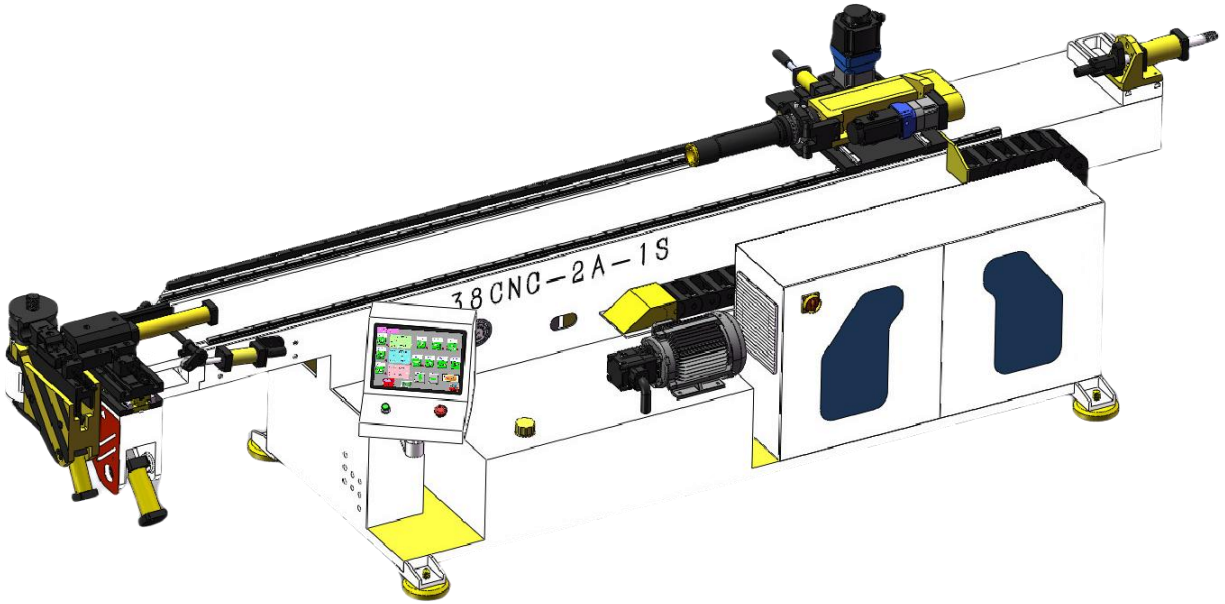
Two-axis/Three-axis CNC pipe bending machine user manual

Welcome to use our company's equipment

Product Introduction



This system is a set of high-quality and professional control system developed for controlling two-axis or three-axis automatic CNC pipe benders. Production of Mitsubishi high-performance PLC host, high-brightness touch LCD display. Meet industrial site control requirements. Mitsubishi high-precision servo system for feeding and transfer pipe production. Storage capacity: 32 bends per part, 200 sets of storage parts. It adopts a special pipe bender program control system Optional remote MODEM for remote troubleshooting and program updates. It has a graphical interface and is intuitive and easy to operate. It has diagnostic and error warning functions.

operation and usage

Safety precautions

1.1 If the machine exhibits abnormal behavior, press the emergency button to stop the machine or turn off the power switch to cut off the power.

1.2 After the machine is started, the operator should stay on site to be able to access the emergency stop switch. In case of any abnormalities, the emergency stop switch can be pressed at any time.

1.3 The power transmission for the main clamp, guide clamp, material clamp, mandrel, and bending pipe is driven by hydraulic cylinders with pressure up to 10MPa-14MPa. Therefore, The operator's body should not be close to the part where the action is to occur, otherwise it may cause injury to the body.

1.4 When changing the die, bending die, and other parts, the power must be cut off.

1.5 Before starting the machine, ensure that no one is in the area where the machine's movements occur.

1.6 Do not touch the screen with sharp or hard objects to avoid damaging the screen and causing electric shock.

1.7 Do not approach the action area of the bend arm. Moreover, it is recommended to set up a

barrier on the outer diameter of the bend arm action area to prevent others from accidentally entering the area.

1.8 Only those responsible for using and maintaining the machine are allowed to operate it. Others should not operate this machine. The operator must be familiar with the safety precautions before starting the machine.

1.9 Before opening the electrical box, the power switch should be set to OFF to prevent electric shock accidents.

2. Machine installation instructions

2.1 The machine must be installed on a flat and solid concrete floor, equipped with adjustment shims to allow for adjustments so that the machine's weight is evenly distributed on the ground. Additionally, a spirit level should be used to correct the machine's horizontal position (preferably using 6 anti-vibration pads).

2.2 The lubricating oil level should be kept close to two-thirds of the dipstick mark. Please

use China National Petroleum Corporation (Sinopec) R46 oil or other equivalent grade oils.

2.3 First, use a voltmeter to test the stability of the three-phase voltage. The voltage should be within ±10% of the normal voltage range.

2.4 Turn on the power, at which point the power indicator light and touchscreen will light up, enter manual mode and press the clamping key. Check if the pressure gauge shows normal pressure. If there is no pressure on the pressure gauge, it indicates that there is an issue with the input hydraulic system. Please ensure that the input air pressure can be maintained within the range of 10-14KG.

2.5 Ensure safety by grounding the two-color wire. The ground resistance should be less than 100 ohms.

First, when turning on the machine, the origin return for all three axes must be performed! The specific steps are: Hold down the key

, At this time, the machine oil pump is operating., All hydraulic cylinders

should retract all actions to their original positions. Wait until the sound of the oil pump stops. (If the oil pump continues to work for a long time or if diagram AA appears, check if all sensors on the equipment are lit and ensure that all actions have retracted to their original positions.)

Remove your finger from the reset button. Then click once 

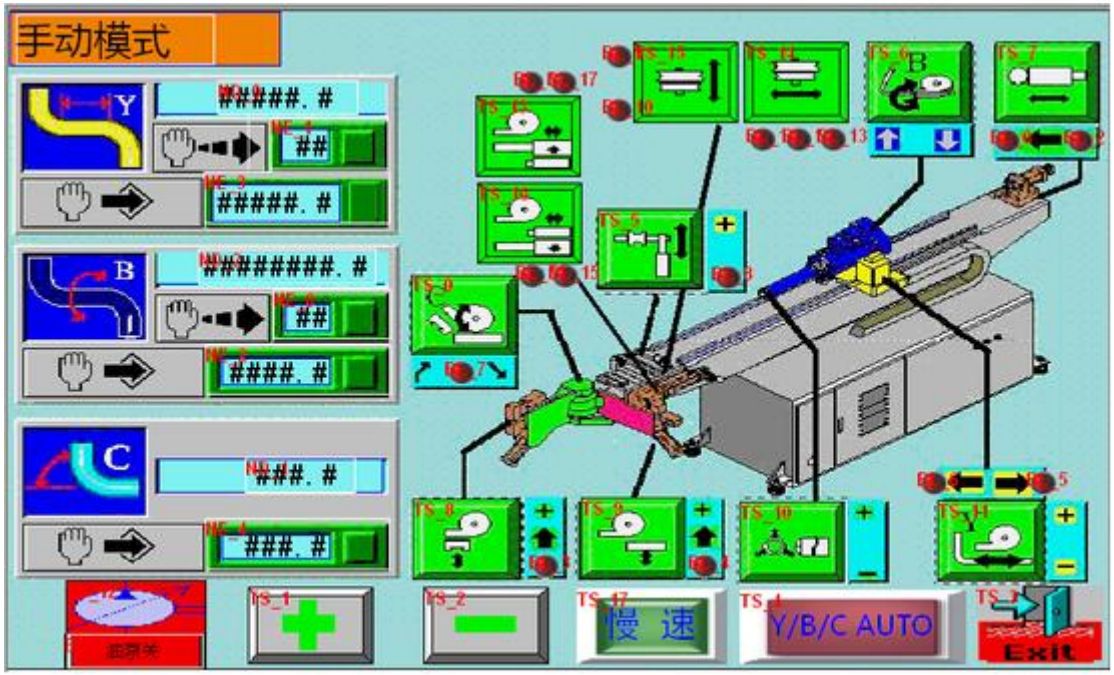
, The feed servo motor and angle servo motor operate, the feed retracts to the origin sensor, and after the angle rotates a certain degree, until it appears

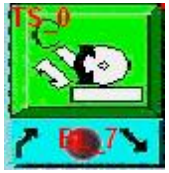
Three OK scenes。Indicates that the device has completed returning to the origin.

图 AA:


气缸、油缸动超时警告！
BL_0 主模夹退动作超时
BL_1 导模夹退动作超时
BL_2 上辅推退动作超时
BL_3 下辅推退动作超时
BL_5 抽芯退动作超时
BL_4 抽芯进动作超时
BL_6 换模上动作超时
BL_7 换模下动作超时
BL_8 脱模动作超时
BL_9 退弯动作超时
BL_10 上模合模动作超时
BL_11 下模合模动作超时
BL_12 托料下动作超时
油缸气缸动作时间超过设定动作超时报警时间。
请检查相应动作缸感应开关、超时时间设置、系统气压
油压是否正常。
TS_0
Exit

1. Mold installation

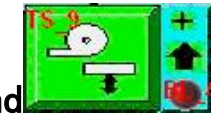
2. 

1: choose 

bend pipe, Then click 

, First, bend the elbow pipe to an angle greater than 90 degrees (the auxiliary push function will not work if the elbow pipe angle is less than 90 degrees).

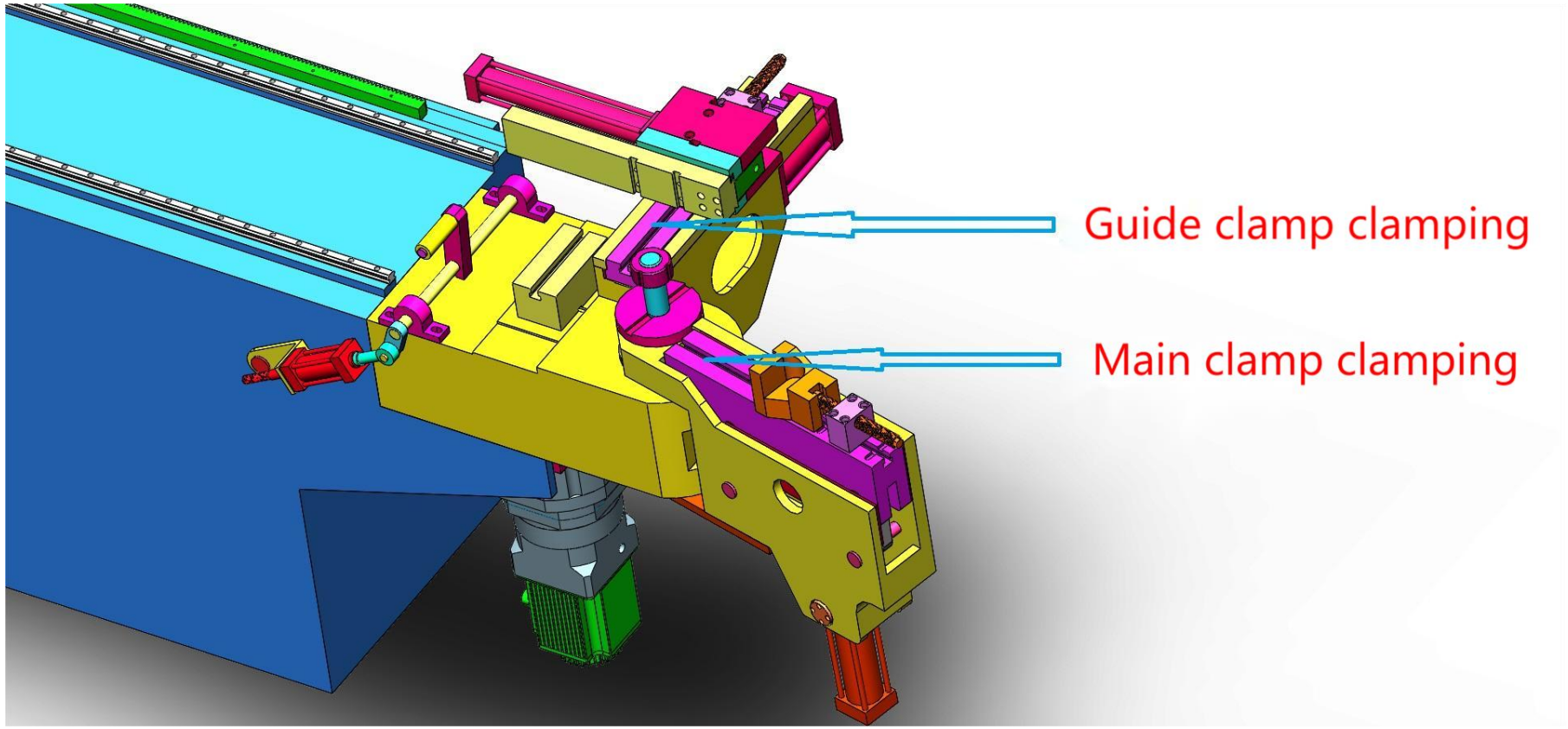
2: Choose separately 

main clip and 

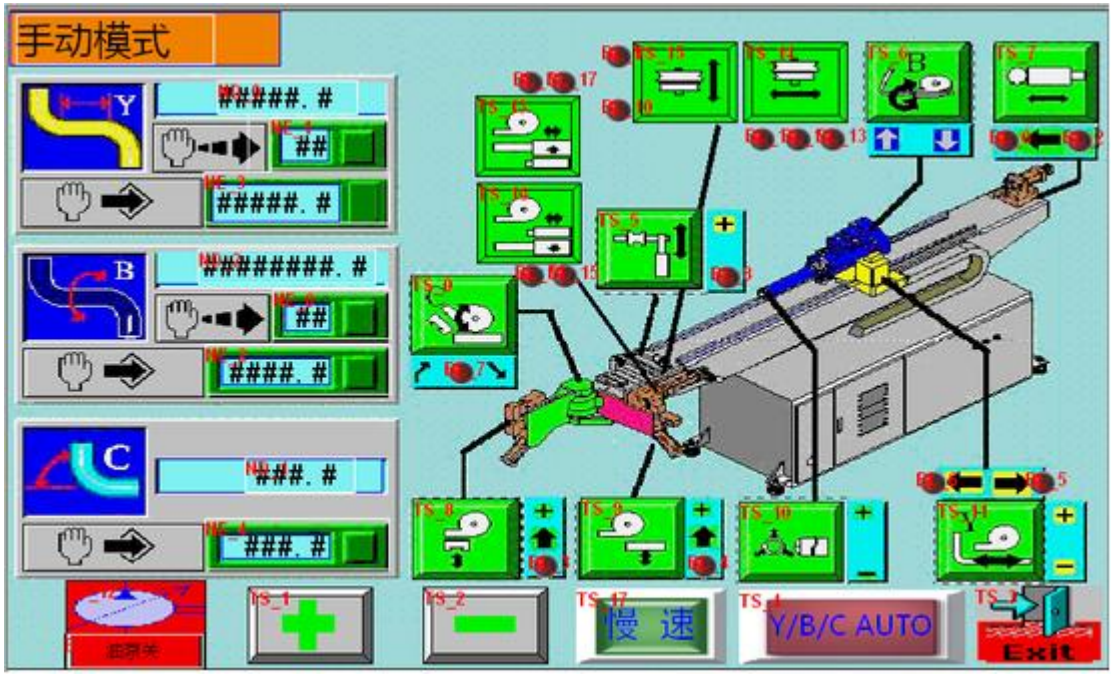
guide clamp, press 

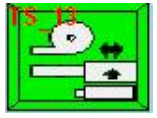
Secure the main clamp and guide clamp in place as shown in Figure 1.

图 1：



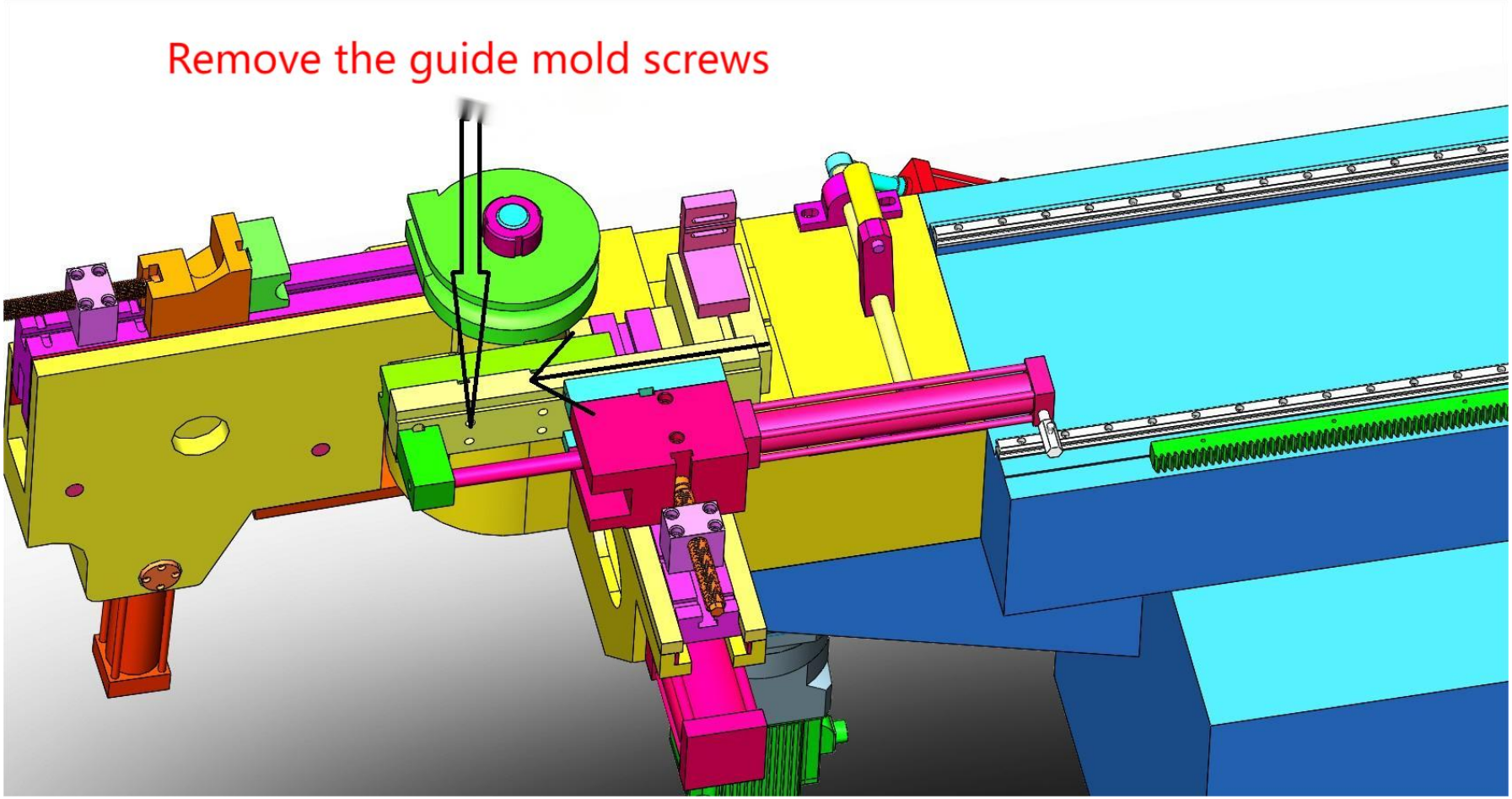
3:Guide mold replacement method



3.1: choose  auxiliary push (At this time, the elbow angle must be greater than 90 degrees.), press  , Until the auxiliary pusher extends and exposes the mold guide adjustment

screw hole, loosen the mold guide screws by a few turns to replace the mold guide. As shown in the figure。

picture 21:

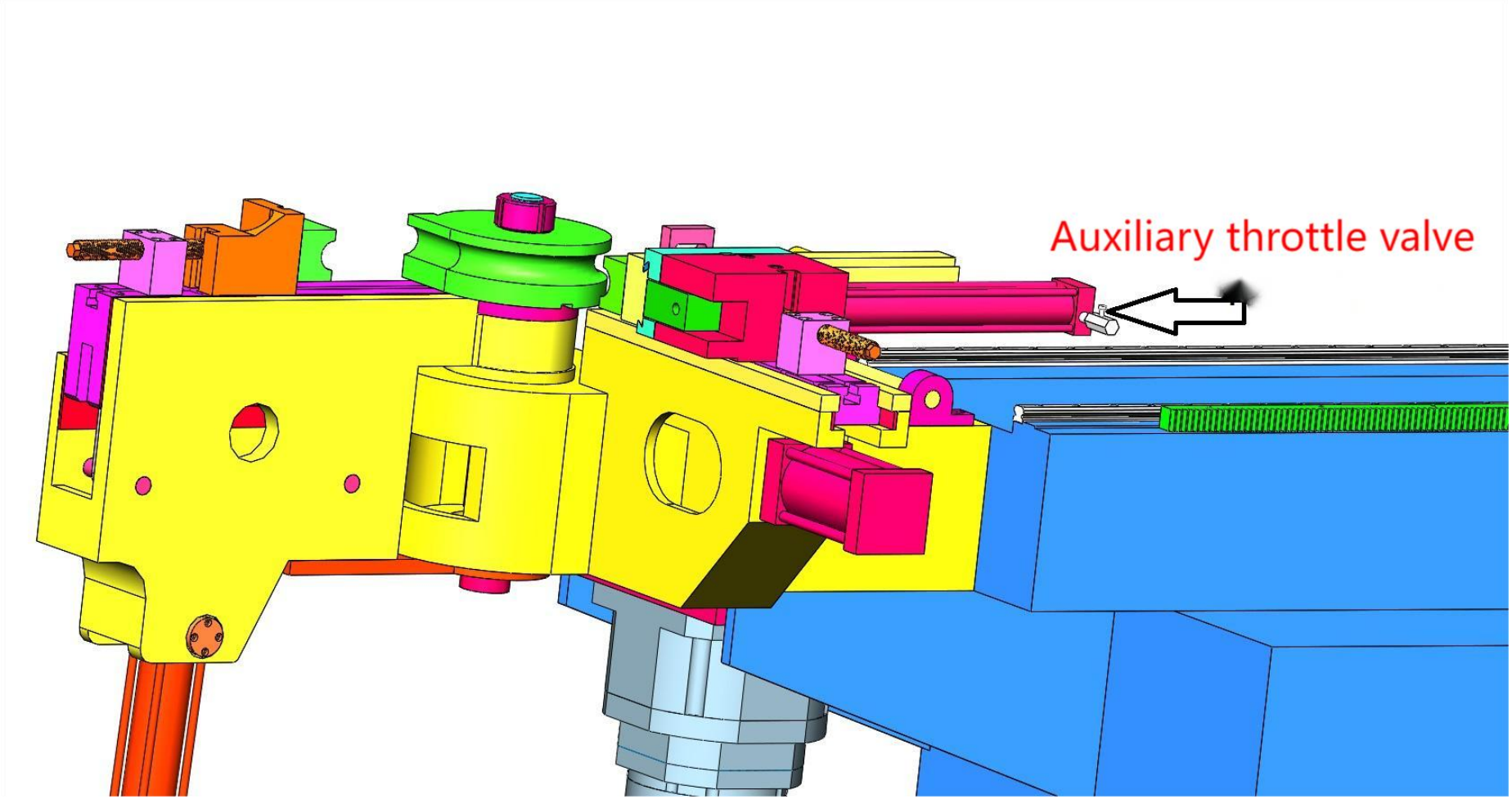


3.1.1: The function of an auxiliary throttling valve is to

regulate and control the flow of fluid in a system, often used to maintain pressure or flow rate within desired limits.:

The mold guiding speed can be adjusted using the throttle knob. Clockwise rotation slows down the speed, while counterclockwise rotation increases the speed. During the bending process, the mold guiding speed should not exceed the bending speed to avoid impact between the mold and the clamping mold. If wrinkling occurs on the inner wall of the pipe during bending, reducing the mold guiding speed can prevent it. Alternatively, slightly adjusting the mold towards the round mold can tighten the pipe further and also prevent wrinkling on the inner wall of the pipe. As shown in the figure211:

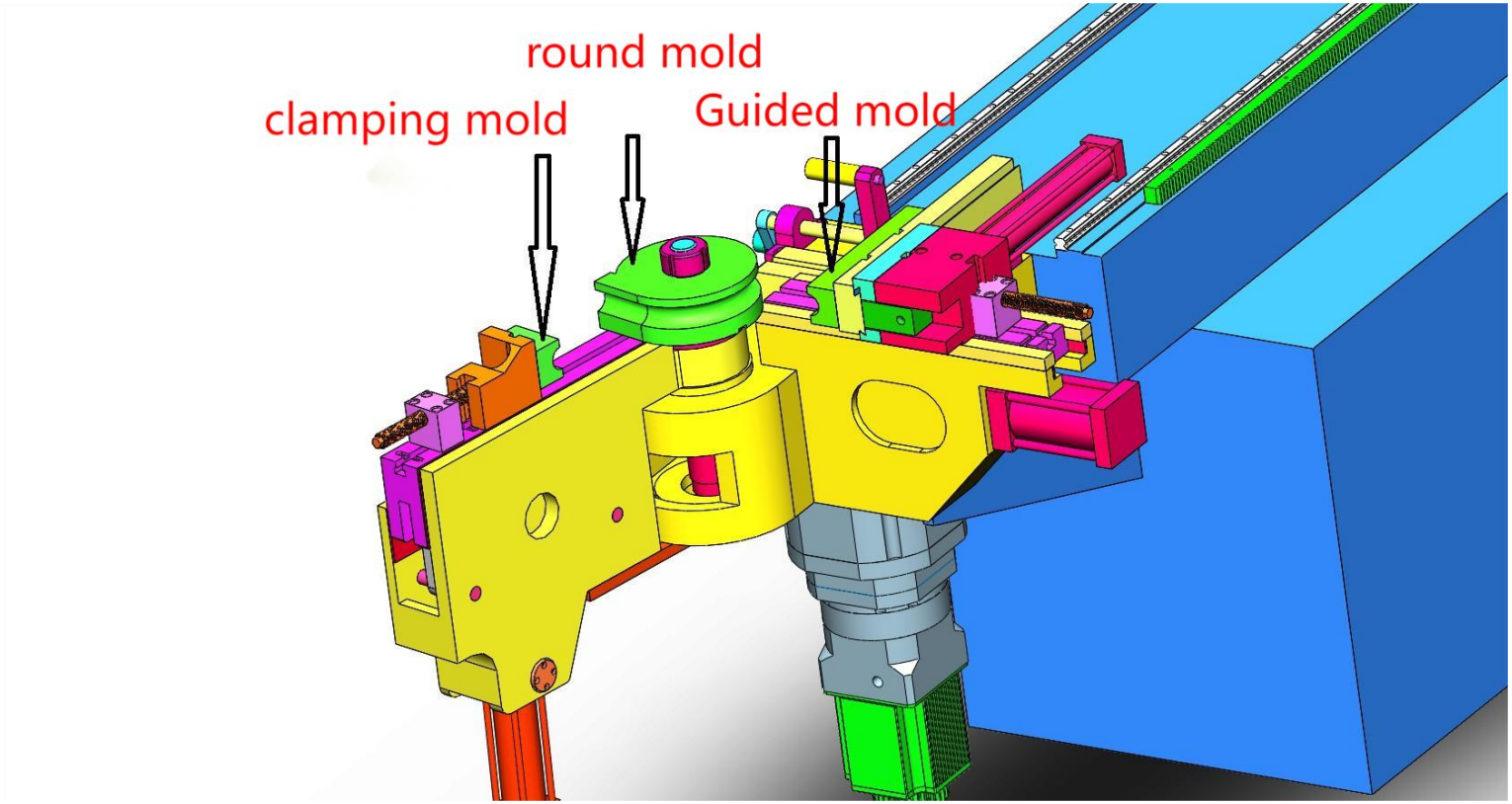
picture 211:



3.2: After installing the round mold, clamping mold, and guiding mold onto the equipment, there

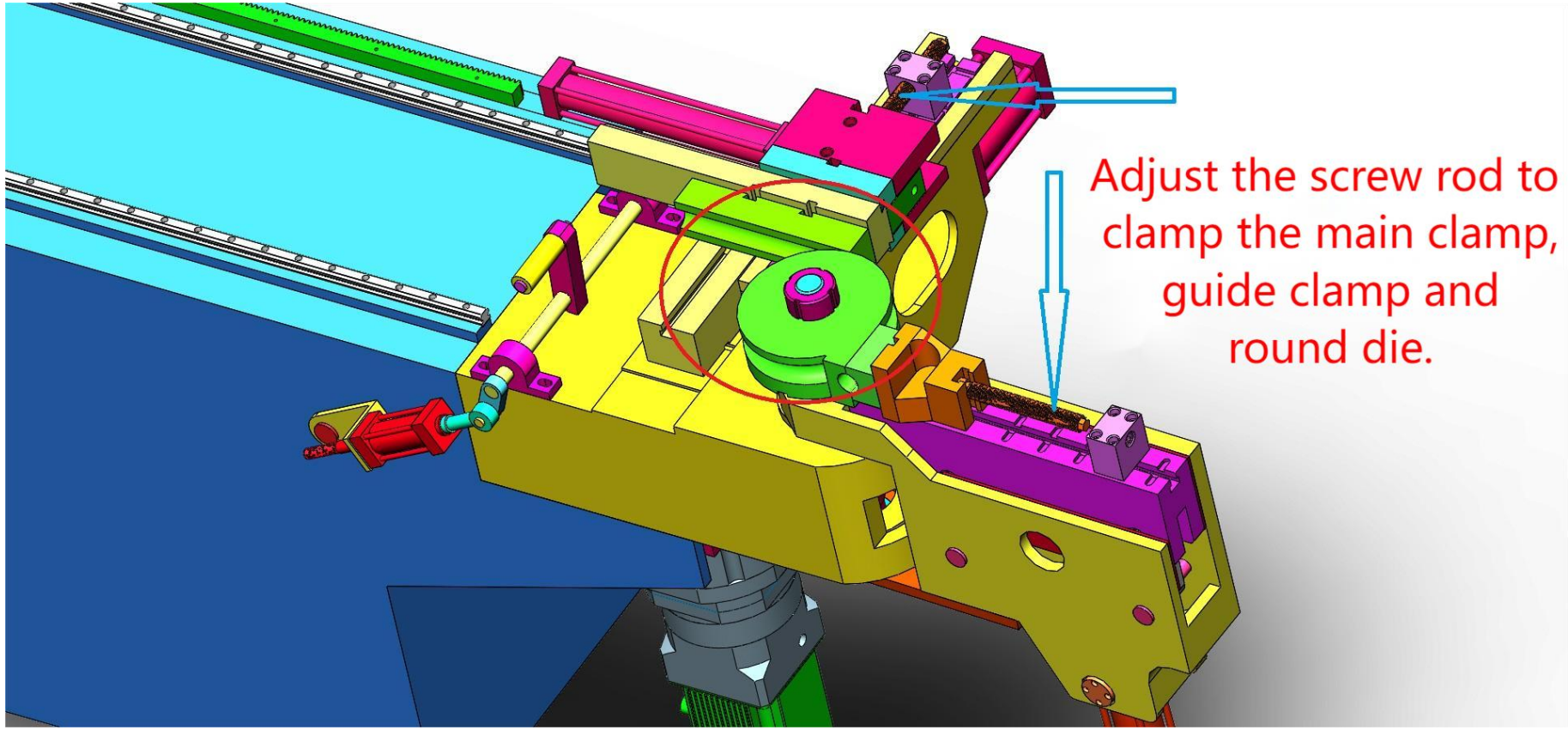
is a certain distance between the clamping mold, guiding mold, and round mold. (Before installing or replacing the mold, the main clamp and guiding clamp must be securely clamped before installation or replacement of the mold can begin.) As shown in the figure22,

picture 22:



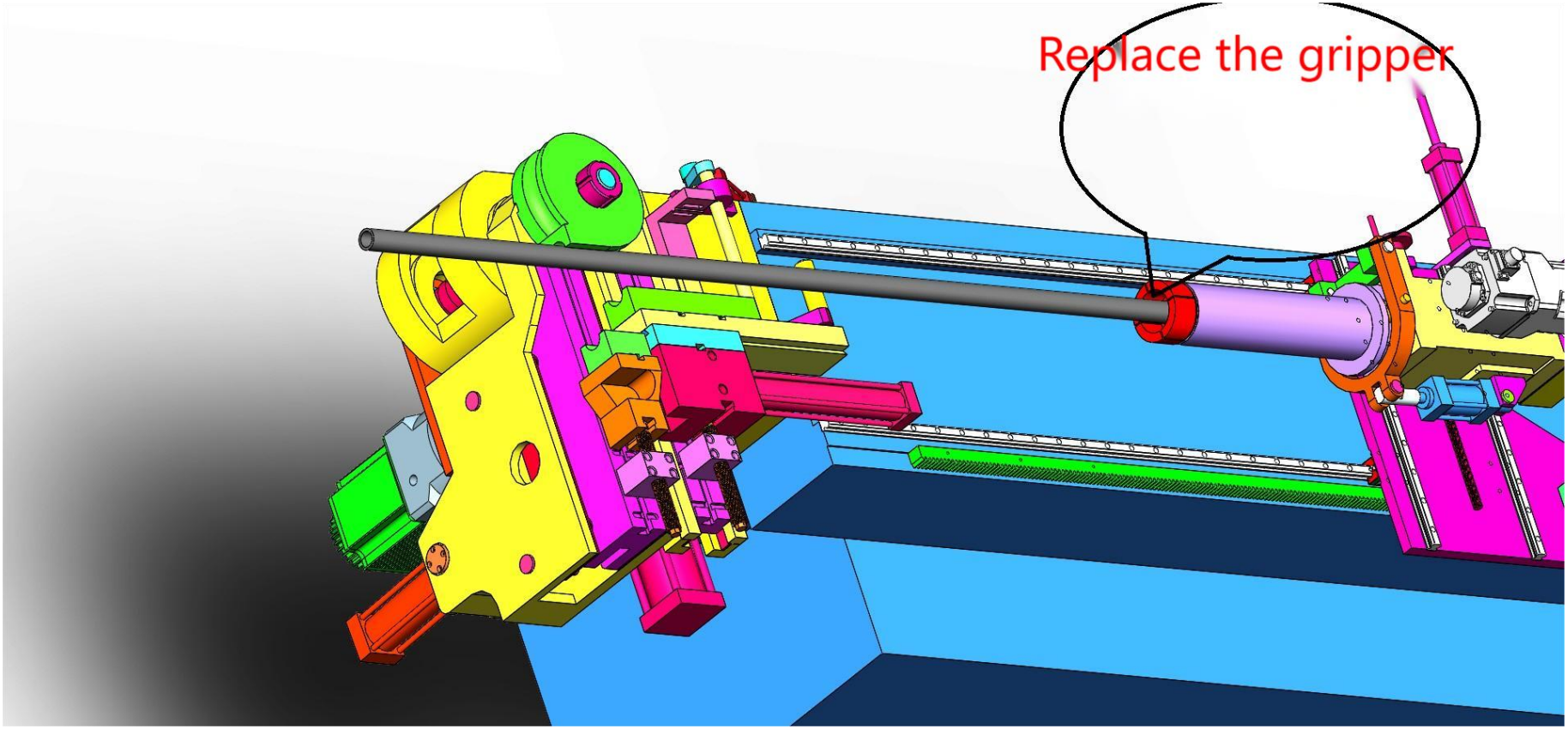
4: By adjusting the lead screw, move the clamping mold and guide mold forward until they contact the round mold or ensure that the pipe can be securely clamped. As shown in the figure3

picture 3:



5: Replace the pick-and-place fixture, at this point, the mold change for the entire equipment is complete. As shown in the figure4。

picture 4:



2-1: Bend pipe data document call and new document creation methods

After completing the mold installation in the previous step, proceed to call up and create the bending pipe data documentation.

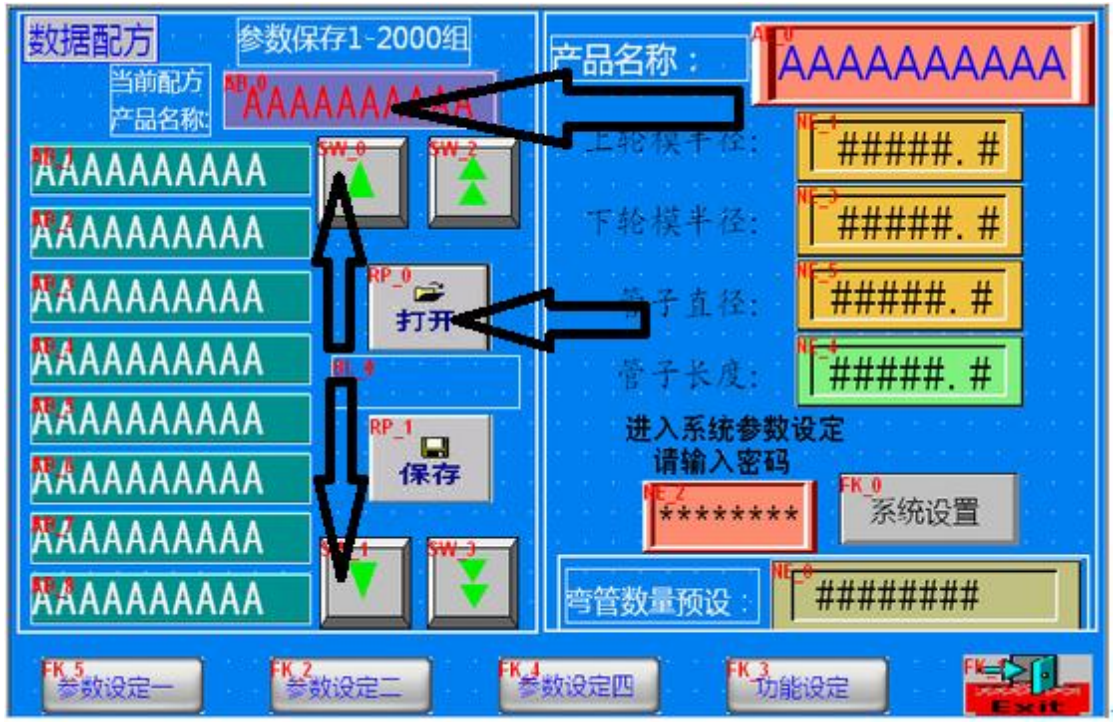
1: Open the third parameter settings page, click 

or 

Press to select an edited document or a blank document, 

The document name displayed in the box after the red text 'Current formula product name' is either the name of the document you want to open or a blank document. Then click to open. As shown in the figure。

picture A:

