RobotAnno_602 robot arm manual

Anuo Robot (Shenzhen) Co., Ltd.

February 20, 2020

This manual is the operating instructions for users of RobotAnno 602.
Last revision date: February 2020

For sales and technical support, please contact Anuo Robot (Shenzhen) Co., Ltd.

E-mail：sales@robotanno.com

Commend

respected user:

Thank you for purchasing and using RobotAnno products. For your safety and benefit, please read this product user manual and all the accompanying materials carefully before using the product. If you fail to operate and use the product according to the user manual, any Anno Robotics (Shenzhen) Co., Ltd. will not be liable for any personal injury, property, or other loss.

About this product user manual (hereinafter referred to as "manual")

- The copyright of this manual belongs to Anuo Robot (Shenzhen) Co., Ltd .;
- The trademarks and sizes mentioned in this manual belong to their respective rights holders;
- The contents of the manual are the same as the actual product, and the actual product shall prevail.

If you have any questions or objections to the contents or terms of the manual, please submit a written objection to Annuo Robotics (Shenzhen) Co., Ltd. within seven days after purchasing the machine, otherwise you are deemed to have agreed, understood and accepted the entire content of this manual.

During the use of the product, if you encounter problems, please call us: +86 0755-36950696.

Anuo Robot (Shenzhen) Co., Ltd. reserves the right to explain and modify the user manual. The amendment, update and explanation of the manual will be on the RobotAnno website (http://www.robotanno.com/) To announce, so stay tuned.

Thanks!

Anuo Robot (Shenzhen) Co., Ltd.
2020

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- This manual provides a comprehensive description of the use of the RobotAnno602 robotic arm. Be sure to operate the robotic arm after careful reading and full understanding.

Official Website: www.robotanno.com

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- The drawings and photos in the manual are representative examples and may differ from the product purchased.
- The manual is sometimes modified due to product improvements, specifications changes, and the manual itself is easier to use. The revised manual will be updated with the version number under the

cover and issued as a revised version.

- If you need to order the manual due to damage, loss, etc., please contact our sales department and order the cover version
- Customers make unauthorized product transformations, which are not covered by the company's warranty, and the company is not responsible.

目录

I. Safety precautions

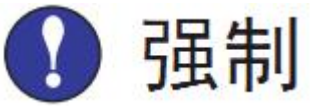
Thank you for purchasing our RobotAnno robotic arm. For your safety and to prevent damage to the robotic arm, please read and master this manual and other auxiliary materials before using the RobotAnno robotic arm, and familiarize yourself with all the equipment knowledge, safety knowledge and precautions Get started

and pay special attention to the following safety signs.

Symbols and their meanings

It is dangerous when mishandled, and death or

It is dangerous when mishandled, and may cause moderate injuries, minor injuries, or damage to objects.



Things to observe in manuals and

Things explicitly prohibited in manuals

Even matters that fall into the category of "Caution" can have serious consequences depending on the situation. Therefore, any "Caution" is extremely important and must be strictly observed.

Although it does not comply with the contents of "Caution" or "Danger", in order to ensure safe and effective operation, the matters that the user must also observe will be described in relevant places.

2. Dangerous matters

危险

(1) In an emergency, press the emergency stop button immediately.If the mechanical arm cannot be braked in time, it may cause personal injury or equipment damage.

Emergency stop button

(2) When the servo power is turned on after the emergency stop is canceled, the emergency stop button must be canceled after the emergency stop caused the accident.

Emergency stop status released

(3) When moving within the motion range of the robot arm, please observe the following:

1) Consider the contingency plan when the robot arm suddenly moves to its prescribed position.

2) Make sure to set up shelters just in case.

注意 Manipulator movement caused by misoperation may cause personal injury.

(4) When performing the following operations, please make sure that no one is within the action range of the robot arm and the operator is operating in a safe position:

1) When RobotAnno robot arm is powered on.

2) When operating the robot arm with g code.

3) During trial operation.

4) During teaching and playback.

(5) Please don't move and repair the robot arm while the robot arm is working. If you

want to move and repair, please turn off the power of the robot arm, and then perform this operation after power off.

Inadvertently entering the movement range of the robot arm or coming into contact with the robot arm may cause personal injury. If an abnormality is found, immediately press the emergency stop button.

The emergency stop button is located on the front right side of the RobotAnno602 robotic arm electrical control box.

3. Matters needing attention

(1) Before using RobotAnno robot arm, check the following items, if there is any abnormality, repair it in time or take other necessary measures.

1) Whether the electrical cables are properly connected;

2) Whether the sheath of electrical cables is damaged;

3) Whether the emergency stop switch is in the released state;

4) Are there any abnormal or abnormal sounds in the movement of the robot arm?

(2) The owner and operator of the RobotAnno robot arm must be responsible for their own safety. Anno Robot reminds users that they must wear safety protection equipment when using robot arm products and must abide by the safety provisions.

(3) Do not modify the robot arm

Please don't modify the robot arm, accidents or failures caused by unauthorized product modification are not covered by our warranty, and our company will not be responsible.

(4) Do not approach the robot arm in operation

Do not approach the moving robot arm to prevent accidental injury or damage to the robot arm.

(5) Please clearly designate the person responsible for supervision

In order to prevent operation errors during manual adjustment or accidents caused by insufficient safety confirmation, when two or more people operate, please clearly designate the person responsible for supervision.

(6) Use the robot arm on the basis of understanding the "Warning Signs" in the RobotAnno robot arm instruction manual.

4. Use environment

(1) Do not place the robot arm in a harsh environment. Dirt, waste, and high temperatures can damage internal components.

(2) After using the robot arm, unplug the power cord, and place the robot arm in a dry, normal temperature place. High temperature and harsh environments can damage the internal components of the robot arm.

(3) RobotAnno robot arm cannot be used in the following situations:

1) Environment close to flammable substances

2) Explosive environment

4) in water or other liquids

5) In an environment with corrosive and flammable gases

6) Environment with temperature exceeding 40 degrees Celsius

7) Other harsh environments

5. Safe operating procedures

(1) When controlling the movement of the robot arm

1) Before operating the robotic arm, it is necessary to adjust the movement of the robotic arm at a lower rate to increase the effective control of the robotic arm.

2) Consider the movement trend of the robot arm before pressing the power button.

3) It is necessary to consider the trajectory of the robot arm in advance and

confirm that the line is not interfered.

4) The area around the robot arm must be clean and free of oil, water and impurities.

(2) Production operation

1) Before starting and running, you must know all the tasks that the robot arm will perform according to the programmed program.

2) Know the position and status of all switches, sensors and control signals that will affect the movement of the robot arm.

3) You must know the location of the emergency stop buttons on the robotic arm control equipment and be prepared to press them in an emergency.

4) Never think that the robot arm has completed its program without moving, because the robot arm is most likely waiting for an input signal to let it continue moving.

6. Routine maintenance and storage

The RobotAnno robotic arm is safe to use and can adapt to the environment to the greatest extent. When using it, please follow the instructions in the manual. Be sure to follow the precautions in this manual.

(1) Never force the axis of the mechanical arm, otherwise it may cause personal injury and equipment damage.

(2) Avoid temperatures below 20 degrees Celsius or above 40 degrees Celsius;

(3) Avoid placing it in direct sunlight for a long time;

(4) Avoid being in dirt and dusty environment;

(5) Keep away from strong vibration environment;

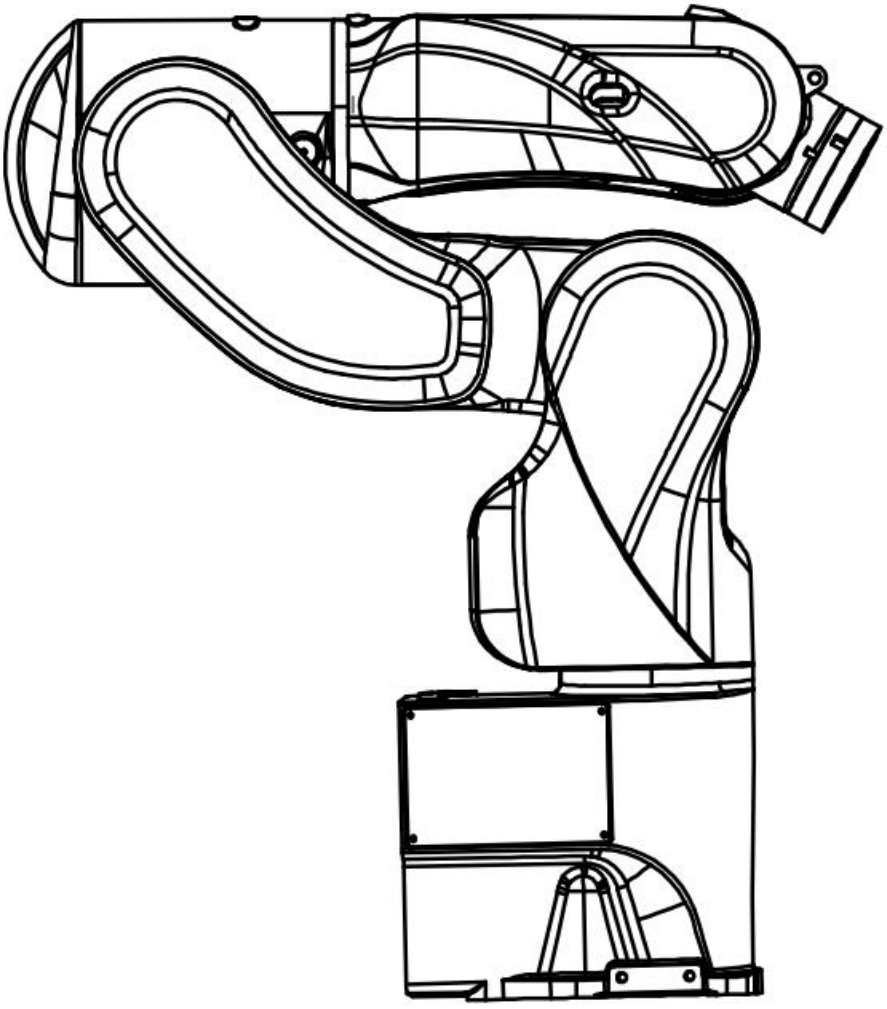
(6) Keep away from high humidity environment;

(7) Keep away from static environment.

2.Preparations:

Positioning of the robot arm after unboxing

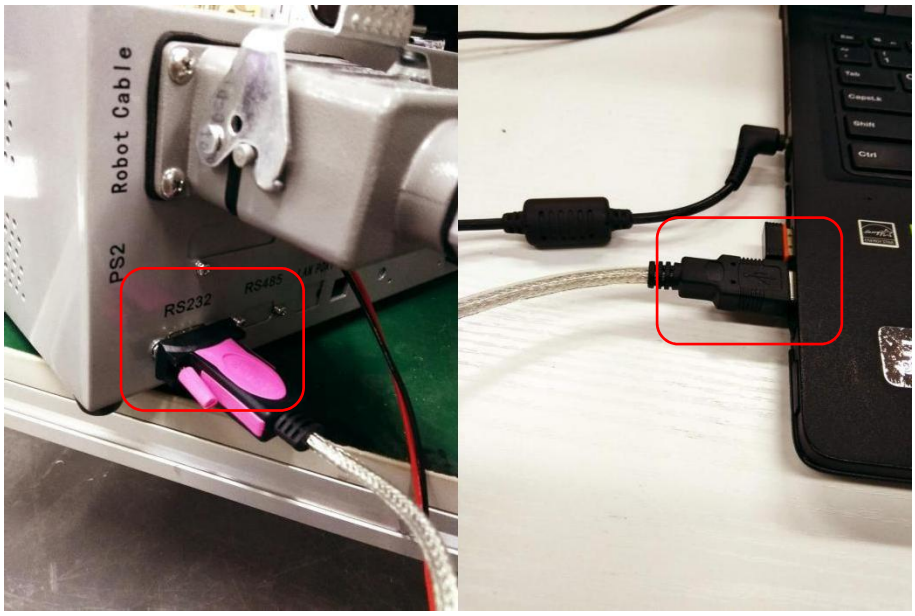
After unboxing, the position of the robot arm is as follows:



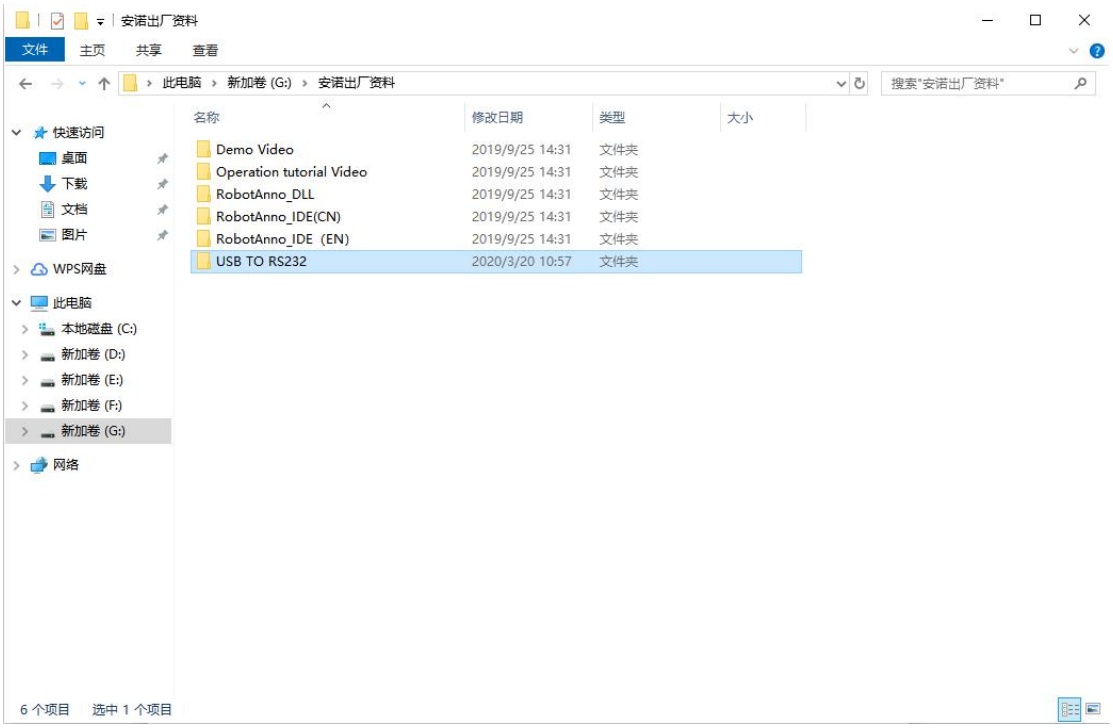
3.Debug the robotic arm to a vertical position

