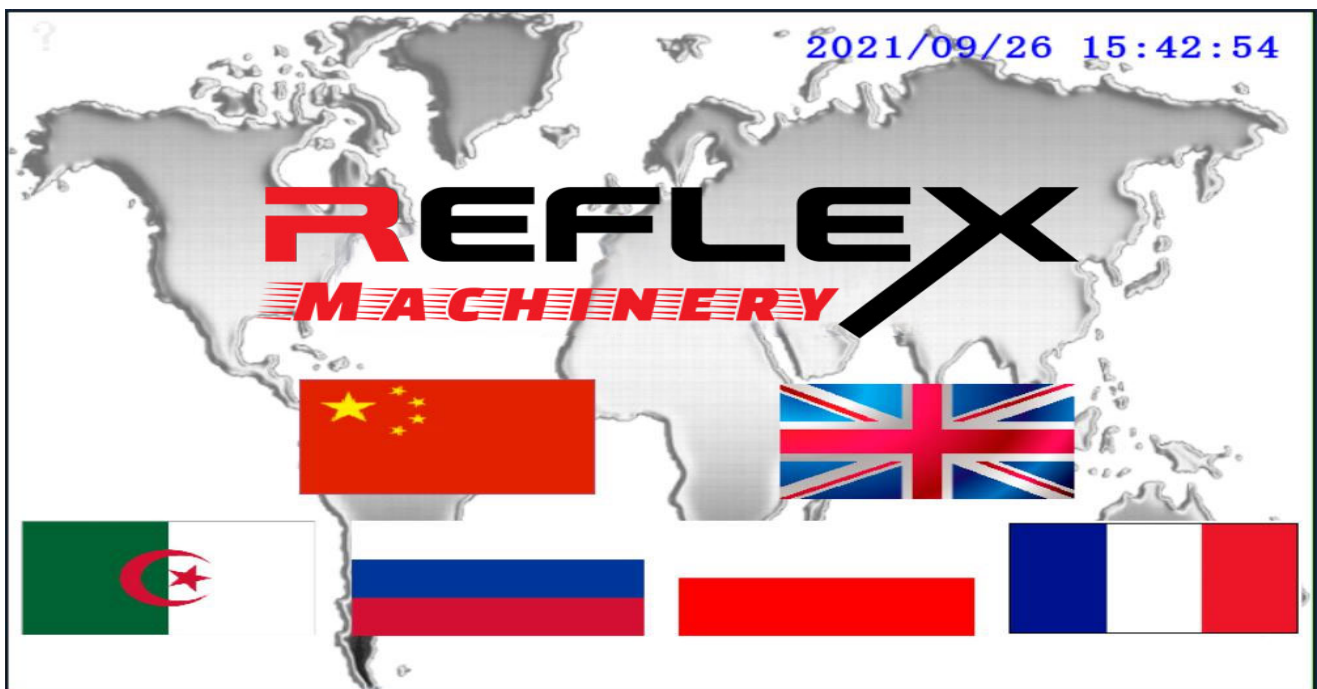
7) Note: When processing  $\phi 12$  round steel or rebar, the processing speed should be limited, otherwise the machine will be seriously damaged if the speed is too fast. When the size of the bending stirrup (side length or diagonal side length) is greater than 400 mm, the bending speed should be slowed down accordingly. These have been set in the program, but the customer should adjust it according to the actual situation.

8) Tail length compensation, demold length setting

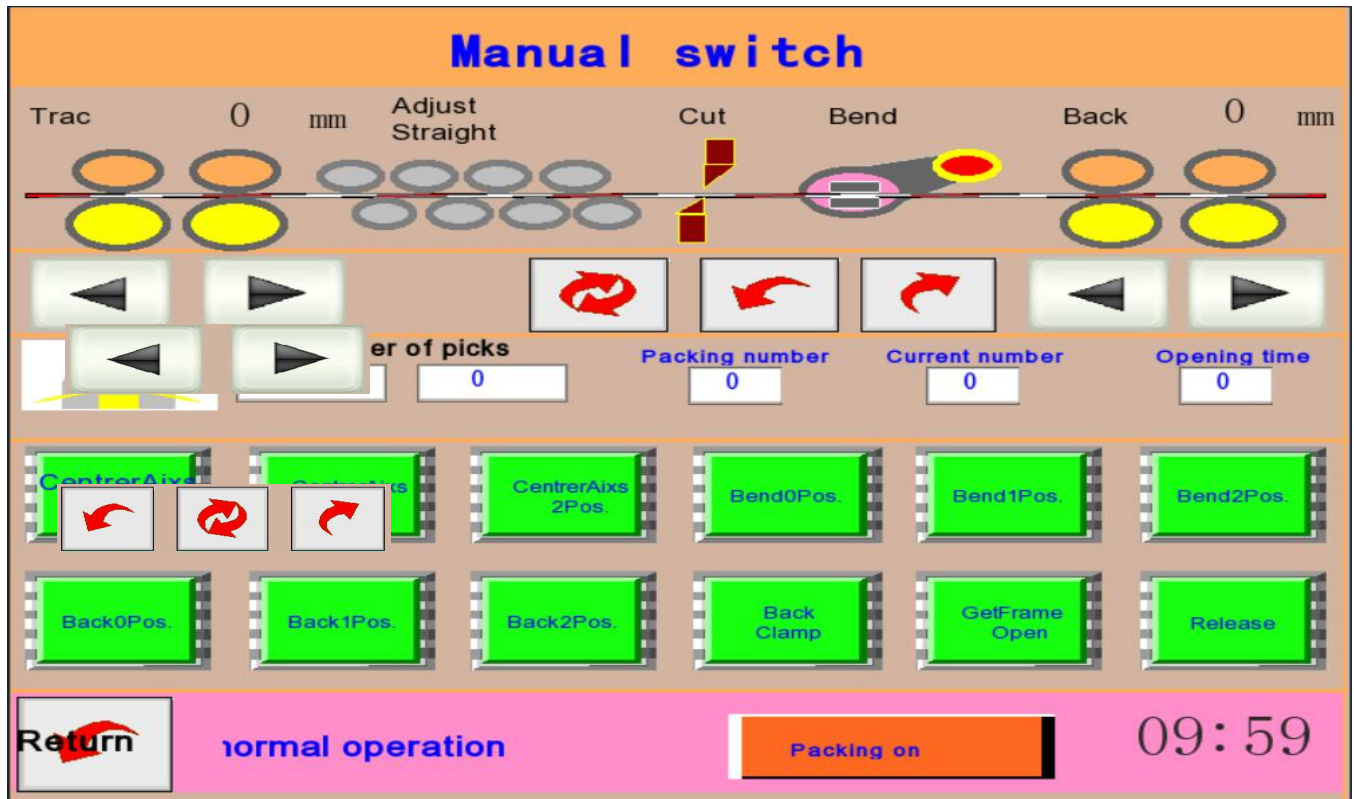


#### 5.1.2 Operation instructions of touch screen system

Language selection screen: (standard version in six languages)




The screen shown in the figure below is the main operating screen of the hoop bending machine touch screen system:





illustrate:

First, turn the manual/automatic knob of the console to the left manual position.

• The feedback pulse value in the screen shows the basic parameters that the servo motor must have for operation;

•  The same function as the traction knob switch of the console;

•  It has the same function as the operation desk bending knob switch, the middle is the function of returning to the origin;

• 

The above buttons respectively operate the extension and retraction of the bending arm, the central axis mold, the return device, the material receiving rack, and the blanking rack.

B) Overall compensation function

When pressing the touch screen to run the screen

Name NO: 0

2021.09.26 10:07:05

**information**

Traction S  %

Bend S  %

BACKSPEED  %

Last S  %

**ClearAll**

Setting N  pcs

Finish N  pcs

	1	2	3	4	5	6	7	8
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

Setting N  pcs

Length + -

Angle + -

Arc + -

New

Front Page

Next Page

Save

Download

ImgLib

Sample

PG OFF

Sgle/Dble

Stl D

Para

Sample

Manual

InOut

Language

Length + -

Angle + -

Arc + -

Compensation parameters: They are angle overall compensation and circular arc overall compensation, which are set by the corresponding compensation buttons. In the actual debugging, you should first run in a single step, and modify the parameters according to the actual bending effect. If the bending angle is too large, decrease the compensation value (it can be a negative number), and vice versa. If you want to log out,

Max: 50
Min: -50
X

1	2	3	CLR
4	5	6	<-
7	8	9	-
0	.	Enter	

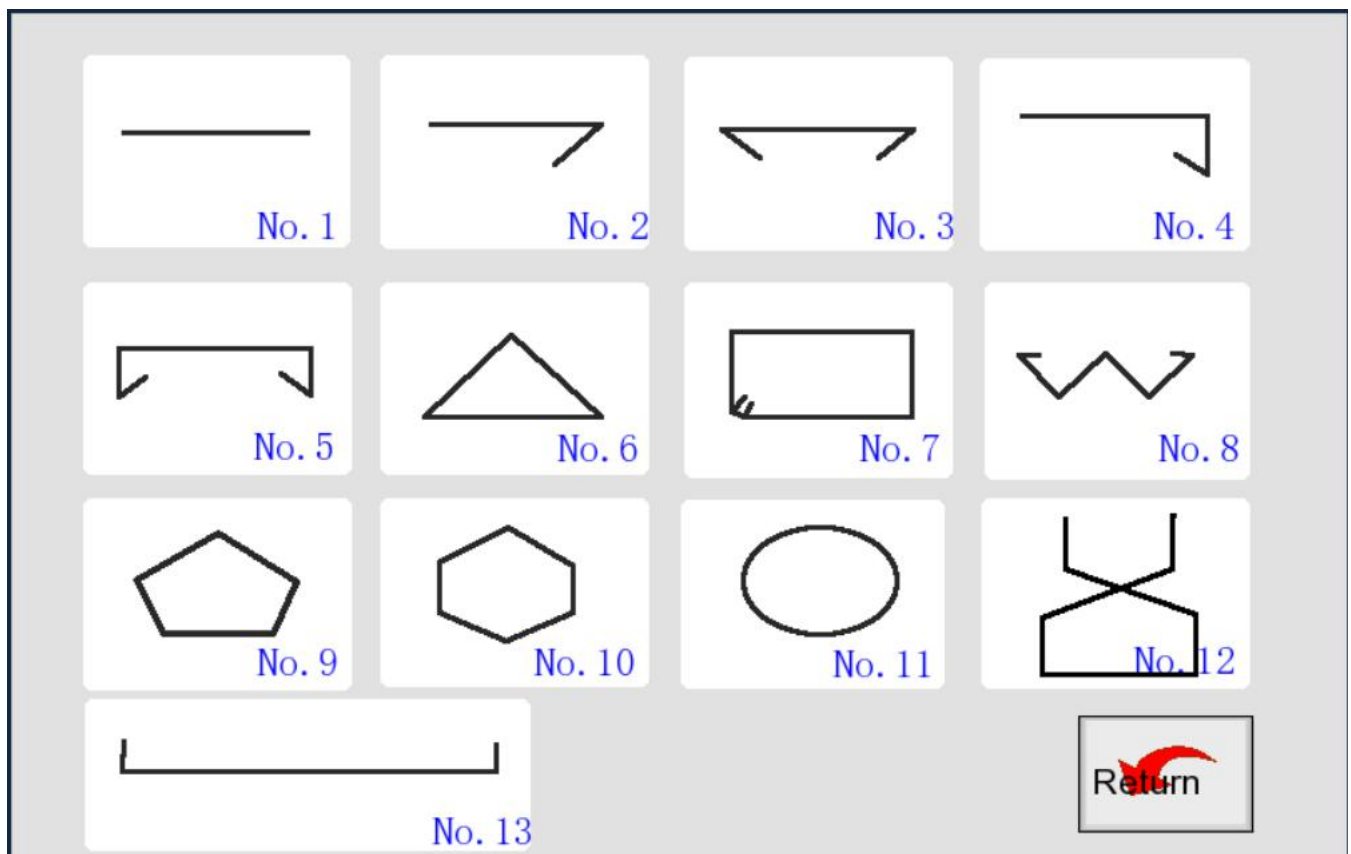
please click on the upper right of the input box



C) Basic graphic template



When you press the template button  
on the run screen, the following screen will appear:



Note: The above 11 templates are shortcuts for curved graphics. When you touch the required template, the corresponding ones will pop up.


The setting graphics parameter screen, for example, when the button



is touched, the following screen will appear:

A

VECTO



Head

0

mm

A =

0

mm

B =

0

mm

Tail

0

mm

Return

Save

Download

10:12

Note: Under normal circumstances, the tapping (first section) and shrinking (tail section) are about 10 times the diameter of the steel bar; and not less than 8 times the length, otherwise it will cause equipment failure. The user only needs to enter the two opposite sides A and B of the rectangle. The length is sufficient.