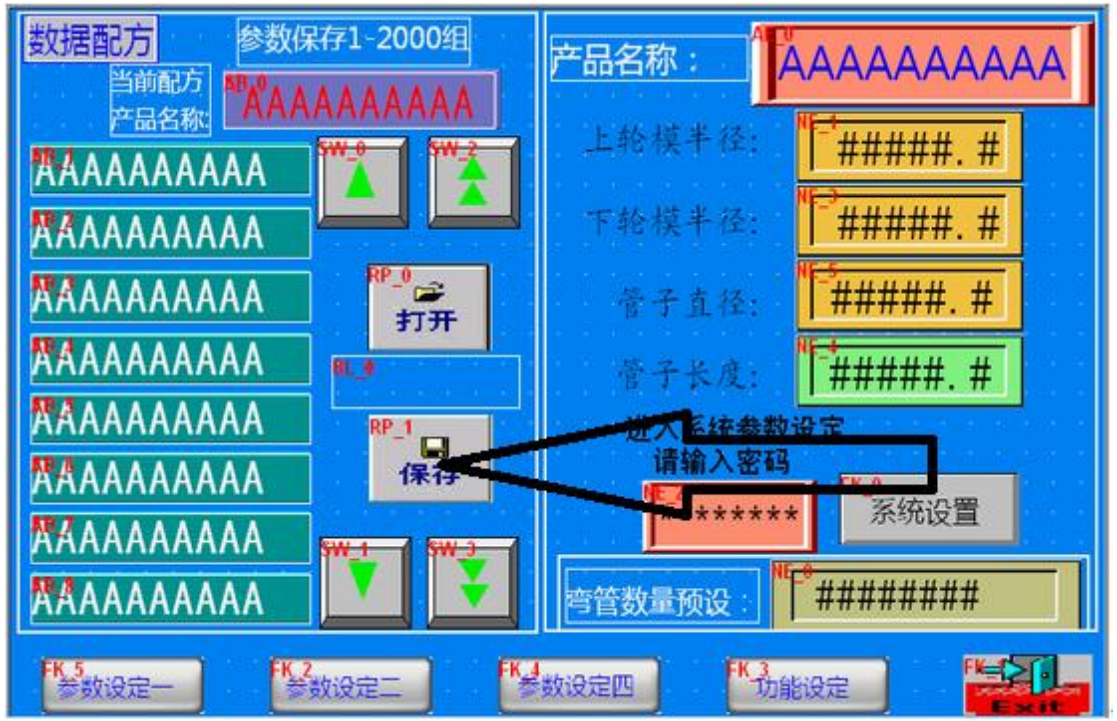

数据配方
参数保存1-2000组
当前配方
产品名称:
AAAAAAAAAA
SW_0
SW_2
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
RP_0
打开
RP_1
保存
SW_1
SW_3
产品名称：
AAAAAAAAAA
#####.#
#####.#
#####.#
#####.#
进入系统参数设定
请输入密码
****
系统设置
弯管数量预设：
########
参数设定一
参数设定二
参数设定四
功能设定
Exit

2: Methods for naming or renaming product names:

After following the steps in the previous step to open the desired document or a blank document, click the red box behind the product name 

A keyboard screen will appear. Enter the document name as needed, and click save once naming is complete. As shown in Figure B.

picture B:

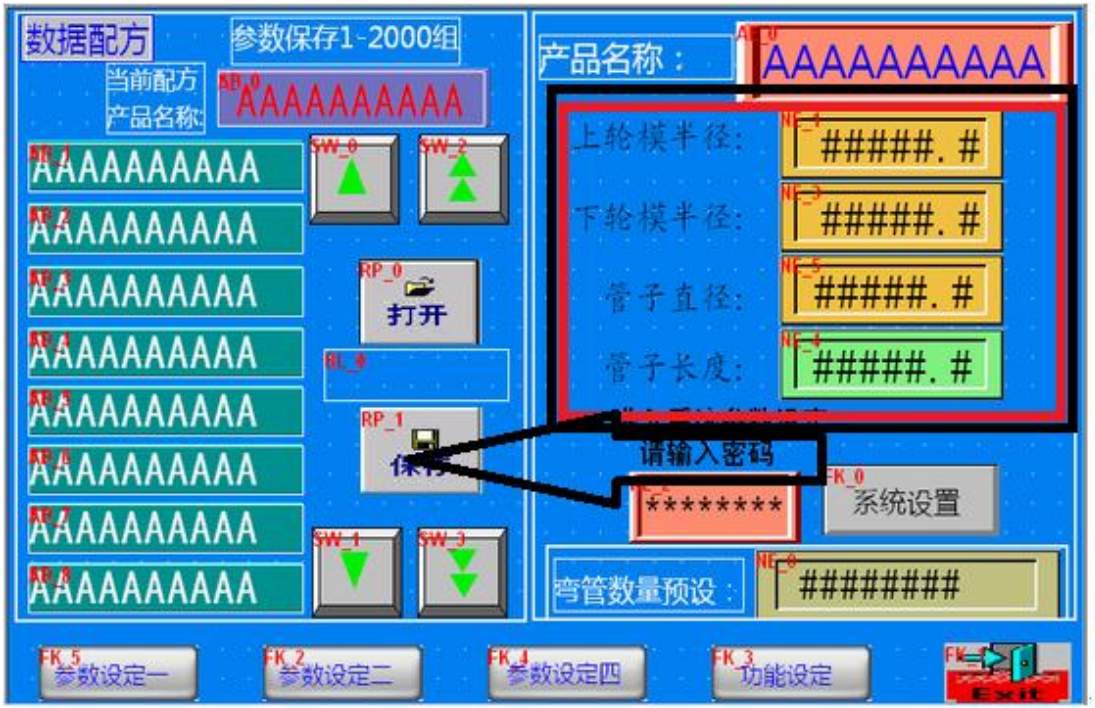

数据配方
参数保存1-2000组
当前配方
产品名称:
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
打开
保存
产品名称：
AAAAAAAAAA
上轮模半径:
#####.#
下轮模半径:
#####.#
管子直径:
#####.#
管子长度:
#####.#
请输入密码
******
系统设置
弯管数量预设：
########
参数设定一
参数设定二
参数设定四
功能设定
Exit

2-2: Bend pipe data setting method and fitting parameter input

Enter fitting parameters:

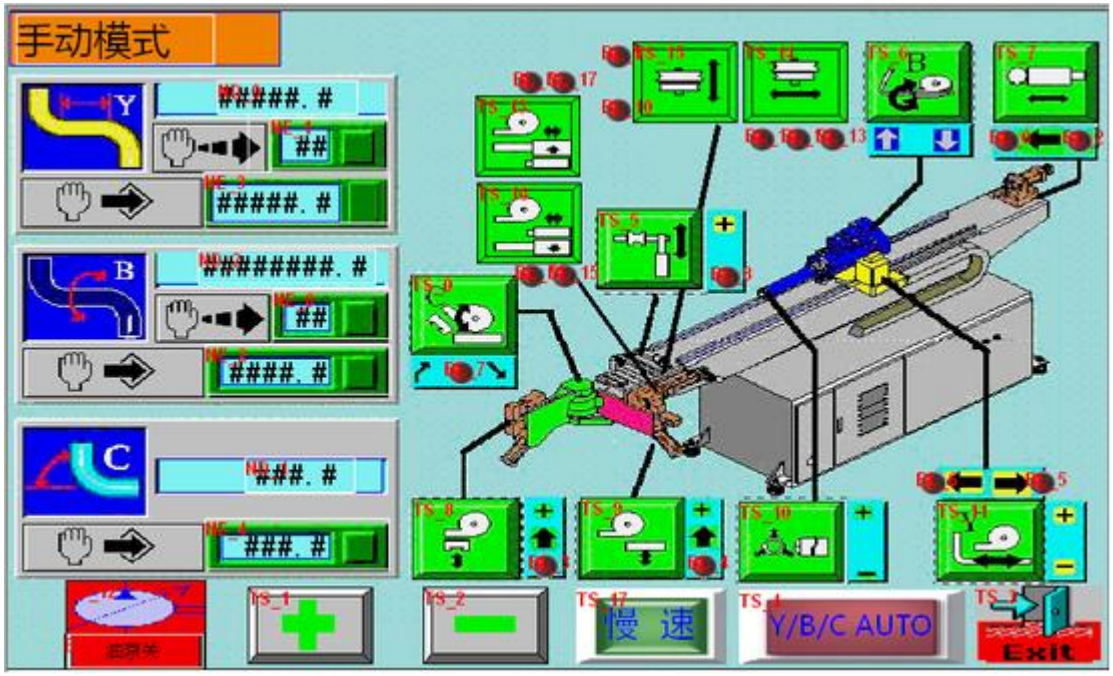
Open the parameter settings three-screen interface, and enter the round mold radius, pipe diameter, and fitting length in sequence. After inputting, please save. Refer to Figure C.

picture C:

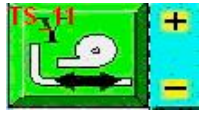


Method for setting bend pipe data:

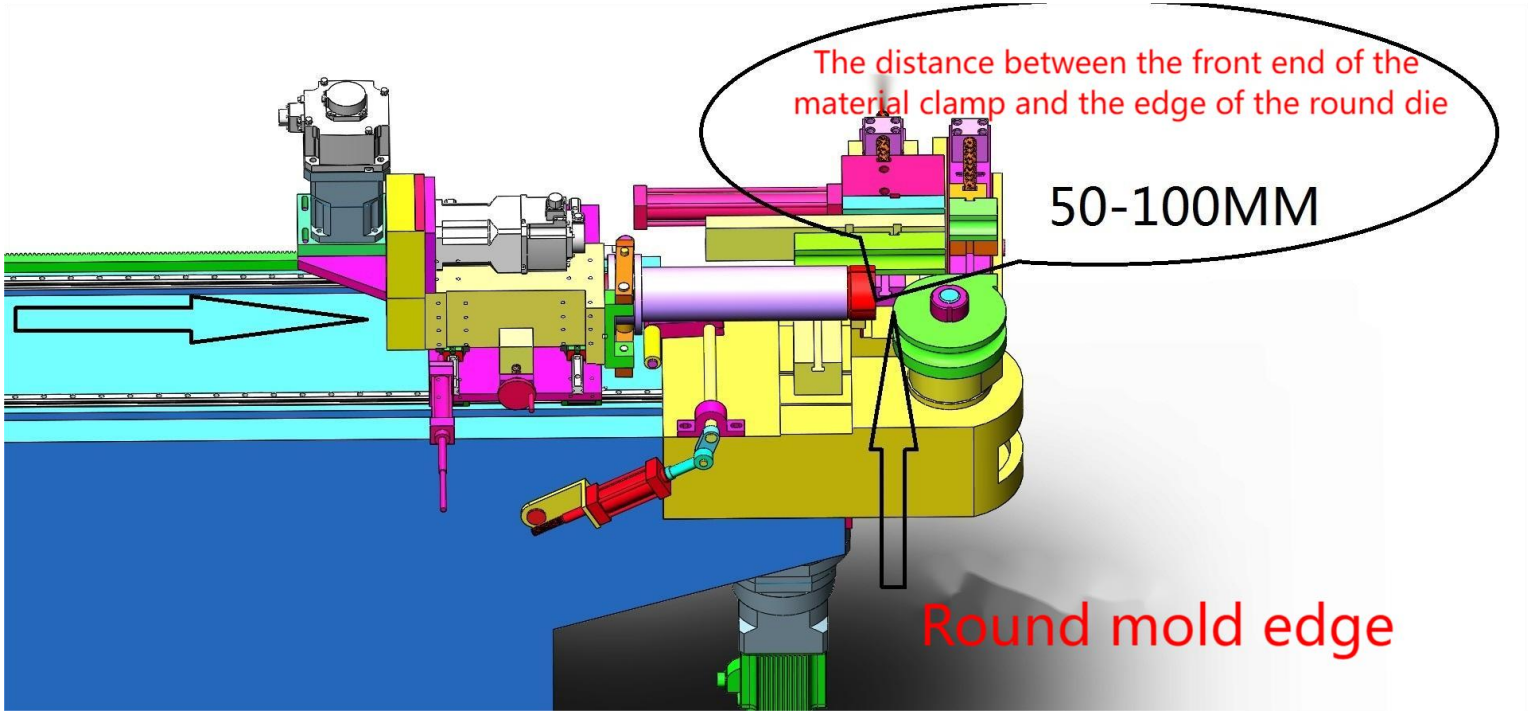
Go to the manual screen



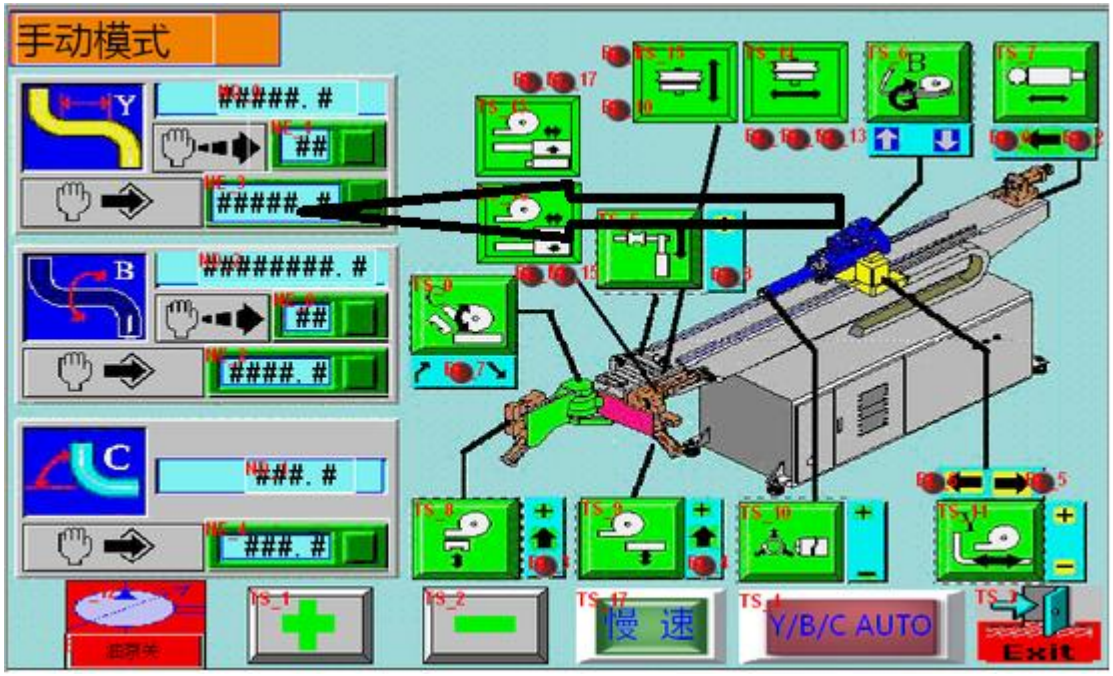
1: Method for setting the interference position of the wheel mold:

1.1: choose  shipping cost, Click  or  , Move the feed cart forward or

backward to a position 50-100mm away from the round mold, then stop. Record the numerical position of the feed cart on the manual display, as shown in Figures 1 and 2.图 1:



picture 2;

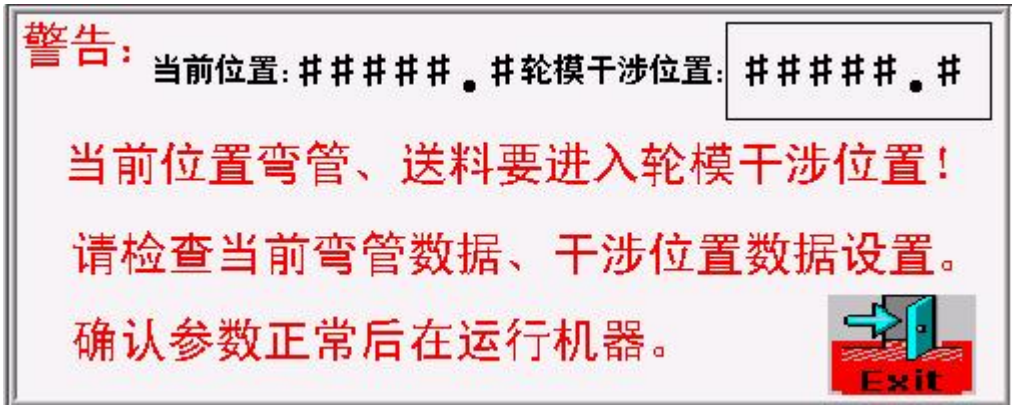


1.2: Set the parameters for the pipe bender on the four-screen interface. Enter the digit representing the position of the trolley moving forward to 50-100mm in front of the round die into the 'die interference position' box on the four-screen parameter setting interface, as shown in Figure 3.

picture 3:

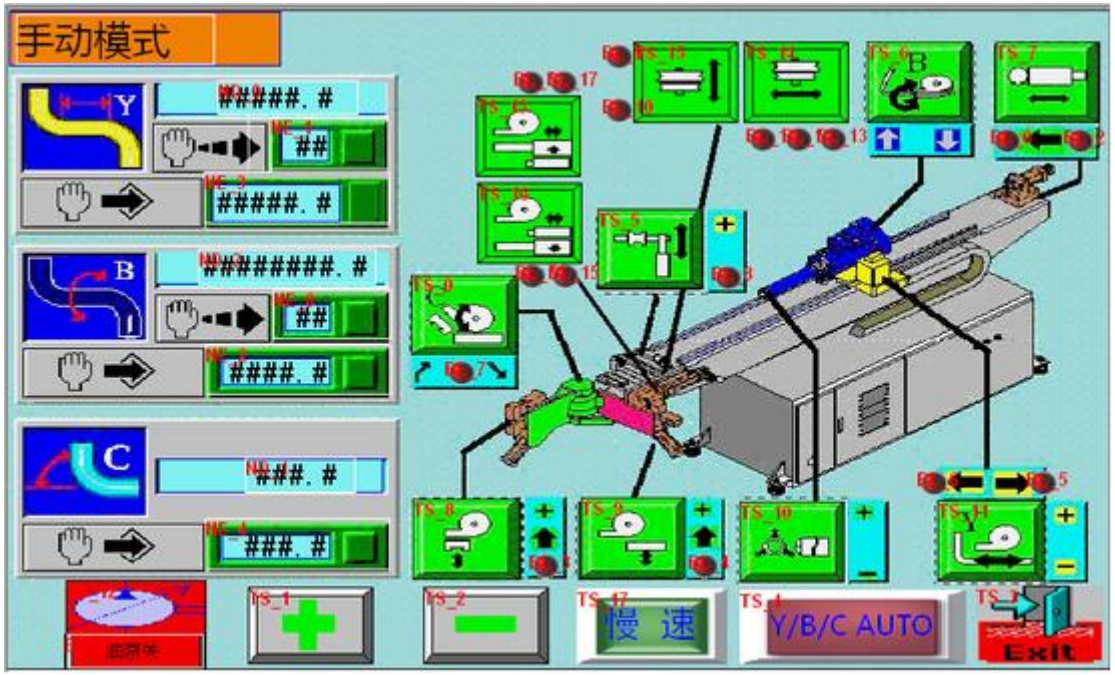
When the image shown in Figure 33 appears during the pipe bending process, it indicates that the material feeder's gripper has entered the round mold area and a collision may occur. If the material feeder's gripper is still some distance from the round mold but must move forward to

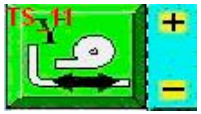
complete the pipe bending product, you can modify the wheel mold interference position data in the parameter setting four screen, as shown in Figure 3. The prerequisite for modifying the wheel mold interference position is to ensure that no collision occurs. (This situation also applies when the material feeder needs to enter the guide mold interference position during the pipe bending process and an alarm similar to Figure 33 occurs. The solution is to modify the guide mold interference position data in the parameter setting four screen.) picture 33:



2: Guide mold interference position setting method

Enter manual mode



2.1: choose 

shipping cost, click 

or 

, Move the feed car forward or backward to a position 50-100mm away from the guide mold, then stop. Record the numerical position of the feed car on the manual display, as shown in Figures 4 and 5.