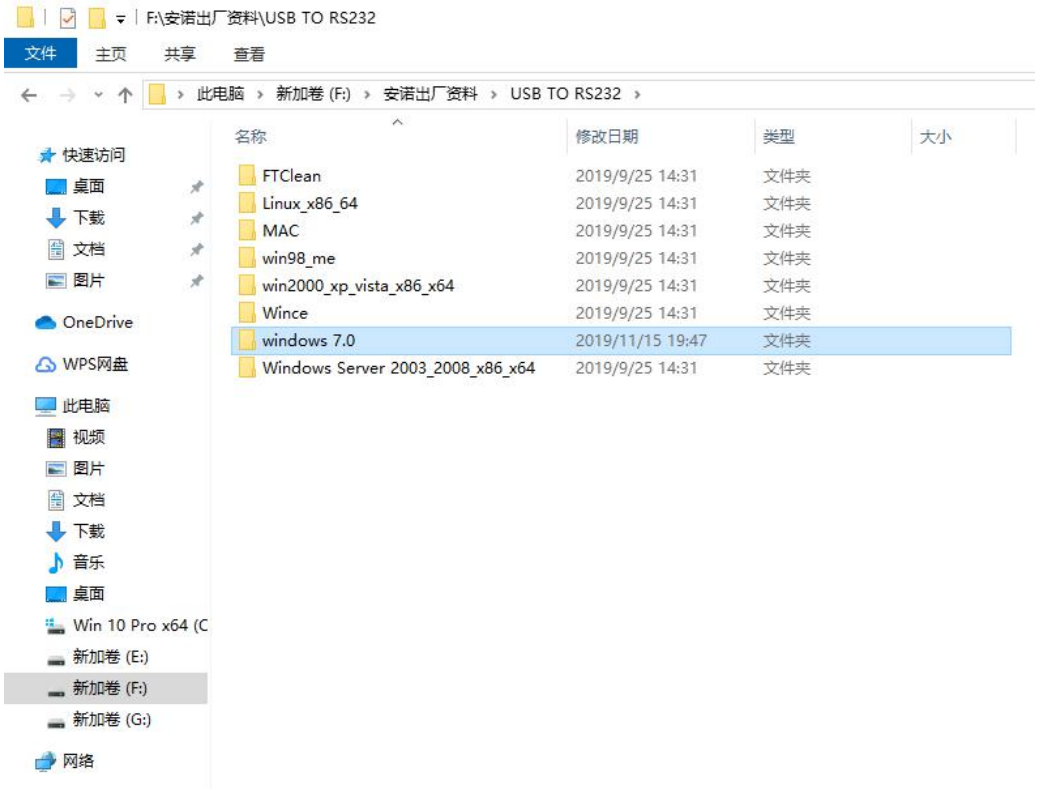
1. Install usb to rs232 driver

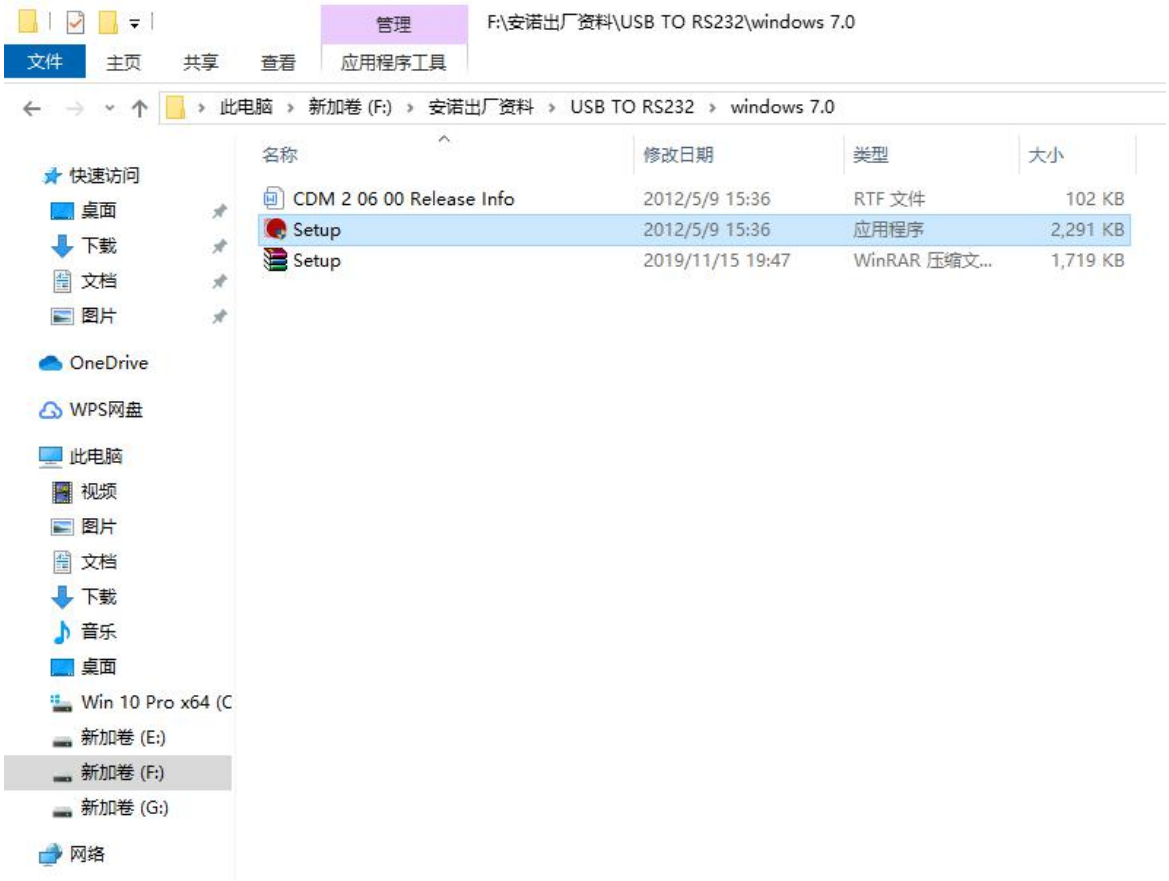
First connect the computer to the controller through a data cable, as shown in the figure:

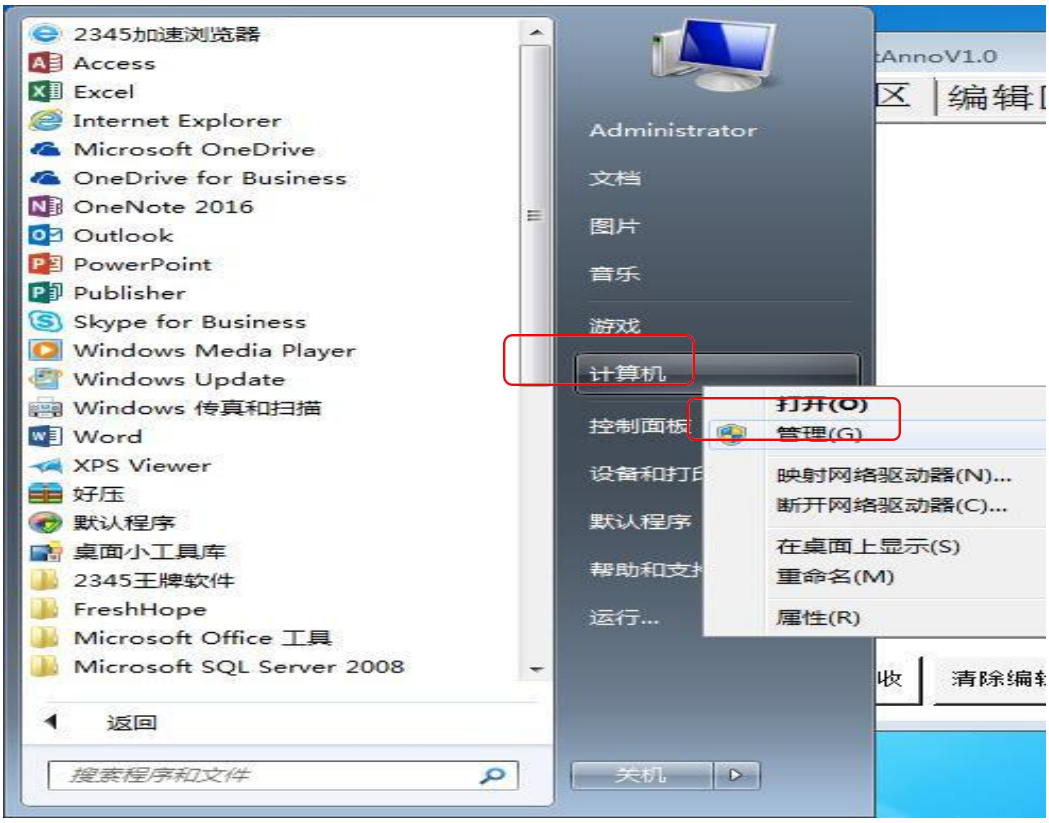


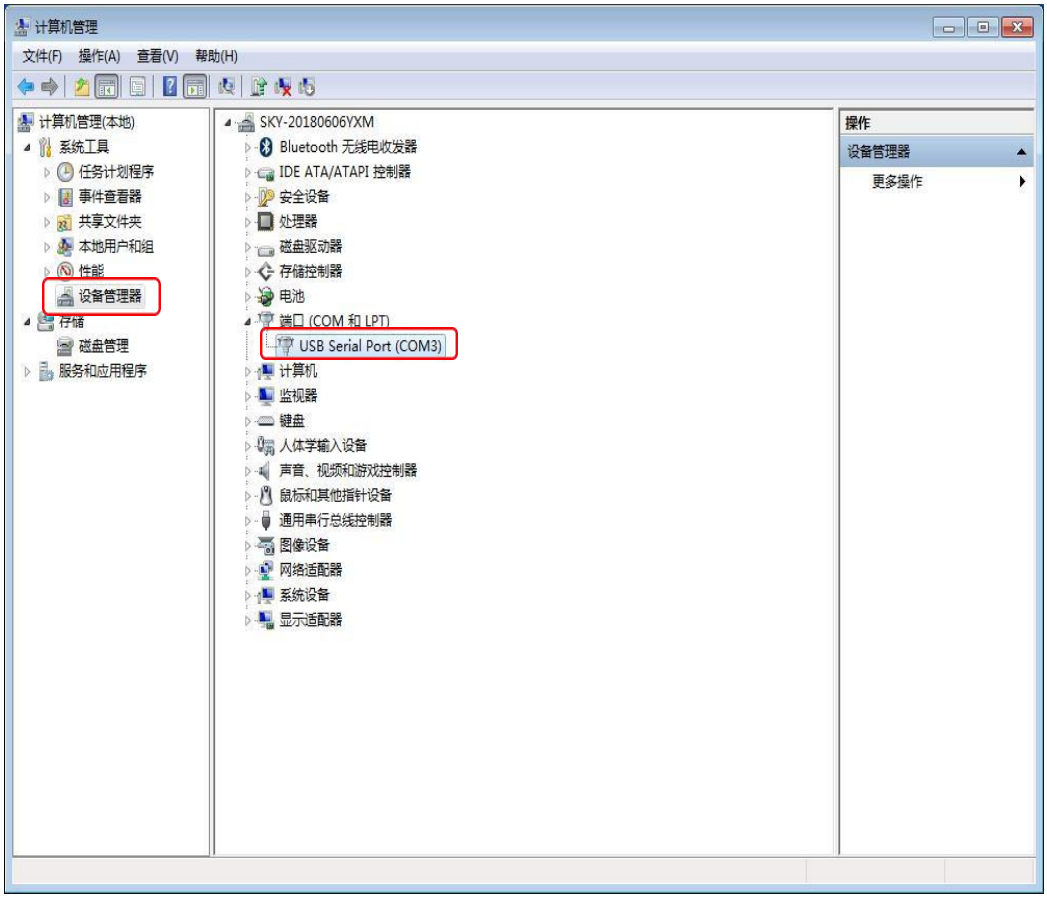
Open the Annuo factory data package, open the USB TO RS232 folder, and selectively install it according to the computer system used. Here, take Win7 / Win7 system as an example.

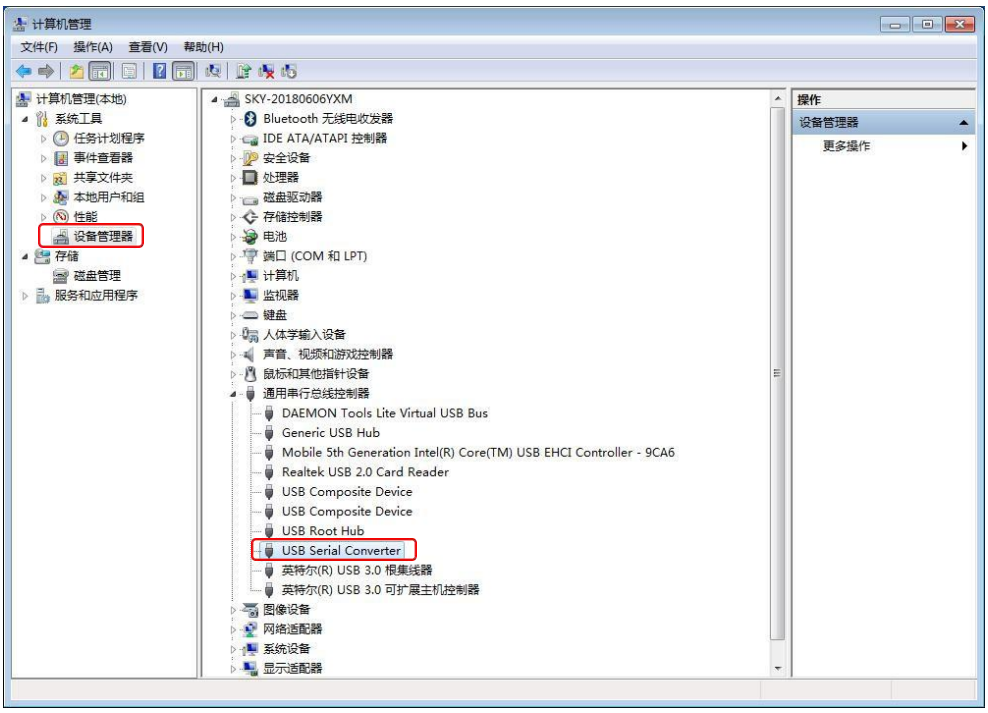



F:\安诺出厂资料\USB TO RS232
文件
主页
共享
查看
此电脑 › 新加卷 (F:) › 安诺出厂资料 › USB TO RS232 ›
名称
修改日期
类型
大小
FTClean 2019/9/25 14:31 文件夹
Linux_x86_64 2019/9/25 14:31 文件夹
MAC 2019/9/25 14:31 文件夹
win98_me 2019/9/25 14:31 文件夹
win2000_xp_vista_x86_x64 2019/9/25 14:31 文件夹
Wince 2019/9/25 14:31 文件夹
windows 7.0 2019/11/15 19:47 文件夹
Windows Server 2003_2008_x86_x64 2019/9/25 14:31 文件夹
快速访问
桌面
下载
文档
图片
OneDrive
WPS网盘
此电脑
视频
图片
文档
下载
音乐
桌面
Win 10 Pro x64 (C
新加卷 (E:)
新加卷 (F:)
新加卷 (G:)
网络


管理
F:\安诺出厂资料\USB TO RS232\windows 7.0
文件
主页
共享
查看
应用程序工具
此电脑 › 新加卷 (F:) › 安诺出厂资料 › USB TO RS232 › windows 7.0
名称
修改日期
类型
大小
CDM 2 06 00 Release Info 2012/5/9 15:36 RTF 文件 102 KB
Setup 2012/5/9 15:36 应用程序 2,291 KB
Setup 2019/11/15 19:47 WinRAR 压缩文... 1,719 KB
快速访问
桌面
下载
文档
图片
OneDrive
WPS网盘
此电脑
视频
图片
文档
下载
音乐
桌面
Win 10 Pro x64 (C
新加卷 (E:)
新加卷 (F:)
新加卷 (G:)
网络

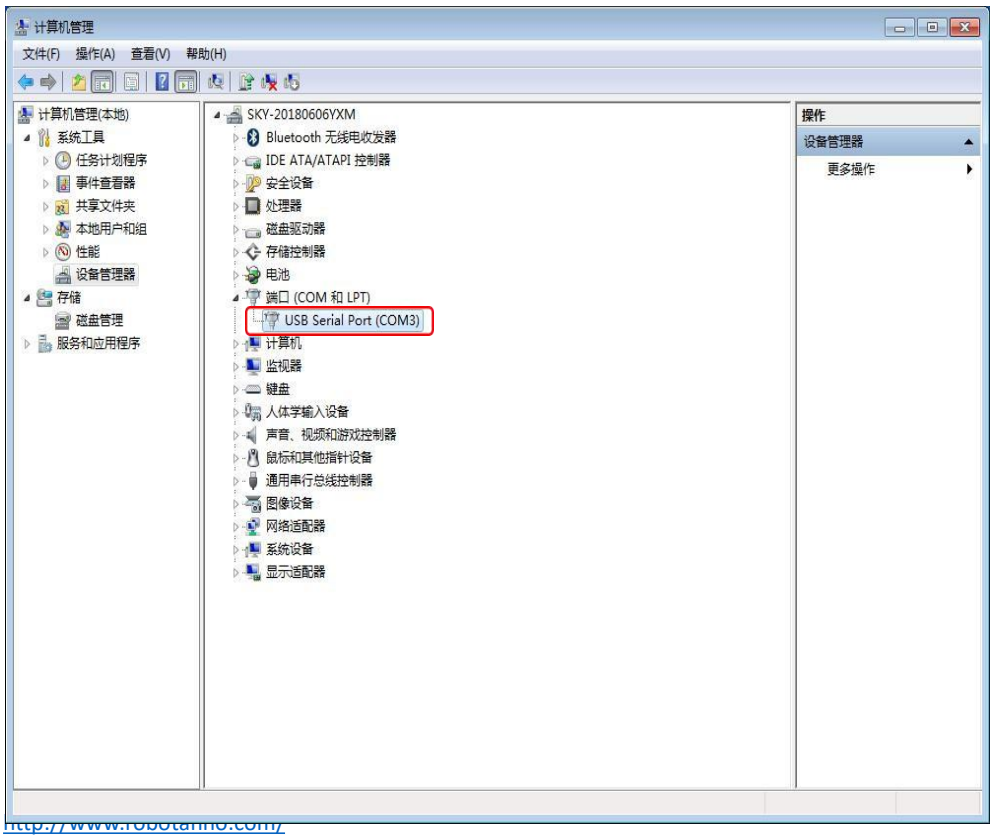

2345加速浏览器
Access
Excel
Internet Explorer
Microsoft OneDrive
OneDrive for Business
OneNote 2016
Outlook
PowerPoint
Publisher
Skype for Business
Windows Media Player
Windows Update
Windows 传真和扫描
Word
XPS Viewer
好压
默认程序
桌面小工具库
2345王牌软件
FreshHope
Microsoft Office 工具
Microsoft SQL Server 2008
返回
搜索程序和文件
Administrator
文档
图片
音乐
游戏
计算机
控制面板
设备和打印
默认程序
帮助和支持
运行...
关机
打开(O)
管理(G)
映射网络驱动器(N)...
断开网络驱动器(C)...
在桌面上显示(S)
重命名(M)
属性(R)