D)Electrical and mechanical basic parameter settings

When you press the



button at the top of the running screen, the following screen will appear:



2021 \_ 9 \_ 26
**parameter settings1**
10 : 24 : 39

BendWheelCurrentPos.

TracClockwise TooPresetPos.  (10~30) Save

TracUnClockwise TooPresetPos.  (-30~-10) Save

BackClockwise TooPresetPos.  (190~210) Save

BackUnClockwise TooPresetPos.  (150~170) Save

CenterPos.Delay☐100ms

BendPos.Delay☐100ms

BackPos.Delay☐100ms

BackClampDelay☐10ms

CutterCutDelay☐100ms

GetProductDelay☐100ms

CentrerAixs 0Pos. Bend0Pos. BendAjst+

CentrerAixs 1Pos. Bend1Pos. BendAjst-

Measuring wheel

PG OFF Potentiometer ON GetProduct OFF FallProduct OFF

Number of picks 

0

InOut I/O

Return

+0 mm

Recover Factory

- GetProduct OFF

The blanking rack that controls the rotating material receiving frame to control the plate ribs and straight bars

GetProduct ON

FallProduct ON
- Potentiometer ON

This button is to select the potentiometer to adjust the speed. When it is switched to Potentiometer OFF the speed can be manually input.
- PG OFF

The button is used when debugging the whole machine. When it is PG ON touched, the whole machine can simulate the stirrup feeding operation. It must be in the valid state of the encoder during normal operation.
- Recover Factory

The button is convenient for the customer to restore the factory parameter setting when the parameter setting error cannot be used normally, please use it with caution!
- CutterCutDelay☐100ms

It is the waiting time for the second feeding after each hoop bending action is completed. The larger the value, the longer the waiting time, the lower the efficiency. Conversely, the smaller the value, the shorter the waiting time, and the higher the efficiency. But it cannot be zero! It is advisable not to block the steel bar at the blade edge!

- TracClockwise  
TooPresetPos.

0.0 (10~30)

Save

TracUnClockwise  
TooPresetPos.

0.0 (-30~-10)

Save
  - BackClockwise  
TooPresetPos.

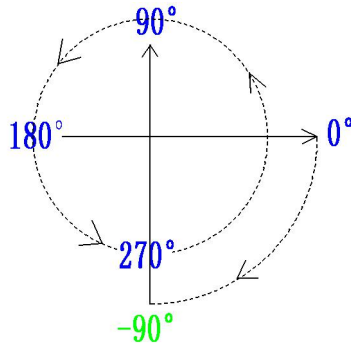
0.0 (190~210)

Save
  - BackUnClockwise  
TooPresetPos.

0.0 (150~170)

Save
- Used to set the bending start point.  
If the initial value of the tool setting position in positive traction along the bend is 30, if the bending 90 degree difference is 10 degrees compensation, then change 30 to 20.

- Schematic diagram of bending coordinates:



**Note: The arrow represents the bending direction, positive bend is a positive number, and reverse bend is a negative number.**

- BendWheelCurrentPos.

0.0

Display the current coordinates of the bending wheel, used in conjunction with the starting point of the bending.
- CenterPos.Delay□100ms□

0
- BendPos.Delay□100ms□

0

Control the parameters of bending and stretching speed, the smaller the value, the higher the efficiency.
- BackPos.Delay□100ms□

0
- BackClampDelay□10ms□

0

Control the speed parameter of the loopback expansion and contraction. The smaller the value, the higher the efficiency.
- GetProductDelay□100ms□

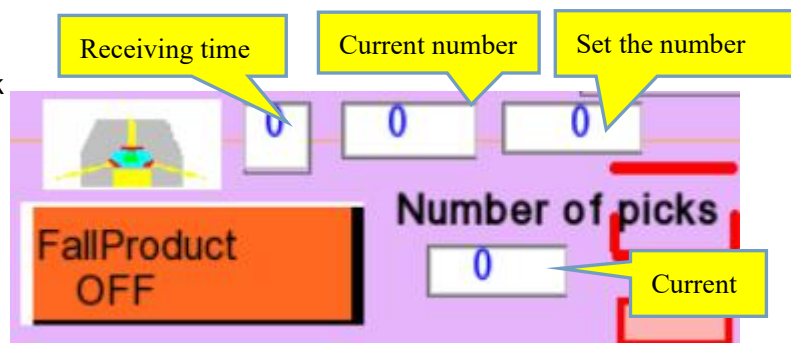
0

Control the continuous extension time of the material rack, adding or subtracting according to the actual situation.
- Measuring wheel

0.000

Parameters that control the size of the closed loop. Add or subtract according to the actual situation. When the actual length is too short, increase the value. The modified formula is: new parameter=original parameter×actual length÷set length.

- Parameters of receiving rack



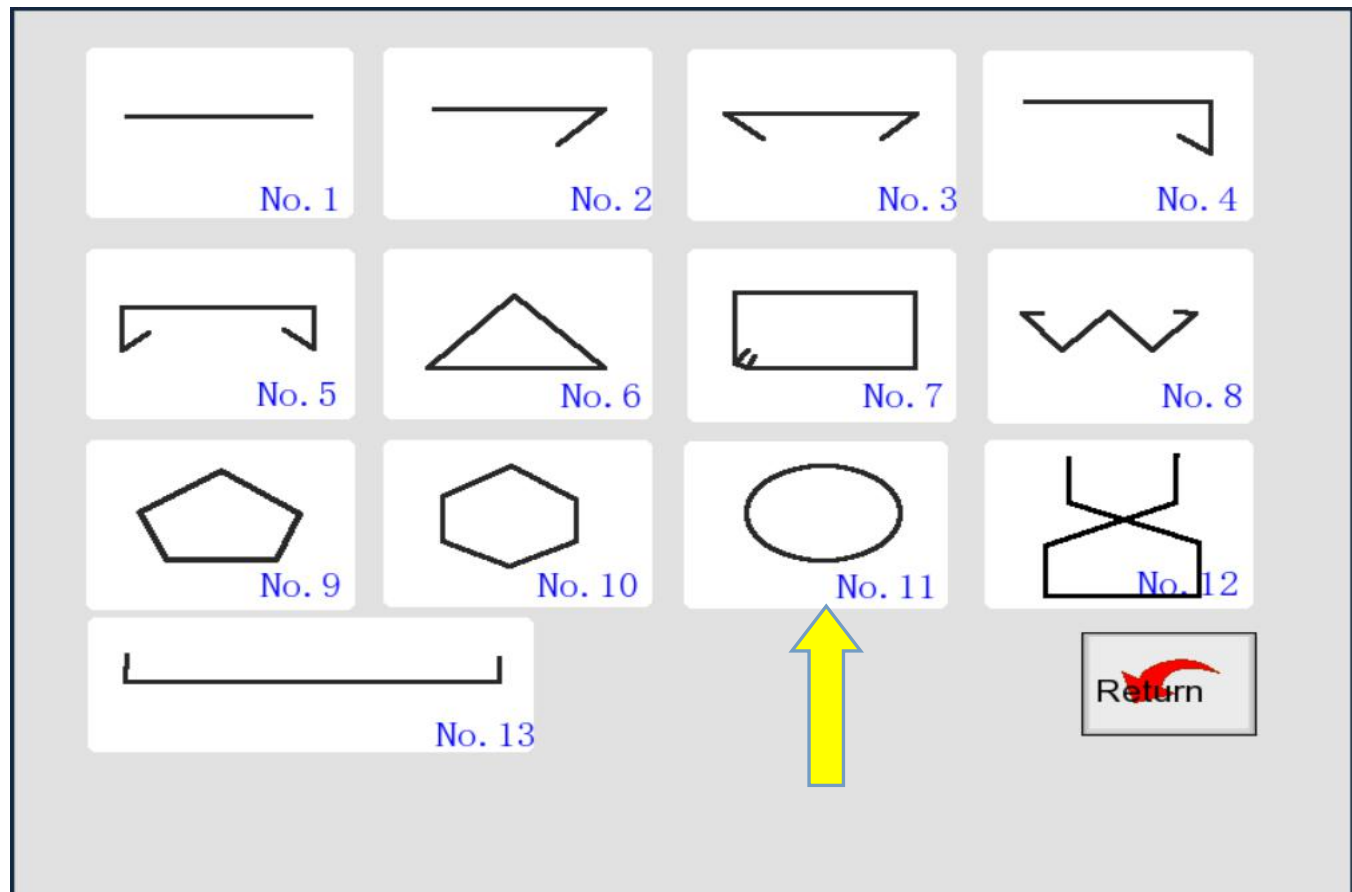


●Please set the remaining parameters according to the specific parameters of each mold. Once the debugging is normal, please do not modify it at will!

To exit, press to return to  the running screen.

Setting of bending circle parameters:

1. Open the template and select the circle



2. Set the radius, arc length, first section, and last section

Parameter	Value	Unit
Head	80	mm
A	3140	mm
r	500	mm
Tail	80	mm

Return Save Download 15:07

parameters

3. After the parameter setting is completed, click to  save and  return to the running screen in turn.

4. Modify the original parameters to the following screen:

Section	Value	Unit
Setting N	0	pcs
Length + -	0	
Angle + -	0.0	
Arc + -	0.0	

information 2021. 09. 26 14:44:27 normal operation

Traction S 0 %  
Bend S 0 %  
BACKSPEED 0 %  
Last S 0 %

ClearAll

Setting N 0 pcs  
Finish N 0 pcs

RACK1

New Front Page Next Page Save Download ImgLib Sample

PG OFF

Sgle/Dble Sti D Para Sample Manual InOut Language

BackClose No. 90 Sec

Name
VECT0
NO: 1



2021. 09. 26 14:46:40

**information**

normal op

Traction S  %

Bend S  %

BACKSPEED  %

Last S  %

**ClearAll**

Setting N  pcs

Finish N  pcs

1	80	90	↓	←	0	0	→
2	3140	500	↓	●	0	0	→
3	10	90	↓	←	0	0	→
4	80	0	↓	←	0	0	→
5	0	0	↓	←	0	0	→
6	0	0	↓	←	0	0	→
7	0	0	↓	←	0	0	→
8	0	0	↓	←	0	0	→

Setting N  pcs
Length + - 
Angle + - 
Arc + -

New
Front Page
Next Page
Save
Download
ImgLib
Sample

PG OFF


No. Sec

Sgle/Dble
Stl D
Para
Sample
Manual
InOut
Language

Here add a side of 10 mm, then bend it by 90 degrees, and finally feed the material by 80 mm.

Click again to save, download, and confirm as the current task.

2. Adjust the arc compensation according Arc + - 0.0 to the diameter of the circle. The size of the arc can be modified. The larger the value, the smaller the arc.

●Fault display analysis function

**information**

normal operation


●Maintenance personnel can find out the cause of the failure based on the relevant alarm messages.

●When the user touches the I/O button, the following input and output monitor function indicator display screen will appear


The main purpose of this screen is to monitor the operating status of the machine when the system is debugged or malfunctions occur.

As shown below:

IO_StatusDisplay			Constraint	Return
I9.1 Trac servo alarm	I1.2 Bend clockwise switch	I8.4 Reset button		
I9.2 Bend servo alarm	I1.3 Bend unlockwise switch	I8.5 stop		
I8.7 back servo alarm	I8.0 Manual switch	I0.5 Shear origin		
I1.1 Ctter motor alarm	I8.1 automatic	I9.0 Bend zero sensor		
I0.6 TracForward button	I8.2 Once/continuous cycle	I1.4 Trac arrive signal		
I0.7 TracBackward button	I8.3 Start button		IN	
Output				
Q0.0 Trac PULSE	Q0.7 Trac motor enable	Q8.0 Center axis keep		
Q0.4 Output	Q9.0 Packing on	Q12.2 Back1Pos.		
Q0.1 Bend PULSE	Q12.4 Cutter run	Q12.1 Back2Pos.		
Q0.5 Bend direction	Q9.5 Bend1Pos.	Q9.7 CentrerAixs 1Pos.		
Q0.2 Back PULSE	Q9.6 Bend2Pos.	Q12.0 CentrerAixs 2Pos.		
Q0.6 Back direction	Q1.1 Back motor enable	Q12.3 料仓1		
Q8.6 Run indicator	Q1.0 Bend motor enable	Q12.4 料仓2		
Q8.5 Alarm indicator	Q8.2 Closed loop-+			

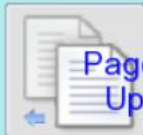
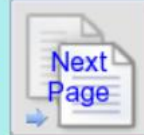
●Note: The indicator light corresponding to each input point is red for off, and green for on. To exit, please press the  button.



