

The most practical robot controller

NEWKer数控
鑫科瑞数控

NEWKer-i18M



Making the most ideal and practical
product to service CNC world

Robot controller

Manual

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CHENGDU NEWKer CNC-TECHNOLOGY CO.,LTD

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Chapter 1 Safety

Pay attention:

Before using the controller (Including install、work、transportation、maintain、detection), please read this manual carefully, after knowing all knowledge about safety.



Danger

Dangerous, could be injured or death!



Attention

Pay attention, could be injured!



Forced

Must follow the noticed!



Forbid

Must forbid doing!

Even some places without “Attention” or “Danger”,but also need to be pay attention and very carefully.



Danger

- Before operating, press the Emergency button on the upper right corner.



- Before remove Emergency, need to solve the accident.



- Before using teach function in the motion range of robot, please follow the steps:

- Keeping in the front to watch the robot.
- Follow the steps.
- Please be careful in case of robot move to you.
- Please make sure the safe place in case of accident.

- **Must make sure there is no person in the motion range of robot, the operator should be in safe place:**

- When powering up the robot
- Using teach function
- Try to run

Please press emergency if somebody get in the motion range of robot or some accident happens.

**Must be sure when operating**

The operator knows how to operate.

Knows how it works.

Knows how dangerous it is.

★Need detect before using teach function.

The motion of robot is no abnormalities.

The original point is right or not.

The external accessory equipment is no abnormalities.

★The controller need to take care and put it to the fixed place after using

If the controller is falling down, it will cause robot motion to damage equipment or get somebody injury.

**Safety operation**

- 1、 All operators need to know all function of robot and the safety operation.
- 2、 Make sure there is no dangerous before running.
- 3、 Must press emergency and power off when in the motion area.
- 4、 Should watch and be careful when programming in case of press emergency in time.
- 5、 No gloves when using teach function or move in manual,make sure it is in low speed.
- 6、 Must know the function and how to stop the external accessory equipment.
- 7、 Never trust the robot is stop, it maybe wait the signal to work the next program.

Chapter 2 Summary

NEWker-i18M robot controller use the international embedded bus type,the controlling circuit use the newest industrial high speed ARM CPU 、 Mass programming FPGA technology, multilayer PCB, the whole machine adopts high integration chip and surface mount element, the structure is more compact and reasonable, and better ensure the reliability and stability of the system.The software is module designed, to suit the different structure, industrial application requirements.The robot controller can realize vertical multi joint robot,vertical articulated parallelogram robot, vertical multi joint robot, L wrist shaped vertical multi joint robot, spherical wrist robot, Delta robot ,pole coordinate robot and so many kinds. It is widely used and could be worked in handling, welding, spraying, palletizing, cutting, polishing,welding and so on.

The controller adopts bus structure with absolute motors, simple structure, practical and reliable.Use 800X600 TFT LCD technology, LED got uniform brightness and long service life.

The system is motion controller performing 3 axis, 4 axis, 5 axis, 6 axis, 7 axis, 8 axis moving simutaneously, and bus type full digital cnc controller, having powerful function and various command, the program code corresponds to standard ISO code.

Note:

1. all A,B,C,Xs, Ys axis function is avaiable only when 4th, 5th, 6th, 7th, 8th axis is activated.
2. all absolute type function works only when connecting absolute driver and motor, all bus type function works only when connecting bus type driver.



Attention

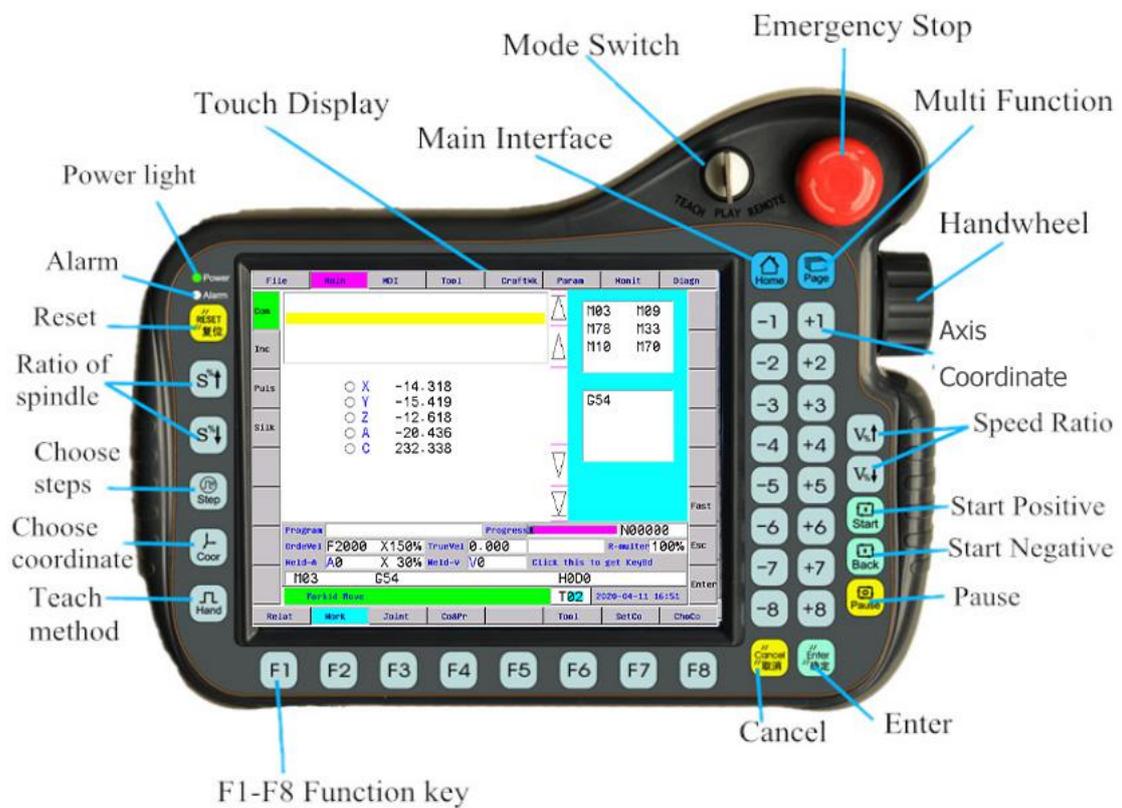
If the operation is wrong with our controller to cause some accident,read the manual and operate carefully, must follow the steps from manual,otherwise the result is no relations with our company!!!

Chapter 3 Operation

3.1 Summary

Knowing the parameter of controller.edit program, teach function, reappear function will be easy to use robot.

3.2 Controller



3.3 Function

3.3.1 Emergency



Pay attention: Usage for emergency need match with the circuit, must be safe and reliable, otherwise it can't stop.

3.3.2 Switch the mode



Usage for choosing the mode of operating the robot, total 3 kind of mode: Teach function, reappear, remote.

3.3.3 Safety switch



Safety switch is on back of controller, when the switch is pressed in the middle, the robot could move in Teach mode; If press it hard or loose it, the robot will stop, the controller will stop giving the signal.

Note: The switch got total 3 gears, the outermost and the innermost could stop the robot, only in middle gear, could robot move.

Pay attention:

- 1. To be safe, safety switch should be kept pressed during axis homing, otherwise homing process will be interrupted!**
- 2. To be safe, safety switch should be kept pressed during trial running! otherwise trial running will be interrupted!**
- 3. The person can't be in the motion range of robot, the robot will move when the press is in the middle, in case of accident.**

3.3.4 Handwheel



There are 3 gears could be chosen, 0.001, 0.01, 0.1, chosen by
The handwheel also could be used in program, it means use handwheel to run the program, move handwheel positive, the program will run forward, move handwheel negative, the program will run backward.

3.3.5 Function



<Reset>, to stop program; <RESET> can work in abnormal conditions or when executing program should be ended.

Pay attention: Reset may close some output (Relate with PLC), be careful



<Enter>;



<Cancel>;



Main interface;



Multi Function, could choose "program" "parameter" "compensation" "diagnosis" interface;



Choose the incremental value in teach function or handwheel mode;



F1-F8 Function;



The program will start forward in reappear mode;

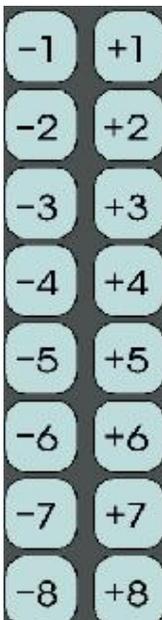


The program will start backward in reappear mode;

Pay attention: The robot will move when press Start. Must be carefully.



<Pause>, the program will pause when pressing this button.



To choose each axis of robot in teach function.

3.3.6 Adjust the ratio

(1) Rapid ratio

Use VJ= to specify the rapid ratio. For example, VJ=90, but the ratio can't be over 100%.

In PLAY mode, Rapid ratio is used adjust rapid speed.

(2) Feeding Ratio



Total 16 gears includes 0%~150%. Feeding ratio is used to adjust MOVJ speed during MOVJ execution.

(3) Ratio of electric current



Total 16 gears includes 5% ~ 150%, Ratio of electric current can be used to adjust welding current AA during welding.

3.4 Teach operation

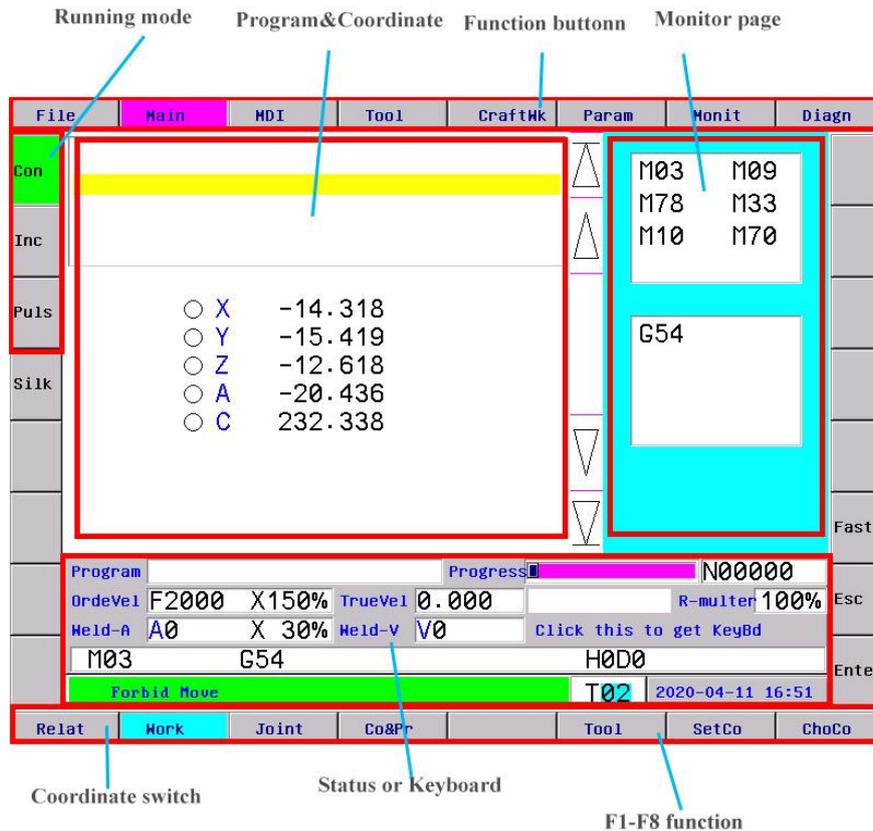
Switch the key into mode of TEACH, press in the middle of safety switch, then could move each axis.

Be noticed when operating:

- 1) Keep watching in front of robot
- 2) Must follow the steps;
- 3) Think a plan in case of the robot will run to person to get injury;
- 4) Make sure the safety place;
- 5) The wrong operation may get somebody injury;

The controller use the first level operation, easy and fast, got full of information.

The controller is power up and enter the main interface, or press<Home> to enter main interface.



Press lower half of screen, it will show or hide the touch keyboard. The areas around the screen are function block or status monitoring block, which can be performed by corresponding touch keys.

“File”: edit, revise, compile, delete, copy user program and files.

“Main”: main interface, processing interface in auto and manual mode.

“MDI”: edit program and execute it immediately.

“Tool”: is used to modify tool compensation parameter if tool coordinates offset.

“Craftwk”: set and change technique parameters.

“Param”: set and change parameters.

“Monit”: convert monitoring interface among coordinates, processing instruction and processing status.

“Diagn”: input and output debugging, monitor and modify PLC.

Coordinate displaying: display relative, user and machine coordinates.

Program displaying: display user program.

Status display or Touch keyboard: display of alarm, program name, instructions, status, coordinates. Meanwhile, this area is touch keyboard also, gentle touching will convert between status and keyboard.

When press <F1> in main interface, it will enter into World Coordinate interface, this is the world coordinate of Tool endpoint (TCP coordinate). and when press <Monit> on the top block, there is also world coordinate, but this is world coordinate of J6 flange endpoint.

The Teach function is used for adjust the coordinate of robot and the motion of

accessory axis to programme.

Adjust position of touch screen: If buttons on touch keyboard are incorrect, please press "6" or <Pause> in Password interface and press enter, then reboot the controller.

3.4.1 Button in Teach mode

(1) "F" or "V": Set the feeding speed of Joint; linear coordinate unit:mm/min; joint coordinate unit:degree/s.

(2) <HAND>: Switch "Continuous"、 "Incremental"、 "Handwheel".

In "Incremental" or "Handwheel" mode, press <Step> to switch different steps: "0.001/0.01/0.1/1.0" or "x1/x10/x100".

(3) "S": Set the speed of the first spindle (The first analog output), the max value is up to the Speed parameter No.43. or run "S"/"AA" in MDI to set spindle speed(analog output).

In welding robot, welding current output(A) is performed through runing "SS" in MDI, and welding voltage(V) is through running (VV) in MDI.

(4) "I": Modify the incrental value in incremental mode.

(5) "T": Set the number of the current tool and TCP point in world coordinate as the base point of tool set.

(6) "V↑": The ratio of feeding speed will increase 10% by pressed once, total 16 gears in 0—150%.

In Auto mode, if <Fast> is pressed, it will adjust the rapid ratio by 10%.

(7) "V↓": The ratio of feeding speed will decrease 10% by pressed once, total 16 gears in 0—150%.

In Auto mode, if <Fast> is pressed, it will adjust the rapid ratio by 10%.