图 4:

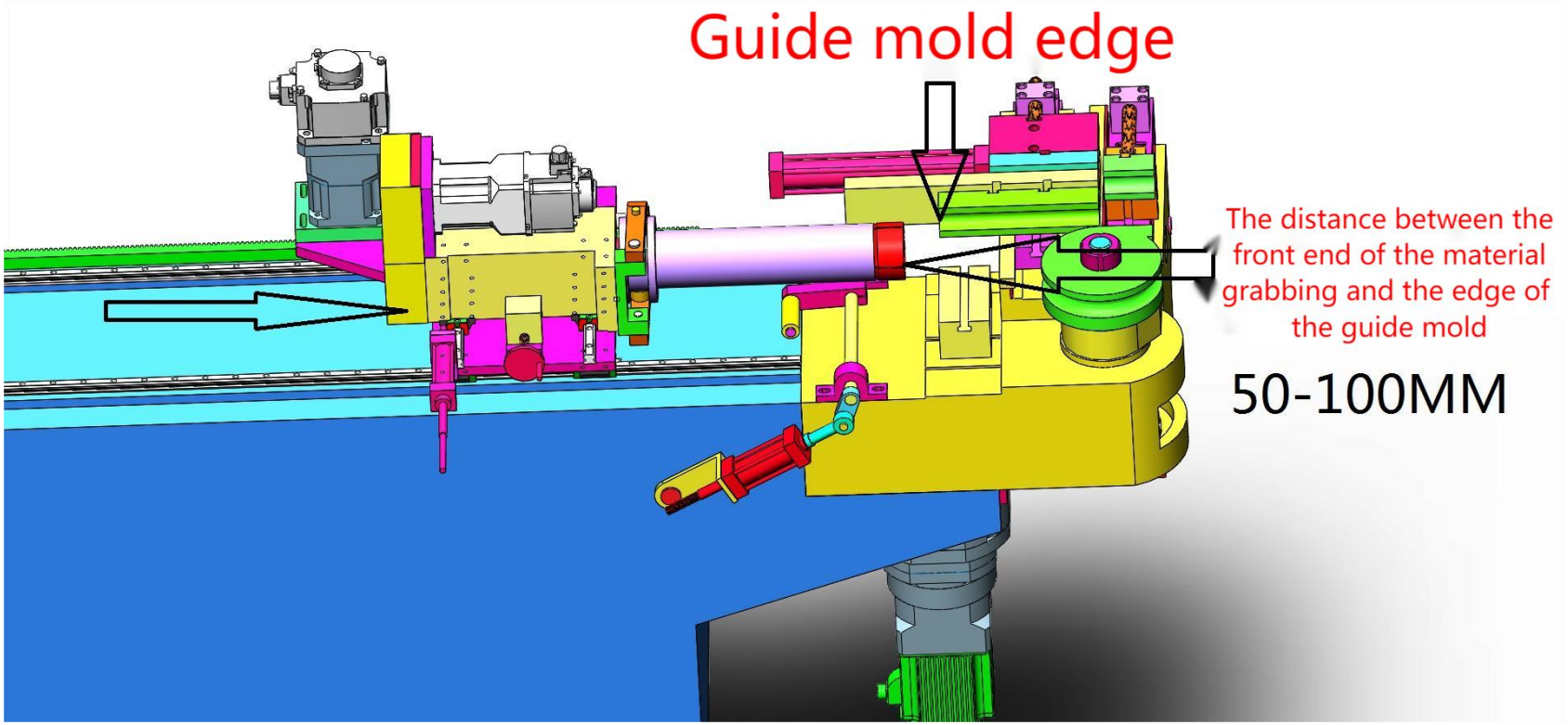
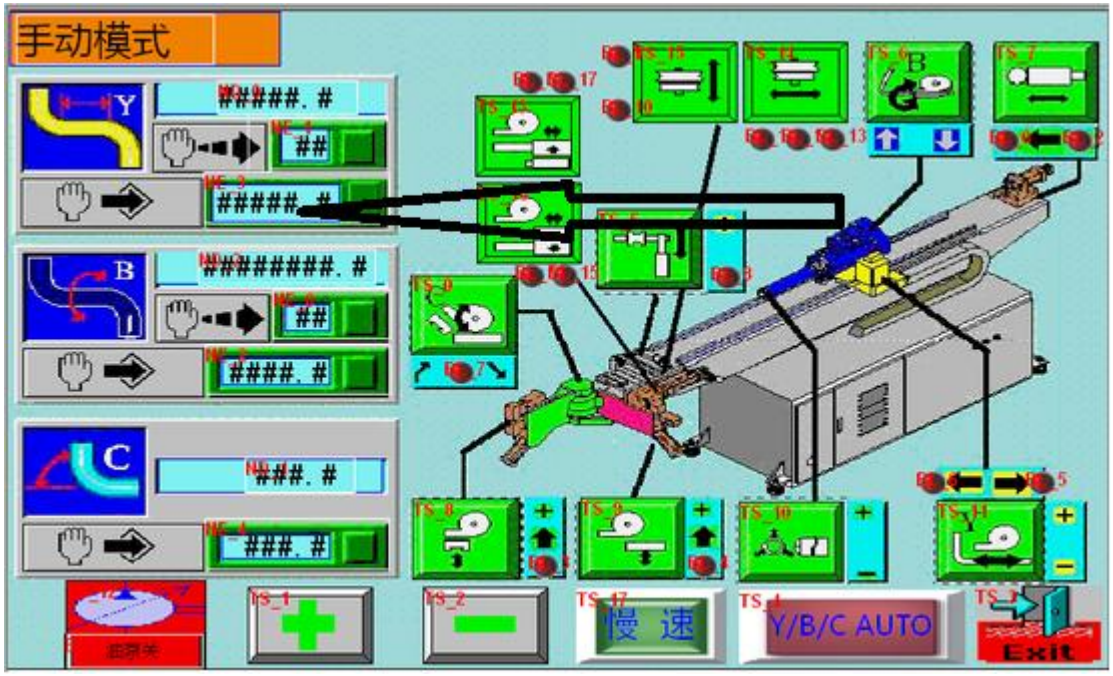

Guide mold edge
The distance between the front end of the material grabbing and the edge of the guide mold
50-100MM

图 5：

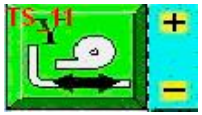


2.2: Set the parameters for the pipe bender on the four-screen interface. Enter the digit representing the position of the trolley moving forward 50-100mm into the mold interference position box on the four-screen parameter setting interface. As shown in Figure 6.

picture 6:


参数设定四
机械行程：
#####.#
mm
当前位置：
#####.#
mm
托料干涉位置：
#####.#
mm
轮模干涉位置：
#####.#
mm
导模干涉位置：
#####.#
mm
待料位置：
#####.#
mm
最后弯小车位置：
#####.#
mm
上料时间：
##.#
下料时间：
##.#
送料脱模长度：
#####.#
mm
送料脱模速度：
##
最后一弯弯管延时：
##.#
慢弯角度：
##.#
角度补偿：
##.#
辅推先关角度：
##.#
慢退芯角度：
##.#
慢退弯角度：
##.#
参数设定一
参数设定二
参数设定三
功能设定
Exit

3: Feed material interference position setting method:

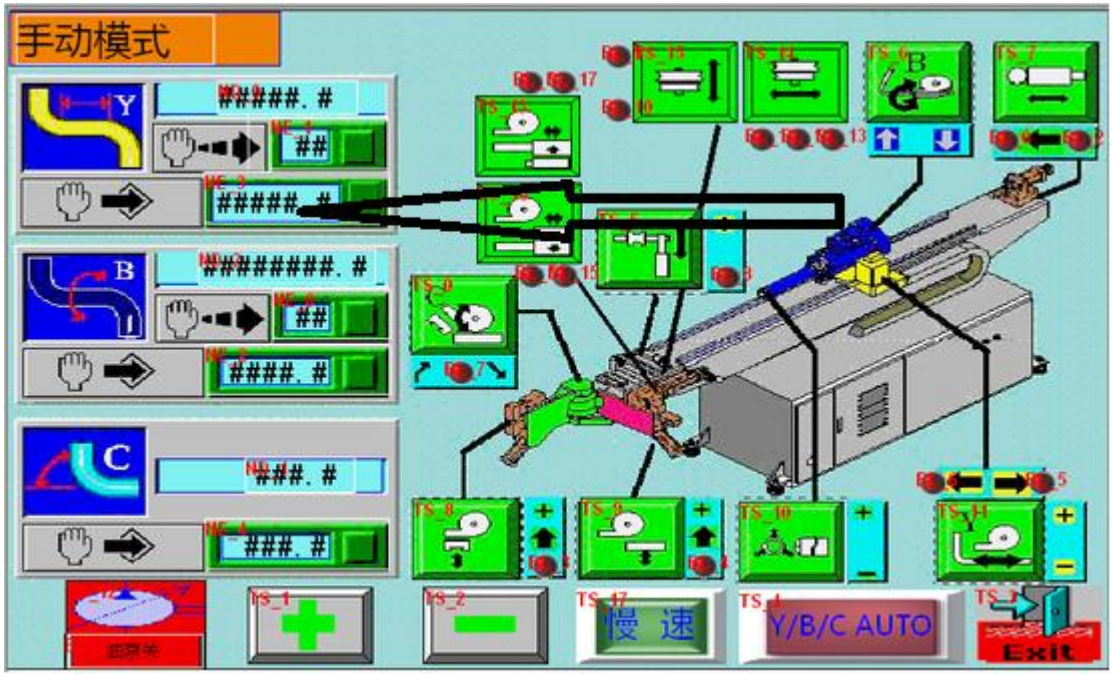
3.1: Enter the manual mode, choose 

shipping cost, Click 

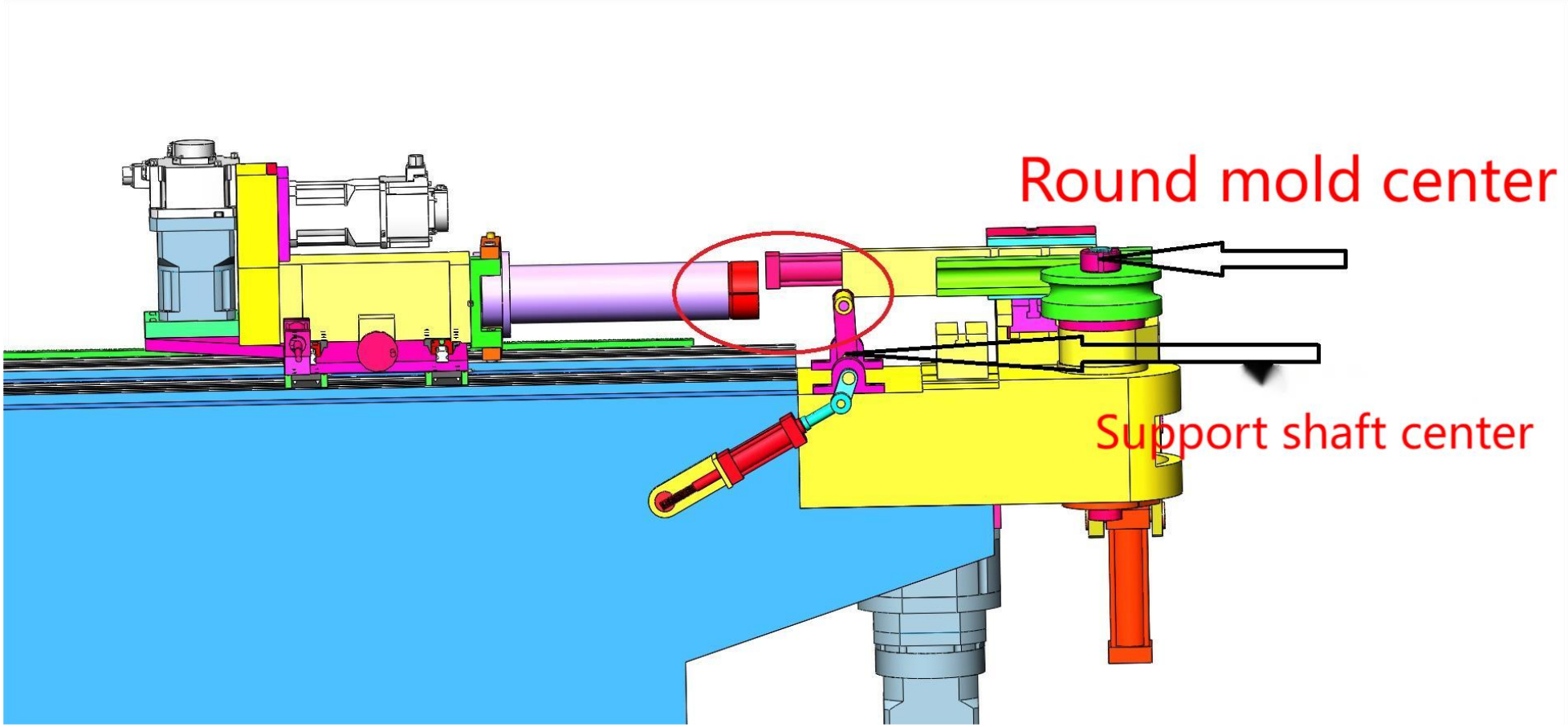
or 

, 将 Move the material supply cart forward or backward to a position 200-300mm away from the material rack, then stop. Record the numerical position of the material supply cart on the manual display, as shown in Figures 7 and 8.

picture 7



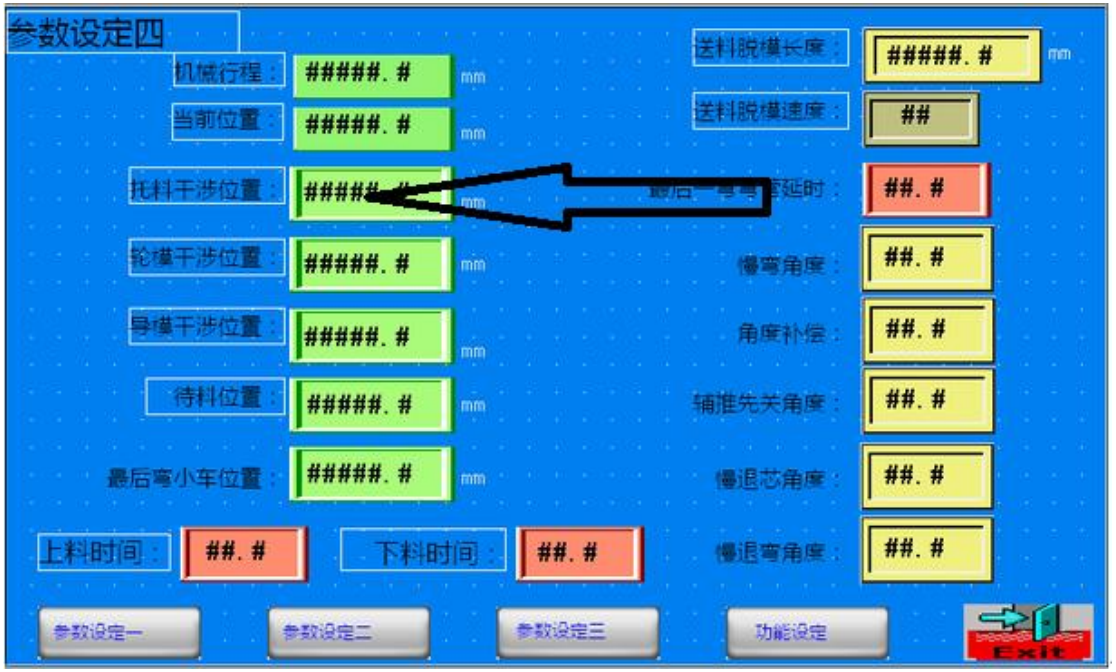
picture 8:



3.2: Set the parameters for the pipe bender on the four-screen interface. Enter the previously

recorded distance of 200-300mm, where the cart moves forward to the material support rack, into the 'material support rack interference position' box on the four-screen parameter setting interface. As shown in Figure 9.

picture 9:

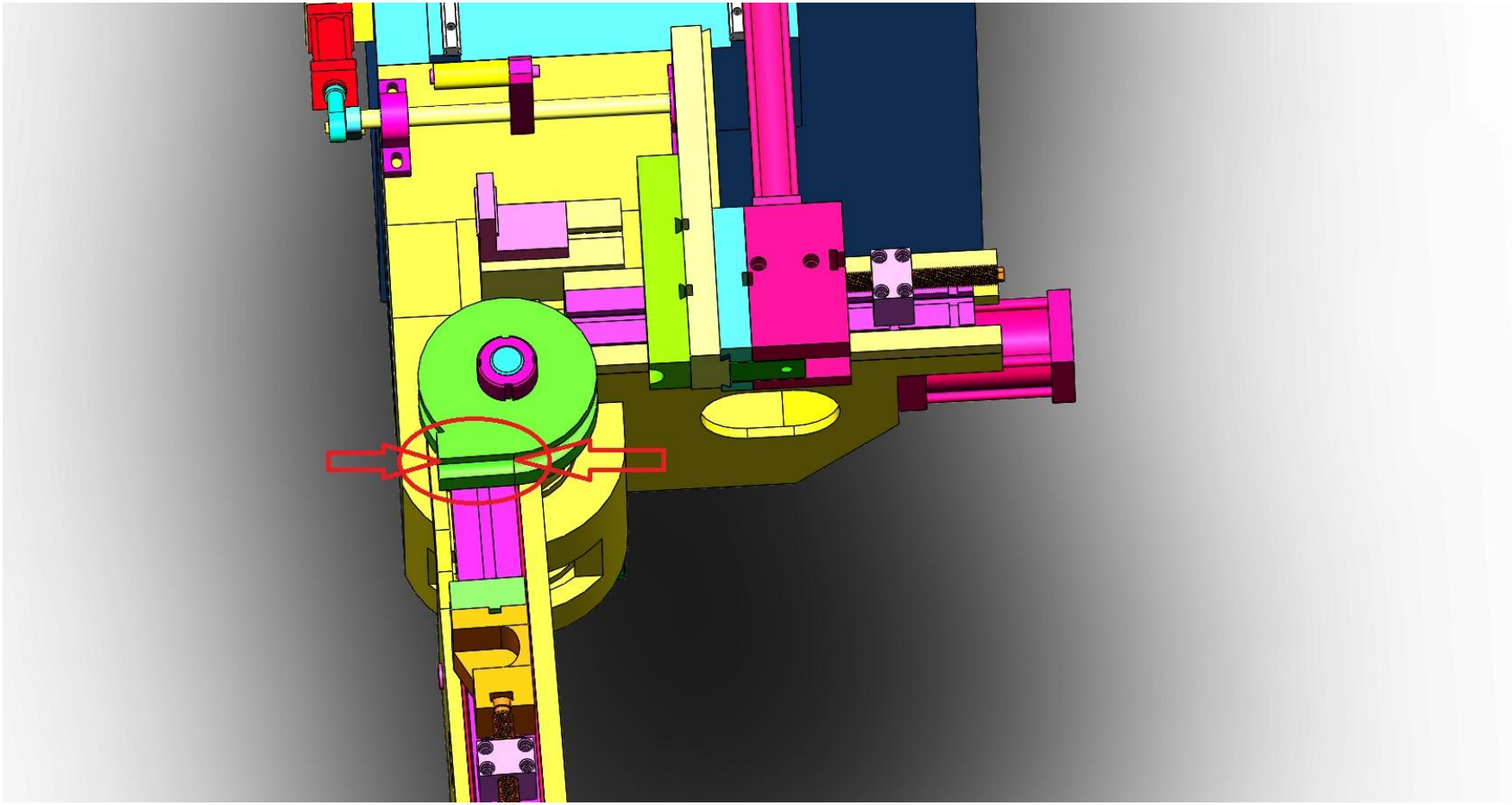


4: The method for setting the demolding length of delivery:

The value of the feed demolding length is: (The input position for feed demolding length is in parameter setting four, as shown in Figure 10). The feed demolding length value should be greater than or equal to the clamping length on the round mold (or the clamping length of the mold installed this time), for example, if the clamping length is 100mm, then the feed demolding distance can be 100mm or 100-120mm. As shown in Figure 10.1. picture 10:


参数设定四
机械行程：
#####.#
mm
当前位置：
#####.#
mm
托料干涉位置：
#####.#
mm
轮模干涉位置：
#####.#
mm
导模干涉位置：
#####.#
mm
待料位置：
#####.#
mm
最后弯小车位置：
#####.#
mm
上料时间：
##.#
下料时间：
##.#
送料脱模长度：
#####.#
mm
送料脱模速度：
##
最后一弯弯管延时：
##.#
慢弯角度：
##.#
角度补偿：
##.#
辅推先关角度：
##.#
慢退芯角度：
##.#
慢退弯角度：
##.#
参数设定一
参数设定二
参数设定三
功能设定
Exit

picture 10.1:



5: The method for setting the feed demolding speed: The feed demolding speed is also the feed

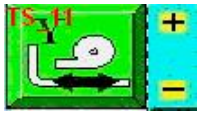
speed. Generally, input values of 4-6 are acceptable. Inputting 1 gives the slowest speed, while inputting 9 gives the fastest speed. When first using this pipe bending machine and not yet familiar with it, a too fast speed is unsafe, so it is not recommended to use the maximum speed. Once you become proficient with the equipment and ensure that there is no interference or collision between the pipe and the machine during the bending process, you can increase the speed to improve production efficiency. The feed demolding speed input screen is located on the 'Parameter Setting Four' screen of this machine, as shown in Figure 11:

picture 11:

6: The method for setting the material holding position:

The meaning of the 'waiting position for material' is: At what position on the equipment is the material-grasping clamp of the feeding cart waiting for manual insertion of the pipe.