#### F) Graphic editing function

When you press the  button in the running screen of the touch screen, you will enter the following gallery screen:

No.	Name
1	VECTØ
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

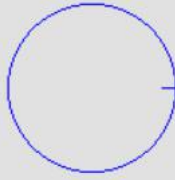
NO ☐ 0









●Click the area with different graphic names in the sequence number, and the corresponding graphic screen will appear on the upper right side.

No.	Name
1	VECTØ
2	
3	
4	
5	
6	




NO ☐ 1

- Click the  button to confirm the use and return to the operation screen.
- In the running screen, click the Save  button to save to the system, and then click  Download to confirm it as the current task.
- A total of 400 graphic elements can be edited in the gallery, and the pages can be   turned through.



## G) Create a new graphic file

When the  button in the running screen of the touch screen is pressed, the current graphics

parameters will be cleared, and the following new graphics screen will be entered:



The screenshot shows the REFLEX Machinery software interface. At the top, there's a header with 'Name' and 'NO: 0'. Below this is a large central area for drawing. To the right of the drawing area is a table with 8 rows and 6 columns, containing numerical values and icons. Below the table are four input fields: 'Setting N' (0 pcs), 'Length + -' (0), 'Angle + -' (0.0), and 'Arc + -' (0.0). At the bottom, there's a navigation bar with various icons and buttons, including 'New', 'Front Page', 'Next Page', 'Save', 'Download', 'ImLib', 'Sample', 'BackClose', 'PG OFF', 'Sgle/Dble', 'Stl D', 'Para', 'Sample', 'Manual InOut', and 'Language'.

illustrate:

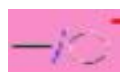
The user can set according to the length dimension and bending direction of each section of the required product



length,



angle,





type,



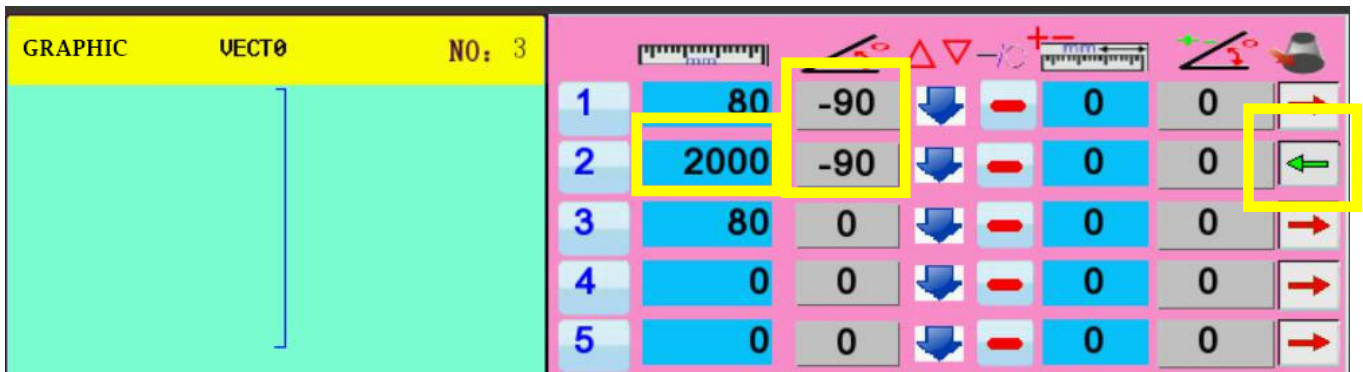
Length compensation,





angle compensation

If you want to do slab reinforcement, you must choose the  return arrow behind the longest side, and the first angle must be  a negative number!

As shown below:



After setting, you must press the  button, otherwise it cannot be saved in the system. Click  to confirm as the current task at last.

## 5.2. Preparation and inspection before use

① The equipment operator must wear a safety helmet when taking up the post.

② Plug in the aviation plug of the data line connecting the console and the host.

Note: The aviation plug of the data cable is divided into front and back. Before plugging or unplugging, please see the direction of the notch clearly. It is strictly forbidden to plug or unplug when the power is on! Otherwise it will cause system failure! Even burn the system! Please pay special attention to the operator!

③ Turn on the power supply: Connect the main power supply terminal. It is recommended that you use a four-core copper cable of  $3 \times 16 + 1 \times 10 \text{mm}^2$  and above, and properly ground it.

Electrical operation can only be carried out when the circuit is normal and the grounding wire is tight.

④ Check whether the power supply voltage is abnormal, whether it is within the three-phase  $380\text{V} \pm 5\%$ , whether the wire ends of the connection wires in the electrical box fall off, especially the connection of the PE grounding wire, and then turn on the main power switch after confirming that there is no abnormality.

⑤ Close the key power switch on the console, check whether there is an alarm display, if there is an alarm indication, follow the fault prompt on the alarm screen to eliminate the alarm.

Note: The operating personnel must be specially trained and qualified before the operation, otherwise the wrong operation will destroy the internal procedures and make the equipment unable to work normally.

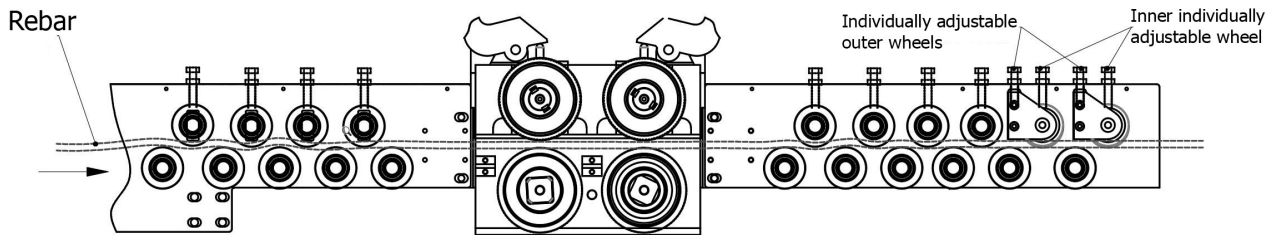
Special attention: When it is necessary to replace a new touch screen, after the touch screen is replaced, or when there is no original compensation data generated in any other situation, the original parameters need to be reset. If the process parameters are not set, the event of damage to the machine will occur, remember!!! (The original parameters are given in the data form by the trainer.) If the bending arm touches the upper and lower limits during the automatic working process, it needs to return to the reference (the bending arm returns to the original point) before it can work again.



### 5.3. Description of safety precautions during equipment use

Before use, pay attention to whether the power supply voltage is abnormal, whether it is within three-phase 380V $\pm$ 5%, whether the cables are damaged, whether the wire connectors fall off, whether the graphics are edited correctly, whether the speed parameters are reasonable, whether the steel bars are disordered or misplaced.

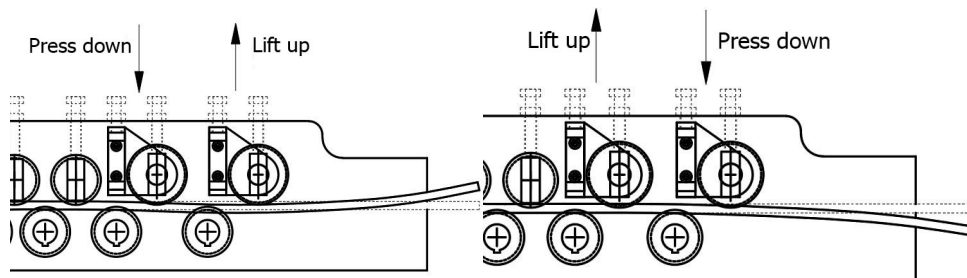
### 5.4. Operating procedures, methods, precautions and preventive measures



#### 1) Adjustment of the amount of compression of the straightening part:

The reduction of the straightening wheels is reduced in a gradually decreasing mode, and the reduction of the two sets of straightening wheels at the back is adjusted until the steel bars are not deformed. As shown in the figure, the two sets of straightening wheels in the front of the two parts of pre-adjustment and straightening are bent and deformed by compression, and the rear straightening wheels gradually reduce the pressing amount.

#### 2) Adjustment of up and down/inside and outside bending of steel bars:



① Press down the penultimate individually adjustable wheel on the right and raise the penultimate individually adjustable wheel: the steel bar can be bent upwards.

② Raise the penultimate individually adjustable wheel on the right side and press down the penultimate individually adjustable wheel: the steel bar can be bent downward.

③ The pre-adjustment part mainly controls the internal and external bending of the steel bar. When the internal and external bending of the steel bar occurs, it may be caused by insufficient compression of the pre-adjustment part, and the pre-adjustment wheel should be increased to a suitable position.

#### 3) Adjustment of steel bar reduction: For steel bars with uniform transverse ribs and uniform mechanical

properties, straightening is relatively easy, and there is no need to apply too much pressure on the straightening wheel. For steel bars with irregular transverse ribs and irregular mechanical properties, such steel bars are more difficult to straighten, and it is recommended to apply greater pressure on the straightening wheel. After installation and debugging or special failure, the steel bars are withdrawn, and cut them after threading and running at a slow speed for 3-4 meters before running, and then run for 3-4 meters to observe the straightness of the steel bars. If the above 2) and 3) clauses appear The situation is adjusted according to the adjustment prompts in each clause until the straightness of the steel bar reaches the requirement. The adjustment method of the outer reinforcement is the same as that of the inner.

4) When the stirrups are twisted and cannot be closed during the production process, the downward pressure of the left straightening wheel of the straightening part is not enough, and the steel is rotated. At this time, the downward pressure of the straightening wheel needs to be re-adjusted.

Note: Each straightening wheel must be in working condition, so as to ensure the continuous work and service life of the machine and the quality of the product.

Note: The reduction amount of the straightening mechanism should be a suitable value, otherwise it will overload the traction servo motor current if it is too large.

Note: When the equipment is in normal operation, the safety protection door and the back door should be closed to prevent the steel bars from popping out and hurting people; when opening or closing the safety protection door, you should echo back and forth to prevent hurting others; when the cutter is cutting, keep away from the cutter position , Prevent the steel bar from cutting the head and hurting people.



**Fingers at risk of being crushed or cut off!**

---



When the machine is running, it is strictly forbidden for people or other creatures to directly or indirectly touch the moving parts of the machine and the steel bars in work. Otherwise it will cause serious injury. The surface of the raw steel bars must be dry and free of rust, otherwise the machine will be damaged and the safety of the operator will be affected.

Even when the equipment is in an automatic working state, it must be supervised by a trained person, and the person in charge of the equipment should keep all the keys to prevent others from operating the equipment.

Notice:

It is strictly forbidden to touch the cutting position by hand at any time during power-on operation!

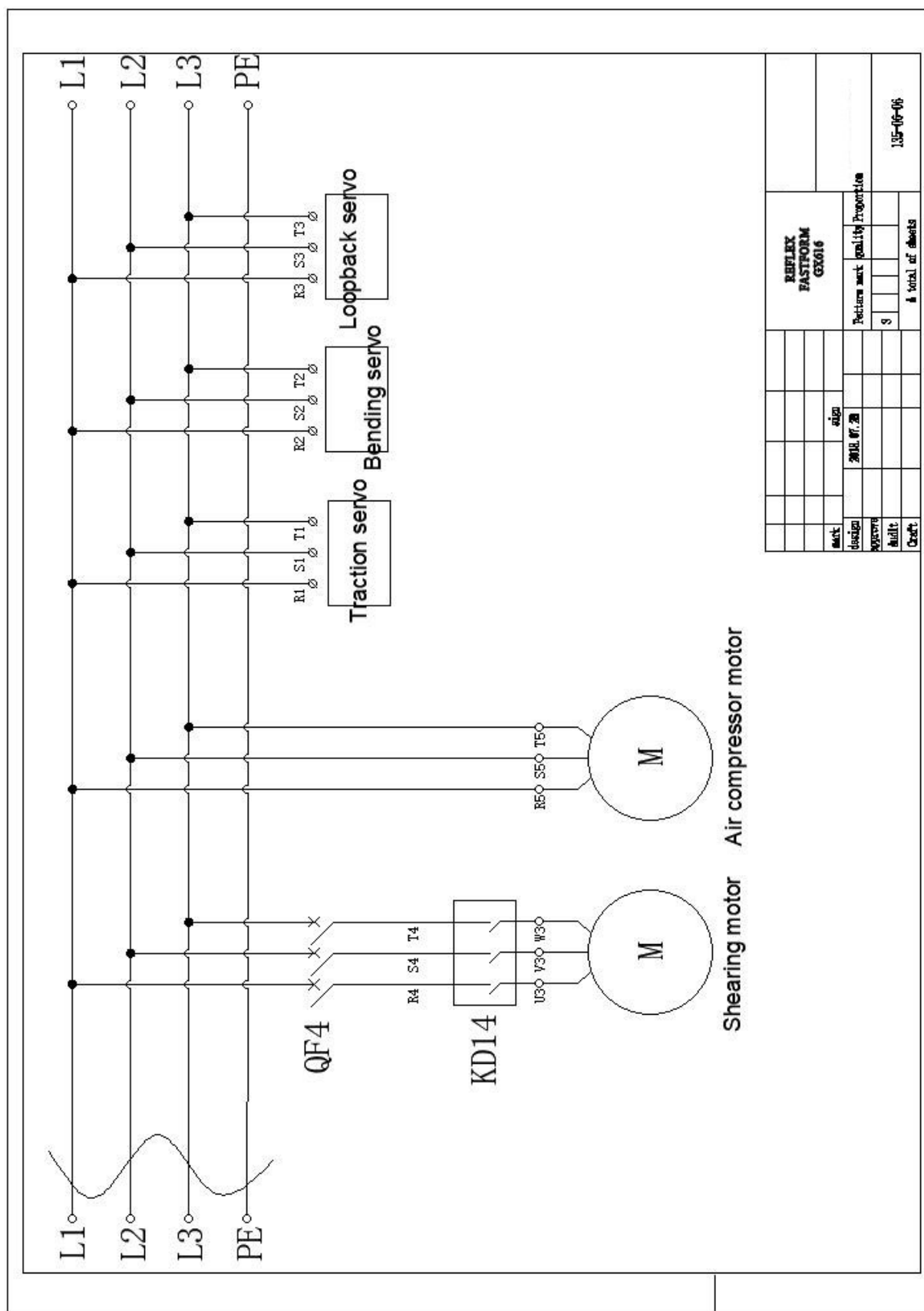
It is strictly forbidden to open the body cover at any time during power-on operation!