(8) "S↑": The ratio of spindle speed will increase 10% by pressed once, total 16 gears in 5—150%. for welding robot, it will be used to increase welding current by 10%.

(9) "S↓": The ratio of spindle speed will decrease 10% by pressed once, total 16 gears in 5—150%. for welding robot, it will be used to decrease welding current by 10%.

(10) "R": The current user coordinate backs to zero point, input "XYZABC78" correspond to "XYZABCXsYs" go back to zero point, if input "0", then all axis go back. If the robot is equipped with incremental encoder motor and mechanical home switch, then XYZABC/Xs/Ys back to home switch(X0/Y0/Z0/A0/B0/C0/XS0/YS0).

To be safy, sfety switch need to be kept pressing during homing, otherwise homing stops.

(11) <F7 Set coordinate >: In user coordinate system (G54.1-G54.48/G54-G59) to set the value of (G54.1-G54.48/G54-G59) , update the value of coordinate system; Use "MDI" or <F8> to set the user coordinate system (G54.1-G54.48/G54-G59) .

3-points method to set user coordinate system: P1 as original point 0, P2 as the

direction of +X, P3 as the direction of +Y.

(12)Coordinate Feed: Press “+1、 -1、 +2、 -2、 +3、 -3、 +4、 -4、 +5、 -5、 +6、 -6、 +7、 -7、 +8、 -8” correspond to XYZABCXsYs to move positively and negatively.

(13) In Teaching mode, press “Silk” + “S↑” to output M03, press “Silk” + “S↓” to output M04, then quit without pressing.

(14)“<F6> Tool”, used for making sure the coordinate in tool coordinate system.

3.5 Reappear(PLAY) operation

Switch the mode into reappear (PLAY) position.

PLAY mean reappear the current editing or teaching program. The controller could work in any point, from any line to work. If work from any point or any line, then need edit with absolute coordinate. Reappear function can't work with teach.

Select the running program: Press “↑”“↓” to select the program and press “C”.

To change to coordinate: Press “F1”“F2”“F3” to change”relative coordinate” “User coordinate” “All coordinate”, “Coordinate&Program”.

3.5.1 Start

Choose “Single or continuous”: Press “F4 single” to switch.

“Continuous” means after pressing “start”, the program will run until to the end or stop instruction.

“Single” means only run the current segment of program, press “start” again to run the next segment.

“Grapgh” means didplay program route when program running.

“Simulation” means simulate program running, only coordinate runs, keep motor still.

3.5.2 Start from any line

A、 Start from real line:

Press “-” to input the number of line in reappear mode, press Enter to make sure,or Press“↑、 ↓” to select the program line in status of reappear coordinate, this line will be the start line. **It will starts from the input line when press “start”.**

Pay attention :

- 1、 **This line is the real line of the program, not the line is specified by N.**
- 2、 **Start from the real line, the default line is the line when pause the program, so that user could operate easily.**

B、 Start from marked line:

The controller could start the program from the marked line. Press “N” in reappear mode and input the number of line which be marked, press enter to make sure. It will start from the number of line you enter when pressing start.

C、 Start from tool line

The controller can start program from the some tool number line. Press “tool number start” in the reappear mode, it will prompt a dialog, input tool number, and press enter. When pressing ENTER, program will start from tool number line.

3.5.3 Program start

First change into reappear (PLAY) position, there are two ways.

- (1) Press “Start” on panel or connect external “RUN” signal.
- (2) Press “Back”, the program goes back (No.14 parameter in other parameter need to be 40).

3.5.4 Program stop

Program stop:

- (1) Instructions M00、 M01、 M02、 M30、 M20;
- (2) Press “Single” to move a segment and stop;
- (3) Connect external “HALF” signal, the program will pause;
- (4) Press “Reset” to stop all motion of robot.

3.5.5 Real-time control in reappear mode

- (1) Modify rapidly: By VJ instruction;
- (2) Feeding speed: Press “V↑” “V↓”. changed by 10%.
- (3) Spindle speed: Press “S↑” “S↓”. changed by 10%.
- (4) Stop in process: Press “Single” in continuous mode, it will finish the current segment and wait for the next signal.
- (5) Pause: Press “Pause” or connect external “HALT” to pause. Press “Run” or “Start”, it will continue; Press “Reset”, it will quit the status of reappear, at the same time, the program will go back to the first line.
- (6) Keep feeding: When it is pause (external HALT、 press “Pause” or “Single”) ,change the mode into “Teach”, keep feeding in reappear, could adjust the coordinate, change the mode into “PLAY” mode, press “Start”, it will move to the point of pause and continue to work.
- (7) Quit process: Press “Pause” during process, or press “Reset” during keep feeding.

3.5.6 MDI

Press “ MDI” to enter MDI mode in “Teach” or “PLAY”. “MDI” mode is input segment of program, run segment of program, press “Back” in the process to quit, press “Start” to run.

3.5.7 Handwheel

Press “Hand” in “PLAY”, it will goes in handwheel process mode, the program

will run by handwheel. F speed and ratio of feeding according to the speed of handwheel rotate. Usually this method is used to try to work with program.

3.5.8 Trial run

In the interface of program edition, one line of program where cursor locate will be executed when “start” is pressed once (either auto mode or manual mode). The segment name on the screen will be “RUN-TEST” during test run. Such flow control language as GOTO, WHILE, IF will not be executed in test run mode. Once the program is edited, it will come into force immediately.

3.6 Remote control

Remote mode: refers to control robot away from robot controller. Applying to many robots are connected together to be controlled remotely, and operator is far away from the robot position.

The “start”, “back”, “pause” on the panel are disabled in remote mode, only remote control by signal RUN and signal HALT.

Process parameter P17 is used to define the remote controlling, to choose the executing program by input points [D2-D7(+4...+128) corresponding to X26-X31, D8-D13(+256...+32768) corresponding to X16-X23].

To choose the executing program by input points. For example, if process parameter P17 is set as $+4+8=12$, when X26 or X27 is effective, to choose program HIDEFILEX26 or X26, or HIDEFILEX27 or X27. that is all about remote control.

3.7 Safety operation and alarm

3.7.1 Emergency stop

The controller will stop all motion of robot when pressing this button, the controllers show emergency and wait for pressing up the button. M67 output the effective signal when No.19 parameter in other parameter set as effective.

It is the best to run “M500” to read the position of motor again if press this button when robot is working, because it maybe cause the position change.

3.7.2 Reset

The controller will stop all operation when pressing this button.

3.7.3 Alarm

The screen will show the tip of alarm, the light will be red, the movement and program will stop, need to make detection to clear. Other Parameter No.19 set as effective, M67 outputs effective signal.

3.8 Parameter

Press “Page” to enter. The parameter includes “Processing” “Speed” “Axis” “Tool” “Other” “Coordinate” “PASSWD”.

Press 0 or 9 in Parameter interface to enter into screw compensation setting.

Note:

1. Value of all bit parameters are counted from right to left, different bit corresponds to different function.

Format: D9|D8|D7|D6|D5|D4|D3|D2|D1|D0

File	Main	MDI	Tool	CraftWk	Param	Monit	Diagn
Auto Stop Con	No	Parameter Define	Parameter Value				
Step	1,Cycle d of G73 (mm):		5.000			M03 M09	
	2,Cycle d of G83 (mm):		5.000			M78 M33	
	3,Cycle Q-direction of G76G87:		1			M10 M70	
Puls	4,Cycle Q-direction of G87:		1				
	5,Cycle spindle angle of G76G87:		0				
	6,Mode of G84G74(0 is High spe		0.000			G54	
Silk	7,Cycle d of G84G74 (mm):		0.000				
	17,Running program need Sp run		0				
	18,Set M20 the time of auto-ru		-1				
	19,Set part count:		1				
	20,Program trial mode [2:stops		2				
	21,G01/G02/G03 line delay(ms)[0				
	22,G00 line delay(ms)[>100]:		0				
	Program		Progress			N00000	
	OrdeVel F2000 X150%	TrueVel 0.000				R-multier 100%	Esc
	Weld-A A0 X 60%	Weld-V V0				Click this to get KeyBd	
	M03	G54				H0D0	Enter
	No Alarm					T02	2020-04-11 16:52
User	Speed	Axis	Tool	Other	Coor	PASSWD	CANCEL

3.8.1 Processing parameter

- ★、 1,Cycle d of G73 (mm)
Used for setting tool retriev value d of fixed loop G73;
- ★、 2,Cycle d of G83 (mm)
Used for setting tool retriev value d of fixed loop G83;
- ★、 3,Cycle Q-direction of G76G(G17:1 is+X,2 is-X,3 is+Y,4 is-Y)
Offset Q direction of fixed loop G76;
- ★、 4,Cycle Q-direction of G87 (G17:1 is+X,2 is-X,3 is+Y,4 is-Y)
Offset Q direction of fixed loop G87;
- ★、 5,Cycle spindle angle of G76G87(0.1degree)
Spindle orientation angle of G76 and G87;

- ★、 6,Mode of G84G74(0 is High speed to d,8 is to R)
Chips removal mode if G84/G74.
- ★、 7,Cycle d of G84G74 (mm)
Tool retrieve value d of G84/G74;
- ★、 17,Running program need Sp run [1 mean Yes,0 mean No]
For interlock between program and spindle, to set if detect rotation of spindle or not while program running.
If set as 1, the spindle needs rotate when program running(Need detect the encoder rotation when it is M03); Set as 0, then no need to detect.
- ★、 18,Set M20 the time of auto-running
The loop times of M20 in program, infinite loop when it is minus.
- ★、 19,Set part count
Reappear counts of program, if it is 1, the count of work piece will add by one automatically when running M30, M20, M02.
- ★、 20,Program trial mode [2:stops on current row,4:automatically jumps next row]
- ★、 21,G01/G02/G03 line delay(ms)[>100]
The delay time between G01/G02/G03, this parameter solves the overcut problem in the corner.
- ★、 22,G00 line delay(ms)[>100]
- ★、 23,Handwheel smooth acceleration/deceleration constant[50-100]
The smooth acceleration constant when using handwheel, The range is 50-100, smaller value corresponds the faster acceleration, but more vibration.
- ★、 24,Programming interface characters show size boot status
[0:normal,1:inversion]
The font size when controller power on.
- ★、 25,CNC system mode is taught and executed according to the robot programming mode[0:no,1:is]
- ★、 33,M03/M04/S detect the spindle speed(0:M69 relay, 8:encoder feedback)
M03/M04/S code detect if spindle speed reach already.
- ★、 34,The error (RPM) of the spindle speed is detected by the encoder feedback.
The telorance error of spindle speed feedback from encoder.
- ★、 35,Default coordinate(3-9:G53-G59,10-57 for G54.1/48,others:power outages to save)
Set default coordinate system
- ★、 200,system protect times [>=2minutes]
When under main interface and no dialog, and if P18>2 minutes, controller will enter in screen protection, any key to quit.

★、 203,Whether strict inspection G41/G42 (34818:No,6326274:Yes)

The controller inspects overcut of G41/G42 strictly.

★、 210,Enable graphics display area(8>manual,0:Automatic)

Enable graph displaying.

★、 211,X axis negative end

X axis negative end of graph displaying;

★、 212,X axis positive end

X axis positive end of graph displaying;

★、 213,Y axis negative end

Y axis negative end of graph displaying;

★、 214,Y axis positive end

Y axis positive end of graph displaying;

★、 215,Z axis negative end

Z axis negative end of graph displaying;

★、 216,Z axis positive end

Z axis positive end of graph displaying;

★、 230,Select executive program through input

(+4...+128,+256...+32768:X26-X31,X16-X23)

Executing program by input points, for example, if P230=+4+8=12, when X26 or X27 is effective to choose the program HIDEFILEX26 or X26 or HIDEFILEX27 or X27.

D2=1, means +4, if X26 is effective, then execute Program X26 or HIDEFILEX26;

D3=1, means +8, if X27 is effective, then execute Program X27 or HIDEFILEX27;

D4=1, means +16, if X28 is effective, then execute Program X28 or HIDEFILEX28;

D5=1, means +32, if X29 is effective, then execute Program X29 or HIDEFILEX29;

D6=1, means +64, if X30 is effective, then execute Program X30 or HIDEFILEX30;

D7=1, means +128, if X31 is effective, then execute Program X31 or HIDEFILEX31;

D8=1, means +256, if X16 is effective, then execute Program X16 or HIDEFILEX16;

D9=1, means +512, if X17 is effective, then execute Program X17 or HIDEFILEX17;

D10=1, means +1024, if X18 is effective, then execute Program X18 or HIDEFILEX18;

D11=1, means +2048, if X19 is effective, then execute Program X19 or HIDEFILEX19;

D12=1, means +4096, if X20 is effective, then execute Program X20 or HIDEFILEX20;

D13=1, means +8192, if X21 is effective, then execute Program X21 or HIDEFILEX21;

D14=1, means +16384, if X22 is effective, then execute Program X22 or HIDEFILEX22;

D15=1, means +32768, if X23 is effective, then execute Program X23 or HIDEFILEX23;

★、 231,"Delete" mode[0:backward deletion,1:Forward delete]

★、 232,Check whether the spindle before tapping [18:Yes,0:No]

Check spindle home position before tapping;