计算机管理
文件(F) 操作(A) 查看(V) 帮助(H)
计算机管理(本地)
系统工具
任务计划程序
事件查看器
共享文件夹
本地用户和组
性能
设备管理器
存储
磁盘管理
服务和应用程序
SKY-20180606YXM
Bluetooth 无线电收发器
IDE ATA/ATAPI 控制器
安全设备
处理器
磁盘驱动器
存储控制器
电池
端口 (COM 和 LPT)
USB Serial Port (COM3)
计算机
监视器
键盘
人体学输入设备
声音、视频和游戏控制器
鼠标和其他指针设备
通用串行总线控制器
图像设备
网络适配器
系统设备
显示适配器
操作
设备管理器
更多操作

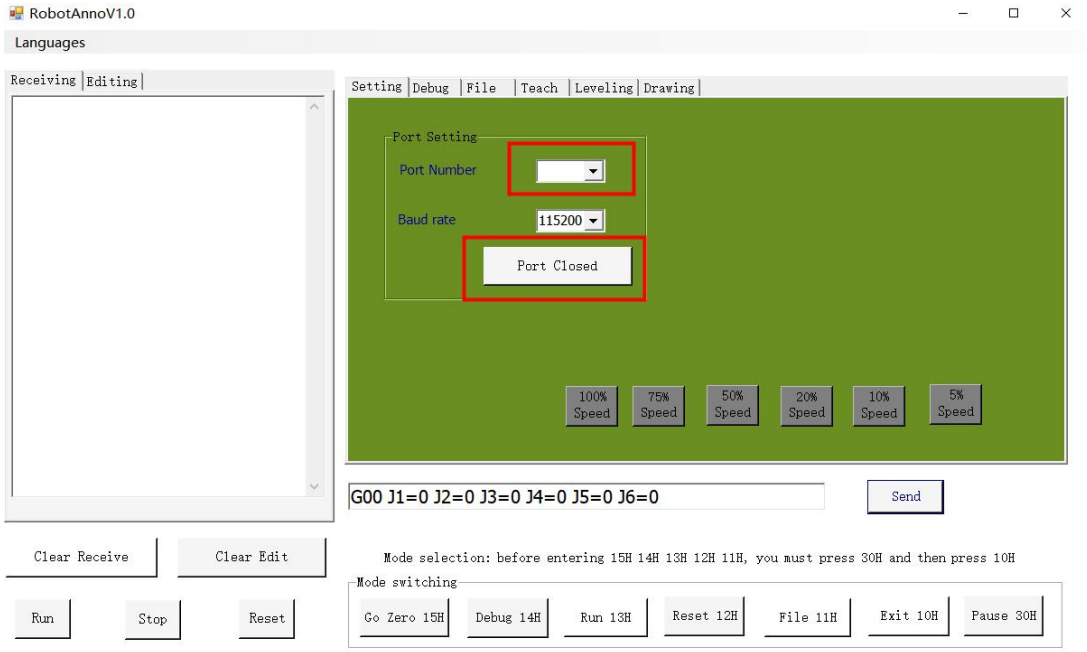


When you see the USB Serial Converter in the universal serial bus controller, the USB TO RS232 driver is successfully installed.

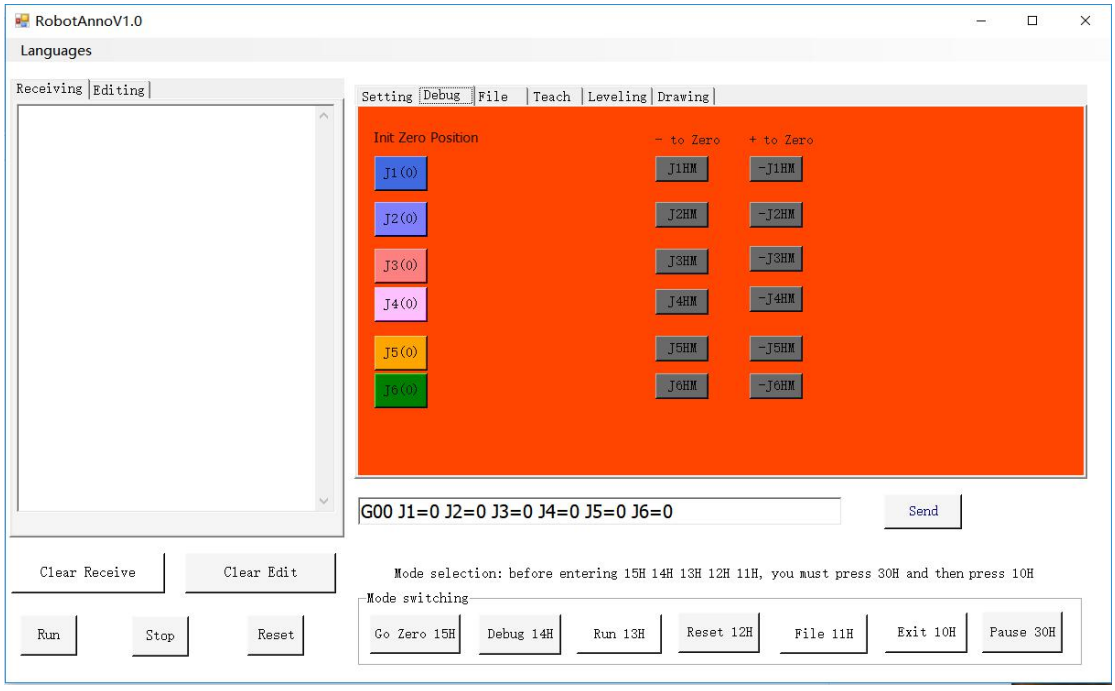
Select the port just installed.The port number of each machine may be different.The actual port will prevail.



Select the correct serial port number, and then click the [Serial Port Not Open] button as shown in the figure below

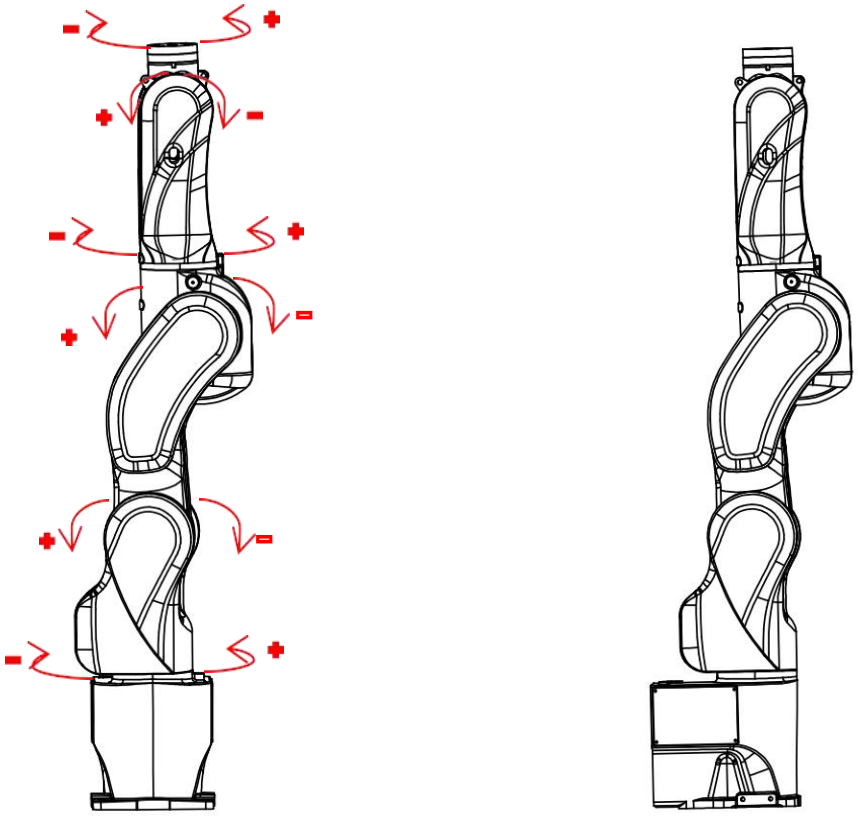


2. Enter debug mode



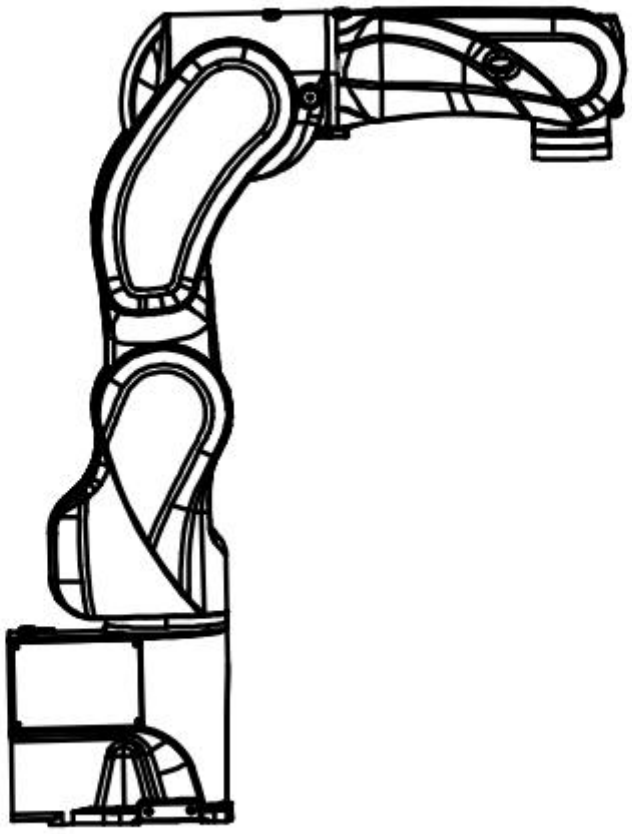
Click the button shown in the figure above, [Pause 30h], [Exit 10h], [Debug 14h], and then click the teaching above.

As shown in the above figure, adjust the 1 ~ 6 joints, and adjust the robotic arm to the vertical state as shown in the right figure below. The lower left figure is the robot arm joint + -direction pattern.



4. Reset

Click [Pause 30h], [Exit 10h], and [Reset 12h] in order to reset. The following figure shows the position after reset.



Note: Reset is that each axis moves in one direction in order to make the induction switch touch the induction screw. If the induction switch is already behind the induction screw before resetting, the axis will reach the limit position. Press the emergency stop button. For details, see 602 Reset video.

5. Enter file mode

As shown in the figure above, click the buttons [Pause 30h], [Exit 10h], [File 11h] to enter the file mode.

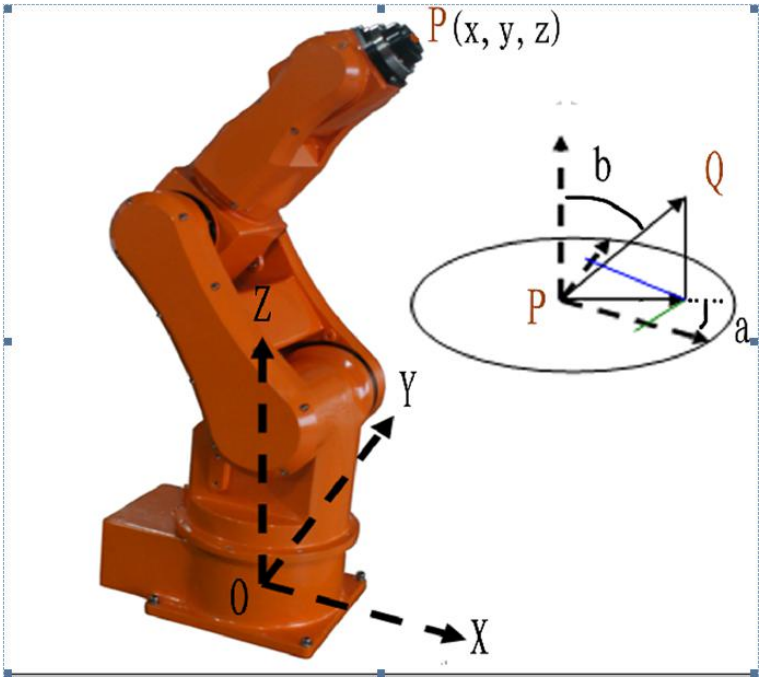
Read file

After selecting the [File] tab, click the [Read] button, and then select the [Editing area] tab to copy the following file contents to the editing area:

FILE=ST
AM.ST
216
code:
G00 J1=0 J2=0 J3=-90 J4=0 J5=-90 J6=0
G20 X=217.4 Y=0 Z=431.1 A=0 B=180 C=0 D=0
G20 X=300 Y=0 Z=285 A=0 B=180 C=0 D=0
G20 X=400
G20 Y=100
G20 X=300
G20 Y=0
G20 X=217.4 Y=0 Z=431.1 A=0 B=180 C=0 D=0

The above file content realizes a continuous action of a square trajectory.
file = st indicates the file type
am.st represents the name of the file
216 indicates the number of bytes in the file
code: the following sections are run instructions

FILE=ST
AM.ST
216
code:
This part is the file header.Every executable file is like this. 216 bytes can be filled with a number first. After downloading, the controller will calculate a correct number of bytes to fill.
g00 j1 = 0 j2 = 0 j3 = -90 j4 = 0 j5 = -90 j6 = 0 indicates the coordinate of the walking joint of the robot arm.
G20 X = 217.4 Y = 0 Z = 431.1 A = 0 B = 180 C = 0 D = 0 means that the manipulator moves in rectangular coordinates, the following is the explanation of (x, y, z, a, b, c, d)



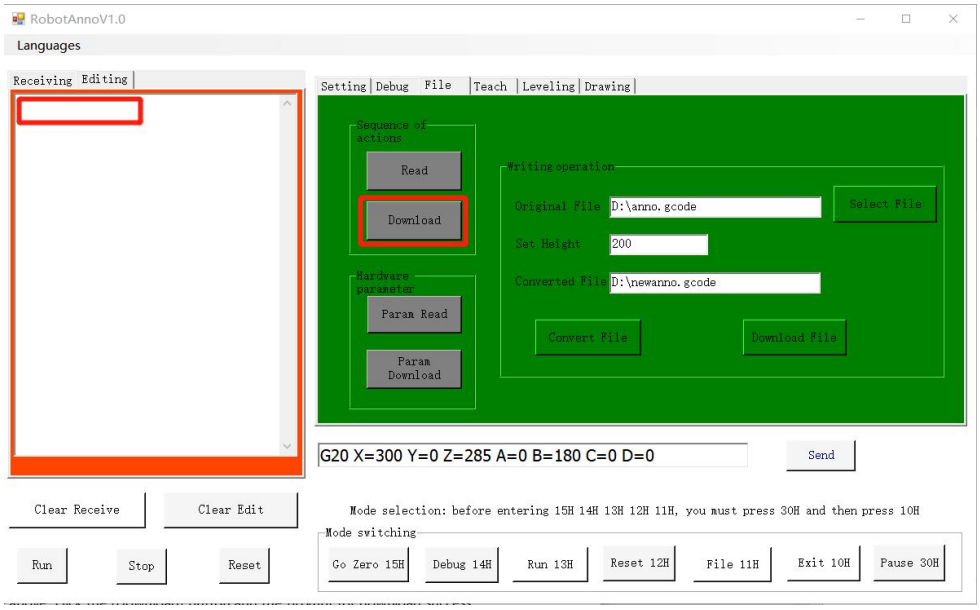
========= Six-axis robot Cartesian coordinate system ========

P(x，y，z，a，b，c，d)

x: X-axis distance (P-point X-axis component);
y: Y-axis distance (P-point Y-axis component);
z: Z-axis distance (P-point Z-axis component);
a: attitude plane angle;
The angle a is the angle between the vector of the attitude vector PQ mapped in the XOY plane and the OX axis;
Angle range: (-180, 180);
b: attitude line face angle;
The angle b is the angle between the attitude vector PQ and the OZ axis;
Angle range: (0, 180);
c: attitude rotation angle;
The c angle is the angle between the vector mapped by the tool vector in the XOY plane and the OX axis;
Angle range: (-360, 360);
d: angular state of each joint in the model;
d is an integer, no value is 0 by default;
Provisions:
0: The end mapping is in the positive direction, the same direction as d1 of the dh parameter, the third axis angle (-) sign, and the fifth axis angle (-) sign;
1: The end map is in the positive direction, the same direction as d1 of the dh parameter, the third axis angle (-) sign, and the fifth axis angle (+) sign;

2: The end map is in the positive direction, the same direction as d1 of the dh parameter, the third axis angle (+) sign, and the fifth axis angle (-) sign;
3: The end mapping is in the positive direction, the same direction as d1 of the dh parameter, the third axis angle (+) sign, and the fifth axis angle (+) sign;
4: The end mapping is in the negative direction, inverse to d1 of the dh parameter, the third axis angle (-) sign, and the fifth axis angle (-) sign;
5: The end mapping is in the negative direction, inverse to d1 of the dh parameter, the third axis angle (-) sign, and the fifth axis angle (+) sign;
6: The end is mapped in the negative direction, inverse to d1 of the dh parameter, the third axis angle (+) sign, and the fifth axis angle (-) sign;
7: The end is mapped in the negative direction, inverse to d1 of the dh parameter, the third axis angle (+) sign, and the fifth axis angle (+) sign;

2. Download the file to the controller



As shown in the figure above, click the [Download] button, and a prompt of successful download will be displayed in the position shown in the editing area.