It is strictly forbidden to open the control cabinet while the machine is running!

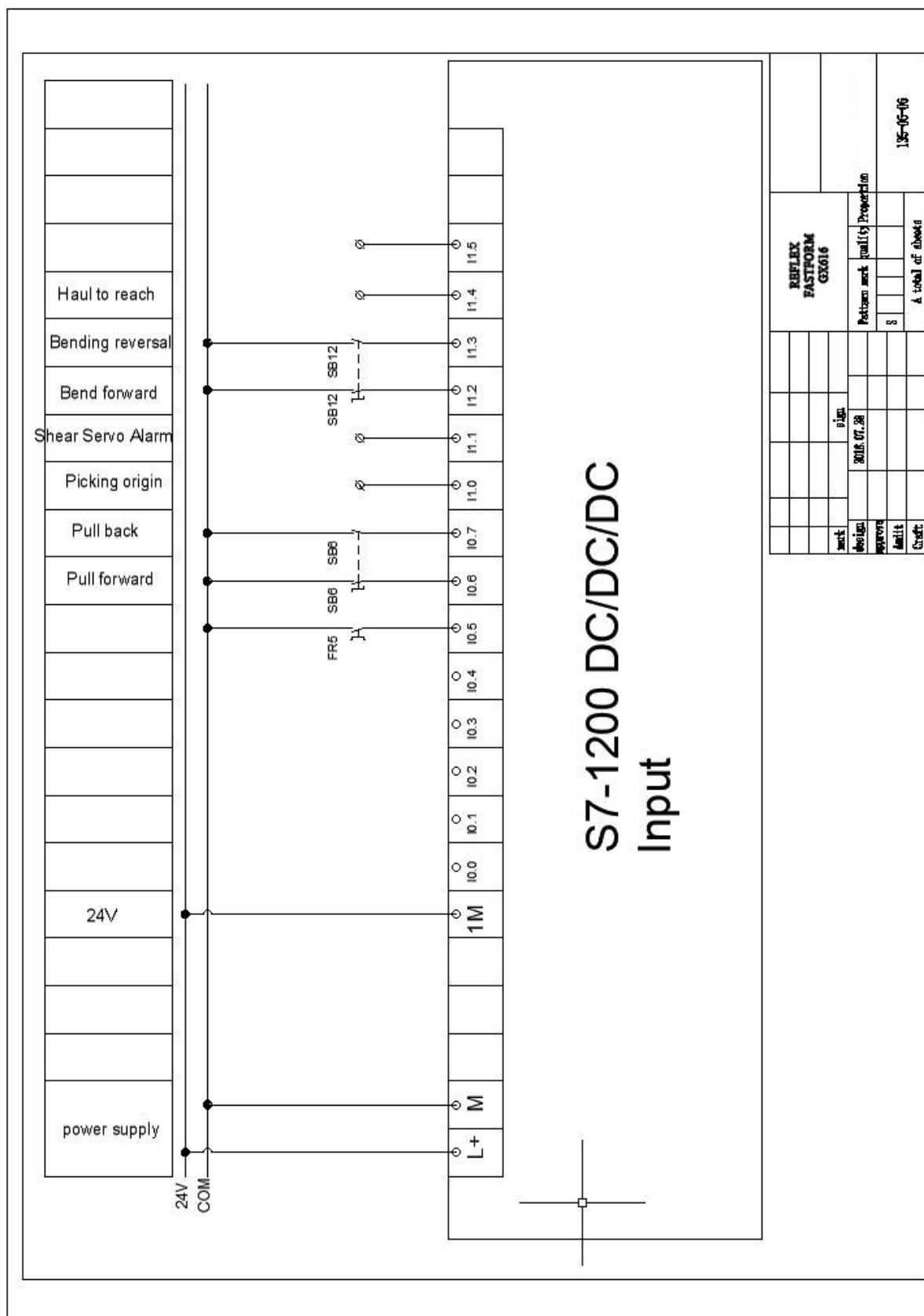
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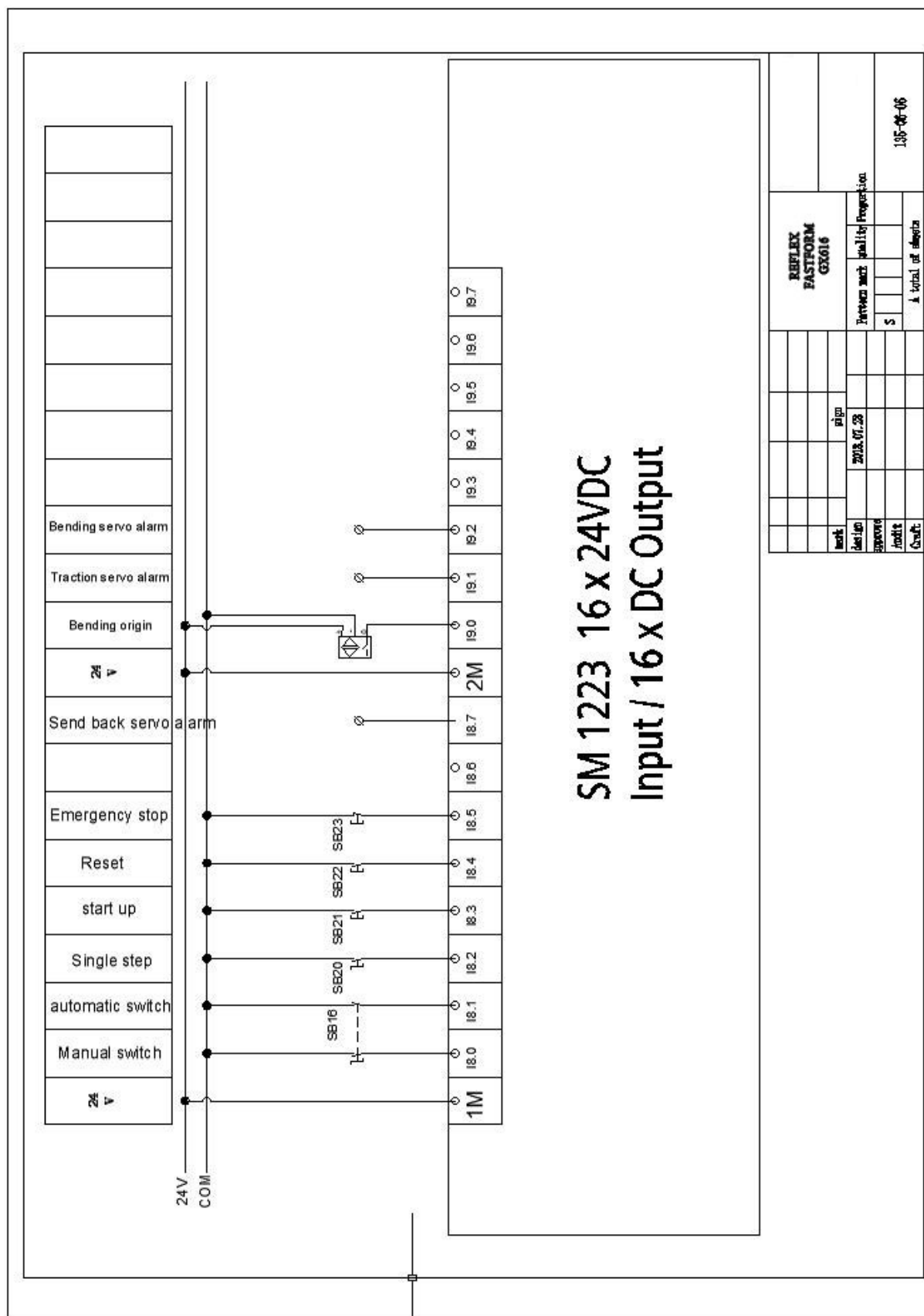
2) Main circuit 2