- ★、 233,G06 Circle teaching function[0:No,1:Yes]
- ★、 234,Program back function[[+8:Yes]
 - Use handwheel to run program forward or backward;
- ★、 235,Automatically generate comments when teaching [0:Yes,1:No]
- ★、 307,M18xx/M28xx/WAT alarm time(ms)[>=10]
 - The max waiting time for M18xx/M28xx/WAT code, if ove the time, controller will alarm.
- ★、 400,Translate DXF file to G code[1:Seqencing,4:Start point seqencing ,8:No seqencing]
 - 1) if P400=1, controller will sequence end to end;
 - 2) if P400=4, controller will sequence end to end, and judging distance between ends to tool start point by parameter, and choose to start tool from nearby end;
 - 3) if P400=8, controller will not sequence. When generate DXF file from AutoCAD, please pay attention to draawing sequence, because DXF file save date according to drawing sequence, the g code generated by controller will also execute according to drawing sequence.
- ★、 401,Translate DXF file to G code X-axis coordinate
 - Tool start pint X cordinate of DXF file.
- ★、 402,Translate DXF file to G code Y-axis coordinate
 - Tool start pint Y cordinate of DXF file.
- ★、 500,G74 equal to ProgramG No.[101-170(101-150Modeless,151-170Mode)]
- ★、 501,G81 equal to ProgramG No.[101-170(101-150Modeless,151-170Mode)]
- ★、 502,G82 equal to ProgramG No.[101-170(101-150Modeless,151-170Mode)]
- ★、 503,G83 equal to ProgramG No.[101-170(101-150Modeless,151-170Mode)]
- ★、 504,G84 equal to ProgramG No.[101-170(101-150Modeless,151-170Mode)]
- ★、 551,Structural Type of Five-axis CNC Machine tool(10--99) [10:B tool A platform,11:AC tool,12:AC platform,13:A tool-C platform,14:A tool-B platform]
 - ★、 552,Reverse calculation of Five-axis CNC RTCP compensation (10/14:B+4,A+8;11/12/13:A+4,C+8)
 - ★、 553,Coordinate-1 of Machine tool in the Center of Five-axis CNC Rotary platform(um) (10/12:Y-axis Coordinate;13/14:X-axis Coordinate)
 - ★、 554,Z-axis Coordinate of Machine tool in the Center of Five-axis CNC Rotary platform(um)
 - ★、 555,The tool length of measuring the center of five-axis CNC rotary platform(um) (10:The tool length of A-axis;12:H1;13:The tool length of C-axis;13:The tool length of B-axis)
 - ★、 556,The coordinate of C-axis rotating Center X-axis Machine tool with AC Axial platform to transform Five-axis Machine tool(um)

- ★、 557,AC Axis offset of tool return Transformation of AC Axis (um)
- ★、 600,Internal multiplier of non-G0 instruction[>=20 valid]

3.8.2 Speed parameter

- ★、 1-5c,G00 speed of XYZABCXsYs(mm/min)
The most speed of G00, the maximum: 30000.
- ★、 6,Manual maximum feed speed(mm/min)
The max speed in manual mode.
- ★、 7,Auto Maximum feed speed(mm/min)
The max speed in auto mode. In order to ensure the max speed efficiency, set P7>G00 speed, P7 limits resultant speed.
- ★、 8,G01/G02/G03 default speed(mm/min)
When the speed is not defined in the first interpolation command (G01/G02/G03), program will run in the P8 default speed. Maximum: 5000.
- ★、 9,Null run speed(mm/min)
The speed when program does idle/null running. Maximum: 240000.
- ★、 10,Feed axis`s manual speed(mm/min)
The current axis speed in manual mode, range:< P6, unit:mm/min
Note: Press F in main interface, also can modify the speed.
- ★、 11,Spindle`s manual speed(rpm)
Spindle speed in manual mode.
Note: Press S in main interface, also can modify the speed.
- ★、 12,Take-off speed(mm/min)
- ★、 13,Maximum mutation speed(mm/min)
- ★、 14,Limit G1G2G3 axis speed[1 mean Yes,0 mean No]
Set max feed axis speed is limit during interpolation.
- ★、 15,X-G1G2G3 max speed(mm/min)
- ★、 16,Y-G1G2G3 max speed(mm/min)
- ★、 17,Z-G1G2G3 max speed(mm/min)
- ★、 18,A-G1G2G3 max speed(mm/min)
- ★、 19,B-G1G2G3 max speed(mm/min)
- ★、 19a,C-G1G2G3 max speed(mm/min)
- ★、 19b,Xs-G1G2G3 max speed(mm/min)
- ★、 19c,Ys-G1G2G3 max speed(mm/min)
XYZABCXsYs max speed during G1G2G3 interpolation.
- ★、 20,X acceleration constant((mm/min)/s)
- ★、 21,Y acceleration constant((mm/min)/s)
- ★、 22,Z acceleration constant((mm/min)/s)

- ★、 23,A acceleration constant((mm/min)/s)
- ★、 24,B acceleration constant((mm/min)/s)
- ★、 24a,C acceleration constant((mm/min)/s)
- ★、 24b,Xs acceleration constant((mm/min)/s)
- ★、 24c,Ys acceleration constant((mm/min)/s)

XYZABCXsYs axis acceleration time constant, the bigger value sets, the faster acceleration is. Range:1-99999.

Note: the value depends on machine configuraiton, incorrect seting may lead to machine malfunction. Usually, the bigger load, the samller value. If installed with stepper motor, it can not ber over 15000.

- ★、 25,Auto run acceleration[>=500]

Auto run acceleration constant, rang:1-500. when the valuse is between 1-500, auto run acceleration speed depends on this parameter. Otherwise, refers to axis acceleration speed parameter in user parameter. This parameter is used to extinguish manual and auto acceleration speed, only when the acceleration speed in two mode has big difference, will this parameter work. Normally it is ineffective.

- ★、 26,Handwheel acceleration[500--30000]

The accelelration speed when use handwheel, range is 500-32000, bigger value means faster acceleration.

- ★、 27,Run program Handwheel acceleration[>500]

The accelelration speed when use handwheel in auto mode, range is 500-32000, bigger value means faster acceleration. When P27<500, it will be ineffective.

- ★、 28,Run program Handwheel G00 speed(mm/min)[>10]

The idle running speed when use handwheel in auto mode. Ineffective when lower than 10.

- ★、 28-1,Run program Handwheel G00 start speed(mm/min)[>5]
- ★、 29,X-Handwheel limit speed(mm/min)
- ★、 30,Y-Handwheel limit speed(mm/min)
- ★、 31,Z-Handwheel limit speed(mm/min)
- ★、 32,A-Handwheel limit speed(mm/min)
- ★、 33,B-Handwheel limit speed(mm/min)
- ★、 33a,C-Handwheel limit speed(mm/min)
- ★、 33b,Xs-Handwheel limit speed(mm/min)
- ★、 33c,Ys-Handwheel limit speed(mm/min)

Used to set max axis speed when use handwheel, range: 100-max manual speed.

The valuse of P29-P33c depends on machine configuration. It should not be over 4000 in oder to run safely. Works only when P29-P33a is bigger than 100.

- ★、 33-1,Make thread Z acceleration
- ★、 33-2,Make thread X acceleration
- ★、 33-3,Servo motor screw thread X axis Back speed
- ★、 34,acceleration type[0 mean line,8 mean curve]

Used to set acceleration type of axis, 8 means acceleration is curve type(S shape), 0 means linear type.

Depending on driver types, usually stepper motor is curve type, servo motor is linear type.

- ★、 35,curve initialization acceleration[≥ 10]

Initial acceleration constant in curve acceleration type, bigger value means faster acceleration.

- ★、 36,curve second acceleration[≥ 10]

The second acceleration constant in curve acceleration type, bigger value means faster acceleration.

- ★、 37,curve max acceleration[≥ 500]

max acceleration constant in curve acceleration type, bigger value means faster acceleration.

- ★、 38,X go home forward speed(mm/min)

The speed of X axis going home sensor in forward direction, range: smaller than X G00 speed.

- ★、 39,X go home backward speed(mm/min)

The speed of motor backing to check Z pulse signal after leave home sensor. Range: 20-500.

Attention: this parameter will influence the accuracy of home position, lower value means higher accuracy. Once this parameter is set down, do not change it again, it may influence home position.

- ★、 40,Y go home forward speed(mm/min)

The speed of Y axis going home sensor in forward direction, range: smaller than Y G00 speed.

- ★、 41,Y go home backward speed(mm/min)

The speed of motor backing to check Z pulse signal after leave home sensor. Range: 20-500.

Attention: this parameter will influence the accuracy of home position, lower value means higher accuracy. Once this parameter is set down, do not change it again, it may influence home position.

- ★、 42,Z go home forward speed(mm/min)

The speed of Z axis going home sensor in forward direction, range: smaller than Z G00 speed.

★、43,Z go home backward speed(mm/min)

The speed of motor backing to check Z pulse signal after leave home sensor.
Range: 20-500.

Attention: this parameter will influence the accuracy of home position, lower value means higher accuracy. Once this parameter is set down, do not change it again, it may influence home position.

★、44,A go home forward speed(mm/min)

The speed of A axis going home sensor in forward direction, range: smaller than X G00 speed.

★、45,A go home backward speed(mm/min)

The speed of motor backing to check Z pulse signal after leave home sensor.
Range: 20-500.

Attention: this parameter will influence the accuracy of home position, lower value means higher accuracy. Once this parameter is set down, do not change it again, it may influence home position.

★、46,B go home forward speed(mm/min)

The speed of B axis going home sensor in forward direction, range: smaller than B G00 speed.

★、47,B go home backward speed(mm/min)

The speed of motor backing to check Z pulse signal after leave home sensor.
Range: 20-500.

Attention: this parameter will influence the accuracy of home position, lower value means higher accuracy. Once this parameter is set down, do not change it again, it may influence home position.

★、47-1,C go home backward speed(mm/min)

★、47-2,XS go home backward speed(mm/min)

★、47-3,YS go home backward speed(mm/min)

★、47-4,The speed ratio of the offset after returning to the reference point (10%-900%)

★、48,Welding zero current (A)

★、49,Welding maximum current(A)

The max command value when use the 1st channel analog output.

★、49-1,Minimum current corresponding to output analog voltage(mV)

★、49-2,Maximum current corresponding to output analog voltage(mV)

★、50,Welding zero voltage(V)

★、51,Welding maximum voltage(V)

The max command value when use the 2nd channel analog output.

★、51-1,Minimum voltage corresponding to output analog voltage (mV)

- ★、 51-2,Maximum voltage corresponding to output analog voltage value(mV)
- ★、 53,arc gap compensation mode(+1 means length, +2 means by G17G18G19, +4 means IJK to arc center, 8 mean B mode)

When D3=0, A type: When interpolation compensation of arc reversal, the speed of compensation is effective with reversal interpolation value, the bigger value, the faster speed to make sure tool will not pause, but the compensation speed can't over 10000mm/min;

+8(D3 bit), B mode: When interpolation compensation of arc reversal, the compensation speed is specified by No.49-No.51 parameter.

+1(D0 bit): Length compensation mode is B mode, otherwise is A mode. A mode is always compensating in Z axis, B mode is specified by G17/G18/G19, G17 compensate Z, G18 compensate Y, G19 compensate X.

+2(D1 bit): The fixed loop mode is B mode, otherwise is A mode. A mode is always compensate in Z axis, B mode is specified by G17/G18/G19, G17 compensate Z, G18 compensate Y, G19 compensate X.

+4(D2 bit): IJK is coordinate from the end point to centre of circle in arc programme, plus 4 means the IJK is to the end point in G02 G03, otherwise is to start point.

- ★、 54,mode B gap compensation speed(mm/min)
- ★、 54-1,,mode B gap compensation Beginning feed speed(mm/min)[>10]
- ★、 54-2,mode B gap compensation acceleration(mm/min)/s)[>10]
- ★、 55,Speed processing Mode(1 Yes,0 No)

To set if do speed pre-processing to short line.

- ★、 56,Hard limit drop speed critical(mm/min)
- Used to set the speed when motor start to reduce speed in hard limit. Servo needn't reduce, set as 1 normally.

- ★、 57,Handwheel stop speed(mm/min)[>18]
- Used to set the speed when handwheel stop, bigger value means faster stop.
- ★、 58,Follow the tapping knife when the spindle speed(rpm)[>1]
- Minimum speed of spindle before rotate CCW during tapping;
- ★、 58-1,When tapping spindle backlash compensation (pulse)
- Spindle backlash compensation before rotating CCW.
- ★、 58-2,Follow the the tapping cutter withdrawal before reversal(um)[10-5000]
 - ★、 58-3,Tapping back speed(mm/min)[>=60]
 - ★、 60,Smooth running function(+4:Manual;+8:Handwheel;+16:Program)
 - ★、 61,Manual smooth running time normal[2-500]
 - ★、 62,Handwheel smooth running time normal[2-500]
 - ★、 63,G01/G02/G03 smooth running time normal[2-500]

- ★、 65,Manual enhancement smoothing processing time constant [2-50]
- ★、 66,Handwheel enhancement smoothing processing time constant [2-50]
- ★、 67,Program enhancement smoothing processing time constant [2-50]
- ★、 68,Enhanced smoothing process rating [1-9] (the bigger the smoother the more smooth)

- ★、 101,X-Beginning feed speed(mm/min)[>1]
- ★、 102,Y-Beginning feed speed(mm/min)[>1]
- ★、 103,Z-Beginning feed speed(mm/min)[>1]
- ★、 104,4-Beginning feed speed(mm/min)[>1]
- ★、 105,5-Beginning feed speed(mm/min)[>1]
- ★、 106,6-Beginning feed speed(mm/min)[>1]
- ★、 107,7-Beginning feed speed(mm/min)[>1]
- ★、 108,8-Beginning feed speed(mm/min)[>1]

Used to set initialize speed when feed axis doing acceleration, and also the end speed of deceleration speed. If feed axis running speed is lower than P101-P108, there is no acceleration or deceleration. If running speed is higher than P101-P108, acceleration starts from P101-P108 speed.

Attention: the value of P101-P108 is relative to machine configuration, wrong setting may lead to machine malfunction.

Usually, if installed with stepper driver, less than 100, if installed with servo driver, less than 500.

- ★、 111,X-Jump speed at continuous track(mm/min)[>1]
- ★、 112,Y-Jump speed at continuous track(mm/min)[>1]
- ★、 113,Z-Jump speed at continuous track(mm/min)[>1]
- ★、 114,4-Jump speed at continuous track(mm/min)[>1]
- ★、 115,5-Jump speed at continuous track(mm/min)[>1]
- ★、 116,6-Jump speed at continuous track(mm/min)[>1]
- ★、 117,7-Jump speed at continuous track(mm/min)[>1]
- ★、 118,8-Jump speed at continuous track(mm/min)[>1]

Used to set break incremental speed of each axis when axis speed changes during mutli axis interpolation in order to ensure reslutant endpoint speed. It means if speed change incremental value is bigger than P111-P118, there is acceleration or deceleration. The purpose is to enhance connection of multi axis interpolation.

For example, if P111=300, during multi axis interpolation, if X speed changes from F800 to F1600, its process should be X axis changes to F1100 firstly, then accelerate to F1600.