The specific setting method is: enter the manual screen, place the pipe material to be bent

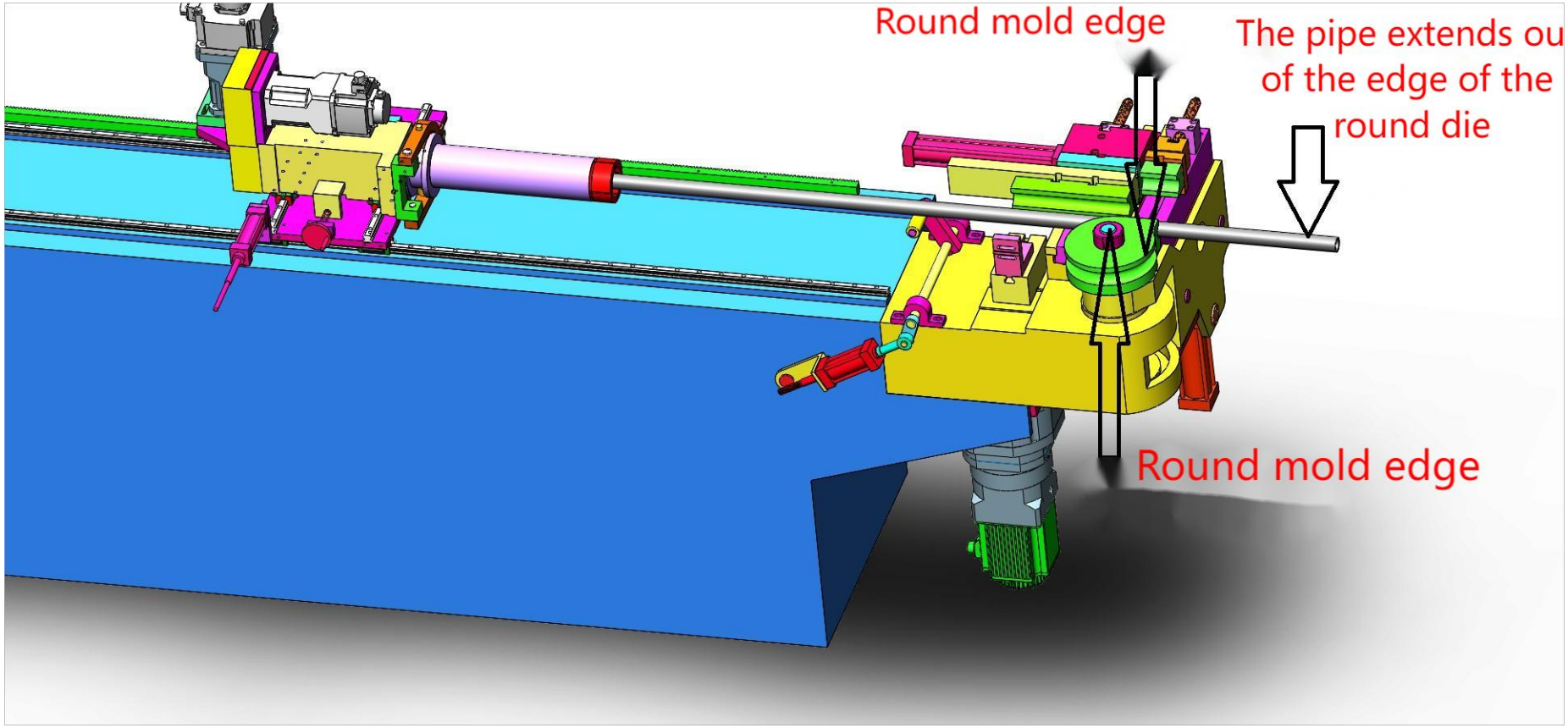
into the pipe bender's clamping mechanism, choose 

shipping cost, Click 

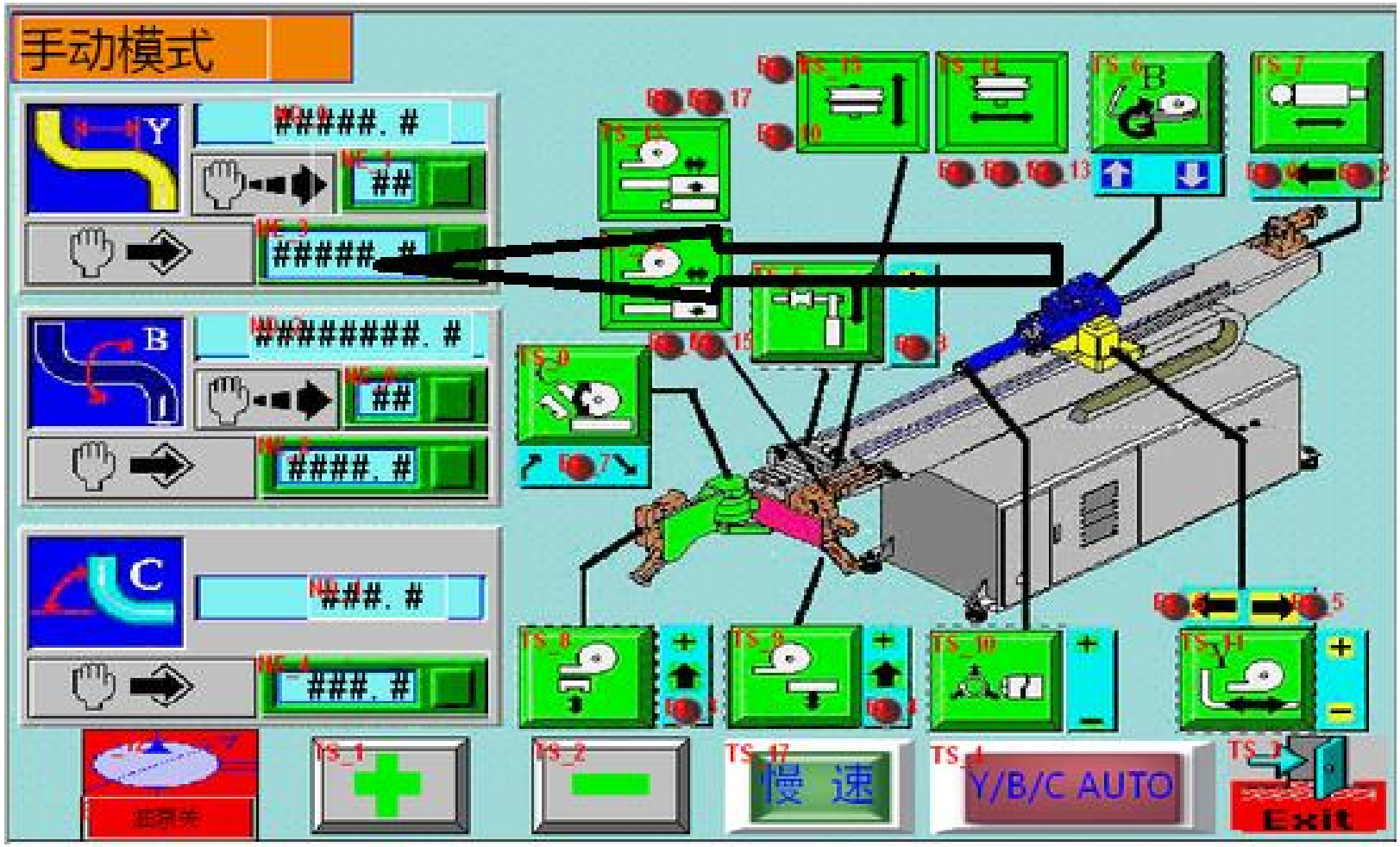
or 

, Move the feed material forward or backward until the pipe extends 200-400mm from the bending machine head (as shown in Figure 12). Then, record the numerical value of the feed cart's position at this moment (as shown in Figure 13). This value is the value of the waiting material position. Then, input this value into the 'Parameter Setting Four' waiting material position box, as shown in Figure 14. Extending the pipe 200-400mm from the bending machine is to ensure that the operator's hand does not enter the clamping area of the bending machine, ensuring safety.

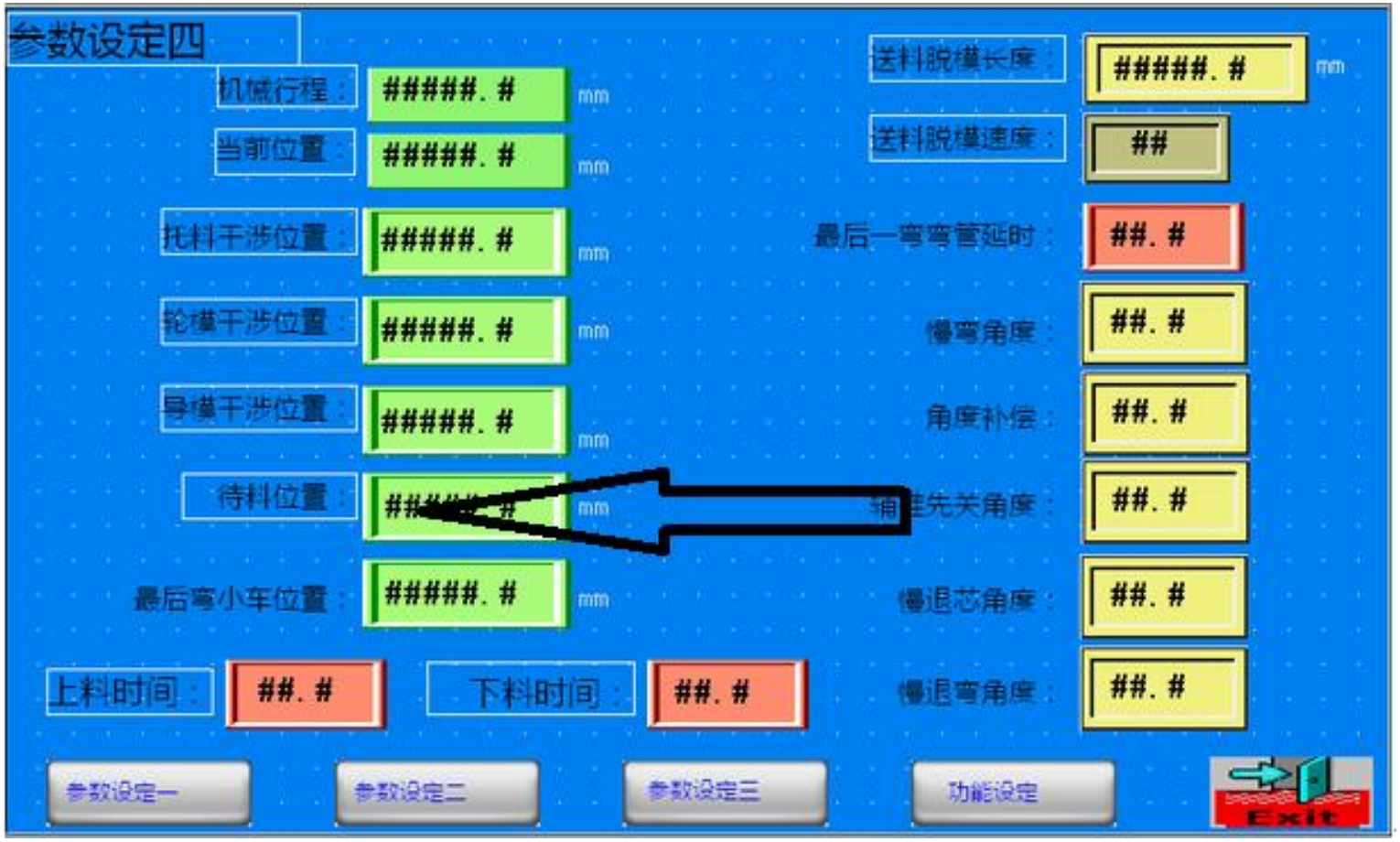
picture 12:


Round mold edge
The pipe extends ou
of the edge of the
round die
Round mold edge

picture 13:



picture 14:



7: The method for setting the position of the last small

vehicle:

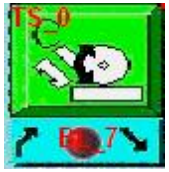
The meaning of the last bend carriage position is: when the last bend of the pipe fitting is completed, the feed carriage retreats to what position? It can also be understood as: after the last bend of the pipe fitting is completed, the carriage retreats to what position to wait for the pipe to be placed and proceed to the next pipe fitting bending. Therefore, the last bend carriage position can be set to the same parameter as the 'waiting position'. It can also be set to: for example, if the waiting position value is 1000, then the last bend carriage position can also be set to 1000 or a value within ±200 of 1000, i.e., 800-1200. The value of the last bend carriage position just needs to be within the machine's travel range.

8: slow curve angle setting:

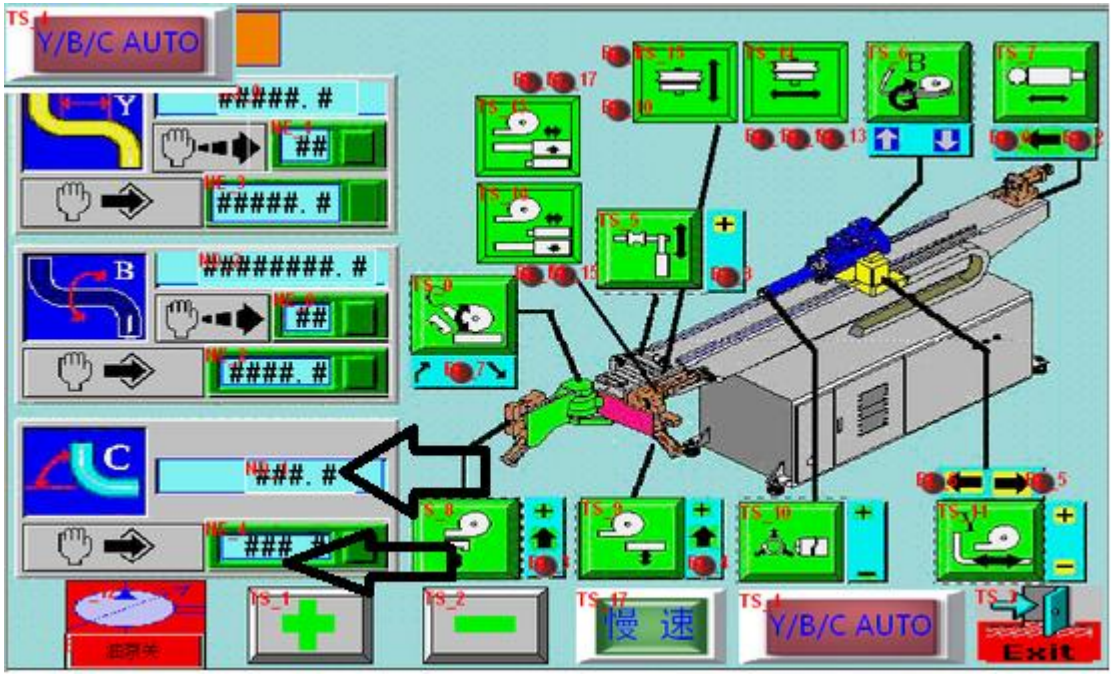
The meaning of the slow bend angle is: when bending the pipe, the bending arm will decelerate when it reaches the set slow bend angle value to improve the accuracy of the bending angle. For example, if the bending angle is set to 90 degrees and the slow bend angle is set to 10 degrees,

then the bending arm will start to decelerate when it reaches 80 degrees to bend to 90 degrees. How many degrees should the slow bend angle be set to? Open the parameter setting screen, go to the slow bend angle box, and input the slow bend angle value (usually between 6-15 degrees), as shown in Figure 15.

picture15

Then switch to manual mode, (this operation is also part of the manual pipe bending method). choose  bend pipe Click  , Click again  , Then click once  , At this time, the bending machine will automatically bend the pipe, and the auxiliary pusher will also work. (If not clicked  , The auxiliary push does not work when bending the pipe.), When the bending arm reaches the preset slow-bending angle, it will automatically decelerate. After the bending process, check if the set bending angle value matches the actual bending angle value, as shown in Figure 16. If they match, it indicates that the slow-bending angle is set accurately. If the actual bending angle value is greater than the set bending angle value, for example, if the set bending angle value is 90 degrees and the actual bending angle displayed is 91 degrees, then the slow-bending angle value still needs to be increased.

picture 16:

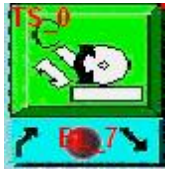


9: angle compensation setting method:

With the use of bend angle compensation, it may not be necessary to set a slow bend angle.

角度补偿的含义是：实际弯管角度值与设定角度值的差就是角度补偿值。

Generally, the actual bending angle value is 1-3 degrees larger than the set bending angle value. This is because the bending process is controlled by hydraulic cylinders and solenoid valves, which introduces some degree of error. The specific setting method involves inputting the difference between the actual bending angle value and the set bending angle value into the angle compensation box in parameter setting four, as shown in Figure 18. For example, if the actual bending angle is 92 degrees and the set bending angle is 90 degrees, the bending compensation value would be 2 degrees. Conversely, it would be -2 degrees.

manual mode——choose 

, bend pipe 

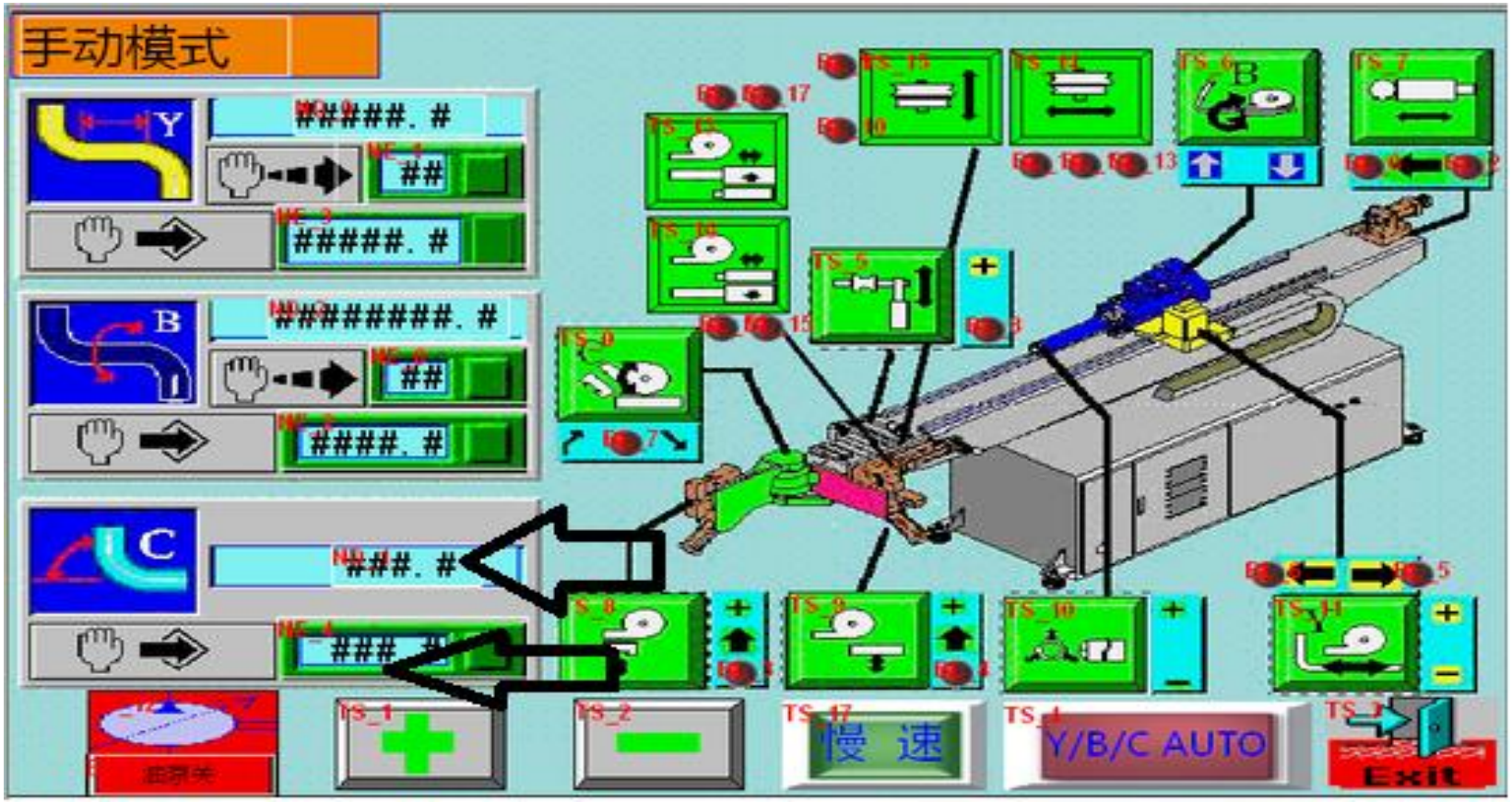
, Then click once 

, At this time, the bending machine will automatically bend the pipe, and the auxiliary pusher will also work. (If not clicked 