3. Run the file

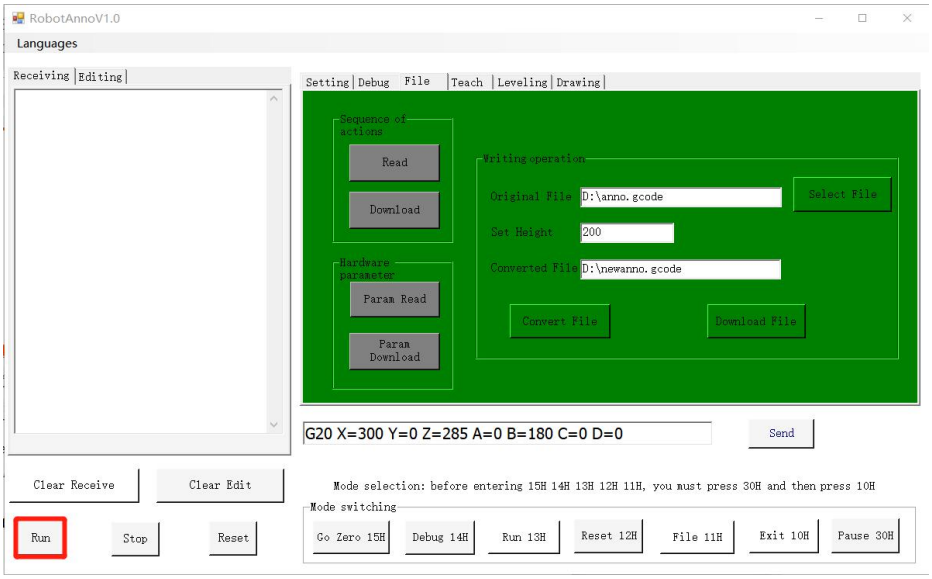
As shown in the figure above, click the buttons [Pause 30h], [Exit 10h], and [Run 13h] in order to see the movement of the robot arm.

For file operation, the robot arm will continue to move and will not stop automatically.

4. Stop file running

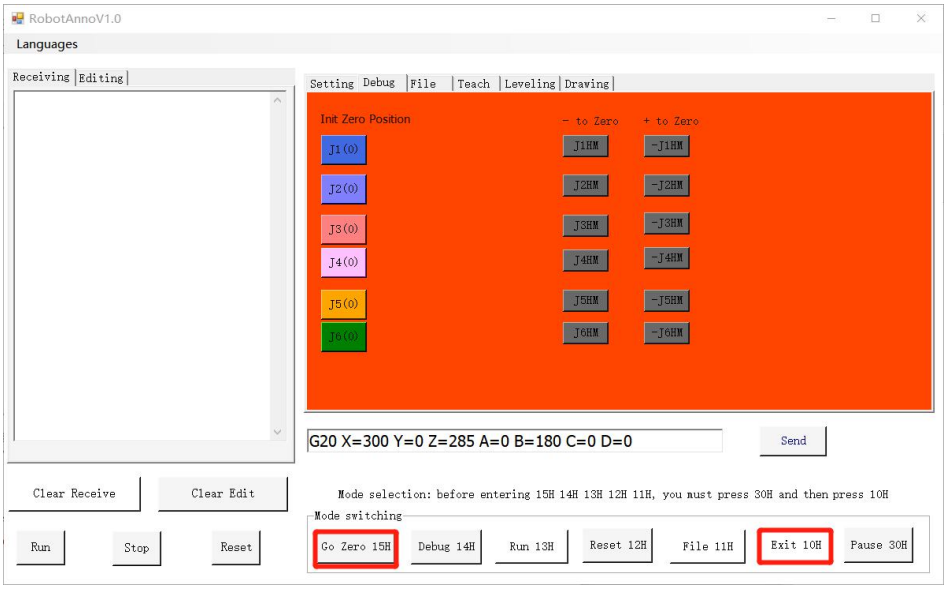
As shown in the figure above, when the file is running, if the robot arm is always moving, and you need to stop the movement, click the [Stop] button, the robot arm can stop the movement.

5. Resume file movement



As shown in the figure above, after stopping the file movement, if you need to continue the file movement that was stopped before, then click the [Run] button and you can see that the robotic arm continues to move at the position where it stopped before.

6. The robotic arm returns to the zero position

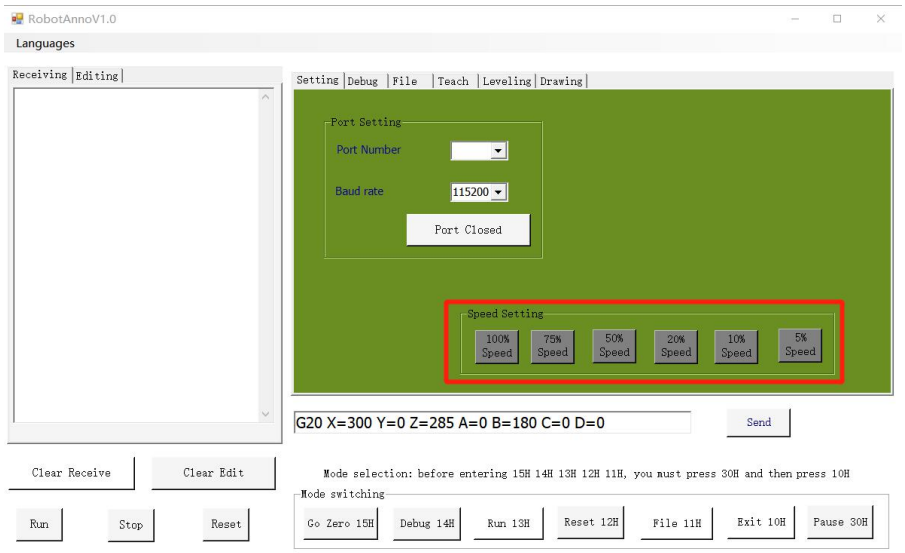


As shown in the figure above, if the robot arm needs to return to the zero position (vertical

position), click [Pause]-> [Exit]-> [Return to Zero], and the robot arm will move to the vertical position.

After clicking the above three buttons in turn, if the robot arm does not move, click these three buttons in turn.

6. Adjust the speed



As shown above, the row of buttons can adjust the speed of the robot arm movement.

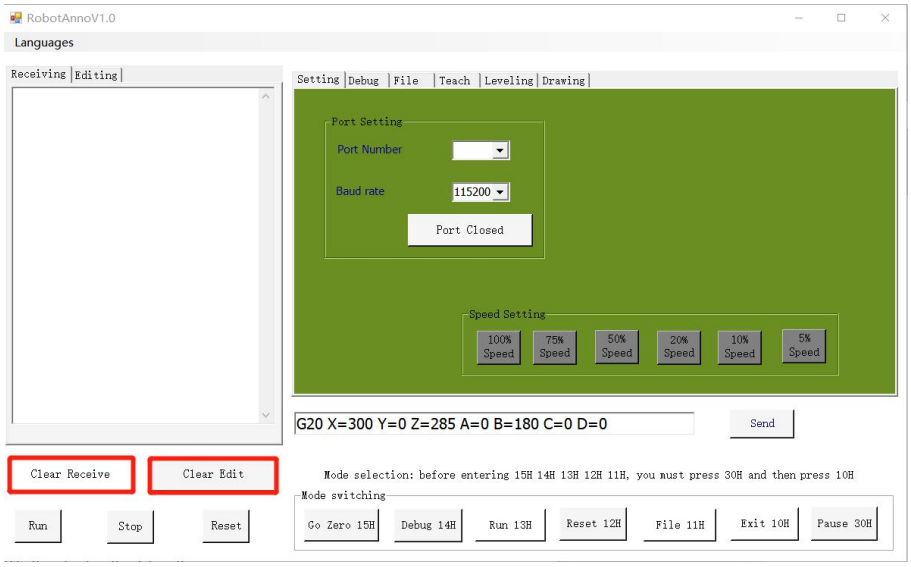
note:

1) If you press the speed adjustment button while the file is moving, it will run at the speed you set in subsequent movements.

2) Before executing a single instruction, if the speed adjustment button is pressed, the next movement instructions will move at the speed you set.

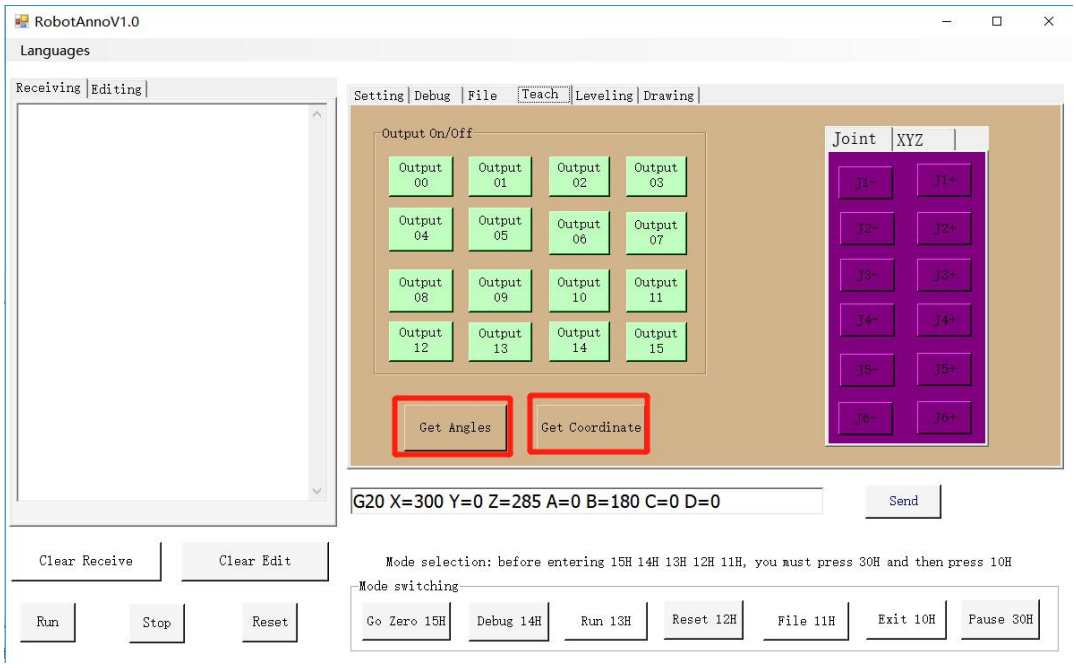
2) In the motion command, the g code command used to control the speed is g07 vp = ## (0 ~ 100), for example: g07 vp = 50, which means that the speed is adjusted to fifty.

7. Clear operation



As shown in the figure above, if there are more data in the [Receive Area], you can press the [Clear Receive] and [Clear Edit] buttons to clear the data in the Receive Area.

8.Check the current position of the robot arm



As shown in FIG:

Check the position of the joint rotation angle of the robotic arm, click [Joint Output], and then click [Pause 30h]. In the [Receiving Area], you can see the rotation angle of each joint.

Check the space coordinate position of the robot arm, click [Coordinate Output], and then click [Pause 30h], and you can see the position of the space coordinate in the [Receiving Area].

9. RobotannoV2.0 instructions

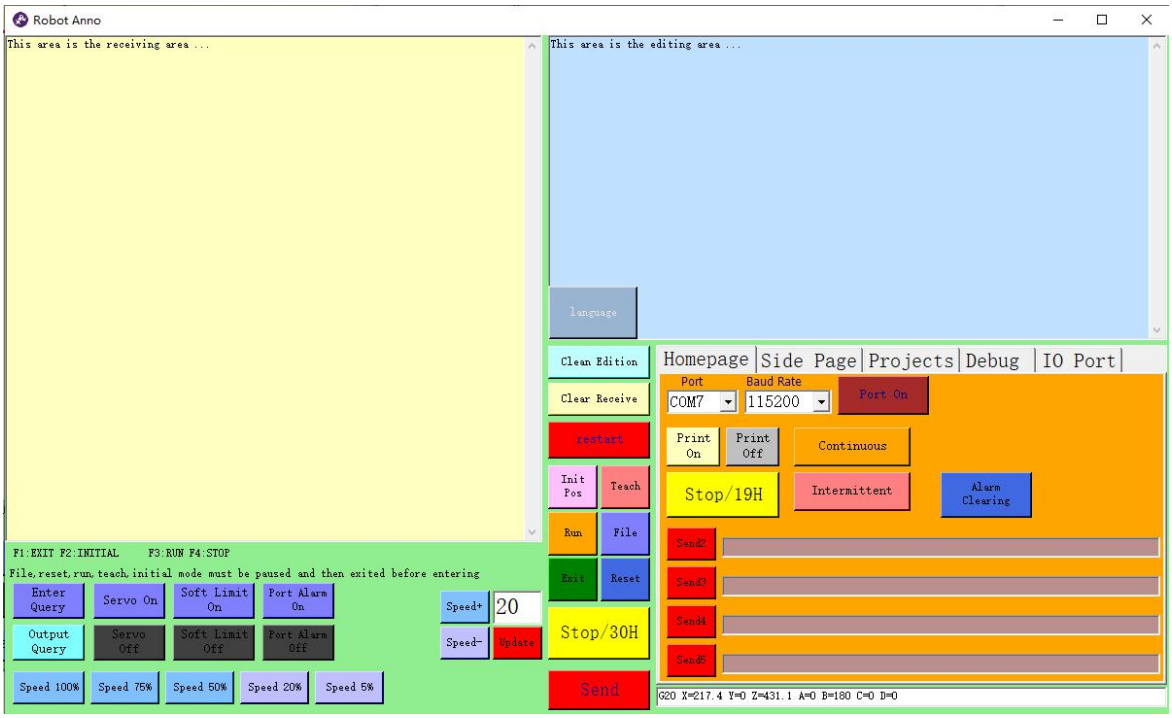
1 When the computer opens the robotanno2.0 software for the first time, and the serial port is connected, a prompt window will pop up and a folder will be automatically created in the root directory of the current software disk of robotanno2.0