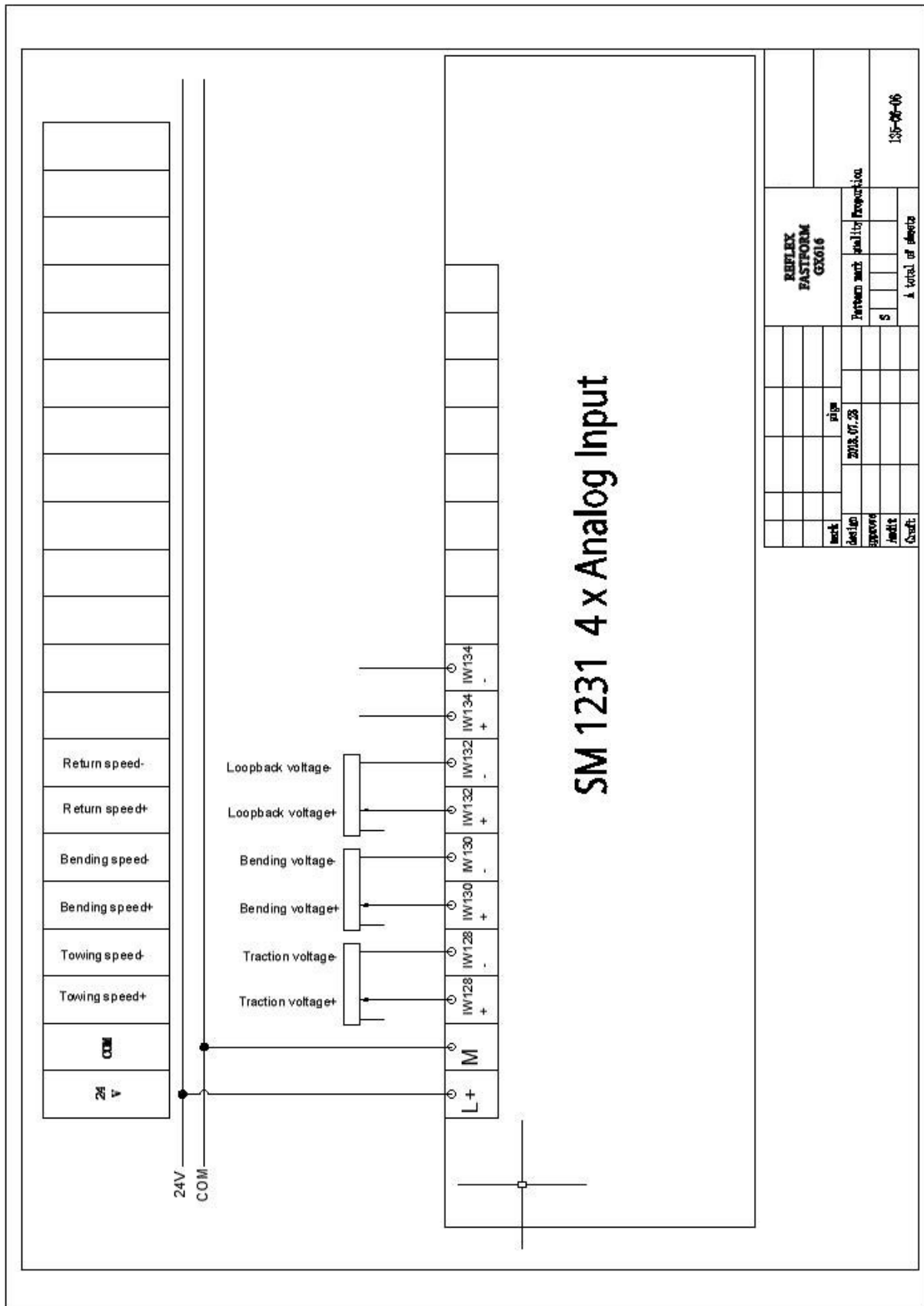
### 3) PLC input circuit 1



#### 4) PLC input circuit 2

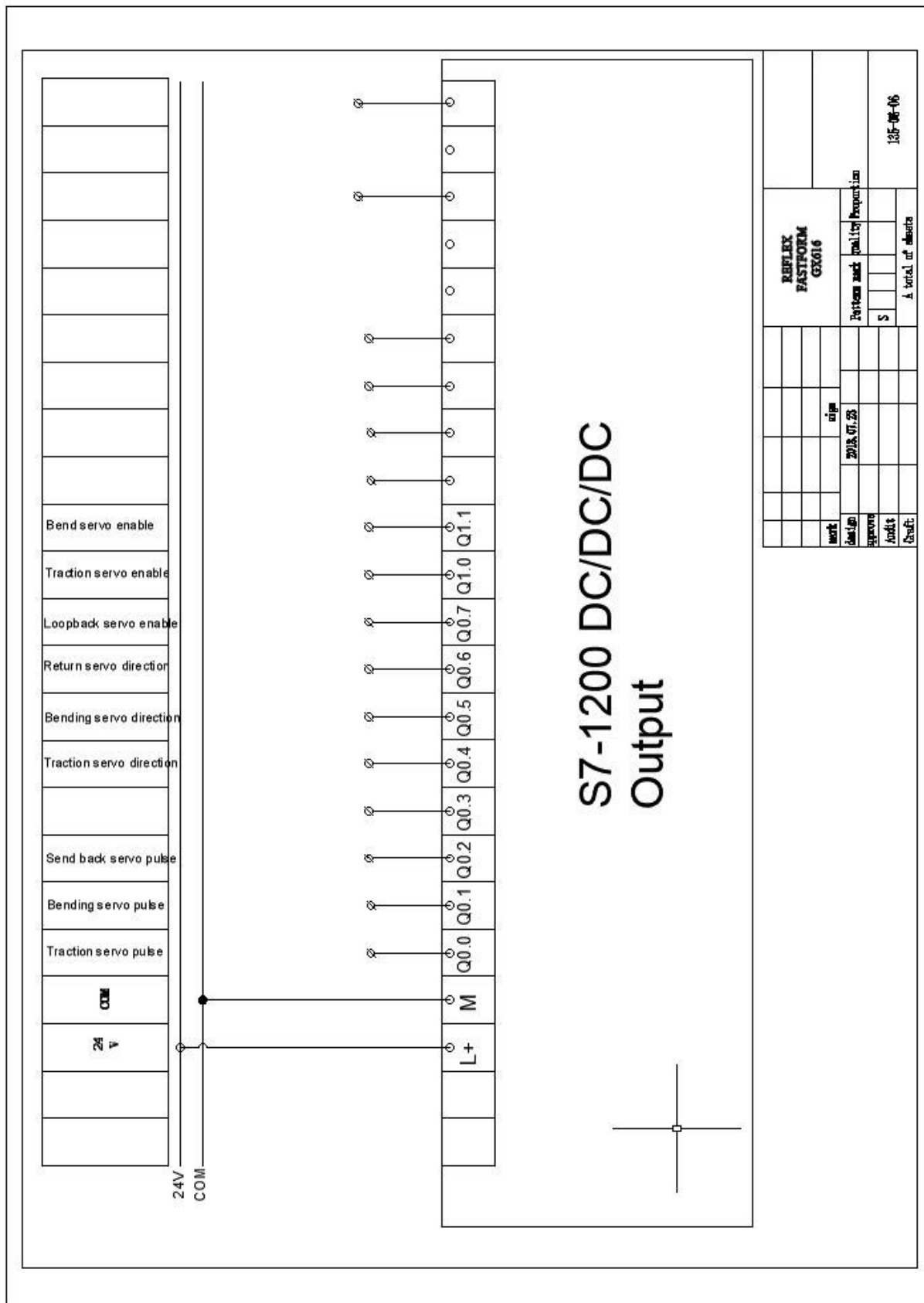


5) PLC input circuit 3

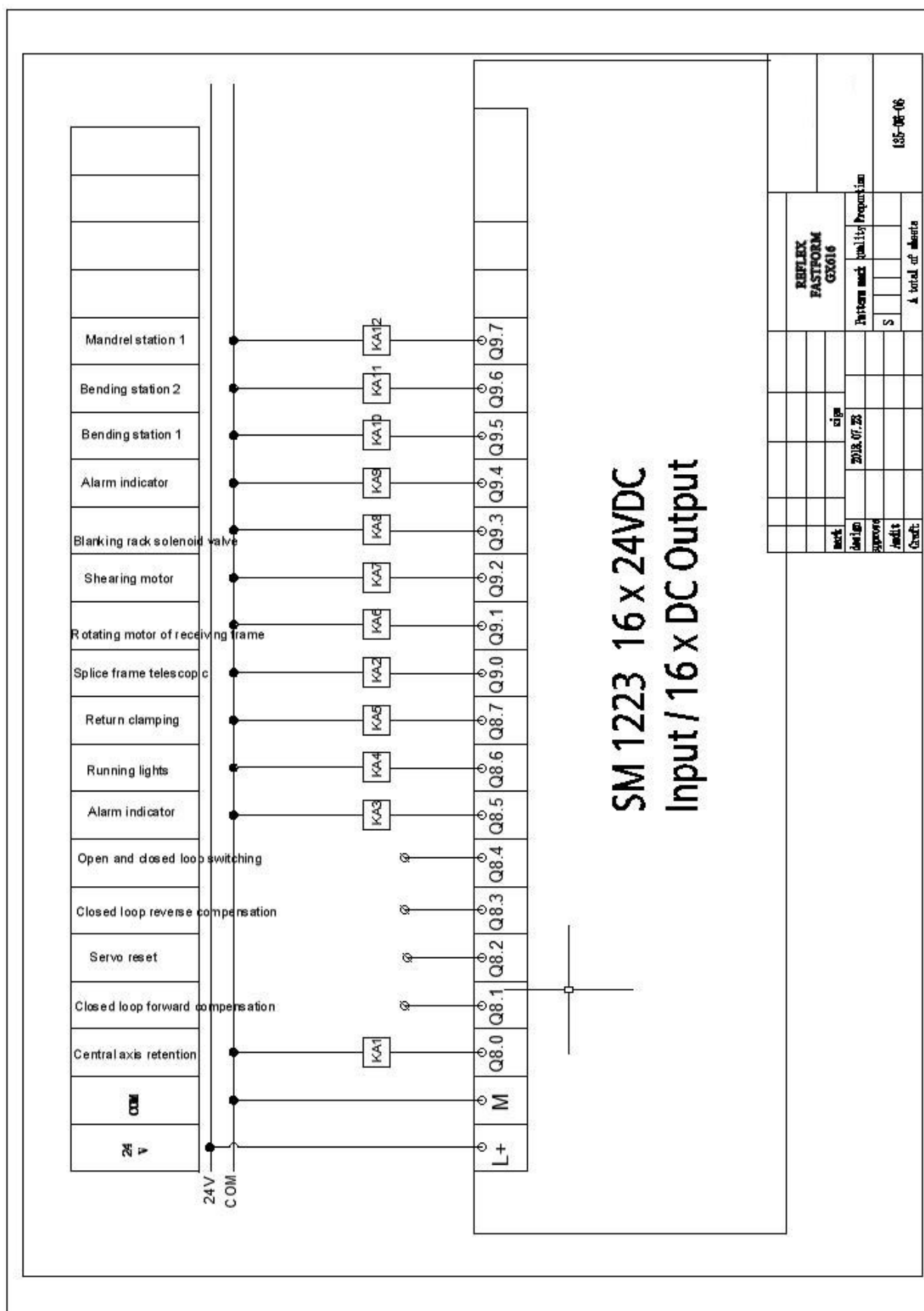




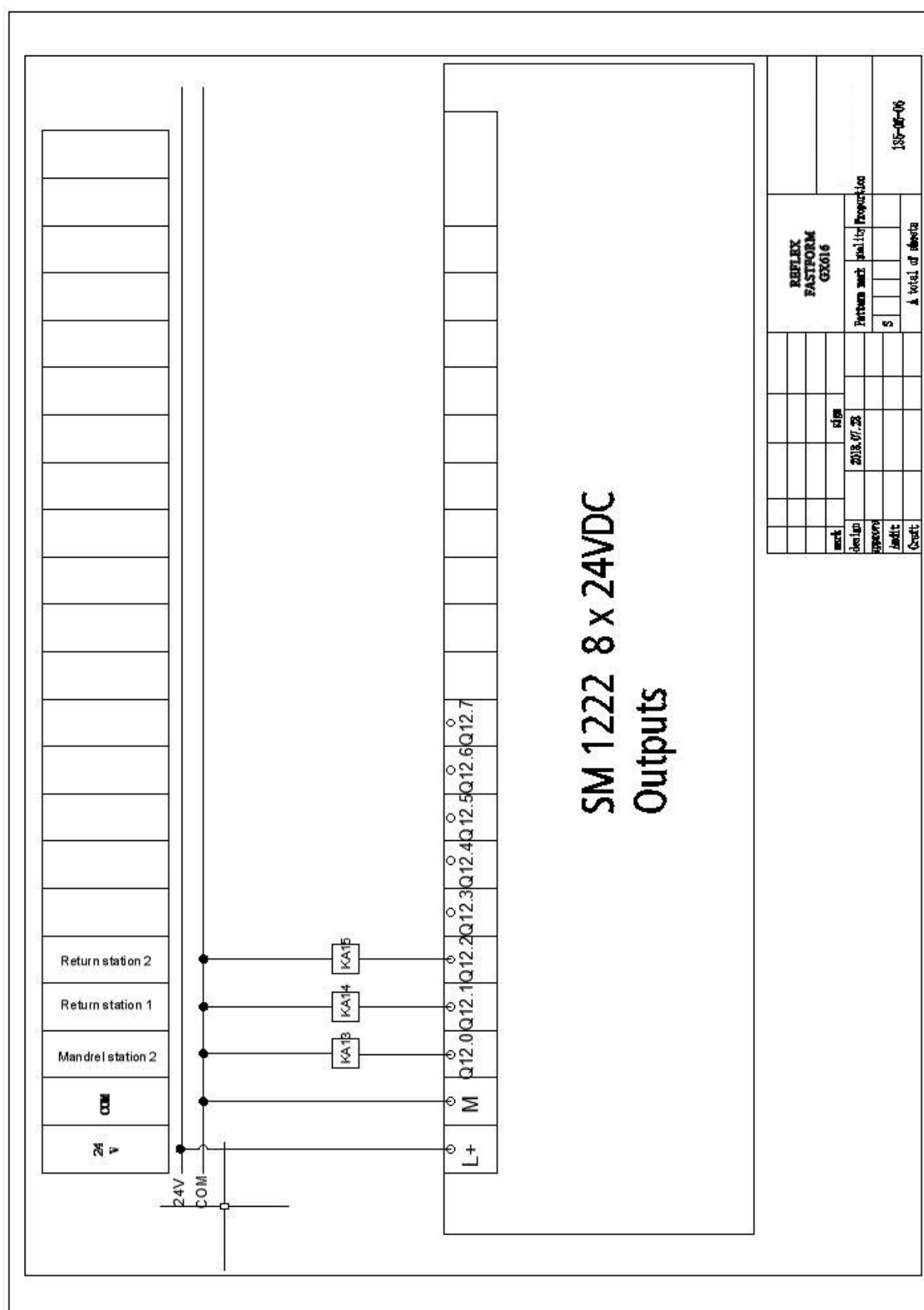
6) PLC output 1



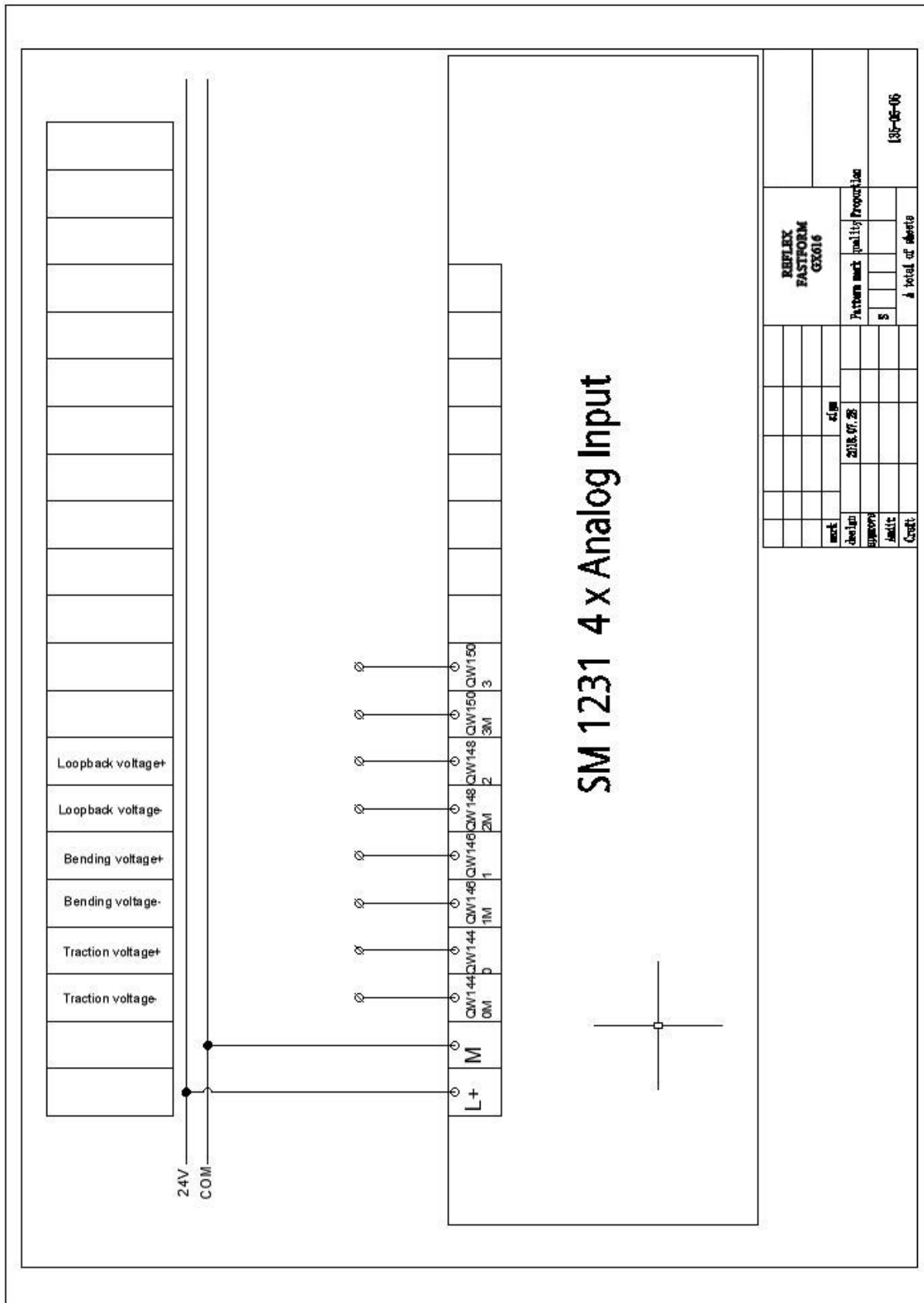
7) PLC output 2



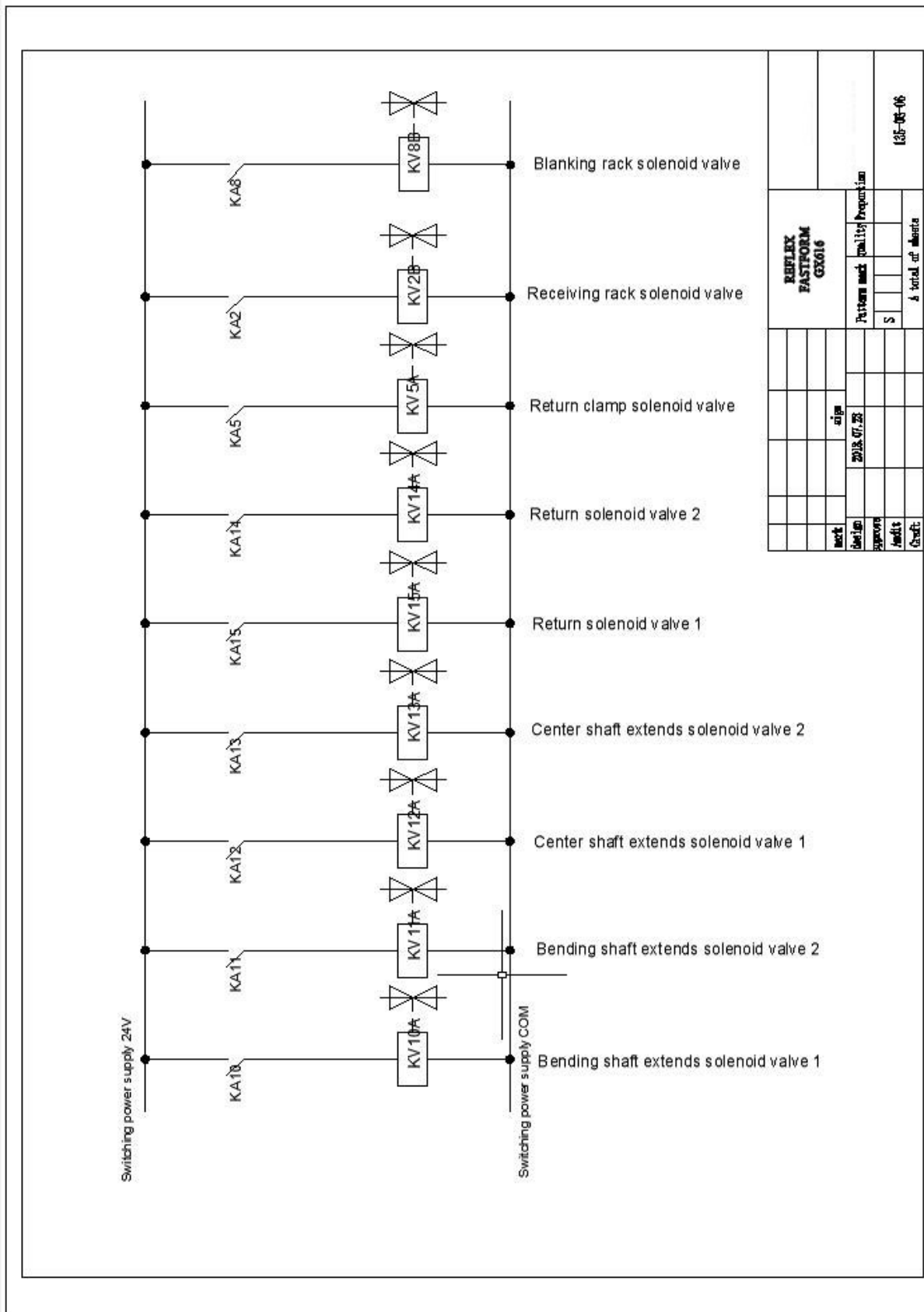
8) PLC output 3



9) Analog circuit



10) Circuit diagram of solenoid value







## 12) Wiring diagram of bending servo



## 5.6.Details of main components:

REFLEX-FASTFORM-GX616 List of main components				
NO	NAME	MODEL	QYT	NOTE
1	HMI	GL104E	1	
2	CPU 1214C	6ES7 214-1AG40-0XB0	1	
3	SM 1223	6ES7 223-1BL32-0XB0	1	
4	SM 1222	6ES7 222-1BF32-0XB0	1	
5	SM 1231	6ES7 231-4HD32-0XB0	1	
6	switch	EDS-205A	1	
7	server Driver	IS650PT112IUX-C	1	
8	server Driver	IS650PT045IUX	1	
9	server Driver	IS620PT3R5I-C	1	
10	Servo connector	S6-C3	2	
11	Servo connector	S6-C6	1	
12	Servo connector	S6-C2	1	
13	Encoder cable	S6-L-P01-5.0	3	
14	Braking resistor	24 $\Omega$ 2000W	1	
15	Braking resistor	2000W 18 $\Omega$	1	
16	AC contactor	CJX1-140/220V	1	
17	AC contactor	CJX2-1801/220V	4	
18	thermal relay	NR2-25 12-18A	3	
19	transformer	NDK-500VA-380V、420V/220V	1	
20	Switching power supply	ELG-150-24A	1	
21	Switching power supply	MOR-40-12	1	
22	Relay	MY2N-GS DC24	16	
23	Aviation plug socket	φ 48 .26	1	
24	Terminal block	UK-50	3	

25	Terminal block	UK-10	7	
26	Terminal block	UK-2.5	80	
27	Encoder	E6B2-CWZ1X-2000P/R	1	
28	Axial Fan	φ 150	2	
29	Iron net	φ 150	3	
30	Proximity switch	FI4-G12-ON6L	5	
31	emergency button	XB2-BS542C	1	
32	Button	ZB2-BA35 (XB2-BA35)(green)	1	
33	Button	XB2-BA55	1	
34	Key knob	XB2-BG21C	1	
35	Knob	XB2-BD53C	2	
36	Knob	XB2-BD33C	1	
37	Knob	XB2-BD25C	1	
38	Potentiometer with handle	WTH-118	3	
39	Flash buzzer	AD16-22SM/R23	1	
40	Indicator light	XB2-BVM3LC	1	
41	Cable Connector	PG29	12	
42	breaker	NM1-125S-3300	1	
43	breaker	NXB-63-D20-3P	2	
44	breaker	NXB-63-D10-3P	1	
45	breaker	NXB-63-D20-2P	1	
46	breaker	NXB-63-C20-2P	1	
47	breaker	NXB-63-D60-3P	1	
48	Magnetic ring	81*51*21	2	
49	filter	FT121-3	1	
50	Magnetic ring	63*38*25	1	