, The auxiliary push does not work when bending the pipe.), When the bending arm reaches the set bending angle, stop. After bending, observe whether the set bending

angle value matches the actual bending angle value, as shown in Figure 17.

picture 17:



picture 18:

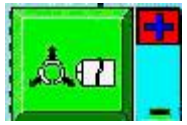

参数设定四
机械行程：
#####.#
mm
当前位置：
#####.#
mm
托料干涉位置：
#####.#
mm
轮模干涉位置：
#####.#
mm
导模干涉位置：
#####.#
mm
待料位置：
#####.#
mm
最后弯小车位置：
#####.#
mm
上料时间：
##.#
下料时间：
##.#
送料脱模长度：
#####.#
mm
送料脱模速度：
##
最后一弯弯管延时：
##.#
慢弯角度：
##.#
角度补偿：
##.#
辅推先关角度：
##.#
慢退芯角度：
##.#
慢退弯角度：
##.#
参数设定一
参数设定二
参数设定三
功能设定
Exit

10: Set relevant angles first

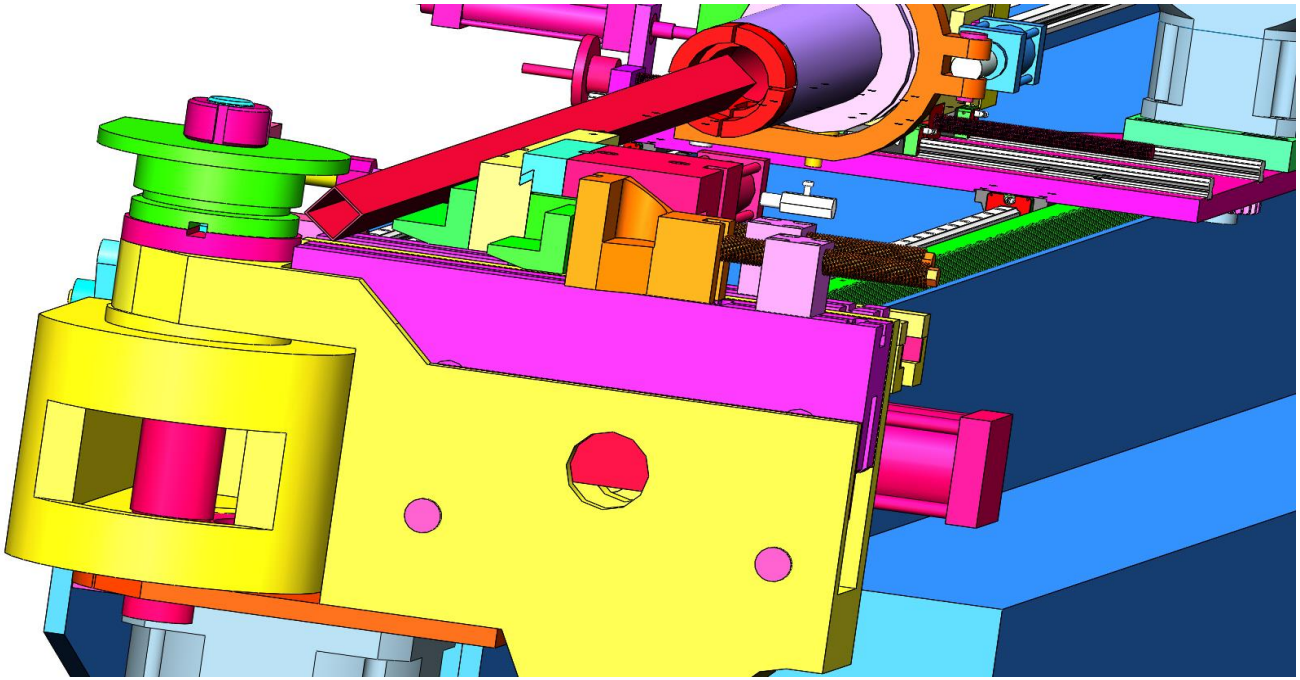
When using a slow bend, the auxiliary thrust pre-close angle needs to be entered, and the value of the auxiliary thrust pre-close angle is the same as the slow bend angle value. The position of the auxiliary thrust pre-close angle is set in parameter setting four. As shown in Figure 19.

picture 19:

Method of operating bent square tubes:

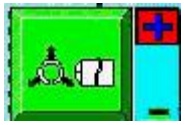
1: (First, place the square tube into the feed cart and select  grasping clamp and secure, At this time, after the square tube is clamped by the material feeder, the plane of the square tube relative to the mold may not be vertical or parallel. It could be that the diagonal of the square tube is facing upwards, as shown in Figure 20.

picture20:

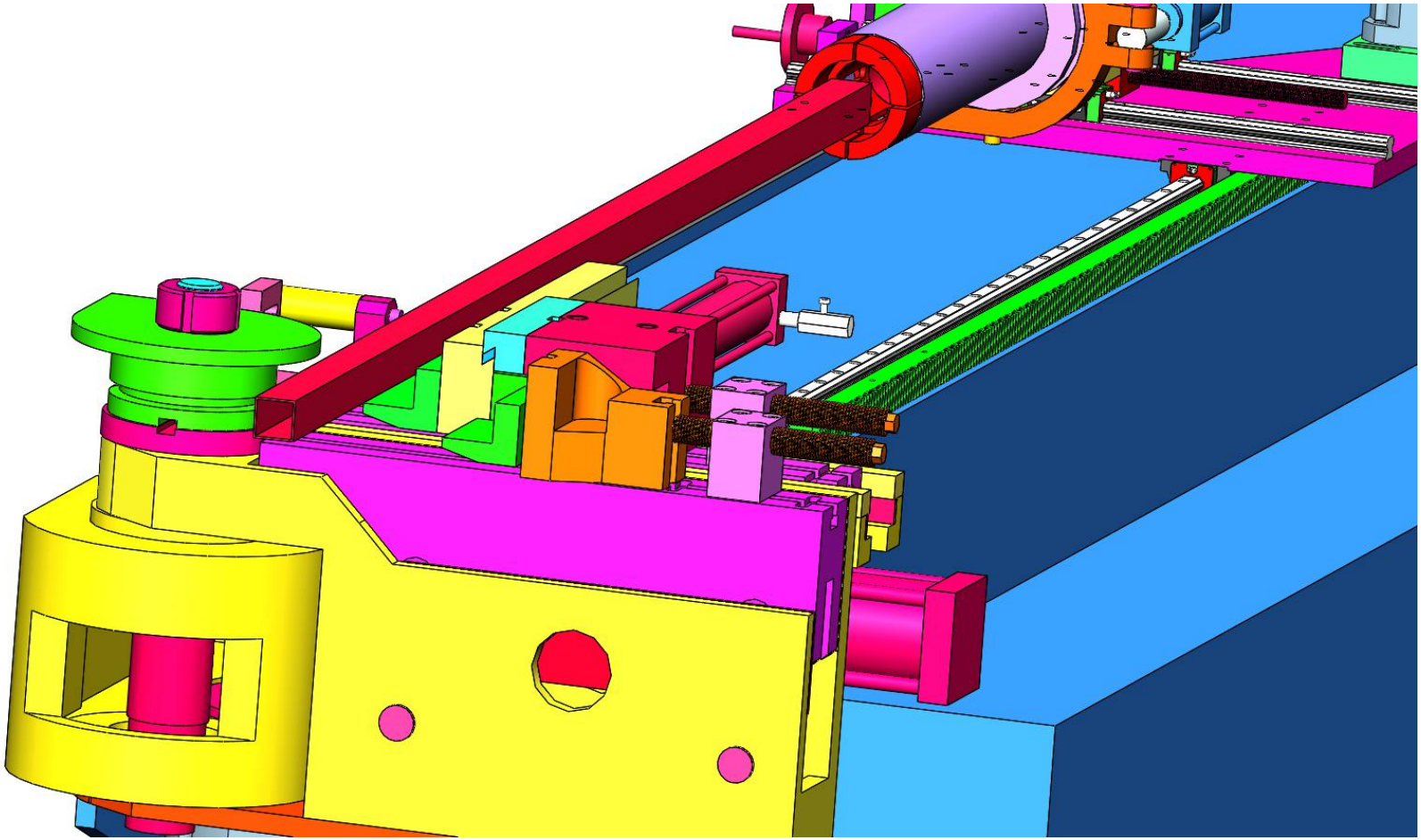


So our first step must be to align the flat surface of the square pipe with the mold. The

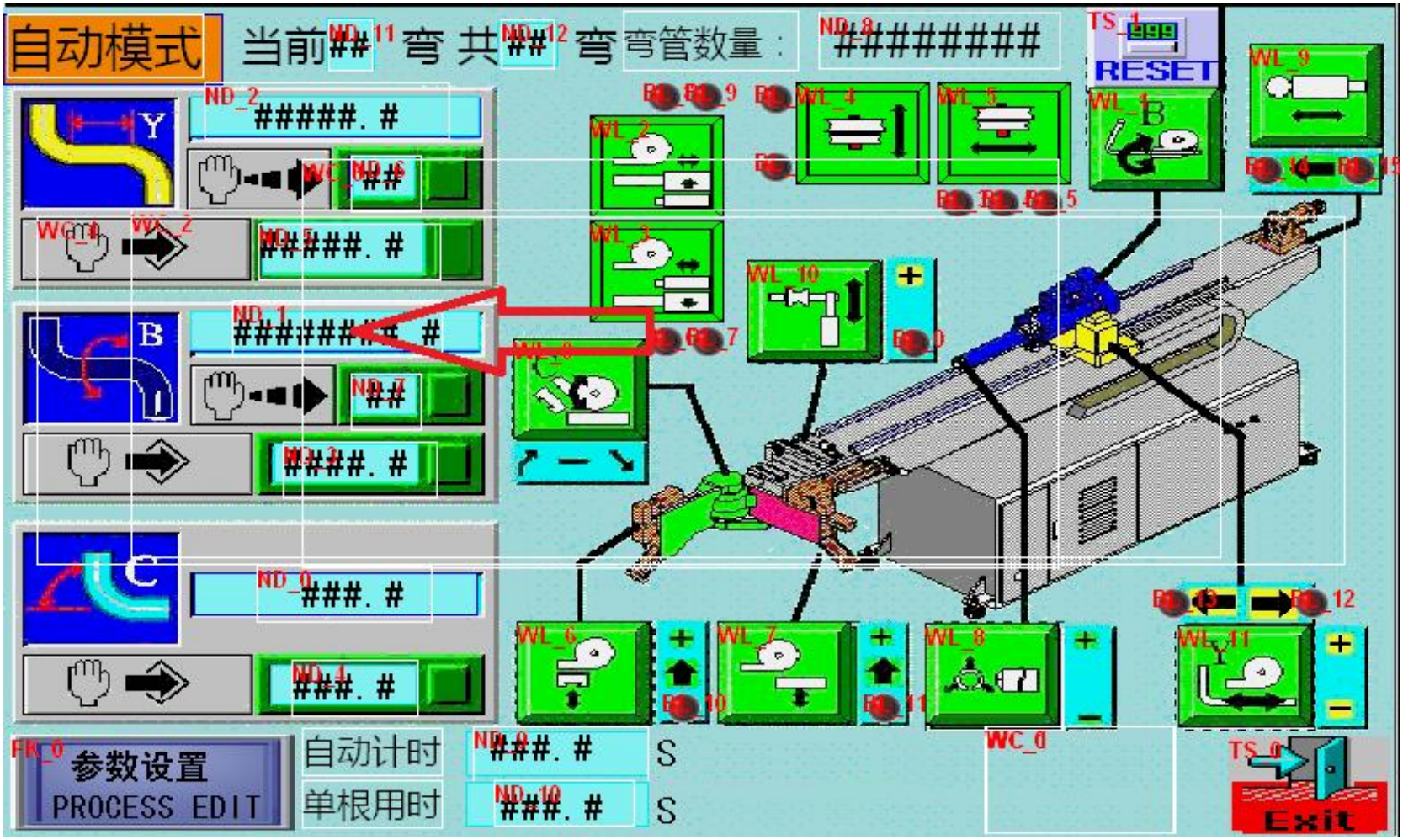
specific method is:

Enter manual mode, choose  rotational angle, click  or  , At this point, the corner will rotate clockwise or counterclockwise until the material-picking barrel rotates to align the square tube's plane either vertically or horizontally with the mold, at which point it stops. At this time, the plane of the square tube is already aligned relative to the mold. As shown in Figure 21. Then record the rotation angle value of the corner, as shown in Figure 22. Enter this value into the 'Parameter Setting Three' corner origin offset box, as shown in Figure 23. This value is the rotation offset angle of the bent square tube, which is also the alignment angle of the square tube. (Note: Clockwise rotation of the corner cannon barrel is a positive value, and counterclockwise rotation is a negative value. When entering the angle values in parameter settings one and two, if you want the fitting to rotate clockwise, please enter a positive value; if you want the fitting to rotate counterclockwise, please enter a negative value.)。

picture 21:



picture 22:



picture 23:


数据配方
参数保存1-2000组
当前配方
产品名称:
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
AAAAAAAAAA
打开
保存
产品名称:
AAAAAAAAAA
转角原点偏移
###. #
管子直径
#####. #
管子长度
#####. #
进入系统参数设定
请输入密码
****
系统设置
弯管数量预设:
#########
参数设定一
参数设定二
参数设定四
功能设定
Exit

3. manual mode

Manual screen instructions

The purpose of manual operation mode.

This machine has four functions for manual operation.

The first function is for the operator to manually operate each component to determine if it is in good condition. For example, the main clamping and releasing can determine if the hydraulic cylinder of the clamp is functioning, and also whether the solenoid valve in the operation of the cylinder is working, and whether the circuit in the operation of the solenoid valve is intact, and so on. Each action can be tested for normal operation by manual operation. If some actions fail, the cause of the fault can be identified and eliminated. Manual operation cannot fully reveal the performance of electrical control and detection components, but this can be displayed on the screen through automatic operation. Alternatively, the operator can directly

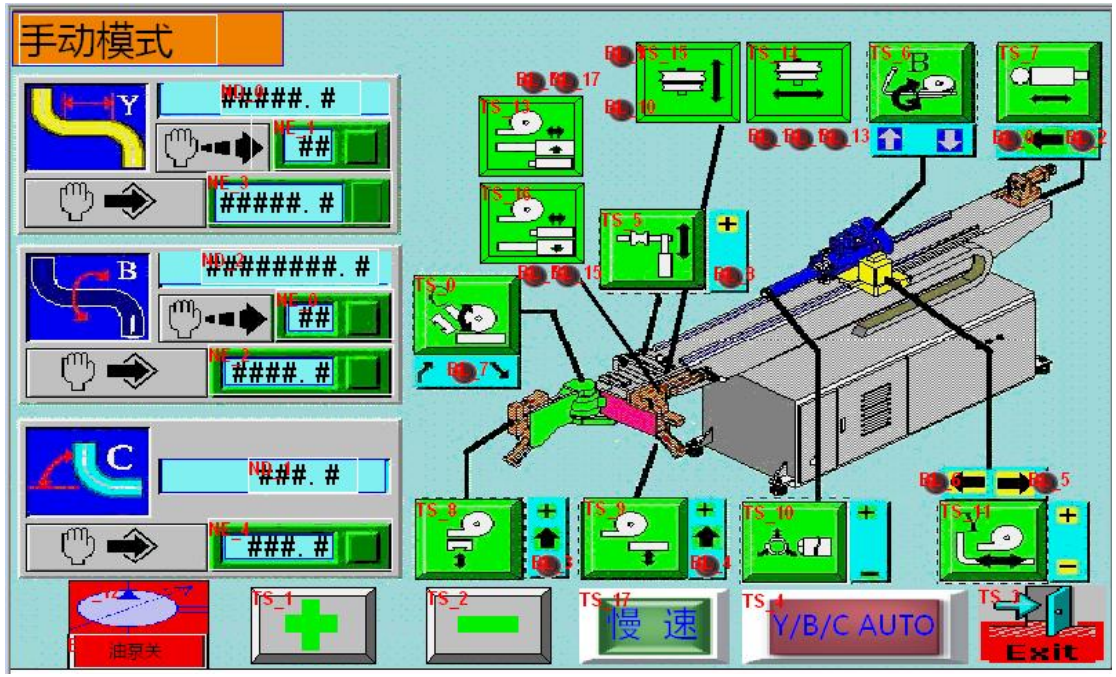
check the I/O indicators to determine their performance. For example, the proximity switch can be tested by bringing a piece of iron close to it. If the switch is in good condition, the indicator light above it will flash. By comparing the numbered lights on the I/O table with the same-numbered lights input by the computer, the performance can be determined.

The second function is for the operator to install and adjust molds, such as bending pipe molds, clamping molds, gripping molds, guiding molds, and mandrel installation and adjustment. Detailed instructions follow.

The third function is for the operator to troubleshoot issues. When internal wrinkles occur during the automatic bending process, the workpiece may get stuck in the die. First, use the main clamp to hold the tube, then manually retract the mandrel to remove the tube. If it is difficult to remove the tube from the mandrel, it is necessary to increase the working pressure to generate more force from the mandrel cylinder to pull out the tube.

The fourth function is to adjust the bending speed and auxiliary push speed after the operator

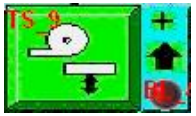
installs and adjusts the mold. The auxiliary push speed must not be lower than the bending speed, otherwise, the pipe may run out of control. Excessive stretching can cause thin-walled pipes to break, severe wrinkling, and other adverse consequences. Do not use manual mode for bending tests. This is not the purpose of manual operation, as it can cause danger and adverse consequences.

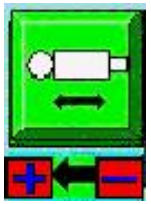


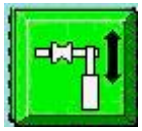
Below is an explanation of multiple buttons.

According to the corresponding action part of the bender, when the button changes from green to red, it indicates that the action of that part has been selected.

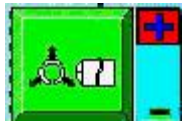
main model --→press  Select the main mold cylinder.

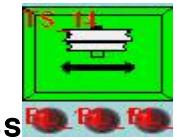
guide mold --→ press  Select guide mold cylinder.

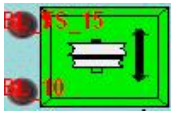
mandrel --→press  Select core rod cylinder.

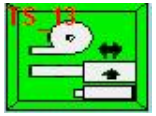
feed --→ press  Select hydraulic cylinder, The material needs to return to the origin

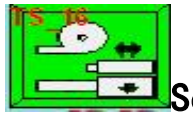
point before it can move up and down.

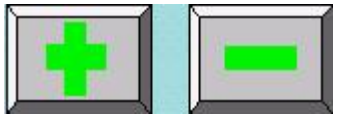
clamp --→press  Select telescopic hydraulic cylinder.

demould --→ press  Choose a demolding cylinder, the demolding action can only occur after the main mold has retracted to the correct position.

changeover --→press  Change the mold oil cylinder, the mold must be demolded in place before it can move up and down.

demould --→ press  Select the upper mold auxiliary push cylinder.