Chosse ok

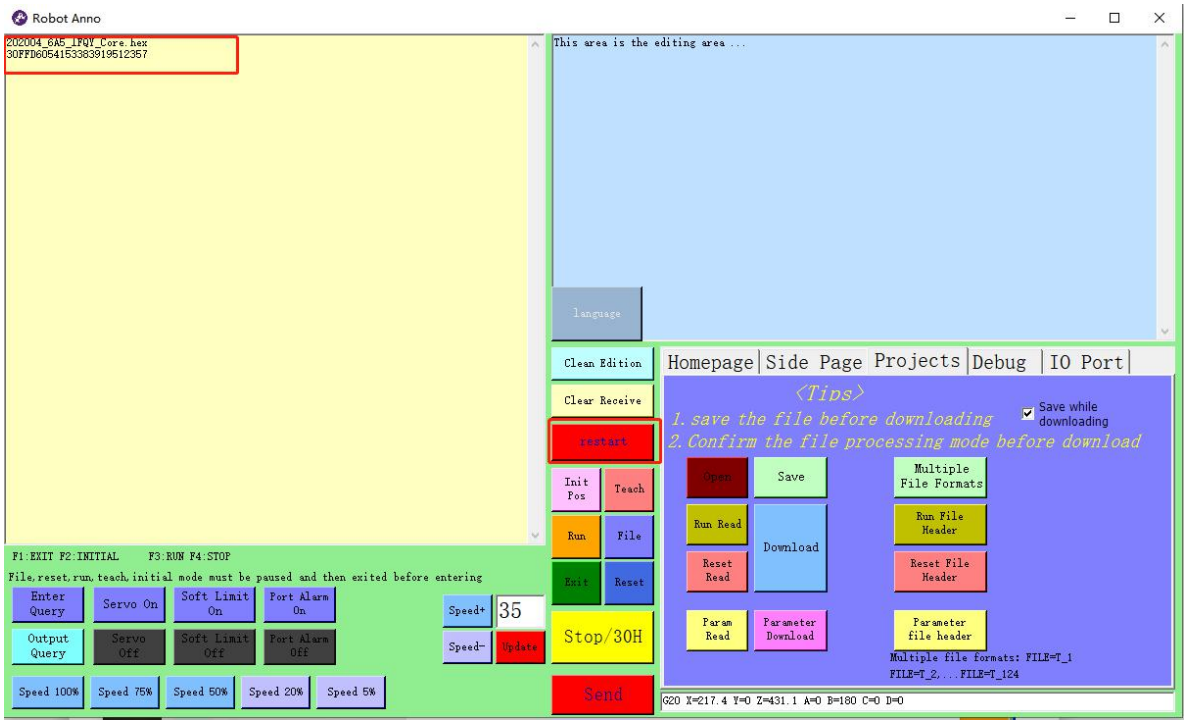
Choose ok again, and then restart the software.

When the serial port is connected, the port number will be displayed automatically. If the serial port cannot be connected, the port number will be blankIf the serial port is not connected, you need to check the serial port connection

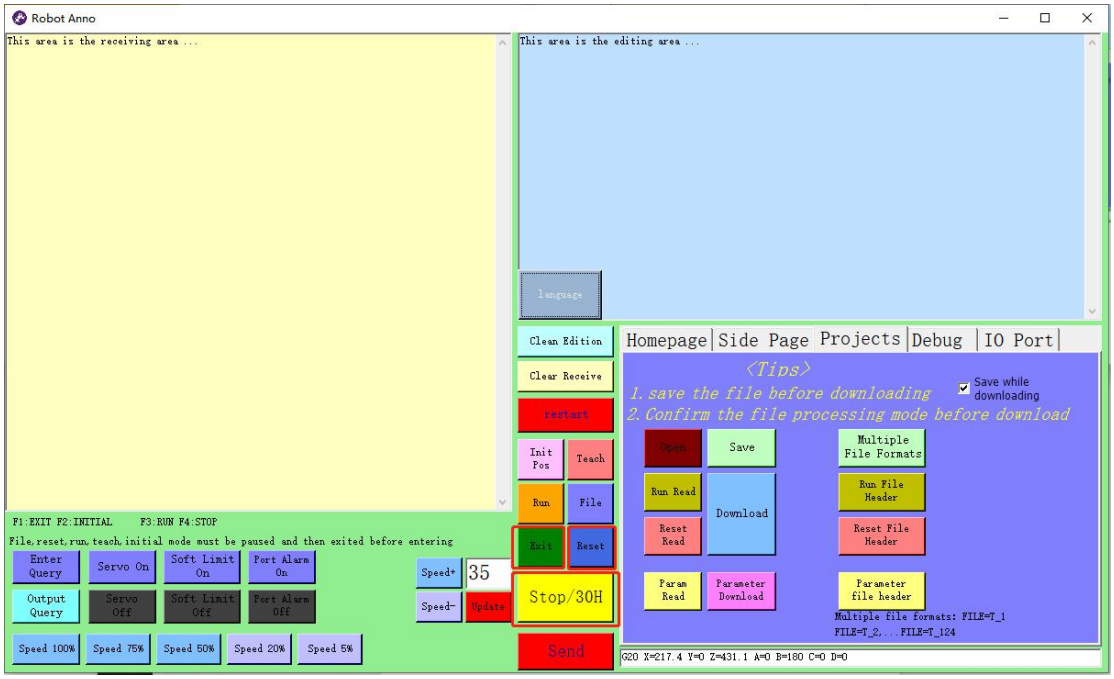
2 Open the software interface



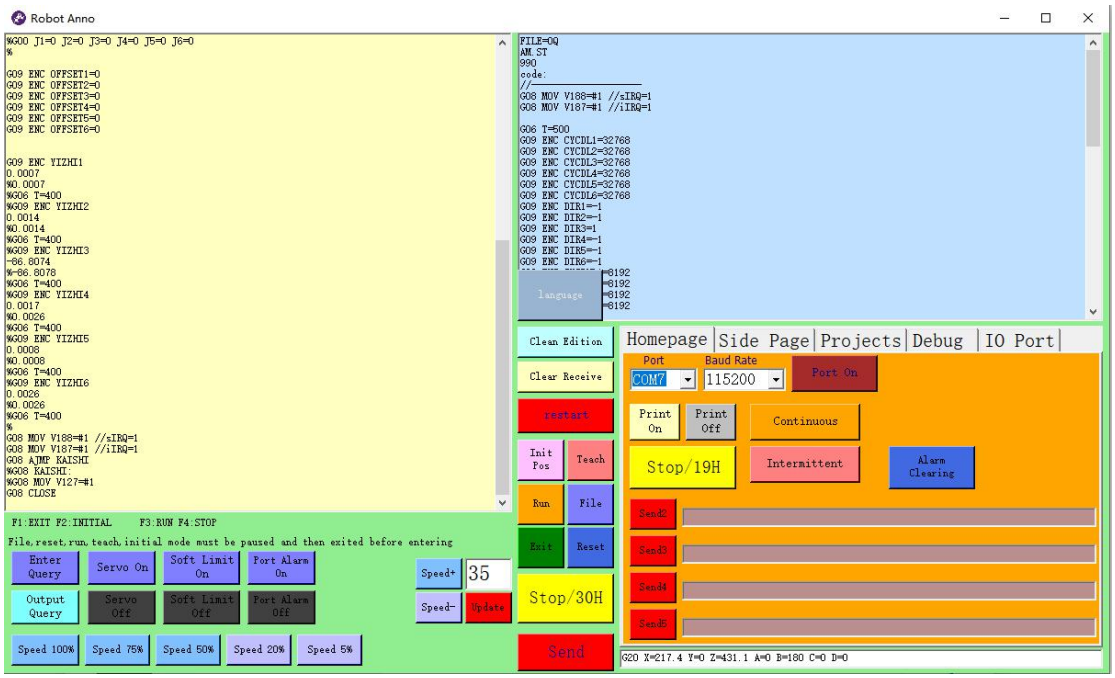
Click Restart, the beige receiving area will receive the system version information



3 Enter reset mode, click pause, exit, reset



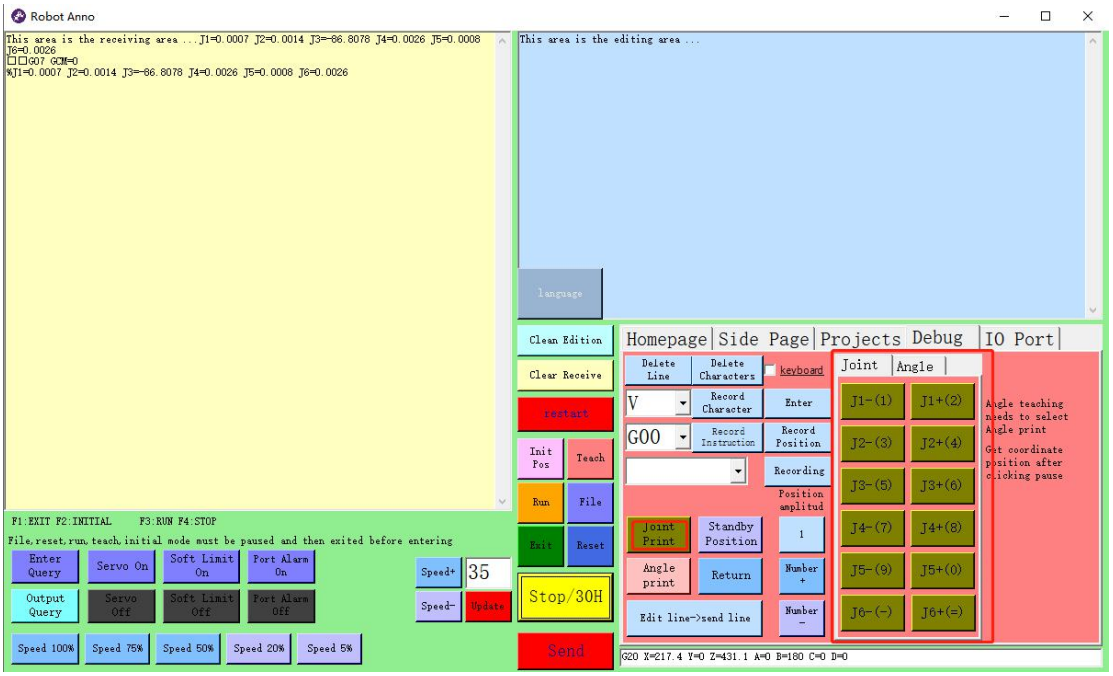
The stepper motor finds the origin sensor and resets it. Before operation, the parameter file of the controller is required.



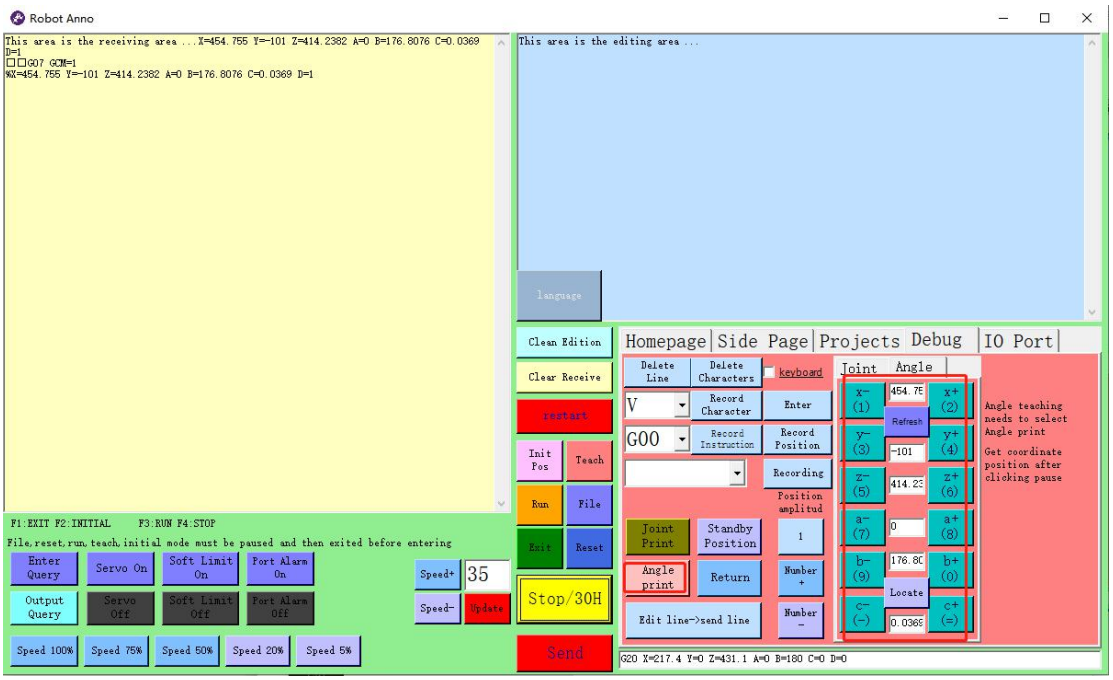
The servo motor reads the absolute encoder position. Before operation, the parameter file of the controller is required, and the zero return file is configured correctly。

4 Enter teaching mode, click pause (30H), exit (10H), teaching (14H)

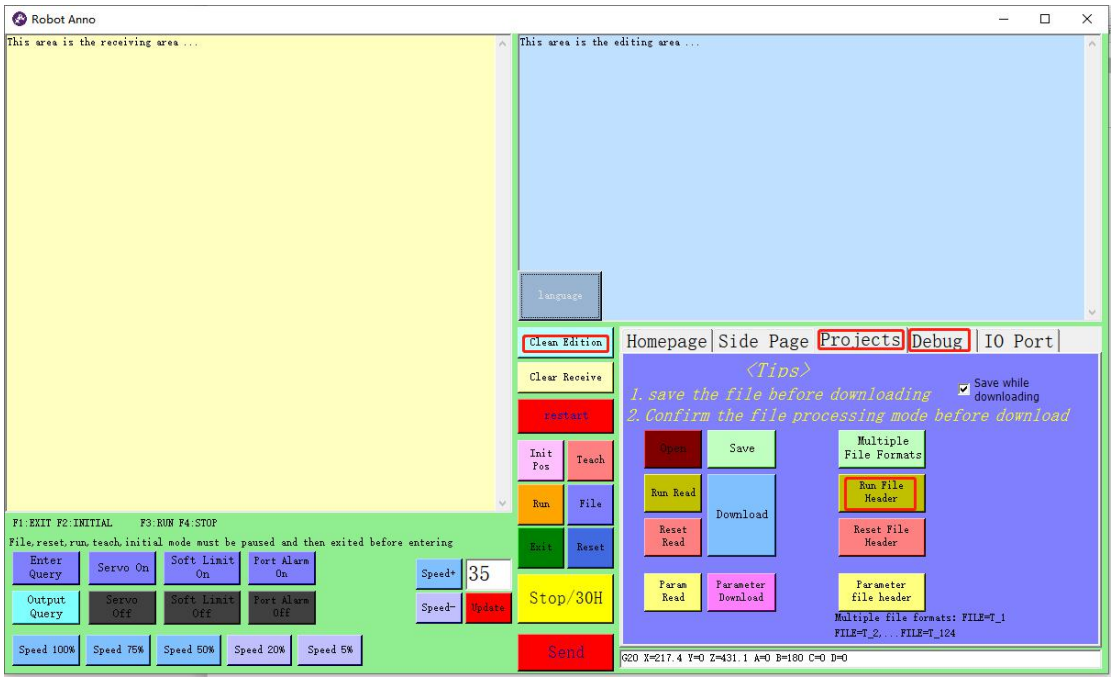
Click Pause, the receiving area receives the current position of the robot (joint position or rectangular coordinate position). When you click the joint to print, press Pause again, the joint angle is printed, and the joint debugging controls (J1 +, J1-, J2 +, J2-, J3 + , J3-, J4 +, J4-, J5 +, J5-, J6 +, J6-,) The brackets in the control are 1234567890- = on the keyboard after selecting the keyboard.