## 6. Drive parameter setting and troubleshooting:

### 1) Drive parameter:

N O	Parameter	Bending	Traction	Feeding	Remark
1	H00.00	14101	14000	14000	Motor code
2	H00.04	2311.4	2312.5	1860	(View the encoder version number)
3	H01.00	1005.1	1002	3005.7	(View MCU software version)
4	H01.01	1002	1001	654.5	(View FPGA software version number)
5	H01.02	20004	20008	10003	(View Servo Drive No.)
6	H02.00	1	1	1	Location mode
7	H02.02	1	1	0	Rotation direction selection, if the direction is opposite, set to 1
8	H02.25	1	1	0	Use external energy-consuming resistors and natural cooling
9	H02.26	800	1500	800	External resistance power
10	H02.27	43	22	43	Resistance of external resistor
11	H03.02	14	14	14	DI1 definition
12	H03.04	15	15	15	DI2 definition
13	H03.06	13	13	13	DI3 definition
14	H03.08	0	0	2	DI4 definition
15	H03.10	1	1	1	DI5 definition
16	H03.12	2	2	0	(DI6 fault reset)
17	H03.14	3	24	3	(DI7 electronic gear ratio switch)
18	H04.02	5	5	5	(D02 positioning completed)
19	H04.06	11	11	11	(DO4 fault output)
20	H04.07	1	1	1	(Logic level selection)
21	H04.00	1	1	1	DO1 is defined as ALM+- fault output
22	H05.07	4980736	83886080	32768	Electronic gear ratio numerator 1
23	H05.09	1875	55292	3927	Electronic gear ratio denominator 1
24	H05.11	4	1442000	4	Electronic gear ratio numerator 2
25	H05.13	1	1000000	1	Electronic gear ratio denominator 2
26	H05.21	734	24	734	(The positioning completion valve changes according to the actual output)
27	H05.41	1	1	1	Alarm threshold for excessive internal and external deviation
28	H05.43	0	0	0	Internal and external position deviation detection%
32	H08.00	40	25	40	Speed loop gain
33	H08.01	19.89	31.83	19.89	Velocity loop integral
34	H08.02	64	40	64	Position loop gain
35	H0A.10	×	3435868	×	(Position deviation valve)
36	H0F.00	×	2	×	Encoder feedback mode



37	H0F.01	×	0	×	Rotation direction of external encoder 0 forward and 1 reverse
38	H0F.04	×	1000	×	The number of pulses of the external encoder when the motor rotates one circle
39	H0F.08	×	100	×	External encoder pulse deviation threshold
40	H0F.10	×	1	×	Closed loop deviation clearing setting

## 2) Drive parameter:

There are 23 non-resettable faults in total.