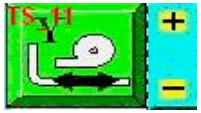
changeover --→press  Select the mold auxiliary push cylinder.

press  It allows the manual advance and retreat actions of the selected cylinder. The parts on the sides are for the inductive switch to detect signals. If the display is not lit, it means there is no signal; if it is lit, it means there is a signal.

The sensors on the machine have corresponding indicator lights that show whether they are on or off. Before the machine operates automatically, it is necessary to adjust the positions of each sensor switch to ensure that all sensors function properly.

The demolding and mold-changing buttons only appear on double-layer mold machines. Moreover, mold changing can only be performed when the machine is in the demolding state.

The loading action can only be performed after the feed axis has returned to its origin.

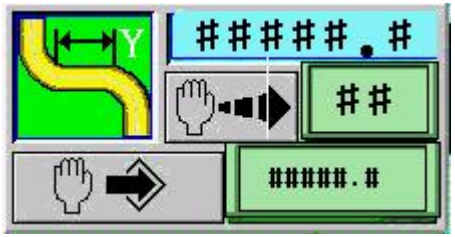
shipping fee --→press  selected feed shaft.

transfer shaft -→press 

rotate the selector shaft。

bend pipe axis --→press 

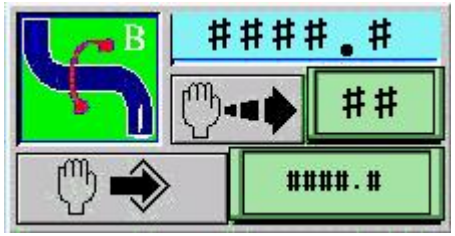
Select curved pipe axis。When retracting, the main mold must retract fully.



----Display the current feed axis position.

----Set the feed axis motion speed.

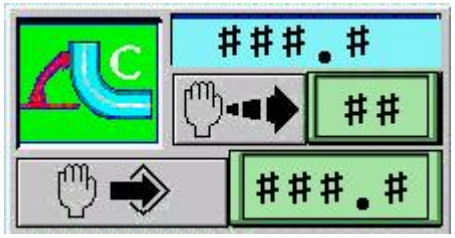
----Set the feed axis positioning position.



----Display the current transfer shaft angle.

----Set the transfer tube axis action speed.

----Set the transfer tube axis action angle.

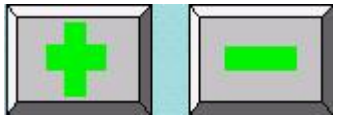


----Display the current position of the elbow

pipe axis.

----Set the bending axis speed of the pipe.

----Set the position of the pipe bend axis.

press  The selected axis can perform forward and backward movements. If the origin returns before the previous action is completed, the feed speed will be very slow, and there will be no position limit protection. Please note.

The delivery advances to the interference position or retreats to the original position and then stops.

After selecting the Y, B, and C axes, proceed 

, press 

It can carry out automatic positioning, pipe turning, and pipe bending actions. When selecting the feeding, the trolley is positioned to the set position. When selecting the adapter, rotate it according to the set angle. When selecting the bend pipe, the bending arm is bent to the set angle position.

When bending the pipe, the auxiliary push also automatically follows the action according to the auxiliary push of the current mold layer.

Note: The jog function will only be effective after returning to the origin and completing the operation.

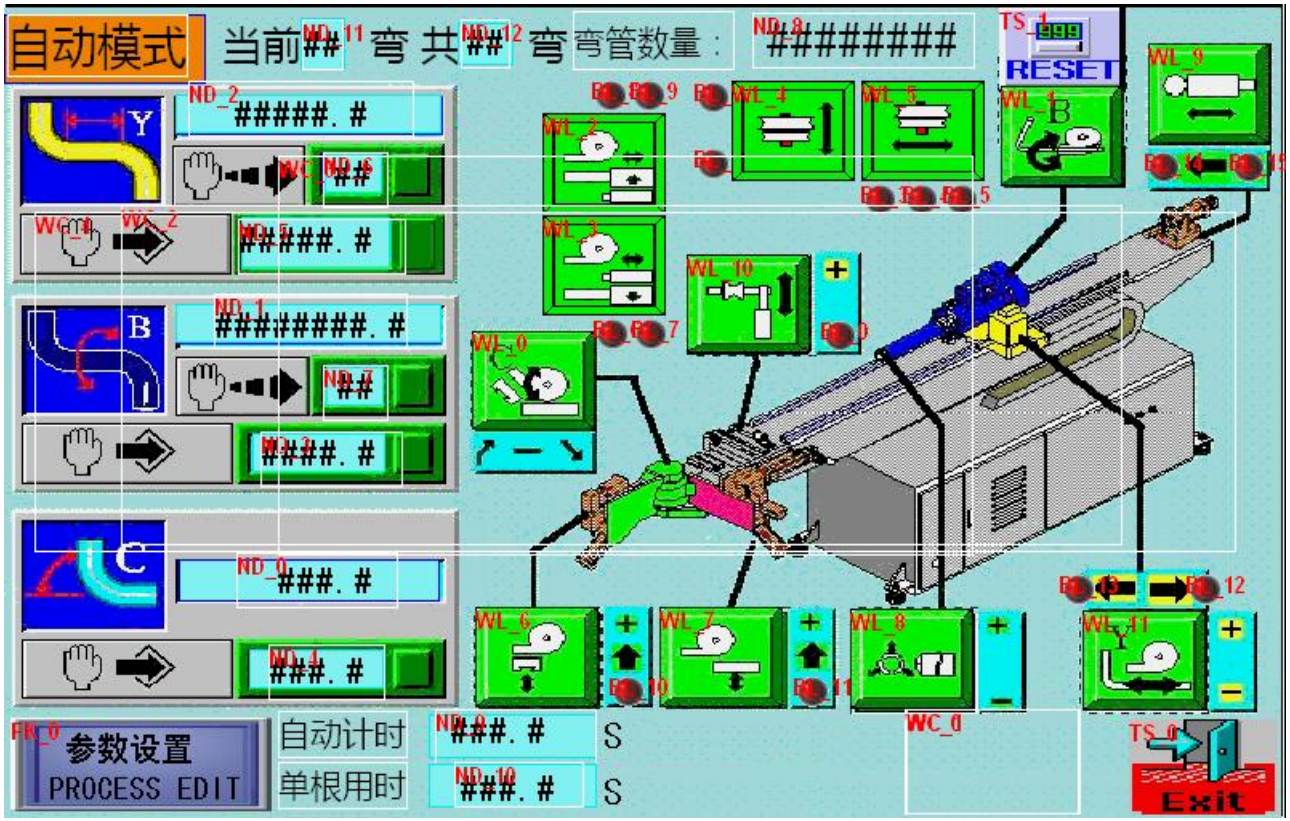
When aligning the mold, the main mold must retract fully. When bending the pipe, the main mold, auxiliary pusher, and retraction must all be in place. Otherwise, manual operation cannot proceed.

The slow-speed key is used to test slow-speed bending and slow-speed core-pulling cylinders.

press 

key, Exit manual mode.

4、automatic mode

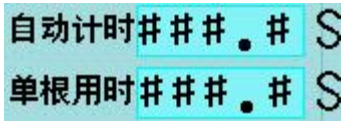


In automatic execution mode, as long as the foot pedal switch is pressed, the machine will

run automatically according to the set parameters.

Before running the automatic mode, it is necessary to fully understand the usage and settings of each parameter in the parameter settings below. Correct parameter settings must be made before automatic operation can be performed.

Before starting the automatic operation, press the automatic reset key on the screen to reset once, then step on the foot pedal switch to start the automatic pipe bending.



Display the current bending time and the time required to bend a single pipe.

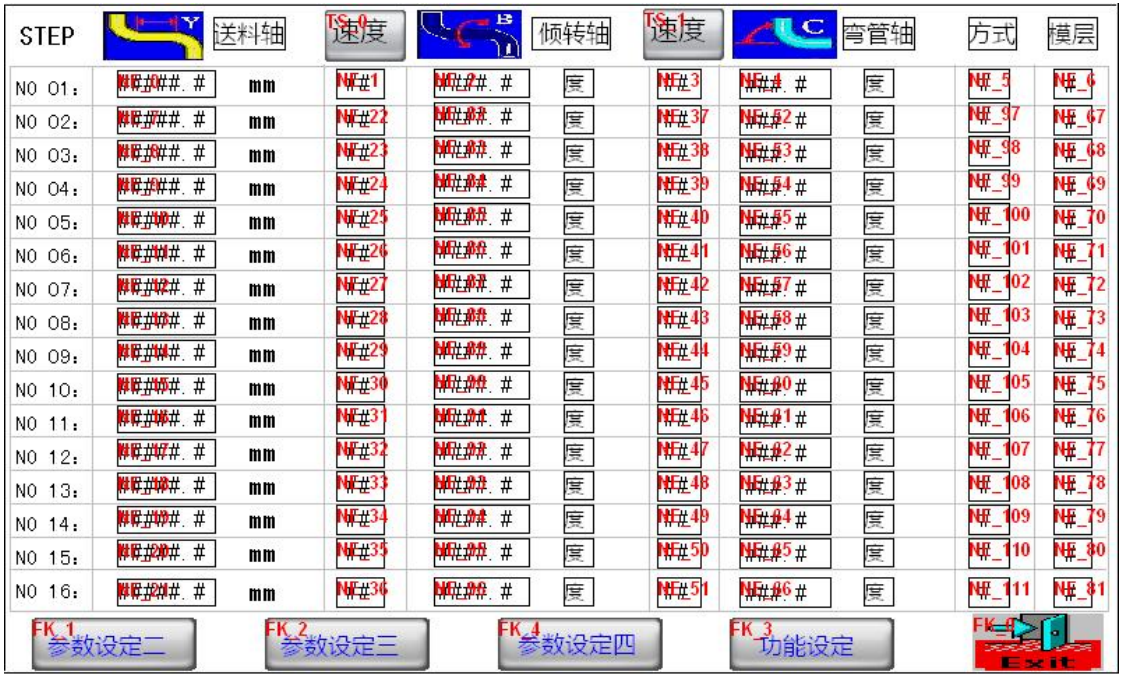
Display the number of bends. Press RESET to reset the counter.

Show the current step of the pipe bending process and the total number of automatic steps.

parameter settings

To ensure that the machine bends the pipe according to your drawings with the required specifications, please fully understand the usage of the parameter settings. The actual bending data for Y, B, and C should be entered into the parameters.

Parameter setting one



Each pipe can be bent up to 32 times, and the maximum number of bends can be set in parameters one and two.

After the first step of entering automatic mode, press the reset pedal to move the cart to the set waiting position. In the second step, after loading the tube, press the start pedal switch, and the cart will run according to the set parameters.

NO 01: The feed shaft set value is running. The first bend feeding has two methods: waiting position and first bend position.

In the waiting material position mode, if the first step of feeding is set to -300, then after clamping, the second step will retract the cart by 300 millimeters.

In the first bend position mode, if the first step of feeding material is set to 300, the pipe length is 1000, and the machine travel is 2000, then after clamping the pipe, the second step positions the cart at the 1300 mark.

The correct setting of NO 01 feed length ensures the accuracy of the first bend length. NO

01: The rotation axis in the middle needs to be set at 0 degrees because the first bend does not require rotation.

NO 01: The angle of the middle bend pipe is the bending angle of the pipe after the first step to the initial bend position.

After the bending process, the feed shaft, tilting tube, and bending machine operate according to the preset settings.,

method explanation:

0 shipping fee - transfer pipe - return bend

1 shipping fee - transfer tube + return bend

2 shipping fee + transfer pipe - return bend

3 shipping fee + transfer tube + return bend

4 Retract bend - feed material + rotate tube

5 Retract-bend-supply-turn pipe

6 transfer tube - retract bend - feed material

If the mode is set to 0, then after bending the pipe, the feeding continues first, followed by the rotation of the pipe after the feeding is completed, and finally, the bending arm returns to the starting point.

If there is a feeding and demolding mode in the lower mold bend pipe, it will automatically select mode 5.

If the machine is a double-layer mold machine, then set the mold layer so that the current bend enters the corresponding mold layer after the bent pipe.

module: Set 0 to select the upper layer model.

Set 1 to select the lower layer model.

The bend correction value can be adjusted by positive or negative angles depending on the material being bent.

NO 02 The feed length, tilt angle, and bend value are set to the distance fed after the first

bend, the rotation angle of the tilt axis, and the bending angle of the next bend after the bend is retracted.

NO 03-NO 32 The setup is the same. If any step sets the feeding, tilting, or bending to zero, the bending action for the current pipe ends at the previous step.

example: NO 05: The more zero settings for delivery, tilting, and bends, the more it indicates that the current pipe has four bends in total. The bending of the current pipe ends when it reaches bend number 04.

Each set value must be accompanied by the corresponding operating speed; otherwise, the machine will not run properly.

example 1: The method for the location of pending materials

NO: 01 Shipping fee - 500, Tilt 00, Bend pipe 90, Method 0

NO: 02 Shipping fee 200, rotate 90 degrees, bend pipe 100, method 0

NO: 03 Shipping fee 300, tilt -90, elbow pipe 80, method 0

NO: 04 shipping cost 0, tilt 0, bend pipe 0, method 0

Then, when automatic, the actions are as follows:

Reset to standby position after ⟶ clamp ⟶ The small car is reversing.500MM ⟶ dominant module ⟶ 90-degree elbow ⟶ The dominant model is open ⟶ The small cart moves forward by 200 millimeters ⟶ Unbending a bent pipe ⟶ tilt 90 degrees ⟶ The second bend main mode guide mode clamp ⟶ 100-degree elbow pipe ⟶ The small cart moves forward by 300 millimeters ⟶

Unbend the elbow pipe ⟶ tilt 90 degrees ⟶ The third bend main mode guide mold clamp ⟶ 80-degree elbow ⟶ The small cart moves forward by 300 millimeters ⟶ Unbend the elbow pipe ⟶ The bend has been completed to the required position

example 2: Select function, select function pending material position method 03 select method 7

NO: 01 Shipping fee - 500, Tilt 00, Bend pipe 90, Method 0

NO: 02 Shipping fee 200, rotate 90 degrees, bend pipe 100, method 0

NO: 03 Shipping fee - 300, Tilt 00, Bend pipe 00, Method 7

NO: 04 Shipping fee 100, rotate -90, 90-degree elbow, method 0

The first step is the same as in Example 1. In the second step, after the main mold guides the mold clamp and the material holder on the cart automatically releases, the bending of the tube and the cart retracting by 300mm begins. After the bending and retraction are completed, the material holder on the cart tightens, and the main mold starts to retract. The subsequent actions are the same as in Example 1.

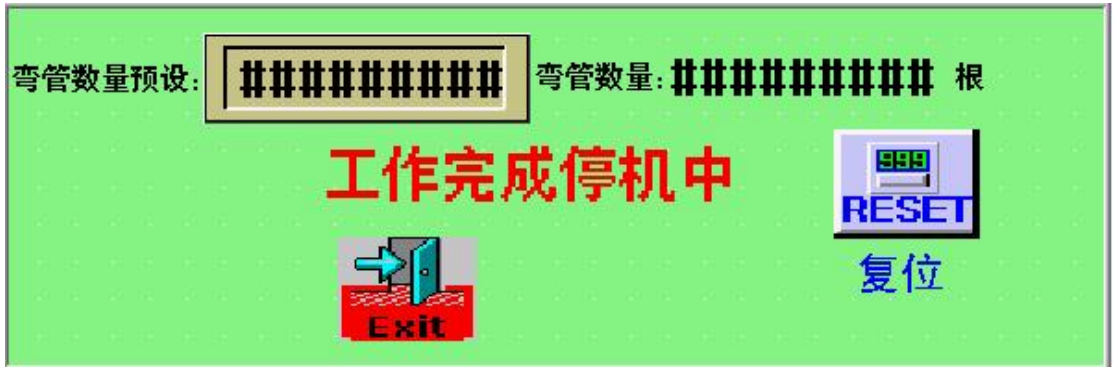
Method 7 is generally used when the length of the pipe exceeds the machine's mechanical stroke. The machine needs to be equipped with a front positioning device to ensure the correct length of the first feed. Pressing the button for more than 1.5 seconds allows the feed or tilt speed of 32 steps to run at the speed of the first step.

The settings for parameter setting two N017-32 are the same as those for parameter setting one

N002-16.


STEP
送料轴
速度
倾转轴
速度
弯管轴
方式
模层
NO 17:
NO 18:
NO 19:
NO 20:
NO 21:
NO 22:
NO 23:
NO 24:
NO 25:
NO 26:
NO 27:
NO 28:
NO 29:
NO 30:
NO 31:
NO 32:
mm
FK_1
参数设定一
FK_2
参数设定三
FK_4
参数设定四
FK_3
功能设定
Exit

The number of bends is preset to display a prompt window when the set number of bends is reached in automatic bending after using the preset count function.



After resetting the counter, you can continue working.

5. function settings

function settings

This screen mainly sets up some common functions of the machine, and checking the box indicates the current setting status.

Whether or not there is a centering function for selecting the mandrel.

When selecting semi-automatic mode, after pressing the reset pedal, you need to press the start pedal to start the automatic pipe bending. When selecting full cycle mode, after pressing the reset pedal to load material, it automatically times and starts bending, and then automatically resets and bends again when unloading is timed. Full cycle mode is generally suitable for factory testing or when workers fully understand the machine's performance. For general use, semi-automatic mode is

recommended. 

For continuous bending, the machine automatically proceeds to the next bend after completing the current one. For single-step bending, the operator must press the pedal to proceed to the next bend after the current one is finished. When creating a sample or adjusting parameters for the first time, it is recommended to use single-step bending to facilitate adjustments.

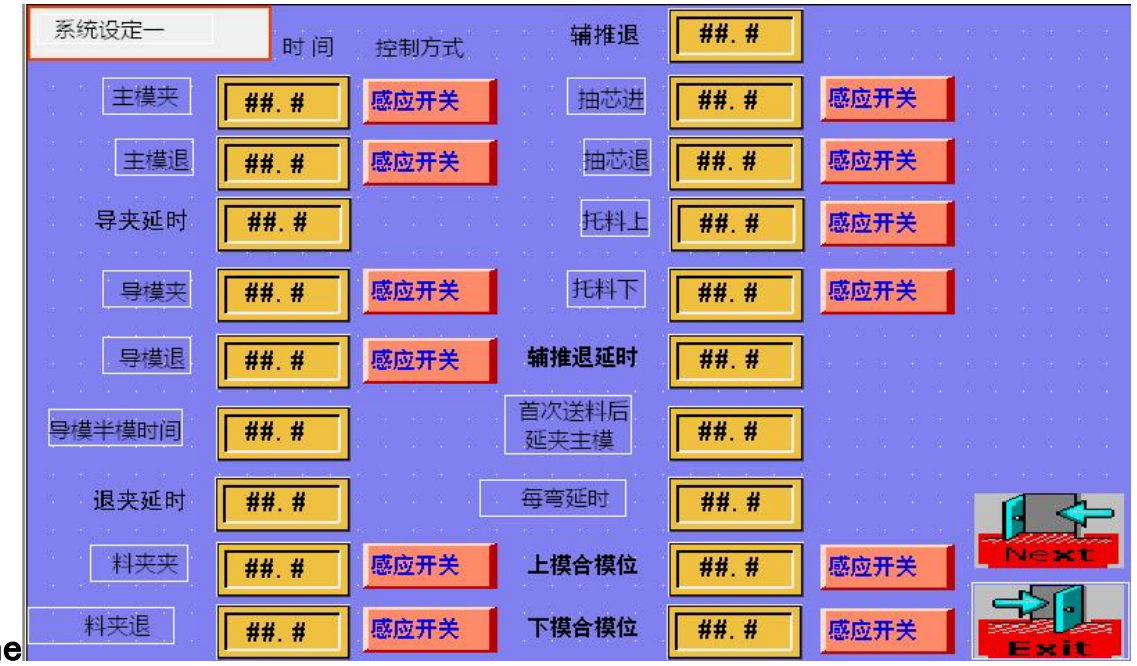
When manually resetting, after the main mold guide mold is released at the end of the last bend, the bending arm must be reset to the starting point by stepping on the reset pedal. If automatic reset is selected, the bending arm will automatically reset after the last bend when the material feeding timer automatically starts. Automatic reset is more convenient for skilled workers when producing standard products. Generally, manual reset is used when using a bender for the first time.