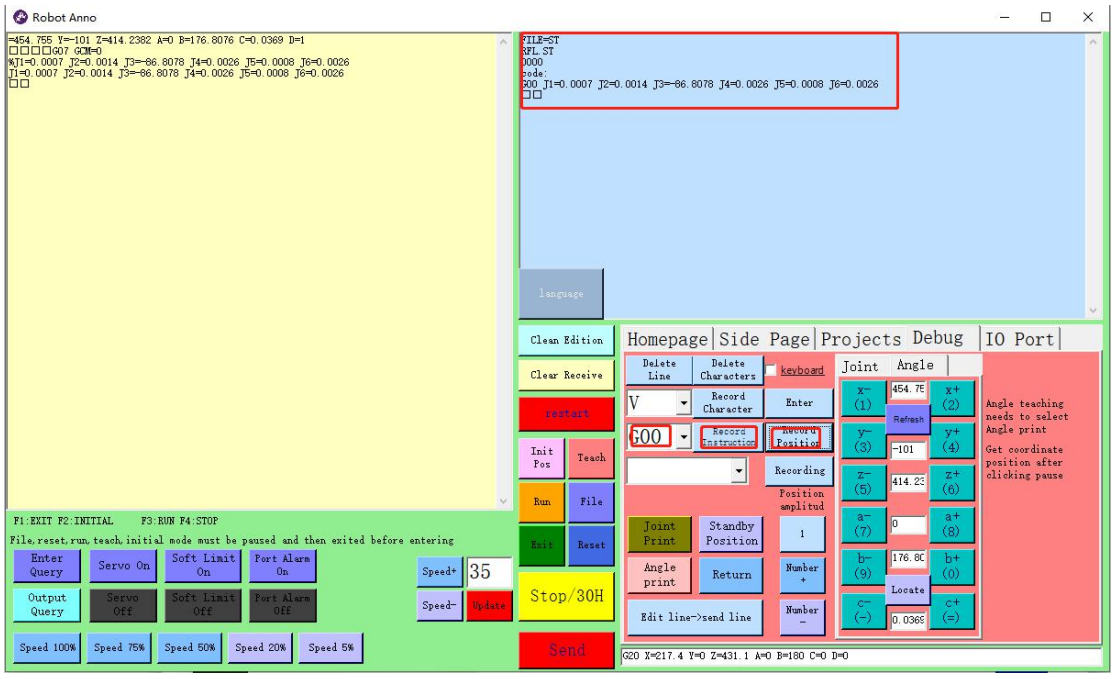
When you click rectangular printing, press Refresh to print the rectangular coordinate position and posture, you can operate the joint debugging controls (x +, x-, y +, y-, z +, z-, a +, a-, b +, b-, c +, c-,) Control brackets are corresponding to the selected keyboard after ticking



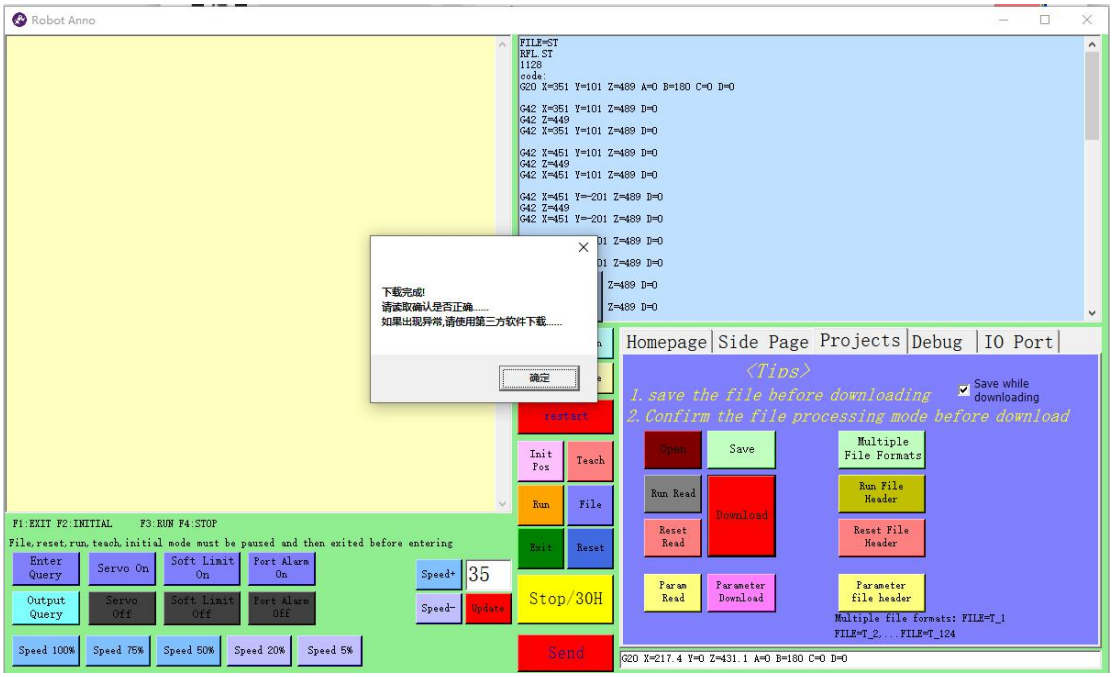
5 Programming, in the teaching mode, click on the project, click to clear edit, click to run the file header, then click debug to return to the debug interface



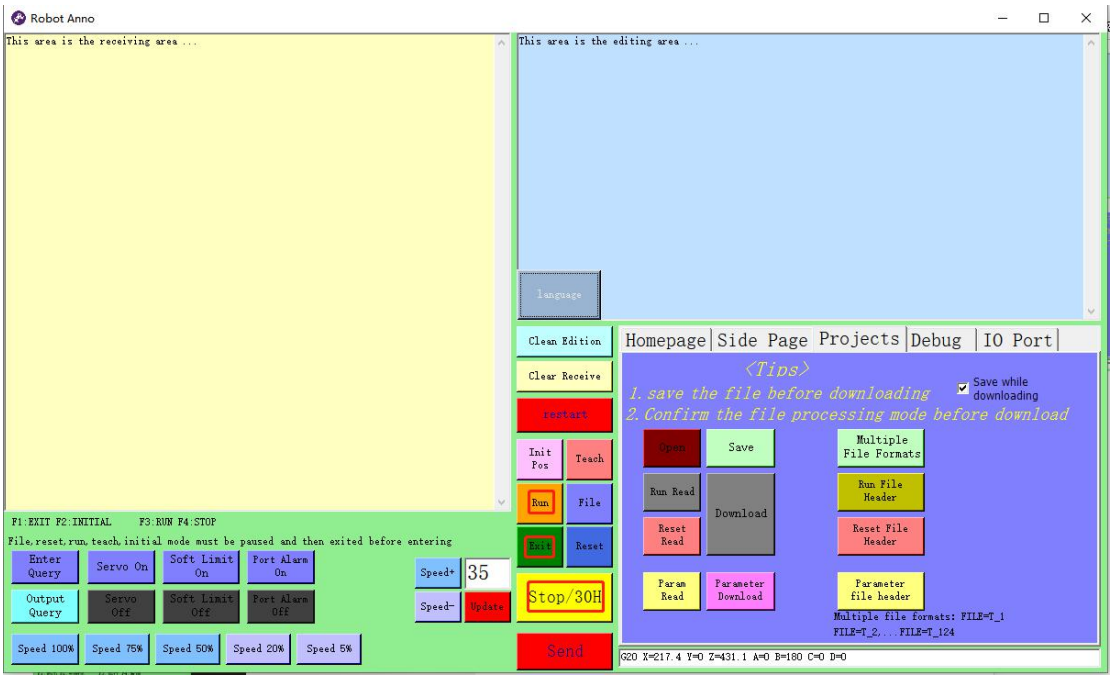
Click the cursor line in the editing area, select the instruction head, click record instruction, record position



6 File download, click pause, exit, file, download; (the download control needs to enter the correct password, the initial password is 1101)



7 Run, click pause, exit, run



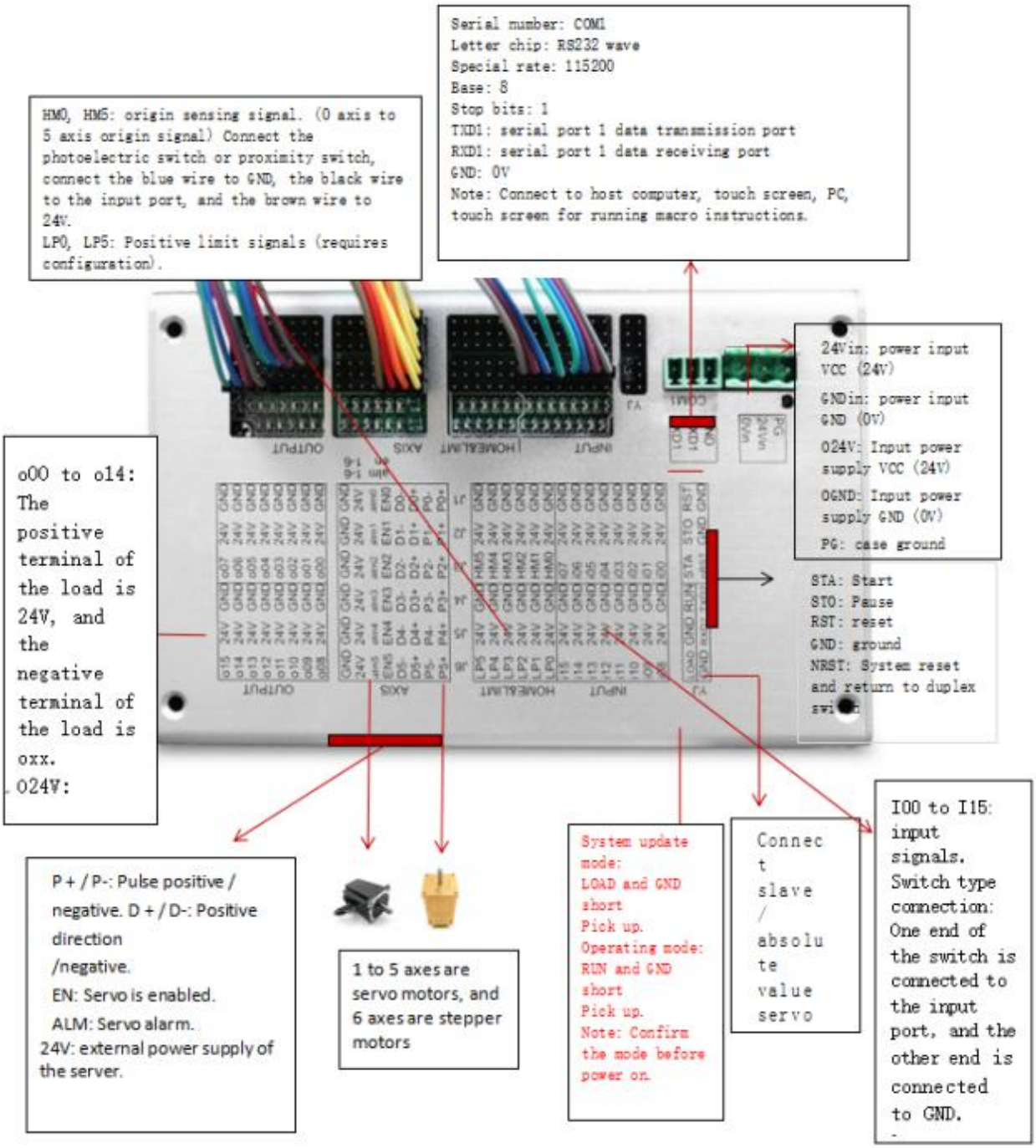
10. I / O and encoder hardware interface definition

602_db9 interface definition		
Pin number	definition	Note
1	j1 return to zero switch signal line	
2	j2 return to zero switch signal line	
3	j3 return to zero switch signal line	
4	j4 return to zero switch signal line	
5	j5 return to zero switch signal line	
6	j6 return to zero switch signal line	
7	24V+	
8	GND	Share`
9	36V+	
602_db25 interface definition		
Pin number	definition	Note
1	OUT0	
2	OUT1	
3	OUT2	
4	OUT3	
5	OUT4	
6	customize	
7	customize	
8	IN0	
9	IN1	
10	IN2	
11	IN3	
12	IN4	
13	customize	
14	customize	
15	customize	

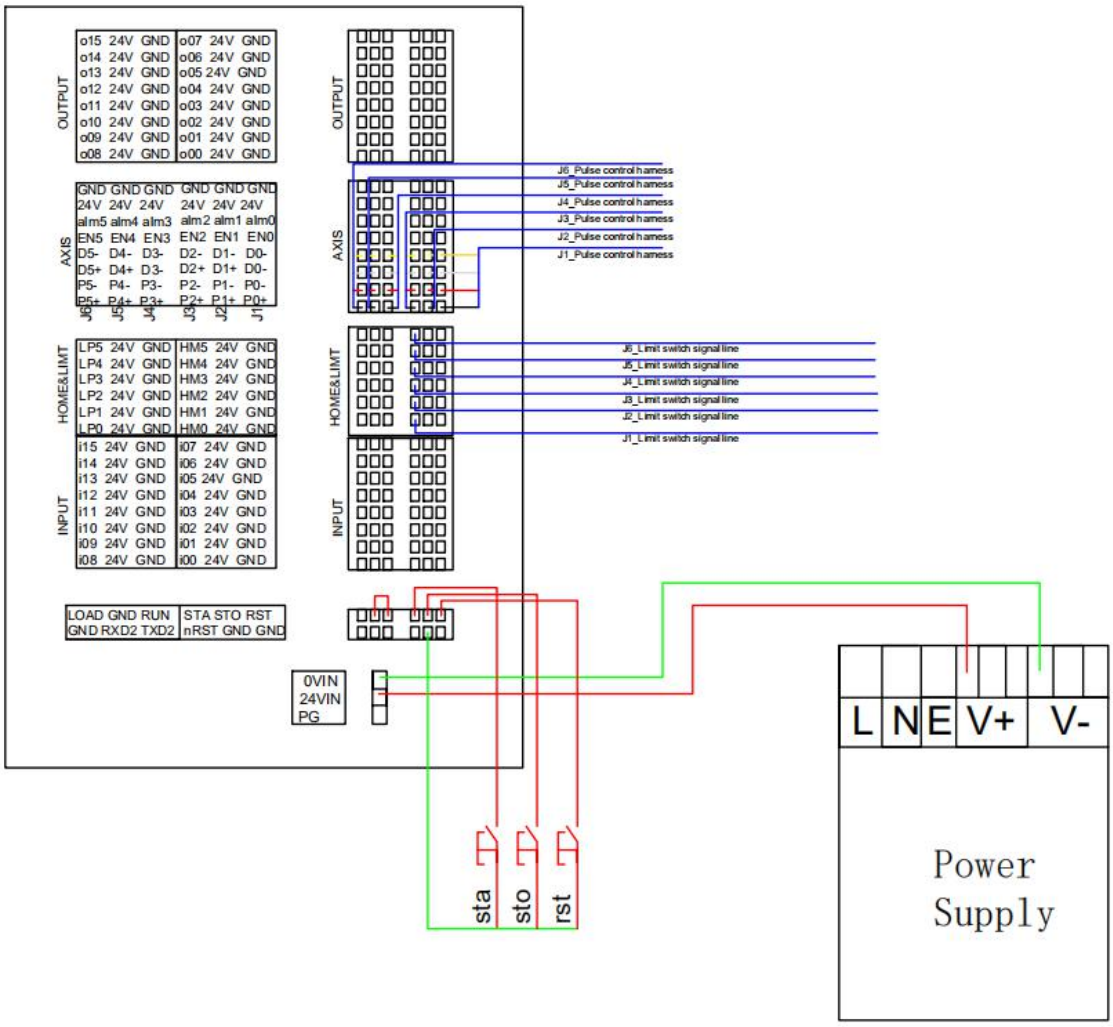
16	customize	
17	customize	
18	customize	
19	customize	
20	customize	
21	customize	
22	customize	
23	0V	Relay use
24	24V	
25	5V	
GND	GND	

The io port of the robot cannot directly send signals.It needs to be switched by a relay.Generally, the relay in the control box has been connected.