- ★、 121,C-go home forward speed(mm/min)
- ★、 122,Xs-go home forward speed(mm/min)

- ★、 123,Ys-go home forward speed(mm/min)
- ★、 200,G00 continue run is valid[1 is No,16 is Yes]
- ★、 210,Thread is waiting for the spindle speed[0:No,1:Yes]
- ★、 211,Initial speed of rigid tapping spindle (rpm)
- ★、 212,The initial speed of the spindle with rigid tapping (rpm)
- ★、 213,Static tapping feed spindle acceleration and deceleration (rpm/S)[>1]
- ★、 214,Acceleration and deceleration of rigid tapping and cutting tool Spindle(rpm/S)[>1]
- ★、 215,Rigid tapping feed spindle reserved amount (1/1000 laps)[>2]
- ★、 216,Rigid tapping tool Spindle tail amount(1/1000 laps)[>2]
- ★、 217,The retention of rigid tapping and returning tool Spindle(1/1000 laps)[>2]
- ★、 218,Rigid tapping and retracting spindle trailing quantity(1/1000 laps)[>2]
- ★、 219,Time constant for smooth processing of rigid tapping [20002-20500]
- ★、 230,SP G00 speed(0.1rpm)
- ★、 231,SP G01 mode[+4: F,+8: G90/G91,+16: show value]
- ★、 232,SP direction[0: Positive,1: Negative]
- ★、 233,SP back to Zero control mode (1:pulse,2: Output M61,check M22)
- ★、 234,SP stop angle(0.1)
- ★、 235,SP back to Zero speed(0.1 rpm)

3.8.3 Axis parameter

- ★、 1,Feed axis band switch[1 mean Yes,0 mean No]
- ★、 2,Spindle and G00 band switch[1 mean Spindle,2, mean G00,0 mean No]
- ★、 3,X-axis`s negative scope(mm)
- ★、 4,X-axis`s positive scope(mm)
- ★、 5,Y-axis`s negative scope(mm)
- ★、 6,Y-axis`s positive scope(mm)
- ★、 7,Z-axis`s negative scope(mm)
- ★、 8,Z-axis`s positive scope(mm)
- ★、 9,A-axis`s negative scope(mm)
- ★、 10,A-axis`s positive scope(mm)
- ★、 11,B-axis`s negative scope(mm)
- ★、 12,B-axis`s positive scope(mm)
- ★、 12a,C-axis`s negative scope(mm)
- ★、 12b,C-axis`s positive scope(mm)
- ★、 12c,Xs-axis`s negative scope(mm)
- ★、 12d,Xs-axis`s positive scope(mm)

★、 12e, Ys-axis's negative scope(mm)

★、 12f, Ys-axis's positive scope(mm)

The movement scope of XYZABCXsYs in machine coordinate.

★、 13, Spindle stop time(10ms)

The time which spindle need to brake, namely output time of M05, the shorter brake time means spindle stopes faster. Unit:10ms.

★、 14, Spindle stop long signal

When P14=1, spindle brake signal is long signal, when P14=0, spindle brake time is short signal.

★、 15, Soft limit invalid

[D2X;D3Y;D4Z;D5A;D6B;D9C;D10XS;D11YS;1:No limit]

D2 means X axis;D3 means Y axis;D4 means Z axis;D5 means A axis;D6 means B axis;D9 means C axis;D10 means Xs axis;D11 means Ys axis;1 means not limit;

Set each axis in each bit. 1 means valid soft limit in corresponding bit, 0 means invalid.

Format: D15D14.....D1D0.

Example: If set soft limit of X axis, then set as:00000100

★、 16, X-axis's reverse compensation(um)

★、 17, Y-axis's reverse compensation(um)

★、 18, Z-axis's reverse compensation(um)

★、 19, A-axis's reverse compensation(um)

★、 20, B-axis's reverse compensation(um)

★、 20a, C-axis's reverse compensation(um)

★、 20b, Xs-axis's reverse compensation(um)

★、 20c, Ys-axis's reverse compensation(um)

If there is backlash in transmission structure when the axis move backward, it is necessary to set backlash compensation. P16-P20c backlash compensation of XYZABCXsYs. Unit:um.

★、 21, X-axis's direction signal [1 mean normal, 0 mean reverse]

★、 22, Y-axis's direction signal [1 mean normal, 0 mean reverse]

★、 23, -axis's direction signal [1 mean normal, 0 mean reverse]

★、 24, A-axis's direction signal [1 mean normal, 0 mean reverse]

★、 25, B-axis's direction signal [1 mean normal, 0 mean reverse]

★、 25a, Reverse direction signal(+2:C-axis,+4:Xs-axis,+8:Ys-axis)

P21-P25a are used to set moving direction of axis, 0 means moving direction reverse from command movement, 1 means axis moving direction is the same as command.

- ★、 26,Close feed electron gear [1 mean Yes,0 mean No]

Used to disable electronic gear ratio, if P26=1, it means close electronic gear, then P27-P36f will not work.

- ★、 27,X-axis's electron gear numerator(1-999999)
- ★、 28,X-axis's electron gear denominator(1-999999)
- ★、 29,Y-axis's electron gear numerator(1-999999)
- ★、 30,Y-axis's electron gear denominator(1-999999)
- ★、 31,Z-axis's electron gear numerator(1-999999)
- ★、 32,Z-axis's electron gear denominator(1-999999)
- ★、 33,A-axis's electron gear numerator(1-999999)
- ★、 34,A-axis's electron gear denominator(1-999999)
- ★、 35,B-axis's electron gear numerator(1-999999)
- ★、 36,B-axis's electron gear denominator(1-999999)
- ★、 36a,C-axis's electron gear numerator(1-999999)
- ★、 36b,C-axis's electron gear denominator(1-999999)
- ★、 36c,Xs-axis's electron gear numerator(1-999999)
- ★、 36d,Xs-axis's electron gear denominator(1-999999)
- ★、 36e,Ys-axis's electron gear numerator(1-999999)
- ★、 36f,Ys-axis's electron gear denominator(1-999999)

Used to set XYZABCXsYs axis electronic gear ratio.

The numerator=10*reduction ratio;

The denominator is ballscrew pitch;

If above parameter setting incorrect, axis will move incorrect, the command distance may not match with real movement.

- ★、 37,XYZA positive limit[0 open,1 close]
- ★、 38,XYZA negative limit[0 open,1 close]

Used to set XYZA axis limit type, 0 means Normal open, 1 means Normal close.

- ★、 39,float zero bit paramter

[D3X;D4Y;D5Z;D6A;D7B;D8C;D9XS;D10YS;1:float Zero;D0D1:Y reduction]

Used to set the type of each axis home type, and it is a bit parameter.

D10|D9|D8|D7|D6|D5|D4|D3|D2|D1|D0

D3-D10 corresponds to XYZABCXsYs home type, 1 mean float zero point, 0 means mechanical home switch;

For eexample, if just set X axis as float home type, then P39=00000001000.

- ★、 40,X coor float zero set
- ★、 41,Y coor float zero set
- ★、 42,Z coor float zero set

- ★、 43,A coor float zero set
- ★、 44,B coor float zero set
- ★、 44a,C coor float zero set
- ★、 44b,Xs coor float zero set
- ★、 44c,Ys coor float zero set

P40-P44c will set the current coordinate of XYZABCXsYs axis as home position, each axis goes home means back here.

If without mechanical zero point, set it as floating zero point. System will locate the zero point rapidly in operation of back to zero point.

- ★、 45,Feed axis home

[1 mean No use, 0 mean clew, 8 compulsion , 9 must compulsion]

Set as 0 means no need, system will not prompt and limit when power on.

Set as 1 means prompt, system will prompt but no limit when power on.

Set as 8 means force, system will prompt when power on, and if no operation of back reference point, it will refuse to execute program.

Set as 9 means super force, motion system of feeding axis will prompt when power on, and if no operation of back reference point, it will refuse to execute motion.

- ★、 46,Feed axis home mode [0 reverse check,1 reverse No check ,2 No reverse check,3 No reverse No check]

Few methods for setting detection switch and zero pulse signal of motor encoder when each axis is backing to zero point:

Set as 0: When backing to zero point, crush to the reference switch, running reversal after the switch is off, then detect the zero pulse signal of motor encoder.

Set as 1: When backing to zero point, crush to the reference switch, running reversal after the switch is off.

Set as 2: When backing to zero point, crush to the reference switch, continue to run after the switch is off, then detect the zero pulse signal of motor encoder.

Set as others:When backing to zero point, crush to the reference switch, continue to run after the switch is off.

According to the circuit to set, normally suggest to set as 0 or 2, if not to detect the zero pulse signal of motor encoder, the accuracy will be worse, it only base on switch of reference point.

- ★、 47,Home reverse direction

[D2X;D3Y;D4Z;D5A; D6B;0 Positive;1 Negative]

Exclusive setting of direction and sequence for every axis.

D10|D9|D8|D7|D6|D5|D4|D3|D2|D1|D0

D2 control X home direction; D3 control Y home direction; D4 control Z home direction; D5 control A home direction; D6 control B home direction, 1 means negative, 0 means negative.

For example, if set X axis home direction is negative, then P47=000000100.
D1 is a status control bit of chuck, 1 means detecting, 0 means without detecting.

If D1=1, after chuck clamping ready M10, system will detect M12, only if M12 is valid, will system execute next step. After chuck unclamping ready M11, system will detect M14, only if M14 is valid, will system execute next step.

★、48, Home switch set

[D0X;D1Y;D2Z;D3A;D4B;D5C;D14Xs;D15Ys;1:close;0:open;D6=1handwheel&auto;D7=1manual&auto]

Used to set home switch type[NC/NO].

D15|D14|D13|D12|D11|D10|D9|D8|D7|D6|D5|D4|D3|D2|D1|D0

1 means normal close, 0 means normal open. D0 control X home direction; D1 control Y home direction; D2 control Z home direction; D3 control A home direction; D4 control B home switch type; D5 control C home switch type; D14 control Xs home switch type; D15 control Ys home switch type.

For example, if XYZ home switch is NC, then P48=000000000000111.

If D6=1, controller will switch between handwheel and auto mode automatically. If D7=1, controller switch between manual mode and auto mode automatically, controller will switch into manual mode after program finishes, pressing Start button in manual mode will switch into auto mode automatically.

★、49, X check zero max length(100um)

★、50, Y check zero max length(100um)

★、51, Z check zero max length(100um)

★、52, A check zero max length(100um)

★、53, B check zero max length(100um)

When P46=0 or 2, after release from home switch, each axis need to detect motor encoder zero pulse signal, P49-P53 are the detecting range.

Note: the range must be less than distance by one type of motor, otherwise, home position accuracy can not be ensured.

★、54, X Home offset(10um)

★、55, Y Home offset(10um)

★、56, Z Home offset(10um)

★、57, A Home offset(10um)

★、58, B Home offset(10um)

★、58-1, C Home offset(10um)

★、58-2, XS Home offset(10um)

★、58-3, YS Home offset(10um)

During axis homing, when detect motor zero pulse signal, and move offset value, then homing finished. Unit: 0.01mm, range: -99999~+99999.

The parameter value depends on installation of home switch and machine coordinate setting.

Note: offset speed is G00 speed.

- ★、 59,Have Spindle class control[1:Yes,0:No,64:Hold the spindle state]

Used to set if activate spindle motor when spindle switches gears. 1 means activate, 0 mean not activate, 64 means hold current status.

- ★、 60,Spindle class speed(1/100rpm)

The spindle initializing speed setting when spindle switches gear.

- ★、 61,Spindle class direction[0 mean M03,1 mean M04]

The spindle rotary direction when spindle switches gear, 0 means rotate CW, 1 means rotates CCW.

- ★、 62,Spindle class stop time(10ms)

Used to set the stop time(M05) before initialize spindle when spindle switches gear.

- ★、 63,Spindle class time(10ms)

Used to set spindle initialization time of spindle when spindle switches gear.

- ★、 64,Spindle stop time(10ms)

The delay time between canceling M03/M004 and output M05.

- ★、 65,Check SP encode[1 mean Yes,0 mean No]

Used to set if check spindle encoder signal. 1 means detect, 0 means not detect.

The parameter is used to activate such function relative to spindle speed like display speed speed, feed vale. And conditon is machine need to be installed with encoder which is drived with spindle by 1:1 transmission ratio.

- ★、 68,XYZAB reverse delay time(ms)

The delay time of feed axis when it moves reverse.

- ★、 80,XZ axis coordinate plan [D2Zwordpiece, D3Xwordpiece, D4Ztool,D5Xtool, D6Zcircumrotate, D7Xcircumrotate]

Used to set if X and Z is rotary axis and do coordinate plan. 1 means yes, 0 means no. The parameter is bit parameter.

D7|D6|D5|D4|D3|D2|D1|D0.

D2 control Z axis work piece coordinate plan; D3 control X axis work piece coordinate plan; D4 control Z axis machine coordinate plan; D5 control X axis machine coordinate plan; D6 control Z axis is rotary axis, D7 control X axis is rotary axis.