After selecting the pipe clamping, it automatically bends. In automatic mode, after the material clamp clamps the pipe, it automatically starts bending. If the selection of clamping the pipe is paused, the material clamp must press the foot pedal switch once again to perform the bending action.

5. system settings

system settings

After entering the correct password in parameter setting three, press the system settings key to enter the system setup screen.

System settings one 

Set the action time for each cylinder in the main mode.

Main mold guide mold clamping time: the time for the main mold guide mold clamping action.

delayed clamping: The delay time of the secondary mold after the main mold clamping.

The main model guide withdrawal time: After retracting to position, the hydraulic cylinder retracts with a delay before stopping.

withdrawal delay: The delay time for the main mold to release the clamp after the bend pipe is in place.

The time for the material clamp to retract: After the material clamping action time is over, proceed to the next set time.

Core pull-in and pull-out time: The ejection time does not need to be adjusted after the induction process.

The time for adding feed up and down: There is no need for an action time after the material feeding without sensing.

auxiliary pushback delay: After the elbow bending is completed, the mandrel retreats with a delay before the bending action retracts.

After shipping, delay the main mold: After reaching the first bend position, there is a delay in the main mold clamping.

Each delay: To automatically delay after each bend before the next bend pipe.

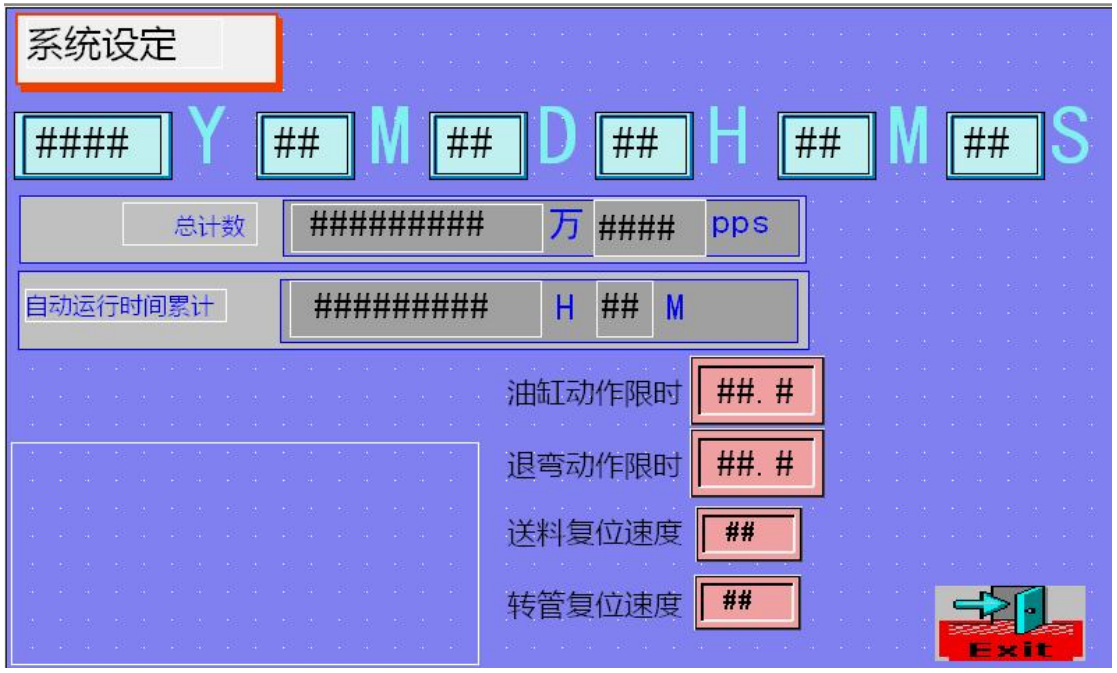
control method: There are two types of control: time control and sensor switch control. If time control is selected, the corresponding actions are controlled by time. If the sensor switch is selected, it will detect whether the corresponding sensor is in place. After confirming that the sensor is in place, it will delay for the set time before performing the next action.

The operation time limit for the hydraulic cylinder: In automatic mode, if the sensing switch does not detect a signal within the specified time after the actions of each hydraulic cylinder, the machine will automatically shut down for inspection.

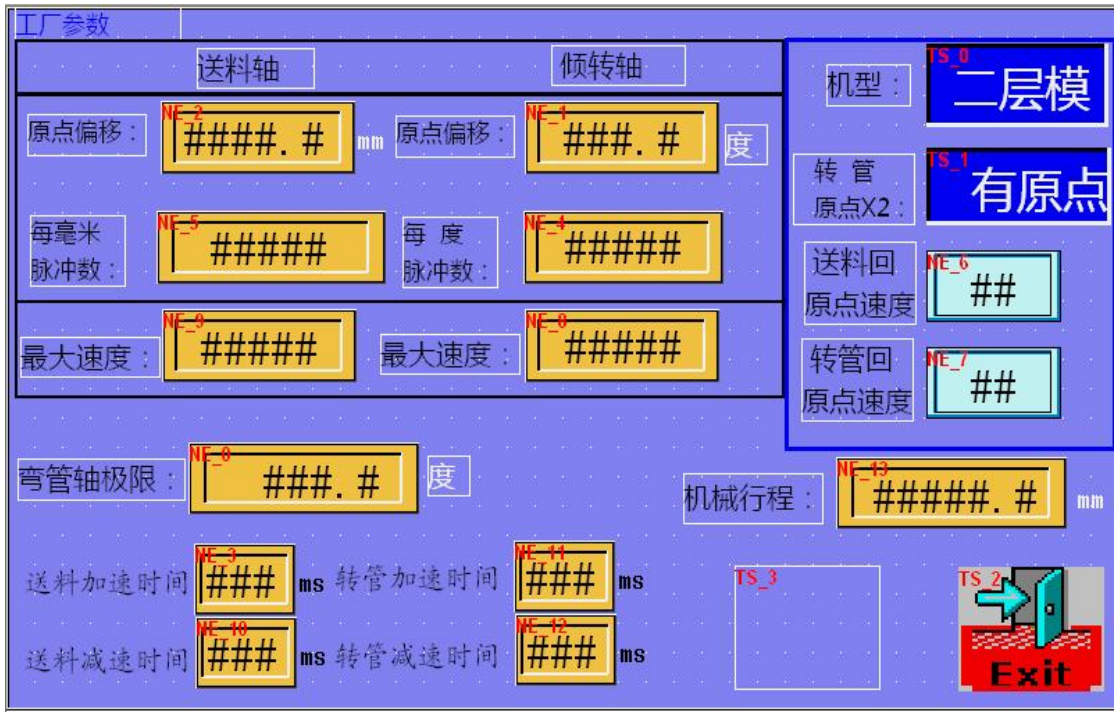
The bending pipe retraction action is time-limited: In automatic mode, if the return oil cylinder action for each bend pipe does not detect a signal from the limit switch within the specified time after returning to the original point, the machine will automatically shut down.

The speed of feeding and tube repositioning is the operating speed during the feeding and tube repositioning after the automatic bending process ends.

slow bend angle: The angle at which the slow bend valve is opened in automatic pipe bending. slowly retract the bend angle: The angle at which the slow retract core valve opens in automatic pipe bending.



System settings can set the touchscreen clock when calibrating, and check the accumulated machine usage time and the number of bent tubes.



Factory parameters are usually set at the time of manufacture. Unless necessary, please do not set them. Otherwise, incorrect settings may lead to unpredictable consequences.

origin offset: The origin can be set so that each axis runs a corresponding data point after returning to the origin, compensating for errors in the installation of the origin.

The return speed to the origin for each axis is the operating speed during the return to the origin of each axis. Do not modify other data arbitrarily. A password is required to enter the factory parameters.

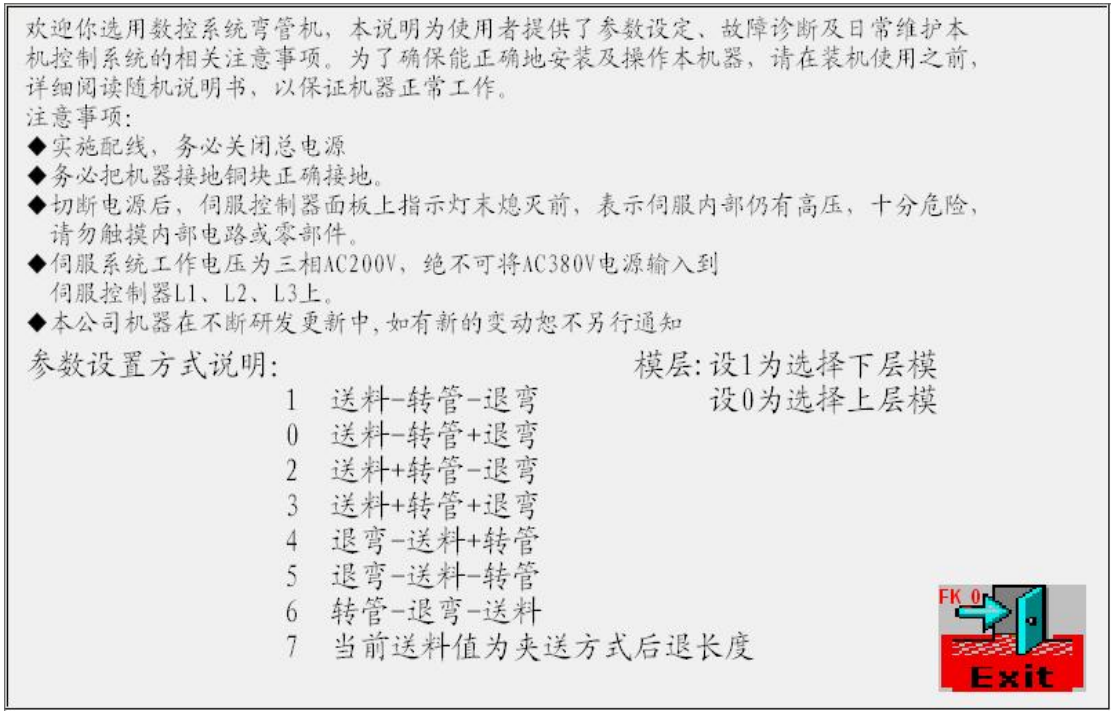
5. I/Ospot check

spot check 

This screen can check the status of all input and output points of the PLC. It is used for maintenance and fault diagnosis.

3. 2. 6 explain

Record some descriptions of commonly used functions to facilitate the operator's access.



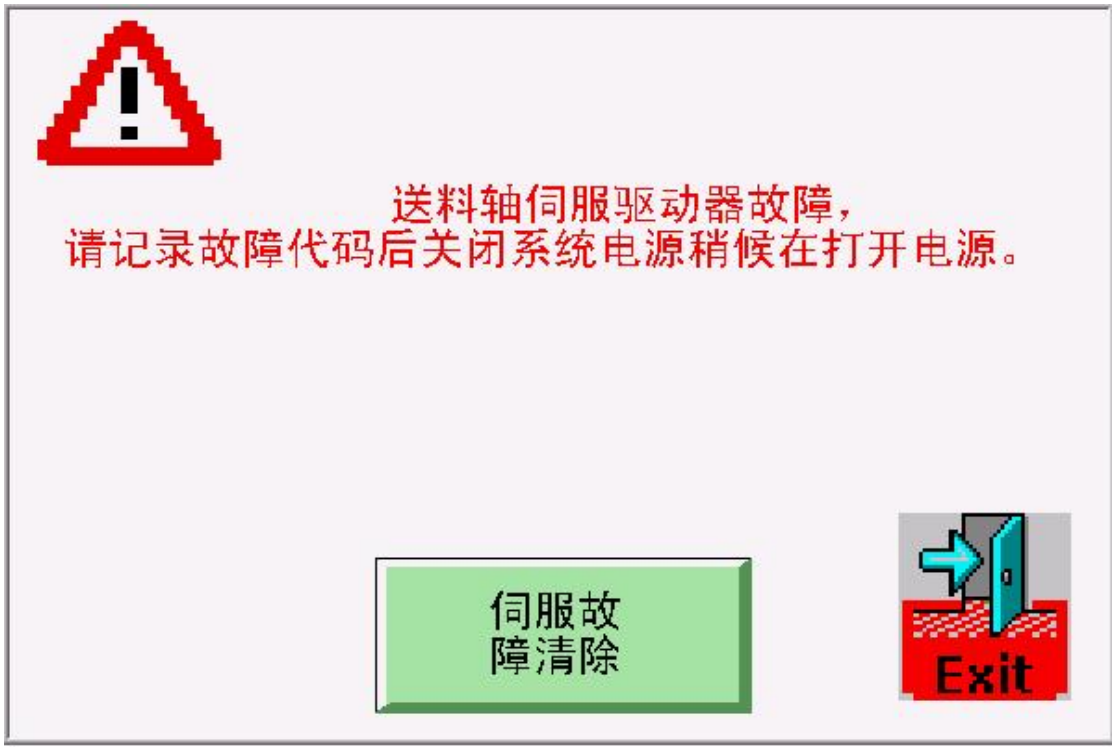
4. Various protections and fault displays

The appearance of this screen indicates that the emergency stop button has been pressed. If it cannot be turned off even after resetting, you should check if there is an issue with the

button wiring.

The front and rear limit actions of the trolley have been triggered. Please check the elbow pipe.

Are the parameters set correctly? Is the limit switch in good condition?

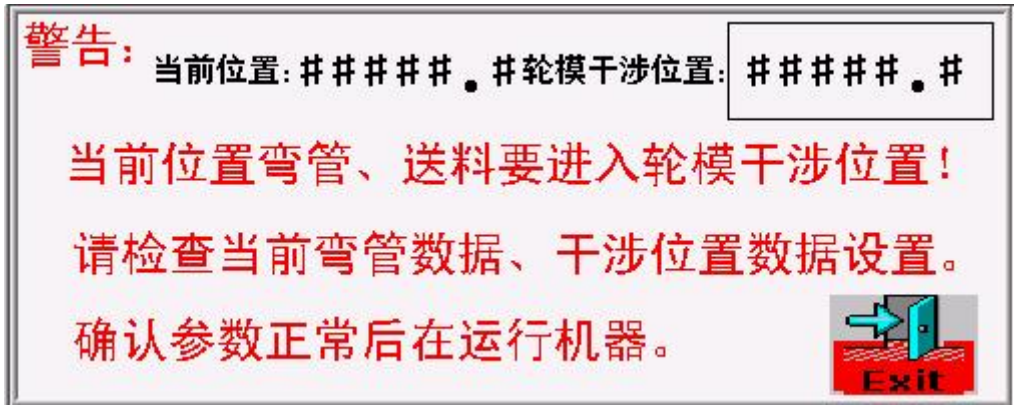

送料轴伺服驱动器故障，
请记录故障代码后关闭系统电源稍候在打开电源。
伺服故
障清除
Exit

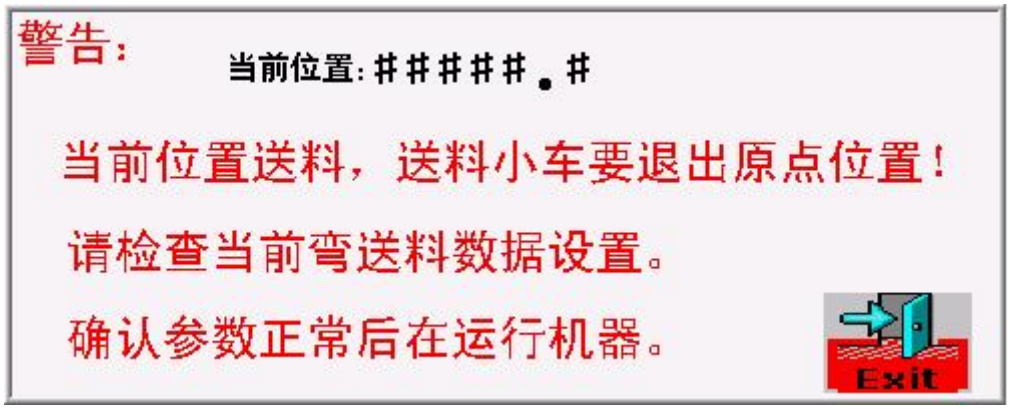

弯管伺服驱动器故障，
请记录故障代码后关闭系统电源稍候在打开电源。
伺服故
障清除
Exit

When a servo motor malfunctions, the corresponding fault axis screen will appear. Please record the fault code of the servo driver. Look up the meaning of the fault code in the servo manual. Clear the servo fault by following the instructions or turn off the servo power and then turn it back on to clear the fault.

If the cylinder action exceeds the set time in automatic mode and the sensor head does not detect a signal, an overrun screen will appear. Please check the corresponding sensor switch or whether the cylinder action is in place according to the

prompts.





The appearance of the above screen indicates that the vehicle is about to collide with the wheel mold or exit the original position during material supply. Please check the corresponding parameters. After confirming

everything is correct, proceed with operation.

5. Common troubleshooting

Troubleshooting common issues

failure	causes of production	exclusion method

1、System pressure is not high or the oil pump noise is loud.	**1. The motor's direction has reversed.** **2. The oil level is too low.** **3. Loose connection screws between the oil pump and motor result in different issues.** **4. There is air leakage in the suction pipe of the oil pump.** **5. The valve core of the relief valve is jammed or the high and low-pressure valves are improperly adjusted.** **6. The pressure electromagnetic valve, when not powered, causes the valve core to jam or the coil to burn out.** **7. After long-term use, the oil filter becomes clogged.**	**1. Interchange any two of the power supply input wires** **2. Add hydraulic oil** **3. Reinstall in the optimal position** **4. Reinstall the fuel inlet fitting** **5. Clean the overflow valve, increase the pressure of the pressure valve, or replace it.** **6. Check the electromagnetic valve wiring, clean or update it.** **7. Clean the oil filter or update it.**

2、The pipe bend accuracy is poor. The stability is unstable.	**1. The bend pipe encoder belt is too loose, the encoder coupling is loose or damaged.** **2. The gears, racks, or rollers are severely worn.** **3. The main cylinder piston seal ring is damaged, causing oil leakage.** **4. The wiring of the bend pipe electromagnetic valve is loose.** **5. The speed adjustment for slow curves is not optimal.** **6. The slow bend setting time is too short.** **7. The main shaft bearing is worn out.**	**1. Check the belt, readjust it, and replace it if necessary.** **2. Replace the rack pressure wheel** **3. replace** **4. reconnect** **5. adjust the optimal speed** **6. reset the time** **7. update**
3、 The tilt angle is not stable.	**1. synchronous wheel movement phenomenon** **2. The gearbox is loose.**	**1. Secure the timing pulleys** **2. tighten the reducer**

4、Actions are unstable, sometimes chaotic.	**1. A proximity switch has malfunctioned. 2. A certain 3. The touch screen settings are incorrect. 4. The touchscreen is displaying an error signal.**	**1. Check the status of the input indicator lights according to the PLC configuration table to confirm the condition of a proximity switch. 2. Clean, check if the PLC output signals and electromagnetic valve wiring are secure or update them. 3. Reconfigure optimal parameters 4. Manually reset to the origin or check if the signal lines between the PLC and the touchscreen are loose or if there is a signal dropout (re-solder them).**
fault phenomenon	**causes of production**	**exclusion method**
5 、 The touchscreen sometimes shows text that disappears.	**The air humidity is too high, there is water on the screen or it is damaged, and there is too much external interference from electrical equipment (such as welding).**	**Use an electric hairdryer to dry wet hair or refresh it. Keep other electronic devices as far away as possible to avoid interference.**
6 、 The motor suddenly stopped while in operation.	**Excessive pressure or a malfunction of the motor oil pump causes the motor to overload, and the thermal relay trips.**	**Reduce stress or check for motor oil pump failures, and appropriately increase the current value of the thermal relay without faults.**