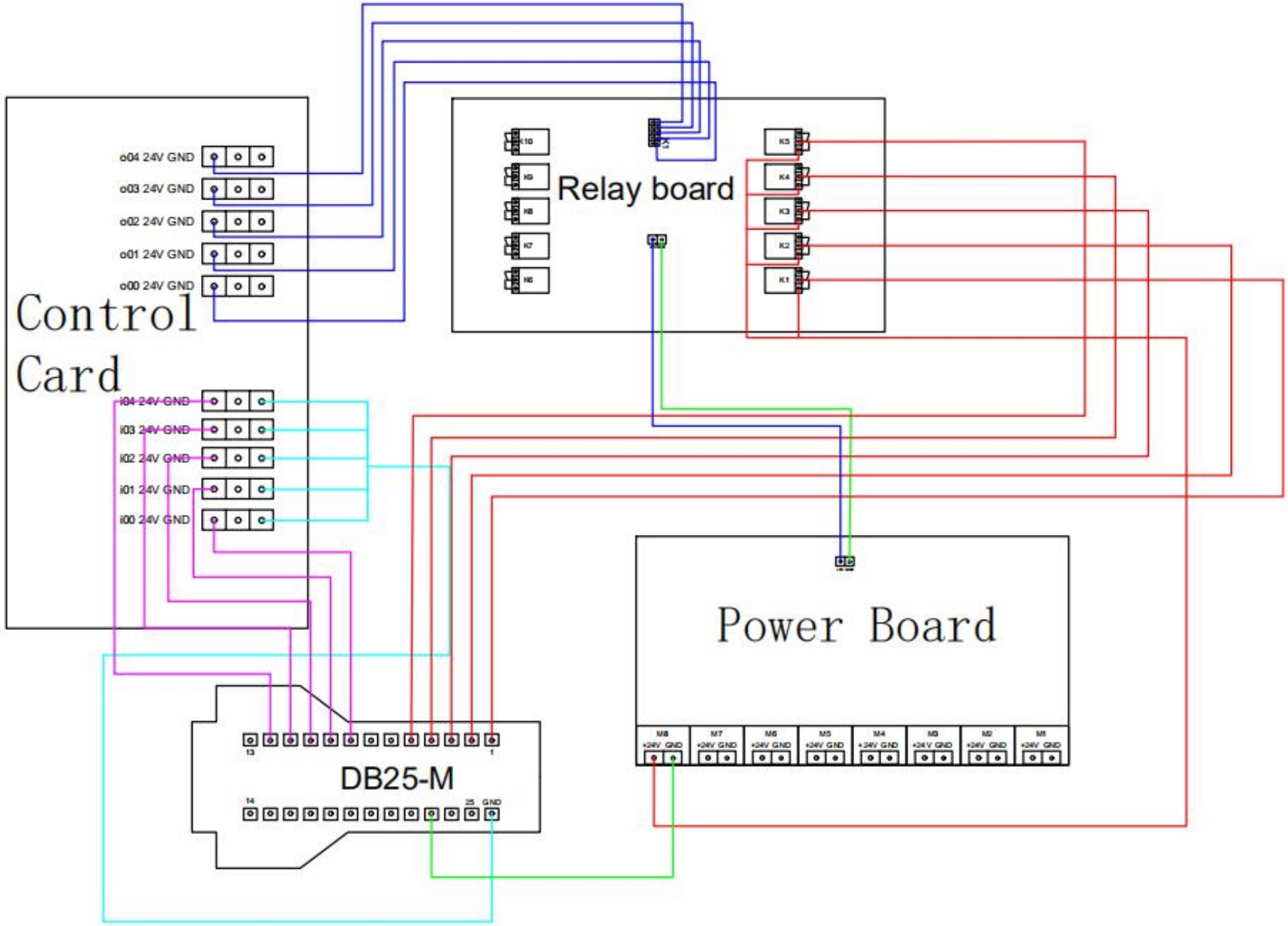
1. Definition of main control port


Serial number: COM1
Letter chip: RS232 wave
Special rate: 115200
Base: 8
Stop bits: 1
TXD1: serial port 1 data transmission port
RXD1: serial port 1 data receiving port
GND: 0V
Note: Connect to host computer, touch screen, PC, touch screen for running macro instructions.
HM0, HM5: origin sensing signal. (0 axis to 5 axis origin signal) Connect the photoelectric switch or proximity switch, connect the blue wire to GND, the black wire to the input port, and the brown wire to 24V.
LP0, LP5: Positive limit signals (requires configuration).
24Vin: power input VCC (24V)
GNDin: power input GND (0V)
024V: Input power supply VCC (24V)
0GND: Input power supply GND (0V)
PG: case ground
STA: Start
STO: Pause
RST: reset
GND: ground
NRST: System reset and return to duplex
o00 to o14: The positive terminal of the load is 24V, and the negative terminal of the load is oxx.
024V:
P+ / P-: Pulse positive / negative. D+ / D-: Positive direction /negative.
EN: Servo is enabled.
ALM: Servo alarm.
24V: external power supply of the server.
1 to 5 axes are servo motors, and 6 axes are stepper motors
System update mode:
LOAD and GND short
Pick up.
Operating mode:
RUN and GND short
Pick up.
Note: Confirm the mode before power on.
Connect slave / absolute value servo
I00 to I15: input signals. Switch type connection: One end of the switch is connected to the input port, and the other end is connected to GND.

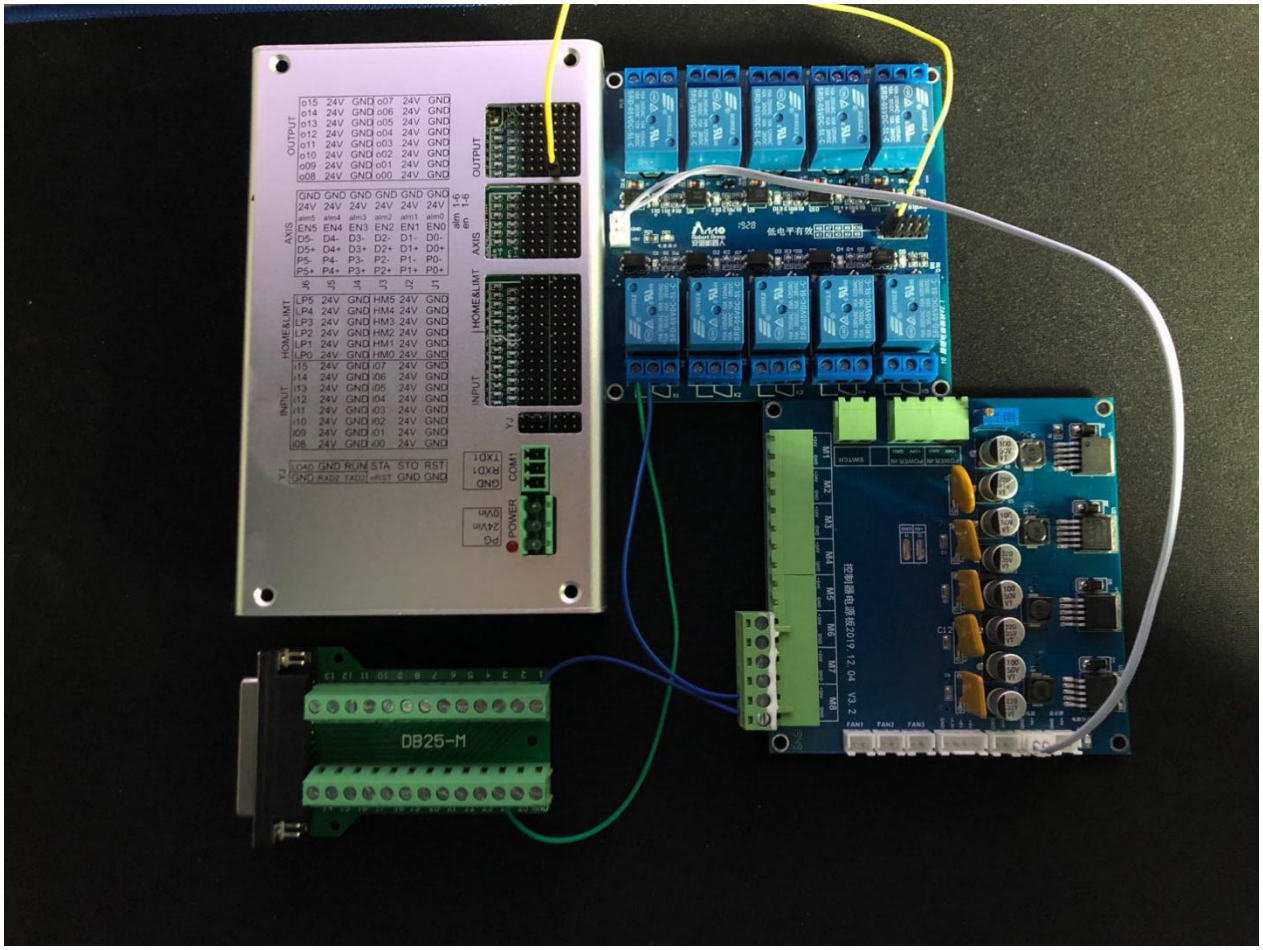
2.Main control wiring diagram:



3.Wiring circuit diagram of the relay in the control box:


o04 24V GND
o03 24V GND
o02 24V GND
o01 24V GND
o00 24V GND
Control Card
i04 24V GND
i03 24V GND
i02 24V GND
i01 24V GND
i00 24V GND
Relay board
K5
K4
K3
K2
K1
Power Board
DB25-M

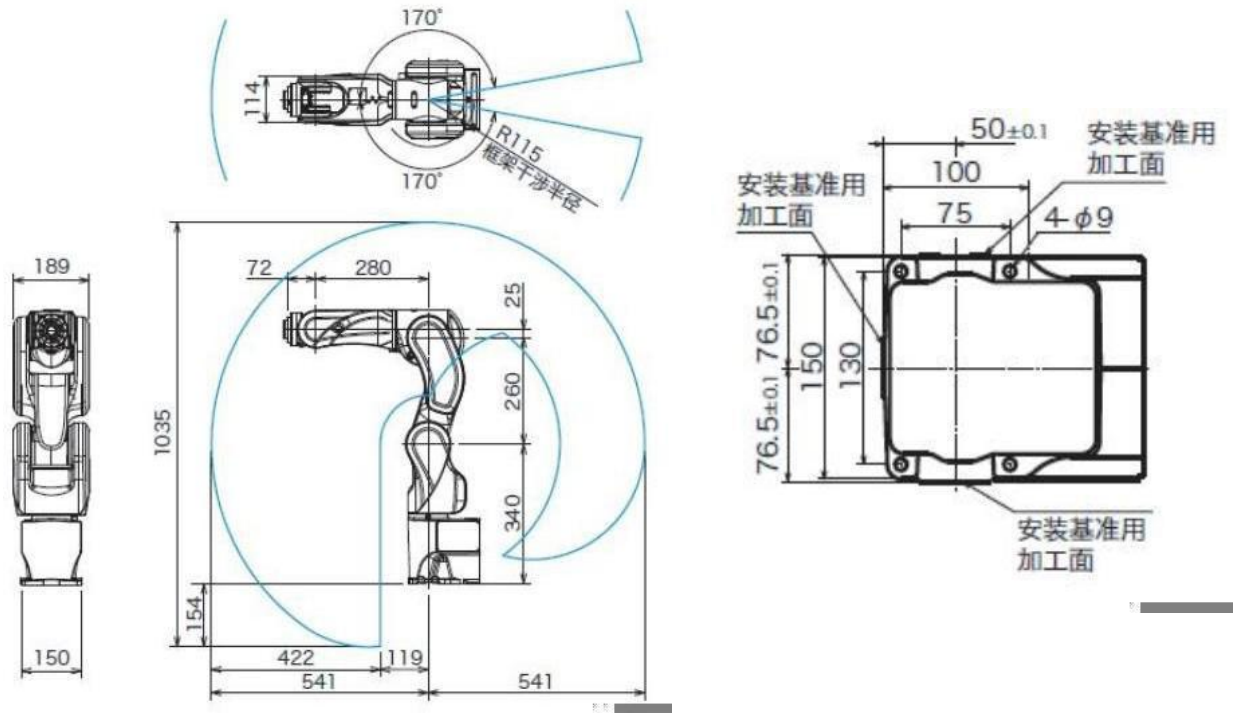
4.Physical diagram of the relay relay wiring in the control box (only one set of output is connected in the picture):



When multiple outputs are required, the positive pole is connected to pins 1 to 5 (controlled by o00 to o04 respectively), and the negative pole is connected to pin 23 (shared).

11.602 parameters

1. Size parameters



2.Motor, reduction ratio parameters

axis	Harmonic reduction ratio	Belt reduction ratio	Single-turn pulse value
First axis	50	1.5	8192
Second axis	100	1.5	8192
Third axis	50	1.4	8192
Fourth axis	50	1.2	8192
Fifth axis	50	1	8192
Sixth axis	/	5	25600

3. Controller parameters

FILE=INI // File path Parameter.ini //file name

661 // File length (count the number of bytes from the fourth line to the last carriage return line feed)

//// DH_PARAMETER: // DH parameter (unit: mm; h axis, d is distance)

_h0=340;

_d1=0.1;

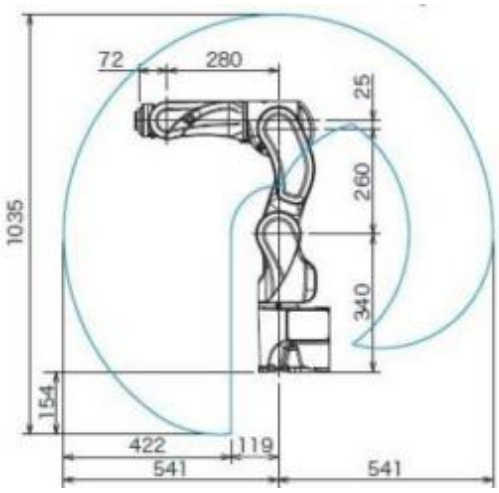
_h2=260;

_d3=25;

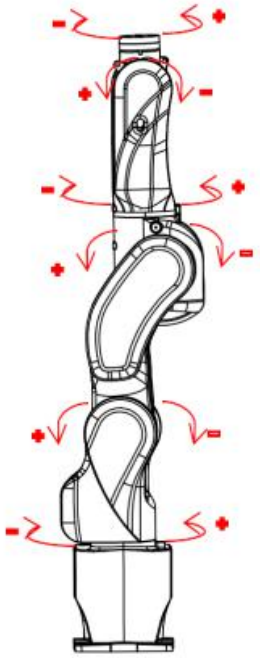
_h4=280;

_h5=72;

_d6=1;



//// motor_dir: // Motor direction



_dir1=-1;

_dir2=1;

_dir3=1;

_dir4=-1;

_dir5=1;

_dir6=1

//// joint_pul: // Organization breakdown

_j1pul = 614400; // Drive breakdown: 8192 // Reduction ratio 75
_j2pul = 1228800; // Drive breakdown: 8192 // Reduction ratio 150
_j3pul = 573400; // Drive breakdown: 8192 // Reduction ratio 70
_j4pul = 491520; // Drive breakdown: 8192 // Reduction ratio 60
_j5pul = 409600; // Drive breakdown: 8192 // Reduction ratio 50
_j6pul = 128000; // Drive breakdown: 25600 // Reduction ratio 5

Note: mechanism breakdown = driver breakdown * structure reduction ratio

Example: The reduction ratio is 1: 100. The driver is subdivided into 8192 pulses / second. The mechanism is subdivided into 100 * 8192 = 819200 pulses / second.

////VELOCITY: // speed setting

_ac=60000.0; // Acceleration (increase in pulses per second)

_de=60000.0; // Deceleration (reduction in pulses per second)

_vpp = 100000.0; // Highest speed (pulses per second)

_vp=10; // Rate (Running speed ve = vpp * vp / 100, ve: The current running speed of the device.)