- ★、 81,Y axis [0 mean circumrotate axis,1 mean line axis]

- ★、 82,Y is circumrotate axis work coordinate[0 No;1 plan]

- ★、 83,Y is circumrotate axis machine coordinate[0 No;1 plan]

- ★、 96a,C axis [0 mean circumrotate axis,1 mean line axis]
- ★、 96b,C is circumrotate axis work coordinate[0 No;1 plan]
- ★、 96c,C is circumrotate axis machine coordinate[0 No;1 plan]
- ★、 97a,Xs axis [0 mean circumrotate axis,1 mean line axis]
- ★、 97b,Xs is circumrotate axis work coordinate[0 No;1 plan]
- ★、 97c,Xs is circumrotate axis machine coordinate[0 No;1 plan]
- ★、 98a,Ys axis [0 mean circumrotate axis,1 mean line axis]
- ★、 98b,Ys is circumrotate axis work coordinate[0 No;1 plan]
- ★、 98c,Ys is circumrotate axis machine coordinate[0 No;1 plan]
- ★、 100,Inner paramter
- ★、 101,A-axis function[0 mean circumrotate axis,1 mean line axis]
- ★、 102,A-axis is circumrotate axis machine coordinate[0 No;3 plan]
- ★、 103,A-axis automatic release of output point or auxiliary relay
[10000+Y_No.20000+M_No.]
When A axis move, output the signal or active a certain relay.
- ★、 104,A-axis automatic release of input point or auxiliary relay
[10000+X_No.20000+M_No.30000+Delay time(ms)]
When A axis move, detect an input signal or a certain relay.
- ★、 110,Inner paramter
- ★、 111,B--axis function[0 mean circumrotate axis,1 mean line axis]
- ★、 112,B-axis is circumrotate axis machine coordinate[0 No;3 plan]
- ★、 113,B-axis named is C(0 No,1 Yes)
Display B axis as B or C, 0 means display as B, 1 means display as C.
- ★、 200,SP encode pulse(4 times encode pulse)
The pulse unit per turn of Spindle encoder, the parameter valuse=encoder resolution*4.
- ★、 200-1,SP encode pulse alarm (diagnostics)[>10:Valid]
The tolerant pulse unit of spindle encoder feedback. Effective when more than 10.
- ★、 200-2,SP encode pulse[4 times encode thread](When Encode:SP is not 1:1)
Four times SP encoder pulse, if the encoder is connected with spindle by 1:1, set parameter as 0, otherwise, the valuse should be integrator bigger than 99.
- ★、 201,Is the measurement of spindle position feedback (1:Yes,0:No)
Used to set if detect spindle position feedback.
- ★、 202,Spindle orientation detection angle
- ★、 203,Angle measurement error of spindle orientation
Tollerance value between detection angle and real angle.
- ★、 204,SP motor direction(0 reverse,1 normal)

- ★、 205,SP-axis's electron gear(0 Yes,1 No)
Used to set if activate spindle electronic gear ratio.
- ★、 206,SP-axis's electron low gear numerator(1-999999)
- ★、 207,SP-axis's electron low gear denominator(1-999999)
- ★、 208,SP-axis's electron high gear numerator(1-999999)
- ★、 209,SP-axis's electron high gear denominator(1-999999)
- ★、 210,Z-axis Interpolation tap SP name
[91X,92Y,93Z,94A,95B,96C,97Xs,98Ys]
- ★、 210a,Y-axis Interpolation tap SP name
[91X,92Y,93Z,94A,95B,96C,97Xs,98Ys]
- ★、 210b,X-axis Interpolation tap SP name
[91X,92Y,93Z,94A,95B,96C,97Xs,98Ys]
When do tapping, the interpolation axis choosing.
- ★、 211,Interpolation tap mode[2 follow encode;3 interpolation to SP]
- ★、 212,SP tooth number(<P213)
- ★、 213,,Encode number(>P212)
Encoder gear tooth number.
- ★、 214,ABC-axis is moving by (7/8/9,17/18/19,27/28/29/D5..D13=1/A by
X/Y/Z,C By X/Y/Z,B By X/Y/Z)
Set ABC axis following XYZ.
- ★、 220,First spindle full pulse control channel(positive:88, reverse:98)
- ★、 221,The first spindle full pulse control of the number of pulses per cycle
- ★、 222,First spindle full pulse speed control(rpm/2ms)
- ★、 223,Second spindle full pulse control channel (positive 81-88:
XYZABCXSYS, reverse 91-98:XYZABCXSYS)
- ★、 224,Second spindle full pulse control of the number of pulses per cycle
- ★、 225,Second spindle full pulse speed control(rpm/2ms)
- ★、 250,Ethernet bus servo motor encoder bus number
- ★、 401,X Zero return switch input point[1000+No.]
- ★、 402,Y Zero return switch input point[1000+No.]
- ★、 403,Z Zero return switch input point[1000+No.]
- ★、 404,A Zero return switch input point[1000+No.]
- ★、 405,B Zero return switch input point[1000+No.]
- ★、 406,C Zero return switch input point[1000+No.]
Used to choose home switch input point of each axis.

3.8.4 Tool parameter

- ★、 1,C Tool radius compensation's establish

The method to establish radius C compensation, 0 means A, 1 means B.

★、 2,C Tool radius compensation's cancel

The method to cancel radius C compensation, 0 means A, 1 means B.

★、 32,Tool position signal/WAT signal filter

[+256+512+1024:2/4/8ms/+2048+4096+8192:2/4/8ms]

Filter for input points, for example: input 256 correspond to X0-X7 filter 2ms,input 2304 correspond to all input point filter 2ms.

3.8.5 Other parameter

★、 1,Set sub-panel type

Used to set if installed with handwheel, 1 means handhold, 0 means panel.

★、 3,use control switch

If controller is 1000 series, used to set if control switch works, 88 means activated both in manual and auto mode, 99 means activated in auto mode, other values means close.

★、 4,Have auto lubricate(0 yes/1 no)

Used to set if machine installed with automatic lubricate system.

★、 5,Auto lubricate time(0.01s)

Used to set auto lubricate time, namely M32 hold time, unit:10ms.

★、 6,Auto lubricate stop time(0.01s)

Used to set interval time between each lubrication, namely interval time between M32 valid. Unit: s.

★、 7,Door switch checking(0 no,1 yes)

Used to set if detect door switch signal, if set as 0, means without door switch; if set as 1, means with door switch. It is suggest to detect door switch for safty sake.

Note: 1. door switch is detected throught M12;

2. when M12 is valid, in manual mode, feed axis coordinate can move, but in auto mode, system will pause program automatically.

★、 8,Door switch(0 open,1 close)

Tyep of door switch signal, 0 means normally open, 1 means normally closed.

★、 9,bit paramter

D1=1 clear to 0; D2=1 space ;D5=0 close spindle; D6 speed; D8=1 save M10 when power on;D10=1 arrange; D12=1 skip is invalid; D13=1 back to zero is invalid

The format: D15|D14|D13|D12|D11|D10|D9|D8|D7|D6|D5|D4|D3|D2|D1|D0.

D0 bit: Default as 1, can't change.

D1 bit: Set as 1 means the number of workpiece clear automatically when

power on, set as 0 means keep.

D2 bit: Set as 1 means insert space into letters automatically when editing the program, set as 0 means not insert.

D3 bit: Default as 0, can't change.

D4 bit: Default as 0, can't change.

D5 bit: Set as 1 means not stop spindle rotation and cooling when pressing RESET, 0 means stop, default is 0.

D6 bit: Set as 1 means each axis work according to own speed, work with nonlinear trajectory when executing G00, 0 means simultaneous, reach at the same time. Default is 1.

D7 bit: Default as 0, can't change.

D8 bit: Set as 1 means save the status M10/M11 of spindle loose or tight when power off, recover this status when power on again. Set as 0 means spindle will be tight automatically when power on. Default is 1.

D9 bit: Default as 1, can't change.

D10 bit: Set as 1 means the number of line is arranged automatically when programming.

D11 bit: Set as 1, the output analog of the first spindle is the same time from the first, second spindle channel, the function of the second spindle is valid.

D12 bit: Set as 1, shield the skip function, “/” in front of the segment means invalid.

D13 bit: Default as 0, can't change.

D14 bit: Default as 0, can't change.

D15 bit: Set as 1, the tool set show the relative value, otherwise it shows the absolute value.

Pay attention: This parameter includes the bit which can't be changed. If change this bit, it will cause some problems with controller.

★、 10,Auto count part[1 mean Yes,0 mean No]

Used to count processed work piece quantity.

★、 11,Program edit number increase

if user want to count program lines automatically, just need to set P11=1.

★、 12,The inner parameter of power on [6:automatically,7:press enter,16:press fast enter,8:allow import,9 clear]

★、 13,Does lock for Spindle & chuck(0 mean no)

Used to set if interlock between spindle and chuck.

0 means no relationship between spindle and chuck status;

1 means only if spindle is in M05 status, can chuck clamp or unclamp;

8 means only if spindle is in M05 status and spindle encoder keep still, can chuck clamp or unclamp;

16 means detect speed and interlock;

32 means when program running in auto mode and status is not pause, button of clamp can not work;

56 means super interlock. when program running in auto mode and status is not pause, button of clamp can not work;

The parameter setting depends on machine configuration and user preference, it is suggested to set as interlock in safety sake.

★、 14, Is available keys of lub&cool as running [1:Yes, 0:No]

Used to set if coolant button works in auto mode. The parameter setting depends on user preference, when set it as 1, operator can control coolant system at any time, to meet processing needs.

★、 17, Servo [XYZA] ALM (0:open, 1:close)

Used to set type of XYZA alarm, 0 means normally open, 1 means normal close.

★、 18, Servo ALM1 [BCXSYS] (0:open, 1:close)

Used to set type of BCXsYs alarm, 0 means normally open, 1 means normal close.

★、 19, Welding gun collision alarm ALM3 (0 open, 1 close)

Used to set type of ALM3 alarm, 0 means normally open, 1 means normal close.

★、 20, Chuck control signal (0 single, 1 double M10/M71)

Used to set chuck control signal quantity, if one-way valve, it needs 1 signal, if with two-way valve, it needs 2 signal.

0: means only one output signal M10 controls chuck clamp or unclamp, when M10 is effective, system executes clamping, when M10 is ineffective, system executes unclamping;

1: means M71 and M10 signal control chuck unclamping and clamping separately. When M10 is effective and M71 is ineffective, chuck clamps; when M10 is ineffective, and M71 is effective, chuck unclamps. Namely M10 output M10, M11 output M71.

Axis parameter P40-D1 bit is used to set if check clamp/unclamp ready, 0 means without detection; 1 means detection, then system will detect if M14 is effective after outputting M10, detect if M12 is effective after outputting M11, only if M14/M12 is effective, will system continue next step.

★、 22, Outside chuck control (0 no, 1 yes M16)

Used to set if there is an external switch controlling chuck clamping or unclamping, it is a loop signal, namely chuck status changes everytime when signal becomes effective once (effective once, then unclamp; effective another 1 time, then clamp). when set as 0, means without external chuck control switch; set as 1, means

with external chuck control, the signal is M16.

★、 24,M10M11 short signal time(s)

Used to set the hold time of M10,M71 when they are the short signal. If the value is 0, it means M10 and M71 is long signal. Unit:S(second)

★、 25,Whether to configure an integrated drive[1:Yes,0:No]

Used to set if connect with NEWKer intergrated type driver. If yes, then when driver works normal, controller will output Y05 to control motor brake.

★、 26,Emerge Stop(0 open,1 close)

Used to set type of emergency stop button, 0 means normally open, 1 means normally closed. The default setting is normally closed.

★、 27,Emerge Stop2(0 open,1 close)

Used to set the type of external emergency stop signal. 0 means normally open, 1 means normally closed.

★、 28,Run status output(0 invalid,1 valid Y04 run,Y02 stop)

Used to set if controller output signal for status displaying. 0 means do not output, 1 means output, namely when machine works, if program running, then output Y04, if program stopped, then output Y02.

★、 29,Alarm status output(0 invalid,1 valid Y03)

Used to set if output alarm signal, namely when machine is in alarm status, if P29=0, controller will not output alssrm signal, if P29=1, controller will output alarm signal Y03.

★、 30,Set language(1 表中文, 0 mean English)

★、 31,Is enable PLC program

★、 32,Is enable High PLC program

Used to set system inner PMC operating. During running machine, it must be enabled.

★、 35,soft-limit without home as manual[1 Yes,0 No]

Used to set if soft limit works before the axis go home.

★、 36,Set system time[year-month-day-hour-minute]

Used to set system time, format: year-month-day-hour-minute.

★、 37,Velocity of RS232 [0=7200; 1=9600; 2=14400; 3=19200; 4=38400; 5=57600; 6=115200]

Used to set baud rate in RS232 communication.

★、 37-1,Serial port ModBus station number of OPC function [odd check 10000+,even check 20000+,no check 30000+]

The station number set in RS232, if controller station number is 2, and check mode is odd check, then set as 10002.

★、 38,Lock Manual rampit func key[8 Yes]

- ★、 39,Special paramter
- ★、 40,Special paramter
- ★、 41,Bake current paramter

Backup current parameter setting as default parameter. After setting machine ready, press P41 twice then set current parameter as default setting for future maintainece.

- ★、 42,Resume original paramter

Restore the default parameter setting which is defined by pressing P41 last time.

- ★、 50,Run from middle Program ask going last line point[8:Yes,0:No]

Used to choose if position at end of last section before running program in middle line.

- ★、 120,Manual axis moving keying reverse(4:is X;8:is Y;16:is Z;32:is A)

Used to exchange the direction of XYZA button.

- ★、 200,X axis feedback alarm error(pulse)[>1]
- ★、 201,Y axis feedback alarm error(pulse)[>1]
- ★、 202,Z axis feedback alarm error(pulse)[>1]
- ★、 203,4 axis feedback alarm error(pulse)[>1]
- ★、 204,5 axis feedback alarm error(pulse)[>1]
- ★、 204a,6 axis feedback alarm error(pulse)[>1]
- ★、 204b,7 axis feedback alarm error(pulse)[>1]
- ★、 204c,8 axis feedback alarm error(pulse)[>1]

When controller activated position feedback function, if tacking error during axis running is bigger than P200-P204a, system will alarm.

Bigger than 1 is valid. Press “G” to clear the feedback position ,clear position and the alarm.

- ★、 205,X axis stop feedback alarm error(pulse)[>1]
- ★、 206,Y axis stop feedback alarm error(pulse)[>1]
- ★、 207,Z axis stop feedback alarm error(pulse)[>1]
- ★、 208,4 axis stop feedback alarm error(pulse)[>1]
- ★、 209,5 axis stop feedback alarm error(pulse)[>1]
- ★、 209a,6 axis stop feedback alarm error(pulse)[>1]
- ★、 209b,7 axis stop feedback alarm error(pulse)[>1]
- ★、 209c,8 axis stop feedback alarm error(pulse)[>1]

When controller activated position feedback function, if tacking error after axis stopping is bigger than P200-P204a, system will alarm.

Bigger than 1 is valid. Press “G” to clear the feedback position ,clear position, and the alarm.

★、210,X-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

★、211,Y-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

★、212,Z-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

★、213,4-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

★、214,5-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

★、214a,6-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

★、214b,7-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

★、214c,8-axis's electron gear numerator[auto count : L screw(um)M encode pulse]

If controller connect with feedback encoder AB signal from driver, set P210-P214a=10000.

★、215,X-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

★、216,Y-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

★、217,Z-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

★、218,4-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

★、219,5-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

★、219a,6-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

★、219b,7-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

★、219c,8-axis's electron gear denominator[auto count : L screw(um)M encode pulse]

Default as 10000, please do not change it.

★、290,Control type (4000-4099:etherCAT, 6000:Modbus, 6001:1-6axis Modbus, 6002:3axis Modbus)

Used to set the type to control servo driver, 4000-4099: means etherCAT, 6000:means Modbus communication, 6001:1-6axis Modbus, 6002:3axis Modbus

★、 300,absolute encoder servo motor

[X-D2,Y-D3,Z-D4,A-D5,B-D6,C-D7,XS-D8,YS-D9,0 mean No,1 mean Yes]

If the servo motor is with absolute encoder, it is necessary to set P300 accordingly.