Fault name	The cause of the failure and its treatment	Remark
ER101, system parameter is abnormal	The function code parameter stored in EEPROM exceeds the setting range of the function code.	The fault cannot be reset, and the problem may occur after the software is upgraded and burned.
ER102, logic configuration failure	Reason (1): After the driver downloads the new version of the software, the function code setting range of the new version of the software does not match the old function code.	Non-resettable fault, this problem generally does not appear in official products.
ER105, system parameter is abnormal	Processing method: Enter the function code H0231, input 1 (system parameter initialization), the drive is powered on again or the drive software is reset.	Non-resettable fault, this problem generally does not appear in official products.
ER107, no corresponding motor or driver	Reason (2): Due to software design, the default parameters of the function code are not within the setting range of the function code.	Non-resettable fault
ER108, parameter storage failure	Processing method: The upper computer software reads the function code setting parameters, and checks whether each function code parameter is within the upper and lower limits set by the function code. Find the function code whose parameter setting is not in the range, modify it so that the parameter setting is within the upper and lower limits, and then re-power on or reset by software.	Non-resettable fault
ER110, frequency division pulse output setting failure	The FPGA function defined in the FPGA register does not match the FPGA function defined in the DSP register.	Non-resettable fault
ER120, product matching failure	Reason (1): Due to the unreasonable design of the software interface, the FPGA function defined in the FPGA register does not match the FPGA function defined in the DSP register.	Non-resettable fault
ER135, EEPROM error in	Treatment method: software design problem, re-upgrade	Non-resettable

reading and writing ABS ENC	FPGA and DSP software.	fault
ER136, data check error in motor ROM or parameter not saved	Due to the abnormal operation of the system, the system entered a mode other than the prescribed design.	Non-resettable fault
ER150, the number of multi-segment position pulses is too few	Reason (1): The operating state of the drive is abnormal, and the system has entered a mode other than the specified design.	Non-resettable fault
ER151, multi-stage position and speed setting is too small	Solution: Eliminate the cause of abnormal operation of the drive system, re-power on or reset by software.	Non-resettable fault, unused fault
ER200, software overcurrent fault	Reason (2): Due to software design, the function code parameters are full of working modes other than the design specification.	Non-resettable fault
ER201, hardware overcurrent fault	Treatment method: software design problem, re-upgrade the DSP system software.	Non-resettable fault
ER210, drive output short-circuit fault to ground	The motor or drive model set by the function code does not exist.	Non-resettable fault
ER 320, GD circuit failure	Reason (1): The drive model set by function code H0102 is not within the model range specified in the manual.	Non-resettable fault
ER740, encoder Z interference fault	Solution: Check the setting range of function code H0102, and correctly set the product grade model corresponding to the drive.	Non-resettable fault
ER741, encoder AB interference fault	Reason (2): The motor model set by function code H0000 is not within the model range specified in the manual.	Non-resettable fault
ERA20, encoder communication failure	Solution: Check the setting range of function code H0000, and correctly set the product model corresponding to the motor.	Non-resettable fault, this fault is exclusive to the rotary encoder.
ERA34, the encoder sends back a checksum abnormality	After the function code parameter is changed, the storage cannot be accessed normally when it is stored in the EEPROM.	Non-resettable fault, only the photoelectric encoder reports the fault
ER B00, the position deviation is too large	Reason (1): The storage unit corresponding to the function code storage is damaged.	Non-resettable fault
ER B01, the position deviation is too large when the servo is on	Solution: Replace with a new drive.	Non-resettable fault, unused fault
ER C11, output phase loss detection	Reason (2): Due to software design, the high-frequency read and write function codes store the corresponding storage unit, which causes the storage unit to be damaged.	Non-resettable fault, unused fault
ER 831, AD sampling fault 1	Processing method: reflect the product phenomenon, upgrade the DSP control software.	Non-resettable fault
ER 832, AD sampling	The frequency division output function code parameter	Non-resettable

fault 2	exceeds the resolution range of the encoder.	fault
ER 833, current sampling fault 1	Reason (1): The frequency division output function code parameter exceeds the encoder resolution range. For example, a 1000-line photoelectric encoder can output 1000 pulses at the highest frequency division. If the frequency division output is set to output 1001 pulses, the fault will be reported.	Non-resettable fault

Type 1 resettable faults, a total of 12 faults.

ER104, parameter combination failure		Type 1 resettable fault, unused fault
ER121, servo ON command invalid fault	When the servo drive is enabled, an illegal servo auxiliary function operation is executed.	Type 1 resettable fault
ER130, DI allocation failure	Reason (1): Under the condition that the servo drive is enabled, some servo auxiliary function operations that need to be stopped can be executed.	Type 1 resettable fault
ER131, DO allocation failure	Solution: Reset the fault through the reset switch signal (AlmRst).	Type 1 resettable fault
ER140, AI selection failure	An error occurs when the DI physical terminal distributes the DI signal and the fault is reported.	Type 1 resettable fault
ER 152, multi-speed execution time is too short	Reason (1): Two DI physical terminals are assigned the same DI signal. For example, DI5 is assigned as Son signal by default (function code H0310 is set to 1), if DI4 is also assigned as Son signal (function code H0308 is set to bit 1). Two different physical terminals (DI4, DI5) are assigned the same DI signal (Son signal), and the fault is reported.	Type 1 resettable fault , unused fault
ER160, PID controller output distribution failure	Solution: Check the DI signal distribution function code to ensure that there is no duplication of DI signal distribution.	Type 1 resettable fault
ER400, busbar overvoltage	Reason (2): The DI physical terminal is assigned a signal that exceeds the maximum range of the DI signal. The current maximum range of DI signal is 32. If the DI physical terminal allocation exceeds this range, the system will report the fault. (Normally, this will not happen)	
ER500, the feedback speed is overspeed	Solution: driver program design problem, upgrade driver program.	Type 1 resettable fault
ER501, position command overspeed	When the DO physical terminal distributes the DO signal, an error occurs and the fault is reported.	Type 1 resettable fault, unused fault
ER510, frequency division pulse output is too fast	Reason (1): Two DO physical terminals are assigned the same DO signal. For example, DO1 is allocated as SRdy signal by default (function code H0400 is set to 1), if DO2 is also allocated as SRdy signal (function code H0402 is set to	Type 1 resettable fault

	bit 1). Two different physical terminals (DO1, DO2) are assigned the same DO signal (SRdy signal), and the fault is reported.	
ER600, offline inertia recognition failed	Solution: Check the DO signal distribution function code to ensure that there is no repeated distribution of DO signal distribution.	Type 1 resettable fault
ER601, return to zero timeout error	Reason (2): The DO physical terminal is assigned a signal that exceeds the maximum range of the DO signal. The current maximum range of DO signal is 17, if the DO physical terminal allocation exceeds this range, the system will report the fault. (Normally, this will not happen)	Type 1 resettable fault

Type 2 resettable faults, a total of 7 faults.

ER410, busbar undervoltage fault	The bus voltage sampled by the driver is lower than the bus undervoltage point 380v.	Type 2 resettable fault
ER420, lack of phase in power cord	Reason (1): Due to poor power supply conditions, the driver's three-phase AC power input voltage is too low, causing the driver's bus voltage to be lower than 380v.	Type 2 resettable fault
ER610, drive overload	Solution: Measure the bus voltage of the driver with a multimeter, and check whether the bus voltage is lower than the bus undervoltage point. If it is lower than the undervoltage point, it indicates that the driver's three-phase AC voltage input voltage is too low, and the power supply conditions need to be improved. If the bus measured value is not lower than the undervoltage point, enter the function code H0b26 to observe the driver's bus sampling result. If there is a big gap between the sampling result and the measurement result, properly adjust the bus voltage gain coefficient (function code H0130) to make the two equal. If the adjustment is invalid, the voltage sampling circuit of the drive is abnormal, please replace the drive.	Type 2 resettable fault
ER620, motor overload	Reason (2): The drive power model setting is wrong. The actual 220 volt-powered driver is set to the 380-powered driver power level, which causes the voltage to be lower than the bus undervoltage point after sampling.	Type 2 resettable fault
ER650, heat sink temperature is too high	Solution: Enter the function code H0102, carefully check the power supply requirements of the function code to set the driver power level, whether it is a 220 volt power supply or a 380 volt power supply.	Type 2 resettable fault
ER651, motor overheating failure	Drivers with three-phase power input specifications are less than three-phase power input.	Type 2 resettable fault
ERB05, there is command input during home return		Type 2 resettable fault, unused fault

## Analysis of common warning causes and treatment methods

There are a total of 17 warnings of various types.

Warning name	Warning reason analysis and treatment method	Remark
ER900, the deviation position is too large	Refer to ERB00 troubleshooting instructions	
ER901, the deviation position is too large when the servo is on		Unused warning
ER909, motor overload warning	Refer to ER620 troubleshooting instructions	
ER910, drive overload warning	Refer to ER610 troubleshooting instructions	
ER920, regenerative braking resistor overload	The operating power of the regenerative braking resistor is greater than the nominal power of the resistor for long-term operation.	
ER922, the resistance of the external regenerative braking resistor is too small	Reason 1: The power of the regenerative braking resistor is too small.	
ER941, parameter changes that need to be turned on again	Solution: Replace the braking resistor with a larger power or connect an external braking resistor.	
ER942, parameter storage frequent alarm	The resistance of the external regenerative braking resistor is too small.	
ER950, overtravel warning	Reason 1: The resistance of the external regenerative braking resistor is less than the minimum resistance of this type of drive, which may cause damage to the discharge tube.	
ER960, when the encoder angle is reinitialized, the deviation is too large.	Solution: Replace the braking resistor with a larger resistance value.	
ER970, Servo is not ready and Servo On warning	After the function code parameter is changed, it is a warning prompt that the power needs to be re-powered.	Unused warning
ER971, busbar undervoltage warning	EEPROM read and write frequency too fast warning	Remark
ER981, heat sink overheating warning	Servo motor running position exceeds the left or right position stroke warning	
ER982, motor overheating warning	Absolute encoder encoder angle deviates too much when reinitializing fault	Unused warning
ER990, power supply phase loss warning		
ER991, the communication module self-check failure alarm	Refer to ER410 troubleshooting instructions	
ER992, communication	Refer to ER650 troubleshooting instructions	

module communication abnormal alarm		
ERB03, electronic gear setting error	<p>The numerator and denominator ratio of the electronic gear is set incorrectly.</p> <p>Reason 1: The setting range of the numerator and denominator ratio of the electronic gear exceeds the range of 0.01-4000.</p> <p>Treatment method: reasonably set the size of the numerator and denominator of the electronic gear, and adjust the numerator and denominator ratio of the electronic gear appropriately.</p>	

#### Reason analysis and treatment method of abnormal servo operation

Fault name	Analysis of the cause of the failure and treatment method	Note
The rotation direction of the motor is opposite to the rotation direction of the drive.	Reason 1: For a servo motor with a rotary encoder, the connection sequence of the sin signal group and the cos signal group of the rotary encoder is reversed. For example, according to "Figure 1-2 Motor Encoder Wiring Diagram with Resolver Encoder", the connection sequence of the encoder signal group is sin- sin+ cos- cos+ from left to right. If the connection sequence of the encoder signal group is changed from left to right cos- cos+ sin- sin+, an error will occur that the motor rotation direction is opposite to the command direction. If the instruction is 200rpm, the actual motor speed is -200rpm.	
The drive is not damaged, but the servo motor cannot rotate after power-on	Processing method: re-identify the angle after arbitrarily swapping the two power lines.	
The running speed is much higher than the set speed, or the car speeds up, and then a fault is reported.		

**Note: Please power off and reset after input confirmation!**

## 7. Maintenance and maintenance

### 7.1. Daily maintenance, maintenance and inspection dates

The power supply of the equipment must be cut off before equipment maintenance. If it involves the adjustment of mechanical parts, then release the remaining gas in the gas path to prevent accidents.

Do not use chemical solvents to clean the equipment.

The lubrication of the equipment seriously affects the service life of the machine! ! Improper maintenance will greatly reduce the service life of the machine.

The equipment maintenance personnel must carefully read the instruction manual. The supplier only



provides one set of keys, and it is strictly forbidden to provide another key. During the maintenance process, only this key can be delivered to the responsible maintenance staff for proper custody.

In order to ensure the normal operation of the equipment, the user is responsible for maintaining the equipment and ensuring that every part of the equipment is in good working condition.