////MODE:

_pve=8.887

_getCodeMode=1; // 0 is teaching for joint output, 1 is teaching for right-angle output

_runCodeMode=1; // 1 is the printing code, 0 is not printing the code

_prmTPUL=90; // Pulse maximum width adjustment threshold (4 ~ 400) (v142)

_flagSoftRst=1
_brkMotorEn=0
_STACLR=0
_almLED=1

_iIRQ=0

_sIRQ=0 //Note
//REPOS /// Power-on motor default position (standby position)

_rePosJ1=1;
_rePosJ2=0;
_rePosJ3=-90;
_rePosJ4=0;
_rePosJ5=-90;
_rePosJ6=0;
_rePosJ6=0;

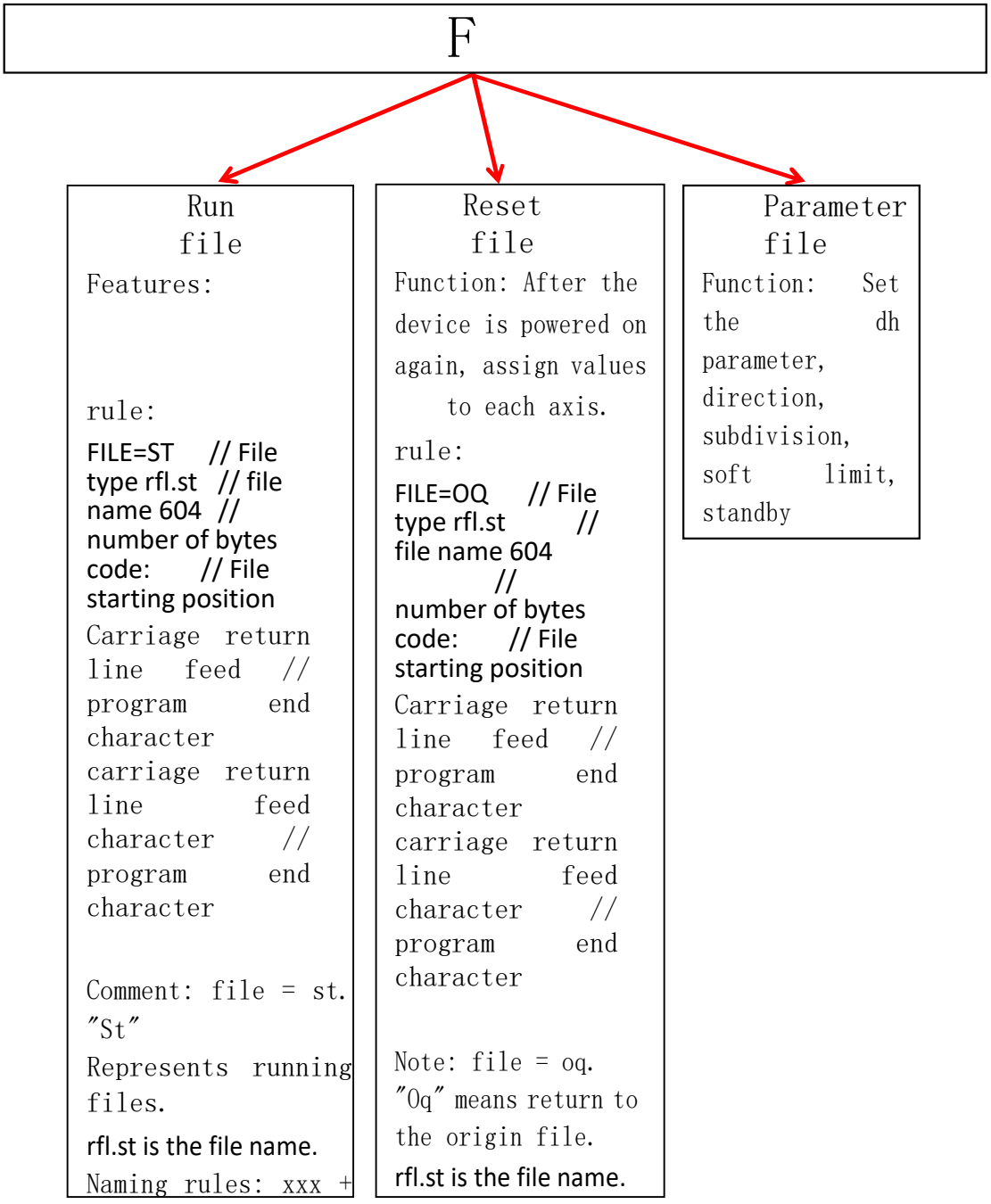
```
//LIMIT                 // Soft limit (0 in _sLp0 represents the axis number)

_sLp0=150                   // Positive limit angle of the 1st axis software

_sLn0=-150                  // 1st axis software negative limit angle
_sLp1=80
_sLn1=-80
_sLp2=0
_sLn2=-150
_sLp3=120
_sLn3=-120
_sLp4=85
_sLn4=-110
_sLp5=180
_sLn5=-180
```

12.Case

Suction handling case:
file = st // file type
am.st // File name
771 // bytes
code: // Run instruction
g07 vp = 50 // speed
G20 X=300 Y=131 Z=55 A=0 B=180 C=0 D=0
g06 o = p0.1 // open the nozzle
G20 X=300 Y=131 Z=47.5 A=0 B=180 C=0 D=0
G20 X=300 Y=131 Z=60 A=0 B=180 C=0 D=0
G20 X=300 Y=42.5 Z=60 A=0 B=180 C=0 D=0
G20 X=300 Y=42.5 Z=20 A=0 B=180 C=0 D=0
g06 o = p0.0 // Close the nozzle
g06 t = 1000 // wait one second
G20 X=300 Y=42.5 Z=47 A=0 B=180 C=0 D=0
G20 X=300 Y=131 Z=47 A=0 B=180 C=0 D=0
G06 O=P0.1
G20 X=300 Y=131 Z=38 A=0 B=180 C=0 D=0
G20 X=300 Y=131 Z=51 A=0 B=180 C=0 D=0
G20 X=300 Y=-46 Z=51 A=0 B=180 C=0 D=0
G20 X=300 Y=-46 Z=20 A=0 B=180 C=0 D=0
G06 O=P0.0
G06 T=1000
G20 X=300 Y=-46 Z=38 A=0 B=180 C=0 D=0
G20 X=300 Y=131 Z=38 A=0 B=180 C=0 D=0
G20 X=300 Y=131 Z=29 A=0 B=180 C=0 D=0
G06 O=P0.1
G20 X=300 Y=131 Z=42 A=0 B=180 C=0 D=0
G20 X=300 Y=-134 Z=42 A=0 B=180 C=0 D=0
G20 X=298 Y=-134 Z=22 A=0 B=180 C=0 D=0
G06 O=P0.0
G06 T=1000
G20 X=300 Y=-134 Z=42 A=0 B=180 C=0 D=0

13.Function mode and programming

File classification



Programming rules

Instruction writing:

1.Constant names: #xx .// xx specific values. Example: # 2, # 1000, # 5.

2.Variable name: vxx.//xx controller general-purpose storage unit. Example: v150 // V150.

3.Instruction rules: function instruction + space + operation instruction. Example:

g06 t = 200 // Delay 200 ms.
g07 ve = 2000 // Set the speed to 2000 pulses per second.g08 sto // The program automatically pauses

4.Position command: Function command (g code) + space + position information Example: g20 x

= 270 y = 0 z = 300 a = 0 b = 180 c = 0 d = 0 // fixed

point

G21 X=270 Y=0 Z=300 A=0 B=180 C=0 D=0 // Go straight

g00 j1 = 20 j2 = 70 j3 = 2 j4 = 0 j5 = 7 j6 = 0 // joint

coordinates

5.Call instruction: g08 + space + acall + subroutine name

Example: g08 acall zaina

6.Jump instruction: g08 + space + ajmp + subroutine name

Example: g08 ajmp xxx // Jump to program xxx for execution.

7.Judgment instruction: g08 + space + if + judgment condition + statement a true: execute

statement a false: skip statement a and execute next.

Determine characters (<,>, ==,! =, <=,> =. Less than, greater than, equal to, not equal to, less than or equal to, greater than or equal to).

Example: g08 if # 2 <# 0 acall xxx

G08 IF #2>#0 ACALL XXX G08 IF #2==#0 ACALL XXX G08 IF #2<=#0
ACALL XXX G08 IF #2>=#0 ACALL XXX

8.Cycle instruction: for (assignment statement, judgment statement, statement B)

{Program segment}

Example: for (V0 = 2, V0 <V1, V0 = V0 + 3) {block

9, subroutine program writing:
g08 + space + subroutine program name + English colon // subroutine start

---- Program content

g08 + space + end // Subroutine end flag.
Subroutine naming rules: uppercase and lowercase letters, numbers.

Note: "/, *, +,-,%, // (division, multiplication, addition, subtraction, remainder, comment)" monocular operation has no priority.

3.Instruction list:

Position command	
Fixed point	g00 j1 = 0 j2 = 0 j3 = 0 j4 = 0 j5 = 0 j6 = 0 // joint coordinates.
	g20 x = 270 y = 0 z = 300 a = 0 b = 180 c = 0 d = 0 // Cartesian coordinates.
straight line	g01 j1 = 10 j2 = 20 j3 = 40 j4 = 10 j5 = 2 j6 = 20 // Joint coordinates.
	g21 x = 300 y = 100 z = 500 a = 0 b = 180 c = 0 d = 0 // without acceleration / deceleration
	g41 x = 300 y = 100 z = 500 a = 0 b = 180 c = 0 d = 0 // with acceleration and deceleration
Arc	Current point: g21 x = 200 y = 0 z = 200 a = -180 b = 150 c = 0 d = 0 Second point: g22 x = 300 y = 100 z = 200 a = -180 b = 150 c = 90 d = 0 third point: g23 x = 400 y = 0 z = 200 a = -180 b = 150 c = 300 d = 0 arc operation: g06 degree = 300 or g06 degree = arc Note: g06 degree = radian. g06 degree = arc Three-point arc.

G06		G07		G08	
instruction	Features	instruction	Features	instruction	Features
T=XX	Delay xx milliseconds.	VE=XX	Speed is xx pulses	XXXX:	Subroutine name (English colon)
I=PA.1	Wait for port a to be high. 1 is high and 0 is low.	AC=XX	Acceleration is xx pulses per second squared	ACALL XXXX	Call xxxx tags to g08
O=PA.0	a port outputs high level. 1 is high and 0 is low.	DE=XX	Deceleration is xx pulses per square	END	End of call
I=STAO	Wait for sta button low	VPP=XX	Maximum speed xx pulses per second	AJMP XXXX	Jump to xxx run
SCAN=I	Read the input port value. Return string “1111 1111 1111 1111 ”	VP=XX	Speed ve is the highest speed xx%. VE=VPP*VP*0.01	FLTAB=#	File jump to file t_ # run;
SCAN=O	Read the output port value. Return string “0000 0000 0000 0000 ”	_h0=xx	Height change	IFF	Floating point comparison
SCAN=RTC	Read the system clock value.	RCM=1	1 print run command, 0 not print Print run instruction	IF_ELSEF	Floating point comparison
DEGREE=ARC	The robot walks a three-point arc.	GCM=1	1 Output in rectangular coordinates during teaching, 0 is output for joint coordinates	MOV VXX=#XX	Integer assignment.
DEGREE=35	The robot walks 35.2 degrees.	Z-ADJ=xx	z-axis height adjustment	MOVF VXX=#XX	Integer assignment.
REPOS=J#	j # axis from the angle increase direction to find home # Sensor (back to low level)	UCS=FCS	Restore original coordinate system *	PRINT VXX	Print the value of vxx, integer formula.
REPOS=-J#	j # axis find home # from the angle decrease direction Sensor (back to low).	UCS=NOW	The center of the sixth shaft end flange For xoy *	PRINTF VXX	Print the value of vxx, floating point formula
				ADD	Integer addition
REPOS=JH#	j # axis from the angle increase direction to find home # Sensor (back to high level)	ABSPOS	Update Cartesian Coordinate Data (xyz increment the amount)	INT VXX	Convert floating point to integer
				SUBB	Integer subtraction
REPOS=-JH#	j # axis find home # from the angle decrease direction Sensor (back to high level)	P J#=XXXX	Calibration j # axis angle	FLOAT VXX	Convert integer to floating point
				STO	Program pauses automatically
REPOS=Z#	j # axis to increase direction from angle to find z # + sense Reactor (back to low)	G07 MARKPOS_HERE X1=0 Y1=0 X2=100 y2 = 100 template mark point G07 MARKPOS X1=10 Y1=10 X2=110 y2 = 110 match mark point		NRST	Restart
				EXIT	Exit run into idle mode

Notes:

g09 instruction function: communication with lower computer.

g09 copyright inquiry system yn

g09 com2 = xxxx com2 sends xxx characters

For example: g09 com2 = g00 j1 = 10 j2 = 10 j3 = -90 j4 = 0 j5 = 0 j6 = 0

This controller sends a command to another controller com1, g09

com2 10h serial port 2 sends 0x10

g09 com2 12h serial port 2 sends 0x12

g09 com2 13h serial port 2 issues 0x13 g09 com2 14h serial port 2 issues 0x14 g09 com2 15h serial port 2 issues 0x15 g09 com2 18h serial port 2 issues 0x18

g09 enc .... It is a special instruction to connect with the absolute value servo motor, refer to the zero return file example;

4. Use of memory

Naming rules: VXX // xx units.

#XX //constant.

User arithmetic unit v0-v127, v400-v511

Port number type	The port	Software port number	register		Port number type	The port number	Software port number	register
input signal	**i00**	**P0**	**v144**		output signal	**O00**	**P0**	**V160**
	i01	**P1**	**v145**			**O01**	**P1**	**v161**
	i02	**P2**	**v146**			**O02**	**P2**	**v162**
	i03	**P3**	**v147**			**O03**	**P3**	**v163**
	i04	**P4**	**v148**			**O04**	**P4**	**v164**
	i05	**P5**	**v149**			**O05**	**P5**	**v165**
	i06	**P6**	**v150**			**O06**	**P6**	**v166**
	i07	**P7**	**v151**			**O07**	**P7**	**v167**
	i08	**P8**	**v152**			**O08**	**P8**	**v168**
	I09	**P9**	**v153**			**O09**	**P9**	**v169**
	i10	**P10**	**v154**			**O10**	**P10**	**v170**
	i11	**P11**	**v155**			**O11**	**P11**	**v171**
	i12	**P12**	**v156**			**O12**	**P12**	**v172**
	i13	**P13**	**v157**			**O13**	**P13**	**v173**
	i14	**P14**	**v158**			**O14**	**P14**	**v174**
	i15	**P15**	**v159**			**O15**	**P15**	**v175**
Note: The light on value is 0, and the light off value is 1.					Note: The light on value is 1, the light off value is 0			

Port number type	The port	Software port number	register		Port number type	The port number	Software port number	register
Origin signal	**HM0**	**P16**	**V192**		Limit bit signal	**LP0**	**P22**	**V198**
	HM1	**P17**	**V193**			**LP1**	**P23**	**V199**
	HM2	**P18**	**V194**			**LP2**	**P24**	**V200**
	HM3	**P19**	**V195**			**LP3**	**P25**	**V201**
	HM4	**P20**	**V196**			**LP4**	**P26**	**V202**
	HM5	**P21**	**V197**			**LP5**	**P27**	**V203**
Servo alarm	**ALM0**	**P28**	**V204**					
	ALM1	**P29**	**V205**					
	ALM2	**P30**	**V206**					
	ALM3	**P31**	**V207**					
V256~V271: Value is 1 capture enable on, **v189 = 0 students** effect	**ENi00**	**p0**	**V256**		**V288~V303:** Capture duration value in milliseconds, which needs to be cleared by software	**FLAGi00**	**p0**	**V288**
	ENi01	**P1**	**V257**			**FLAGi01**	**P1**	**V289**
	ENi02	**P2**	**V258**			**FLAGi02**	**P2**	**V290**
	ENi03	**P3**	**V259**			**FLAGi03**	**P3**	**V291**
	ENi04	**P4**	**V260**			**FLAGi04**	**P4**	**V292**
	ENi05	**P5**	**V261**			**FLAGi05**	**P5**	**V293**
	ENi06	**P6**	**V262**			**FLAGi06**	**P6**	**V294**
	ENi07	**P7**	**V263**			**FLAGi07**	**P7**	**V295**
	ENi08	**P8**	**V264**			**FLAGi08**	**P8**	**V296**
	ENi09	**P9**	**V265**			**FLAGi09**	**P9**	**V297**
	ENi10	**P10**	**V266**			**FLAGi10**	**P10**	**V298**
	ENi11	**P11**	**V267**			**FLAGi11**	**P11**	**V299**
	ENi12	**P12**	**V268**			**FLAGi12**	**P12**	**V300**
	ENi13	**P13**	**V269**			**FLAGi13**	**P13**	**V301**
	ENi14	**P14**	**V270**			**FLAGi14**	**P14**	**V302**
	ENi15	**P15**	**V271**			**FLAGi15**	**P15**	**V303**
Note: The light on value is 0, and the light off value is 1.								

Query input signal:

```
G06 SCAN=I                    // Scan port.
G08 IF v144==#0 ACALL XXX     // If the i00 port signal is 0, call the program
xxx. or g06 i = p0.0          // Wait for i00 input.
G06     O=P0.1                // Make o00 output.
```

5. Model introduction