Format: D15|D14|D13|D12|D11|D10|D9|D8|D7|D6|D5|D4|D3|D2|D1|D0

0 means without absolute encoder, 1 means with absolute encoder motor. D2 control X axis; D3 control Y axis; D4 control Z axis; D5 control A axis; D6 control B axis; D7 control C axis; D8 control Xs axis; D9 control Ys axis.

★、 301,absolute encoder address of lower 16bits multi-turn data

★、 302,absolute encoder address of higher 16bits one-revolution data

★、 303,absolute encoder address of lower 16bits one-revolution data

P301=low 16-bit communication address of multiturn absolute in driver;

P302=high 16-bit communication address of signleturn absolute in driver;

P303=low 16-bit communication address of singleturn absolute in driver;

Attention: Controller communicate with Servo driver through RS485, protocol is as following:

1) Drive station number: 1 means X axis, 2 means Y axis, 3 means Z axis, 4 means A axis, 5 means B axis, 6 means C axis, 7 means Xs axis, 8 means Ys axis.

2) RS485 baud rate is 19200, 8 data bit, 1 stop bit, RTU format, Odd check mode.

★、 304,X-axis one-revolution pulse

★、 305,Y-axis one-revolution pulse

★、 306,Z-axis one-revolution pulse

★、 307,4-axis one-revolution pulse

★、 308,5-axis one-revolution pulse

★、 308a,6-axis one-revolution pulse

★、 308b,7-axis one-revolution pulse

★、 308c,8-axis one-revolution pulse

P304-P308c are used to set resolution of motor absolute encoder, for example, if motor encoder resolution is 17bit, then P304-P308c=131072; if motor encoder resolution is 23bit, then P304-P308c=8388608.

★、 309,X-axis one-revolution coordinate(nm)

★、 310,Y-axis one-revolution coordinate(nm)

★、 311,Z-axis one-revolution coordinate(nm)

★、 312,4-axis one-revolution coordinate(nm)

★、 313,5-axis one-revolution coordinate(nm)

★、 313a,6-axis one-revolution coordinate(nm)

★、 313b,7-axis one-revolution coordinate(nm)

★、 313c,8-axis one-revolution coordinate(nm)

When the machine installed with absolute encoder motor, P309-P313c are used to set coordinate when motor rotates one revolution, unit is nm. Negative value means reverse direction of coordinate counting.

$$\text{One-revolution coordinate} = \frac{\text{electronic gear ratio denominator}}{\text{electronic gear ratio numerator}} (\text{Axis parameter}) \times 10^7$$

For example, if X axis reduction ratio is 4:1, ballscrew pitch is 5, then X electronic gear ratio will be 8:1, then P309=(1/8)*10000000=2500000.

★、 314,X-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

★、 315,Y-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

★、 316,Z-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

★、 317,4-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

★、 318,5-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

★、 318a,6-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

★、 318b,7-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

★、 318c,8-axis multi-turn coordinate offset[Input E to clear,EV to clear&Set]

When the machine installed with absolute encoder motor, P314-P18c are used to set motor absolute multi-turn offset value, input E will clear absolute multi-turn data, normally it is used to set home position or solve dataflow when multi-turn value is too big.

★、 319,Servo driver current/speed/power/load rate(284/283/435/231)16 bits adr.

★、 320,X-axis one-revolution coordinate denominator

★、 321,Y-axis one-revolution coordinate denominator

★、 322,Z-axis one-revolution coordinate denominator

★、 323,4-axis one-revolution coordinate denominator

★、 324,5-axis one-revolution coordinate denominator

★、 324a,6-axis one-revolution coordinate denominator

★、 324b,7-axis one-revolution coordinate denominator

★、 324c,8-axis one-revolution coordinate denominator

When the machine is installed with absolute encoder motor, P320-P324c are used to set one-revolution coordinate denominator, normally, it is 1.

★、 330,Function of controller and interface

(11:weld;12:palletizing;13:painting;14:polishing)

Used to configure machine application and interface.

Network Function of System

★、 350,Internet[0 means close, 1 means open, 8 means open automatically]

★、 351,IP address of gateway

Set as you want, it is better to keep first three numbers the same to address in LAN, for example: 192.168.1.1.

★、 352,IP address

It is better to keep first three numbers the same to address in LAN, for example: 192.168.1.103

★、 353,MAC address

Make sure every piece should be different address, for example:255:255:255:1

★、 354,IP address of internet service

The IP address of computer, It is better to keep first three numbers the same to address in LAN, for example: 192.168.1.13

Wi-Fi function of USB internet: The network card of USB use EP-N8508GS and BL-LW05-AR5, others cannot supported currently. The install steps as follows:

1. Install ES browser on Android phone;
2. Open internet of ES browser -->Remote manager-->Set;
3. Set the number of port to be 3721 or 2121 or 2221
4. Set the root directory and select the internal storage of the cellphone
5. Setting up a management account with anonymity
6. Set the code to be GBK mode
- 7.Open the remote manager (put the IP address shown into the parameter No.561)

If there isn't Wi-Fi signal, could use Hotspot of cellphone to form LAN:

- 1.Open internet of ES browser -->Internet manager-->Create internet hotspot
- 2.Use defined hotspot, set the user name and code
- 3.Input the name and code to No.562 and No.563 parameter
- 4.Quit remote manager and enter remote manager (put the IP address shown into the parameter No.561)

The operation method of entering the FTP server folder on the controller:

- 1、 Press “N” in the program interface(or shift+N).
- 2、 After entering the FTP server folder, press the "N" key (or F6 key) to exit the FTP server folder according to the same operation above.

The advantage of using FTP to transfer files is that you can see the contents of PC folder on the system, and you can freely choose the files you want to transfer, which is more convenient to use. You can use anonymous login FTP server (no need to set parameter P565, P566), you can also use FTP username and password, FTP username and password using the original wired network FTP username and password.

When the system is connected to the wireless WIFI and the wired Ethernet at the same time, when the FTP server is opened, the wireless WIFI is preferred, and the

parameters in the system are as follows:

★、 361.The IP address of FTP server of the WiFi hot spot [based on the value of the FTP server in the cell phone, such as 192.168.2.206]

★、 362. Wifi username

★、 363. Wifi Password

★、 364. Wifi hot spot

★、 365. FTP username

★、 366. FTP password

★、 380, Automatic tool X setting initial coordinate(mm)

★、 381, Automatic tool Y setting initial coordinate(mm)

★、 382, Automatic tool Z setting initial coordinate(mm)

★、 383, Automatic tool forward speed(mm/min)

★、 384, Automatic tool slow forward speed(mm/min)

★、 385, Automatic tool Z axis coordinate value(mm)

★、 386, Automatic tool Speed of fast locating points(mm/min)

★、 387, Automatic tool setting mode(1:Fixed tool,0:Floating tool)

★、 388, Automatic tool Z axis minimum machine tool coordinate value(mm)

★、 389, Automatic tool Z axis difference value(mm)

Define macro variables of the automatic tool setting gauge function are as follows (corresponding to the other parameters P380 - P389):

#380: The X axis machine coordinate of initial position when automatic tool setting;(Unit:mm)

#381: The Y axis machine coordinate of initial position when automatic tool setting;(unit:mm)

#382: The Z axis machine coordinate of initial position and returning point with automatic tool setting;(unit:mm)

#383: The negative speed of automatic tool setting;(mm/min)

#384: The positive speed of automatic tool setting;(mm/min)

#385: The Z axis coordinate of workpiece surface in current workpiece coordinate system after automatic tool setting;(mm)

#386: The speed which is rapid move to locating position with automatic tool setting;(mm/min)

#387: Automatic tool setting mode (1 means fixed point, 0 means floating point).

#388: The minimal machine coordinate value of Z axis (mm);

#389: The gap value of Z axis [The height which is the gauge surface relative to the workpiece surface(mm)];

Fixed point gauge means putting the gauge in a fixed position, every time

the X Y Z axis are automatic running to the fixed point first in tool setting; But the floating point gauge search the tool setting gauge signal along negative of the Z axis.

The input point X25 is default to be the checking point of automatic tool setting gauge to input.

2.The instruction:

M880 (corresponding to ProgramUser0) automatic tool setting instruction;

M882 (corresponding to ProgramUser2),

M883 (corresponding to ProgramUser3) set the gap of Z axis.

3. Automatic tool setting steps:

1)Set the No.380--No.388 parameter in other parameter;

2)Set the No.389 parameter in other parameter to set the drop value of Z axis: this operation needs to be set only once.

A.Run M882 instruction in MDI to set the gap of Z axis;

B.Manual run Z axis to move the tool nose to the workpiece surface;

C.Run M883 instruction in MDI to automatical set the gap of Z axis No.389 parameter in other parameter;

3) MDI choose the workpiece coordinate system G54/G59;

4) Automatic tool setting: MDI running the M880 instruction, automatical set the Z axis offset of the current workpiece coordinate system.

★、 400,Axis name display configuration [xxxxx2] (123456 express XYZABC, Example:123462 shows XYZAC,124502 shows XYAB)

★、 401,Feed shaft pulse port configuration[xxxxxxxx0] (12345678 express XYZABC78,Example:123478560 is 7/8/5/6 axis pulse output from B/C/XS/YS port)

★、 451,Controlling mode of robot(100--9999)

★、 452,Safety switch is work or not[1 work,0 not work]

★、 453,The brake of motor is work or not[1 check the X40 when motor with brake, 0 without brake]

★、 501,Interface display [1:is white,8:is black]

★、 591,One key to set stepper type

Applies to case where the stepper equipment is installed in robot. To set the current parameters as parameter of factory default stepper motor. The parameter mainly adjusts the part parameters of speed and motor's specification.

★、 592,One key to set servo type

Applies to case where the servo equipment is installed in robot. To set the current parameters as parameter of factory default servo motor. The parameter mainly adjusts the part parameters of speed and motor's specification.

★、 600,Control type (4000-4099:etherCAT,6000:Modbus,6001:1-6axis Modbus, 6002:3axis Modbus)

- ★、 601,etherCAT Position loop gain coefficient
- ★、 602,etherCAT Thread machining position ring gain coefficient
- ★、 603,etherCAT Position in position allowable difference (number of motor encoder pulses)

- ★、 610,etherCAT Electronic gear common denominator
- ★、 611,etherCAT J1 Electronic gear molecule
- ★、 612,etherCAT J2 Electronic gear molecule
- ★、 613,etherCAT J3 Electronic gear molecule
- ★、 614,etherCAT J4 Electronic gear molecule
- ★、 615,etherCAT J5 Electronic gear molecule
- ★、 616,etherCAT J6 Electronic gear molecule
- ★、 617,etherCAT 7 Electronic gear molecule
- ★、 618,etherCAT 8 Electronic gear molecule
- ★、 620,etherCAT Station number setting [> 10]

- ★、 621,etherCAT Servo drive type [> 1]

(1 means Maxsine, Aecon/Invnt/Estun/STEP/Xinje, 2 means Sanyo Denki/Panasonic A5, 3 means Enpu ,4 means Yakotec/Thinkvo/Panasonic A6/Yuhai, 5 means bichannel Thinkvo, 6 means Tsino-dynatron, 7 means Zhenzheng/+3Eura/+4Dorna/Kinco+6DVS , 8 means Jotong/Weide)

Example: 777777773 means Eura driver; 777777774 means Dorna/Kinco driver; 777777776 means DVS driver.

If the 9th byte is 5, it means delay 1 minutes before communication after power on, for example, P621=666666665 means when connect Tsino-dynatron driver, delay 1 minute before communication in order to make sure driver initializes normally.

- ★、 622,etherCAT J1 Collision threshold
- ★、 623,etherCAT J2 Collision threshold
- ★、 624,etherCAT J3 Collision threshold
- ★、 625,etherCAT J4 Collision threshold
- ★、 626,etherCAT J5 Collision threshold
- ★、 627,etherCAT J6 Collision threshold
- ★、 900,User-defined dialog box[1:is invalid,4:is valid,12:is all]

Used to set if activate user-defined dialog when press Enter in main interface.

- ★、 901,Axis go home sequence(>9) [5-9 bits,1/2/3/4/5/6/7/8 is X/Y/Z/A/B/C/XS/YS, last bit must is 0]

Used to set sequence of each axis home. For example, if P901=4521360, it means axis go home sequence is 452136 axis.

★ 、 903,Inner parameter[2start function of SD card,+16:B-axis Welding following processing function,+32:A-axis Welding following processing function]

★ 、 910,M18/M22/M24/M28 High speed input[1:Yes]

Used to set if define M18/M22/M24/M28 as high speed input of G31/G311.

★ 、 911,Whether to start M18 for the teaching, M28 for the recording function[1:Yes,0:No]

Used to set if activate teaching function by input point M18/M24/M28.

★ 、 912,"Reset" to reset the output interface[1:Yes,0:No]

Used to set if reset output point when press Reset button.

★ 、 994,CNC controller serial number

★ 、 995,Machine tool serial number

★ 、 996,user-defined serial number

3.8.6 Coordinate system

The parameter includes multiple coordinate system, namely 6 user coordinate system and 1 world coordinate system G53. 1 program could set 1 user coordinate system, also could set multi user coordinate systems, which could be changed by moving its original point.

Use G54 to G59 could set 54 coordinate system (G54 -G59、G54.1-G54.48), the original point of 54 user coordinate system could be changed in interface of setting coordinate system.

Overall modification of user coordinate system G54--59 could be finished in dialog box of coordinate system deviant in parameter:

1) Input Axxx means the axis of all coordinate system deviate overall, for example, input A12.5 means the coordinate system of current modifying items deviates by 12.5 mm.

2) Input E means reset, input Exxx means input absolute deviant.

3) Input EA means reset the overall axis of all coordinate system,input EAxxx means the axis of all coordinate system input the deviant.

4) In arbitrary coordinate system of X axis, input EALL means reset all deviant of all axis of coordinates.

★ 、 1-0,The current group of user coordinate system[G54-G59]

P1-1/P1-9 corresponds to coordinates in user coordinate system, for example, if set it as 54, then P1-1/P1-9 is specifying coordinate of G54.