Fill in the equipment maintenance diary after equipment maintenance. This is helpful for users to master equipment management knowledge as soon as possible. Appropriate tools should be used during equipment maintenance and repair, which can reduce equipment damage and avoid danger. Clean up excess lubricating oil and other oils in time to prevent soiling the steel bars and prevent fires. Clean up the iron filings and waste materials in the workshop in time and put them together for recycling, which can also prevent injury to workers and affect production.

## 7.2 Outdoor use of equipment

When the equipment is used outdoors, it should be installed in a shed with a roof and dry ground. Avoid using it in the sun as much as possible. It is also not allowed to use it in the open air in rainy and snowy weather. It should be protected from wind, sand and dust from blowing into the equipment and electrical control system. Otherwise it will cause mechanical damage and malfunction.

## 7.3 Maintenance and maintenance of equipment

The traction part of the equipment should be regularly added or replaced with lubricating oil according to the regulations, and the grease filling nozzle should be filled with oil every week, and each straightening shaft should be filled with lithium-based grease every month to make the bearings sufficiently lubricated. There are oil injection holes above the shearing mechanism and the bending mechanism, and lithium-based grease should be injected regularly to ensure that the bearings are sufficiently lubricated. Extend the service life of each component. In addition, the air compressor and filter should be drained regularly.

### Routine maintenance per shift

Note: One shift is 8 working hours.

- ① At the end or beginning of each work shift, perform a general cleaning work to remove oxide scale and debris.
- ② Check the integrity of the movable blade and the static blade at any time, whether the fixing nut of the traction wheel and the compression wheel is loose, and check the tightness of the traction part of the conduit, otherwise the lower traction wheel will be broken, and the iron filings will splash out.
- ③ When the temperature is lower than 3℃, the water must be discharged at the end of each shift, otherwise the entire pneumatic system will not work normally due to the freezing of the water.
- ④ When the temperature is lower than 3℃, it is required to use cotton yarn to absorb the water vapor in the muffler at the end of each shift, otherwise it will cause the cylinder to move slowly or fail to work.
- ⑤ Lubrication.

NO	Lubrication part	Lubricant	Refueling time	Remark
1	Forming wheel	Lithium-based grease (10g)	once a week	Grease gun injection
2	Bending bearing	Lithium-based grease (10g)	once a week	Grease gun injection
3	Shear rocker	Lithium-based grease (10g)	once a week	Grease gun injection
4	Curved components	Lithium-based grease (10g)	once a week	Grease gun injection

#### ⑥ Fastening of screws in various parts

It is necessary to check the fastening of the traction wheel, meter wheel, traction spindle end cover, various shear blades, bending bearings, forming wheel screws, and connection bolts of each box body in time.

#### **Routine weekly maintenance**

Check the tightness of the connecting bolts, and tighten them with special tools if necessary.

Check whether the cable insulation is damaged.

Whether the air filter and the pressure regulating valve are malfunctioning.

Clean up the dust of each control component.

Check the air pipe joint and air path for air leakage.

In the event of electrical failure, first check the fuse and thermal contactor, and whether the proximity switch is damaged.

Check the protective grounding wire.

Check the wear and tear of the motor brake system.

Maintain the sanitation of the electrical cabinet and the console.

Check the tightness of the timing belts, etc., and adjust the tightness in time.

#### **1) Monthly maintenance**

Check the lubricating oil in each gear box.

Check the change of the bearing clearance of the transmission part, if there is any looseness, please adjust it in time.

Check the oil mark to check whether the lubricating oil is in place. When the oil level is found to be low, add CKC105 lubricating oil in time.

Since there are more oxide scales on hot-rolled steel bars during the feeding process, cleaning them every week can reduce wear and reduce adjustment resistance.

#### **2) Maintenance of purchased standard accessories**

Reducer: Check the ventilation of the vent every week, and clean the vent in time to make it exhaust smoothly.

Air compressor: Change No. 32 oil once a year, drain water once every shift, and check whether the belt is loose every month.

Cylinder: The muffler will block the muffler due to environmental pollution. The muffler should be cleaned or replaced every 3 months.

Before using the reducer, check the lubricating oil and add the specified lubricating oil. All kinds of lubricating oil should be supplied according to the position of the oil mark and replaced strictly according to the replacement time.

Special oil for reducer 2000 hours

Lithium-based lubricant 8000 hours

Gear oil 5000 hours

Operate strictly in accordance with the lubricating oil standard, otherwise the machine will not operate normally, and the lubricating performance of the structure will be affected by the solidification of the lubricating oil, which will seriously damage the various mechanisms of the equipment.

Note: The above maintenance period is the minimum requirement, and the specific time depends on the usage of the equipment.

## **8. Transportation and storage**

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### **8.1. Precautions for hoisting and transportation**

Use cranes or forklifts with a load-bearing capacity of  $\geq 5T$  to hoist the equipment, and it is strictly forbidden to fix the hoisting rope at the non-hoisting position of the equipment for hoisting;

The equipment must be fixed to the transfer vehicle with ropes or other methods during the transfer process. Speeding and sharp turns are strictly prohibited during the transport process to avoid traffic accidents. The vehicle must slow down when driving on potholes to avoid damage to the equipment. . During transportation, the equipment must be covered with a rain-proof tarp or transported in a box-type vehicle to make the equipment rain-proof and moisture-proof.

### **8.2. Storage conditions**

When the equipment is not used for a long time, the power supply of the equipment should be cut off and the compressed air and water in the equipment and the air compressor should be discharged; the dust and iron filings on the equipment should be cleaned up, and all parts that need to be lubricated should be fully lubricated , All mechanical parts should be painted with anti-rust oil; the steel bending panel should be painted to prevent rust; the equipment should be stored in a rain-proof and moisture-proof room and covered with a rain-proof and moisture-proof tarp.

## 9. Schedule

### 9.1. Random accessories list

NO	Product Specifications	QTY	REMARK
1	Torx wrench 22-24	1	
2	Open wrench 8-10	1	
3	Open wrench 13-16	1	
4	Open wrench 16-18	1	
5	Open wrench 22-24	1	
6	Ratchet wrench (with 14mm inner hexagon)	1	
7	Allen wrenches 2, 3, 4, 5, 6, 8,	1	Must be a complete set (lengthened)
8	10, 12, 14	1	
9	7 "inner straight circlip pliers	1	
10	7 "outside straight circlip pliers	1	
11	8 "wire cutters	1	Good quality is required
12	Adjustable wrench 12' --300	1	
13	Phillips screwdriver 6×150mm	1	
14	Slotted screwdriver 6×150mm	1	
15	Slotted screwdriver 2.5×75mm	1	
16	Oil gun	1	With soft and hard connectors
17	Grease gun (100g is good)	1	
18	Dust blowing gun (YAG-A)	1	With male and female connectors
19	Spring tube (5*8*9M)	1	
20	Potentiometer WTH-118	1	
21	Photoelectric proximity switch FI4-G12-0N6L	1	
22	Small relay MY2NJ DC24V	1	
23	Small short circuit device IC65N-1P-C10A	1	
24	Connector-Y type tee X-APY12	1	
25	Pagoda Mouth 10-03	2	
26	16 double groove straightening wheel $\Phi 89 \times \Phi 55 \times 38$	2	
27	16 plane straightening wheel 1 $\Phi 89 \times \Phi 55 \times 38$	2	

28	Traction wheel	2	
29	Pinch wheel	1	Groove width 12mm
30	Forming wheel 1 with oiling cup (nozzle)	1	Slot width 14mm
31	Forming wheel 3 with oiling cup (nozzle)	1	Slot width 16mm
32	Forming wheel 5 (new) oil cup (nozzle)	1	Groove width 12mm
33	Rib forming wheel with oil cup (nozzle)	1	Slot width 16mm
34	16 stirrup forming wheel oil cup (nozzle)	2	Slot width 20mm
35	16 ribs forming wheel oil cup (nozzle)	1	(1 installed, 1 additional)
36	Φ 60 bending bearing with oil cup (nozzle)	1	(1 installed, 1 additional)
37	Moving blade	2	
38	16 static blades	2	
39	Static knife hexagon socket screw M8X25	4	12.9 level
40	16 round inlet	2	(1 installed, 2 additional)
41	16 Feed inlet mounting plate	1	(1 installed, 1 additional)
42	Hexagon socket screw for forming wheel M8X50	8	12.9 level
43	Bending disc removal screw M8X60 (full wire)	2	
44	Forming wheel loading and unloading hexagon socket screw M6X50 (full wire)	4	12.9 level
45	Movable blade hexagon socket screw M10X25	4	12.9 level
46	16 Feeding guide block 1	1	(Including 2 M10*60 mounting screws)
47	16 Feeding guide block 2	1	
48	Enlarged bend washer	1	(1 installed, 1 additional)
49	Encoder hose	1	10cm
50	Solenoid valve 4V310-10-DC24	1	
51	Nylon cable tie 8*400	50	

## 9.2. Recommended spare parts list

NO	Product Specifications	QTY	REMARK
1	Traction wheel	2	
2	Pinch wheel	2	
3	16 double groove straightening wheel $\Phi 97 \times \Phi 55 \times 38$	4	
4	16 plane straightening wheel 1 $\Phi 89 \times \Phi 55 \times 38$	4	
5	Forming wheel 1 with oiling cup (nozzle)	1	Groove width 12mm

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6	Forming wheel 2 with oil filling cup (nozzle)	1	Slot width 14mm
7	Forming wheel 3 with oiling cup (nozzle)	1	Slot width 16mm
8	Forming wheel 5 (new) oil cup (nozzle)	1	Groove width 12mm
9	-4 Rib forming wheel 1 with oiling cup (nozzle)	1	Slot width 16mm
10	16 stirrup forming wheel oil cup (nozzle)	2	Slot width 20mm
11	16 ribs forming wheel oil cup (nozzle)	1	
12	Φ 60 bending bearing with oil cup (nozzle)	1	KRV60X-00
14	Moving blade	2	
15	16 static blades	2	
16	16 round inlet	2	
17	Solenoid valve 4V310-10-DC24	1	
18	Deep groove ball bearings 6006E-2RZ	10	For straightening wheels

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## 10. After sale

### 10.1. Product after-sales service guarantee

Warranty Standards for Fully Automatic CNC Rebar Bending Machine Series		
Time	Part name	Remark
Three months warranty	Machinery: traction gears, traction adjustment gears, straightening wheels, pre-adjusting wheels, forming wheels, timing belts.	1. During the warranty period of the whole equipment, after the parts are replaced, the warranty period of the parts will be calculated from the date of purchase and delivery of the whole equipment.
Half year warranty	Machinery: sprocket, guide cylinder, shear guide plate, static blade mounting plate, synchronous axle, compression axle, synchronous axle sliding sleeve, straightening axle, synchronous belt wheel.	
	Machinery: reducer, traction box, compression box, shear seat, bending seat, straightening wheel plate, pre-adjusting wheel plate, shearing rocker arm, shearing connecting rod, main shaft, gear, frame.	
One year warranty	1. Vulnerable parts are not covered by the warranty: sprockets, chains, blades, V-belts, bearings, oil seals, button switches, feed ports, wear-resistant sets of feed frames, etc.	

## **10.2. Precautions for maintenance**

1. Please keep the equipment power distribution cabinet clean and tidy, do not pile up debris, and avoid short circuits.
  2. Please keep the inside and outside of the equipment clean and tidy. All sliding surfaces, screw rods, racks, gear boxes, oil holes, etc. are free of oil; no air or oil leaks at all parts; sundries and dirt around the equipment should be cleaned up.
  3. The water discharge valve of the air compressor tank should be opened once a day to drain the oil and water, and check whether the oil level meets the standard of use every day. The new machine needs to replace the lubricating oil every 2500-3000 hours of operation.
  4. Tighten the screws at the equipment connection every day, and replace the screw rod every three months where the screws are frequently loosened to prevent the screw rod from breaking.
  5. Please add lubricating oil to the gears, racks and gear boxes regularly. The rack or gear needs to be filled with grease once every half a month, and the gear oil needs to be replaced every three months in the gear box.
  6. Please use the equipment strictly in accordance with the instruction manual, and it is strictly forbidden to disassemble the machine parts without the guidance and assistance of professionals.
  7. If the power supply of the unit is used to supply power to the self-equipped generator, the rated power generation of the generator must be greater than 2-4 times the total power of the equipment, and the voltage fluctuation is less than  $380V \pm 5\%$ , otherwise it will cause damage to the equipment and affect the installation. The time schedule of commissioning, training and maintenance shall be fully borne by the user.
  8. After receiving the goods, the user immediately inspects the equipment and parts. If it is found to be damaged in transportation, it shall immediately report to the company and negotiate with the transporter of
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the equipment. The company and the user will cooperate with the transporter of the equipment.

Responsibility recovery and subsequent handling.

**After-sales service contact number: +1800706620**