★ 、 1-1/1-9, X of user coordinate system G54-G59(mm)[Input incremental, E means absolute]

★、 2-0,The current group of user coordinate system[G54.1-G54.48]

★、 2-1,X of user coordinate system G54.1-G54.48(mm)[Input incremental, E means absolute]

★、 1. X(mm) of user coordinate system G54 [Input incremental, E means absolute]
P1-8 means XYZABCXsYs of user coordinate system G54(mm)

★、 11. X(mm) of user coordinate system G55 [Input incremental, E means absolute]
P11-18 means XYZABCXsYs of user coordinate system G55(mm)

★、 21. X(mm) of user coordinate system G56 [Input incremental, E means absolute]
P21-28 means XYZABCXsYs of user coordinate system G56(mm)

★、 31. X(mm) of user coordinate system G57 [Input incremental, E means absolute]
P31-38 means XYZABCXsYs of user coordinate system G57(mm)

★、 41. X(mm) of user coordinate system G58 [Input incremental, E means absolute]
P41-48 means XYZABCXsYs of user coordinate system G58(mm)

★、 51. X(mm) of user coordinate system G59 [Input incremental, E means absolute]
P51-58 means XYZABCXsYs of user coordinate system G59(mm)

★、 61. X(mm) of user coordinate system G54.1 [Input incremental, E means absolute]

P61-151 means XYZABCXsYs of user coordinate system G54.1-G54.10(mm)

Operation:

1、 Build the user coordinate system

Usually in status of teach:

(a) Press “F8” or “F5” to choose the corresponding user coordinate system(G54-G59).

(b) Move coordinate to the fixed position(so that to measure the position), measure the point to the position of zero point in user coordinate system

(c) Press “F7” , to set XYZ.

2、 Offset of user coordinate system

If still need adjust after setting:

Choose the corresponding axis in interface of coordinate system, press enter, input the offset(incremental, example:offset 10mm negative, then input -10), input E and absolute offset. Press enter to adjust.

Note:

- 1、 After modifying the parameter, refresh the coordinate system.
- 2、 The value in brackets is the offset so that operator to check and adjust easily.

3.8.7 Password

In case of the parameter can't be modified, the controller adopt the classified authority code. Including "CNC factory" "Machine factory" "User". "CNC" arrange inner parameter; "Machine" arrange the equipment and electrical parameter of robot; "User" arrange the technique, function and working.

Initial arrangement of authority is, "CNC" authorized, "Machine"and "user" unauthorized. If want to enable this function, need use initial code to open, and set the new code, the initial code will be invalid when setting the new code, must remember the code.

★、 1, The protection of "CNC"

Inner parameter, unable to operate.

★、 2, The protection of "Machine"

Since the parameter enabled, parameters about configuration of machinery will be under the shield. It cannot be operated till the parameter is disabled.

The initial code is "NEWNEW".

★、 3, The protection of "User"

Since the parameter enabled, parameters about processing will be under the shield. It cannot be operated till the parameter is disabled.

The initial code is "KERKER".

★、 4, Modify the code of "CNC"

★、 5, Modify the code of "Machine"

★、 6, Modify the code of "User"

Above the three parameter apply to change new code, change the new code again need to input old code first.

★、 7, Work time of controller

Starting using time of controller, unable to operate.

★、 8, Version of software

3.9 Technique parameter

Including welding, palletizing technique etc, press"craftwork" to convert, press it twice will shift to next page.

3.9.1 Welding technique

★、 1-0,The basic technique parameter in welding[0-9]
Arc weld instruction AS* to be invoked parameter group.

★、 1-1,Basic technique group: Open the function of “Back” or not[8 means open, other means closed]

Set as 8 means, press “Back” got the back function. The back function means if arc breaking happens(X0 invalid) during arc welding with MOVL or MOVC instructions, robot will back for a distance then restart arc start instruction AS*, and continue arc welding process.

★、 1-2,Basic technique group: The back distance of restart(um)

Only available if back function is enabled, refers to the automatic back distance after arc breaching during arc welding.

★、 1-3,Basic technique group: The speed of restart(mm/min)

Only available if back function is enabled, refers to the automatic back speed after arc breaching during arc welding.

★、 1-4,Basic technique group: The detection times of cladding

Definition: when sold wire sticks on the workpiece before execution of AE*, it is necessary to clad to separate solder wire and workpiece. When times of cladding is over the st value, it will alarm ad quit. When the parameter is equal or less than 0, it is unnecessary to detect cladding(X03), but it will execute cladding once.

★、 1-5,Basic technique group: weld mode [1:MIG-VA, 2:MIG-VW, 3:TIG-A, 4:TIG-AW]

★、 1-6,Basic technique group: Open the scrape function or not[8 means open, others mean closed]

Scrap function open means, after execution of AS*, keep running for a distance to ensure arc strike when output of arc starting is effective. If arc strike succeeds in scrape range, then back to start point and execute welding; if arc strike fails then alarm and quit. Scrap function close means, after execution of AS*, when output of arc starting is effective, wait for a period to check if arc strike succeeds or not, if succeed then weld, if fail then alarm and quit.

★、 1-7,Basic technique group: The scrape distance in weld(um)

★、 1-8,Basic technique group: The backing speed of scrape in weld(mm/min)

★、 1-9,Basic technique group: Starting of arc and arc extinction:+2 means the starting of arc is specified; +4 means arc extinction is specified.

- ★、 1-10,Basic technique group: The voltage of starting of arc
- ★、 1-11,Basic technique group: The current of starting of arc
- ★、 1-12,Basic technique group: The voltage of welding port treatment
- ★、 1-13,Basic technique group: The current of welding port treatment
- ★、 1-14,Basic technique group: The voltage of after treatment
- ★、 1-15,Basic technique group: The speed of solder wire go back(mm/min)
- ★、 1-16,Basic technique group:The time of gas purge(ms)
- ★、 1-17,Basic technique group: The present time of delivery gas(ms)
- ★、 1-18,Basic technique group: The detection time of electrical arc(ms)
- ★、 1-19,Basic technique group: Starting time(ms)
- ★、 1-20,Basic technique group: Time of behind delivery gas(ms)
- ★、 1-21,Basic technique group: Time of welding port treatment(ms)
- ★、 1-22,Basic technique group: Time of behind treatment(ms)
- ★、 1-23,Basic technique group: Delay time of cladding detection instruction(ms)
- ★、 1-24,Basic technique group: Delay time of cladding detection (ms)
- ★、 1-25,Basic technique group: Time of cladding detection(ms)
- ★、 1-26,Basic technique group: Welding fixed trim[5-900]
The fixed ratio of MOVL/MOVC between AS and AE, range is 5-900. if beyond the scope, feed speed ratio will be ratio percentage in main interface.
- ★、 101. Open interruption of wire feeding or not(M03)[0 means open, 1 means close]

- ★、 102. Total period(unit:10ms)
- ★、 103.Wire feeding time(unit:10ms)
- ★、 104. Detecting time of successful arc starting[X0 valid](unit:10ms)
Over the time means successful arc starting. And this period is included in P1-18.
- ★、 105.Detecting time of successful arc extinction[X0 invalid](unit:10ms)
Over the time means successful arc extinction. And this period is included in P1-24.

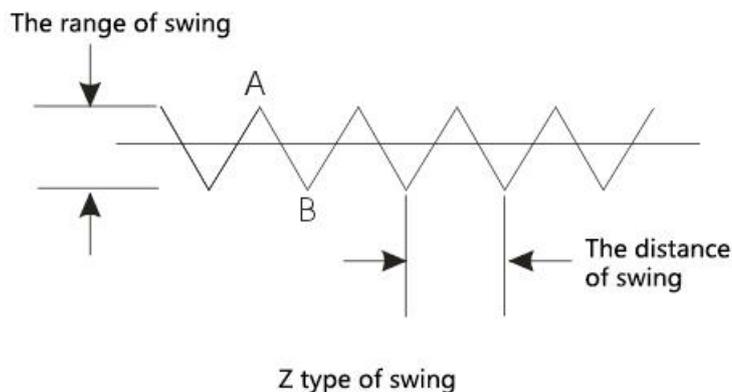
3.9.2 weaving welding technique

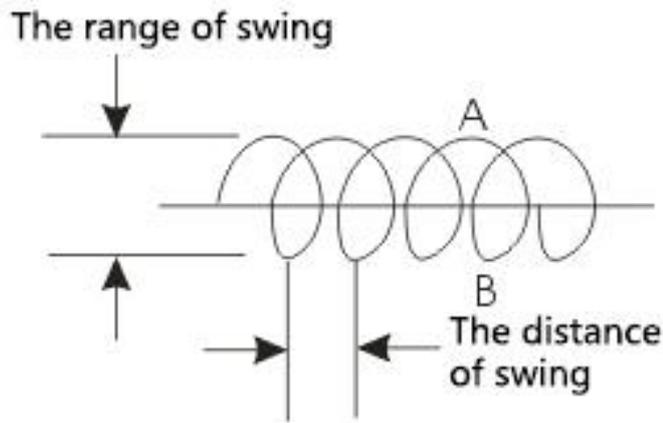
- ★、 2-0,The group number of weaving in weld[0--9]

Starting instruction WS* invokes parameter groups from 0 to 9.

- ★、 2-1,Weaving mode[1 mean Z type; 2 means circle type, 3 means X type]

The types of weaving weld, 1 refers to weaving in the shape of “Z”, 2 refers to circular weaving. If weaving plane is vertical on Z axis of tool coordinate system, direction of Z axis corresponds to direction of welding gun during the setting of tool coordinates. If only set P1, P2, P3, the direction of welding gun P3 signifies Z axis in tool coordinate. If set P4, P5, the direction from P3 to P4 signifies X axis, and direction from P4 to P5 signifies Z axis in tool coordinate system.





Circle type swing

★、 2-2,Distance of weaving(um)

Distance between every two weaving segments.

★、 2-3,Extent of weaving(um)

Distance between two weaving points from A to B.

★、 2-4,The pause time at A point(ms)

Weave weld to A point and the pause time(ms).

★、 2-5,The pause time at B point(ms)

Weave weld to B point and the pause time(ms).

★、 2-6,Circular swing direction(0 means reversal, 1 means normal)

3.9.3 Searching technique

★、 3-0,Search technique group[0--9]

★、 3-1,Search technique group: Mode and type

To set mode and type of search. 1 means one-dimensional search; 2 mean two-dimensional search; 3 mean three-dimensional search; 4 means one-dimensional and rotary search; 5 means two-dimensional and rotary search; 6 means three-dimensional and rotary search; 7 means circumcentre search.

One-dimensional search: to search a point in the direction of X or Y or Z.

Two-dimensional search: to search a point in the direction of XY or YZ or XZ respectively.

Three-dimensional search: to search a point in the direction of XYZ respectively.

One-dimensional and rotary search:to search two points in the direction of X and Y;the first point is used to calculate translation, the angle between line on XY and on workpiece will be rotation.

Two-dimensional and rotary search:to search two points in the direction of X and Y respectively;

Three-dimensional and rotary search: to search two points in the direction of X and Y respectively, and search one point in the direction of Z;

Circumcenter search: to search two points in the direction of X and one point in the direction of Z; or to search two points in the direction of Y and one point in the direction of X. To calculate the center of circle according to the three points through circumcenter. Then conclude offset value by comparing the calculated center with the center of calibrated workpiece.

★、 3-2, Search technique group: The distance of search(um)

★、 3-3, Search technique group: The speed of search(mm/min)

★、 3-4, Search technique group: The back speed of search(mm/min)

★、 3-5, Search technique group: Input point of searching detection (+1000 means waiting valid jump. +2000 means waiting invalid jump)

To set Input point of searching detection by parameter 3-5. For instance, X12 is set as 1012, denotes that if X12 is valid, searching is finished.

3.9.4 Arc tracking technique

★、 4-0. The group number of arc tracking parameter in weld[0--4]

★、 4-1, Compensation mode (+4:Left&right;+8:Upper&lower;+16:Left&right analog;+32:Upper&lower analog;+64:analog address exchange)

★、 4-2, Welding arc tracking: Left and right compensation Detecting IN1 address (1000+X number)[Left&right reference voltage]

★、 4-3, Welding arc tracking: Left and right compensation Detecting IN2 address (1000+X number)[Left&right reference voltage range of error]

★、 4-4, Welding arc tracking: Upper and lower compensation Detecting IN3 address (1000+X number)[Upper&lower reference voltage]

★、 4-5, Welding arc tracking: Upper and lower compensation Detecting IN4 address (1000+X number)[Upper&lower reference voltage range of error]

★、 4-6, Welding arc tracking : 01 Left and right compensation value(um)[Left&right max-compensation value lower than reference analog quantity]

When input point IN1, IN2 is 01, it is left/right offset compensation.

★、 4-7, Welding arc tracking :10 Left and right compensation value(um)[Left&right max-compensation value higher than reference analog quantity]

When input point IN1, IN2 is 10, it is left/right offset compensation.

★、 4-8, Welding arc tracking:01 Upper and lower compensation value(um)[Upper&lower max-compensation value lower than reference analog

quantity]

When input point IN3, IN4 is 01, it is right/down offset compensation.

★、 4-9, Welding arc tracking: 10 Upper and lower compensation value(um)[Upper&lower max-compensation value higher than reference analog quantity]

When input point IN3, IN4 is 10, it is right/down offset compensation.

★、 4-10, Welding arc tracking: Compensated acceleration[Compensation per 2 ms](um)

It is offset compensation value per 2ms, namely compensation acceleration.

★、 4-11, Welding arc tracking: Analog mode Left&right compensated acceleration coefficient

★、 4-12, Welding arc tracking: Analog mode Upper&lower compensated acceleration coefficient

Arc tracking is used to do compensation according to changing of input point IN1-IN4(changing of welding seam) during welding.

Arc tracking also can convert analog signal into 12-bit digital signal, input point X16-X27 and X28-X39 can be used for detection. According to changes of digital signal, controller will correct welding seam continuously.(Attention: if X16-X39 is occupied, then corresponding PLC need to be deleted)

Note for analog-signal arc tracking:

1> Default analog input signal of left/right compensation is X16-X27;

Default analog input signal of up/down compensation is X28-X39;

If 4-1=1, input address of left/right and up/down will be exchanged.

2> when 4-11 or 4-12 < 10, compensation(um) acceleration per interpolation circle(2ms) will be fixed as 4-10. Otherwise, compensation(um) acceleration per interpolation circle(2ms) should be calculated as following formula:

$$\text{Abs}(\text{current analog value} - \text{reference analog value}) * \text{compensation acceleration} * \text{compensation acceleration coefficient} / 1000;$$

reference analog value means P4-2/P4-4, compensation acceleration means P4-10, compensation acceleration coefficient means P4-11/P4-12. when result value is bigger than 10 times of P4-10, it will be limited within 10 times value of P4-10.

3> P4-3/P4-5 means if difference between current analog value and reference analog value is less than value of P4-3/4-5, then keep current compensation value.

4> the analog signal is converted in 12-bit digital signal, so maximum analog voltage corresponds to 4095, minimum voltage corresponds to 0. analog value in parameter refers to digital value, range 0--4095.

3.9.5 Laser tracking technique

★、 5-0. Welding laser tracking technique group number[0-3]

Instruction LS* is used to invoke the laser tracking technique group. The group number is from 0-3.

★、5-1. laser tracking technique group: communication mode[0 means serial port 0, 1 means serial port 1, 6 means network UDP, 7 means network TCP];

★、5-2. laser tracking technique group: searching range[um];

★、5-3. laser tracking technique group: searching speed[mm/min];

★、5-4. laser tracking technique group: search back speed[mm/min]

★、5-5. laser tracking technique group: search interval(ms);

★、5-6. laser tracking technique group: selection of weld mode

★、5-7. laser tracking technique group:periodic time(ms) for search time communication processing

★、5-8. laser tracking technique group:periodic time(ms) for search time communication processing during tracking(ms)[determines tracking sensitivity]

★、5-9. laser tracking technique group: station number in serial port mode; port number in network mode;

★、5-10. laser tracking technique group: Baud rate of serial port(fixed setting: the data bites is 8, the stop bites is 1, no parity)

[0=7200; 1=9600; 2=14400; 3=19200; 4=38400; 5=57600; 6=115200]

★、5-11. laser tracking technique group: mode(+4 means compensate left and right, +8 means compensate up and down, +32 means calibration compensation, +64 means full calibration compensation).

Coordinate system calibration: define several points(usually 3 points), input position XYZ and posture ABC of current TCP into laser tracker, matching tractor coordinate system with controller user coordinate. Then the feedback of XYZABC from tracker will be position XYZ and posture ABC of TCP point in user coordinate of controller, and perform coordinate system compensation.

+32 means calibration compensation: compensate XYZ only, and feedback XYZ 3 group 16 bit coordinate value from tracking.

+64 means full calibration compensation, compensate position XYZ and posture ABC, and feedback XYZABC 6 group 16 bit coordinate value from tracking.

★、5-12. laser tracking technique group: numerator of left and right compensation ratio[could be minus]

★、5-13. laser tracking technique group:denominator of left and right compensation ratio[could be minus]

★、5-14. laser tracking technique group: numerator of up and down compensation ratio[could be minus]

★、5-15. laser tracking technique group: denominator of up and down compensation ratio[could be minus]

★ 、 5-17. laser tracking technique group: max value of left and right compensation

★ 、 5-18. laser tracking technique group: max value of up and down compensation

★ 、 5-20. laser tracking technique group: compensation acceleration
[compensation value/2ms](um)

★ 、 5-21. Laser tracking process group: Compensation acceleration multiplier coefficient

When P5-21 less than 10, each interpolation period acceleration is P5-20, otherwise, the period acceleration is: (original offset value from tracker)*P5-20*P5-21, when the result is bigger than 10 times of P5-20 value, it will be limited within P5-20 value.

★ 、 5-22. laser tracking technique group: left and right deviation feedback is less than this value think weld alignment.

★ 、 5-23. laser tracking technique group: up and down deviation feedback is less than this value and the weld alignment is considered.

★ 、 5-24.laser tracking technique group: track the step of reproduction[>5] (um)
When P5-24>5, P5-25 and P5-26 works.

★ 、 5-25,laser tracking technique group:Tracking the speed multiplier during scanning%[>=20]

When P-24>5, the seam scanning speed=programmed speed*P5-25/100

★ 、 5-26,laser tracking technique group: Track the speed at which the reproduction mode returns the starting point of the welding(mm/min)

When P5-24>5, laser tracking technique group: the speed backing to start point of welding.

★ 、 5-27,laser tracking technique group: the lift height when back welding start point in tracking reproduction.

When P5-24>5, the lifting height of welding gun back start point after scanning.

★ 、 5-27,laser tracking technique group: the drop height when stating welding in tracking reproduction

When P5-24>5, the drop height of welding gun after backing start point.

3.9.6 Match

★ 、 Welding current matching setting

Set corresponding welding current of the 1st analog 0-10V output

★ 、 Welding voltage matching setting

Set corresponding welding voltage of the 2nd analog 0-10V output

3.9.7 Palletizing technique

Referring to command PA**, PW**.

- ★、 601,The basic parameter of depalletizing
- ★、 602,The teach for piling point of depalletizing
- ★、 603,The teach for approach and back point of depalletizing
- ★、 604,The special set for each floor layout number of depalletizing
- ★、 605,The special set for each floor height of depalletizing
- ★、 606,The set or teach for special regular layout data of depalletizing
- ★、 607,The set or teach for special ruleless layout data of depalletizing
- ★、 608,The set or teach for special floor with special approach and back point
- ★、 609,Copy data of some number depalletizing
- ★、 610,Copy data of some number layout mode
- ★、 611>Delete the data of some number depalletizing
- ★、 612>Delete the data of some number layout mode
- ★、 613,The M instruction before depalletizing(880--889)
- ★、 614,The M instruction when depalletizing to point 1(880--889)
- ★、 615,The M instruction when depalletizing approach to the summing point to offset(880--889)
 - ★、 616,The M instruction when depalletizing approach to the summing point(880--889)
 - ★、 617,The M instruction when depalletizing back to the summing point to offset(880--889)
 - ★、 618,The M instruction when depalletizing back to point 1(880--889)
- ★、 620, Decode the current status of palletizing (total stack,layer number,line number,stack number within the current layer)
 - Display and set current total stack, current layer, current column, current stack number.

3.9.8 Point data

- ★、 501,Check the data of position point
 - Read data of position, invoke number 0—499 of parameter
- ★、 502,Adjust the data of position point
 - Adjust data of position, invoke number 0—499 of parameter
- ★、 503,Save the data of the current position point[Pay attention to the current tool number and user coordinate system]
 - Save data of position, invoke number 0—499 of parameter
 - Pay attention: The current tool number and user coordinate system.
- ★、 504,Check the data of movement value
 - Check movement refers to SN* invokes data of parameter group, “*” means

invoke number 0—99.

★、505,Modify the data of movement value

Modify movement refers to SN* invokes data of parameter group, “*” means invoke number 0—99.

★、506,Calculate the data of movement value according to the two position point[Pay attention to the current tool number and user coordinate system]

Modify the data is specified by SN*. According to No.501-No.503 to calculate moving value and save in parameter group.

3.9.9 Vision technique

★、6-0,Group number of visual process parameter group[0--3]

★、6-1,Visual technology groups: means of communication

[0:RS232-0; 1:RS232-1; 6:NETwork TCP; 7:NETwork UDP]

0 means RS232, 1 means RS485, 6 means NEWTwork TCP, camera system is server, controller is client.

★、6-2,Visual technology groups: For serial:station numbers, for network: port number

★、6-3,Visual technology groups: Serial Baud rate(data:8,stop:1, no parity)

[0=7200; 1=9600; 2=14400; 3=19200; 4=38400; 5=57600; 6=115200]

★、6-4,Visual technology groups:VD Maximum waiting time(ms)

★、6-5,Visual technology groups:Get Visual data X offset(um)

★、6-6,Visual technology groups:Get Visual data Y offset(um)

★、6-7,Visual technology groups:Get Visual data Z offset(um)

If the grab is dynamic, appropriate offset value will help in grabbing workpiece successfully. For instance, at the beginning offset value can be 0, then run program to measure difference between grabbing position and real position of workpiece, and input the offset value in above 3 parameters. To modify offset vale to grab workpiece appropriately.

The point data will be saved through feedback XYZABC coordinate by VD command adding XYZ offset value. For example if received data by command VD12 is X10Y20Z40C50, and offset is X-6Y5Z8, then the coordinate data saved in Point 12 will be X4Y25Z48C50.

★、6-8,Visual technology groups:Transmission band speed during dynamic grabbing(mm/min)[>5]

If P6-8<5, it means what VD command received is static data, if P6-8>5, it means what VD received is dynamic data.

★、6-9,Visual technology groups:Communication data format with visual system(12:ASCII, 15:ASCII floating number)

If P6-9=12, transmission data will be ASCII format (unit: um&1/1000 degree) ,

visual system is TCP Server, and controller is TCP guest.

If P6-9=15, transmission data will be ASCII format(unit: mm°ree), visual system is TCP Server, and controller is TCP guest.

Based on value, if with sign - will flip value, it means transmit data incrementally, otherwise means absolutely. For example, P6-9=-5 means transmit incremental value by non-ASCII code, P6-9=-12 means transmit incremental value without decimal point by ASCII code, whose unit is um and 1/1000 degree.

★、6-10, Visual technology groups: VT instruction simultaneously valid output point[1000+No.:AB, 2000+No.:time](1030/1031 refers to Y30/Y31)

when execute VT, the output point controlling camera to take picture and record the shooting time. Once received date by VD, close the output point automatically. The default output point in controller is Y30/Y31. if need to change it into another point, please delete the corresponding output column in PLC. For example, if set the parameter as 1022 to control Y22, then delete following column in PLC;



if the parameter is set as [1000+number], controller will calculate distance from the shooting moment according to the AB signal feedback, that means higher accuracy. The direction of distance is defined by parameter 6-8, negative value means negative direction.

if the parameter is set as [2000+number], controller will calculate distance from the shooting moment according to the time difference, that means lower accuracy. The direction of distance is defined by parameter 6-8, negative value means negative direction.

★、6-11, Visual technology groups: the detection input point of the workpiece to the photographing position[1000+No.,2000+No.Auto]

When P6-11=2000+No., controller will not only detect X No. Input point when VT, but also in any time, then when the input point is valid, controller will execute VT automatically.

When equipped with the detect switch for detecting work piece arriving at camera positioning, controller need to detect this input point before VT execution. If did not install the detecting switch, unnecessary to set P6-11. the detecting time is defined by Process parameter P19, if over P19 time, it will alarm.

3.9.10 Tacking/Spraying technique

★、7-0, the group number for the tracking parameter group[0--3]

The group number invoked by tracking instruction TK*, group number 0-3.

★、7-1, Tracking encoder line number

Pulse number per circle of tracking encoder(resolution).

★、 7-2,The tracking encoder rotates around the transmission belt and moves the distance(um)

The distance of conveyor belt in X direction when tracking encoder rotates one circle.

★、 7-3,Position point number of XYZC in front of the work piece

Specify the position point number of received XYZC user coordinate, and target X coordinate is current X coordinate. If there is visual system connected, coordinate will be generate from visual system, otherwise it need to be set in advance.

★、 7-4,Attract X-to-offset distance(um)

Offset value in the X direction of user coordinate before grabbing work piece.

Attention:

If there is a detection switch for work piece arrival, the offset value is following grabbing, it should be small;

If there is not detection switch for work piece arrival, the offset value is pursuing grabbing, it should be a little bigger.

★、 7-5,Attract Z-to-offset distance(um)

Offset value in the Z direction of user coordinate before grabbing work piece.

★、 7-6,Speed to YZC(mm/s)

Speed of locating at YZC before grabbing.

★、 7-7,Grasp the M instruction executed by the workpiece(880--889)

Arrive at XYZC position specified by P7-6, immediately execute user-defined M code by P7-7 to grab work piece, this M code just include OUT instruction to output, do not use any waiting instruction. If the application is spraying, it means enable spraying function. For example, if set it as 880, then it will execute ProgramUser0.

★、 7-8,The distance of offset along the X after grasping the workpiece(um)

Offset value in the X direction of user coordinate after grabbing work piece.

★、 7-9,The distance along the Z when lifting the workpiece(um)

Offset value in the Z direction of user coordinate when lifting work piece.

★、 7-10,The distance offset along the X direction when the workpiece is lifted(um)

Offset value in the X direction of user coordinate when lifting work piece.

★、 7-11,The input point at which the workpiece arrives is detected[High speed:1000+No.Low speed:2000+No.]

Set the input point to detect work piece arrival, for example, 1041 means detect X41 as work piece arrival. If not set, then controller will detect encoder Z signal as input signal. When set as low speed detecting(2000+No.), detecting time

is defined by Process parameter P19, if detecting time over the time in P19, it will alarm.

★、 7-12, The X coordinate of the workpiece arriving at the detection switch(um)
when equipped with detection switch, this parameter is used to set the X coordinate of detection switch, and it should include the diameter of work piece. For example, if current coordinate is -50, diameter of work piece is 30, then this parameter should be -80. controller will calculate encoder AB pulse number of belt following movement after arrival of work piece according to this parameter, then robot move.

★ 、 7-13, The distance(um) at which the synchronous X-direction offset is achieved before the workpiece is gripped(um)[>10]

When parameter value is more than 10, it is synchronization method, means before grabbing, robot rapidly moves to position of work piece, then tracking AB signal according to X/Z offset by P7-4/P7-5 and grabbing work piece synchronously.

When parameter value is less than 10, it is waiting method, means waiting for work piece arriving at robot statically, then tracking AB signal according to X/Z offset by P7-4/P7-5 and grabbing work piece synchronously.

If there is no arrival detection signal and P7-13 is more than 10, following parameter is available.

★ 、 7-14, Control of X direction range of grasping workpiece [+2 negative limit; +4 positive limit; +8:alarm]

If D1=1(means +2), parameter P7-15 is valid. When work piece is out of negative limit, robot will waiting for work piece coming into work scope and grab it synchronously.

If D2=1(means +4), parameter P7-16 is valid. When work piece is out of positive limit and D3=1(means +8), controller will prompt alarm and quit program, or process according to TK instruction. if P instruction is attached with TK, then firstly locate at target XYZ position before executing TK, and judge that work piece is out of positive limit, then skip to the line specified by P, if no P, then execute sequentially.

Example:

TK1 P200 means execute TK1 to grab work piece and find it out of work range, locate at target YZC position, then skip to line N200.

★、 7-15, Negative limit value of X direction for grasping workpiece(um)

★、 7-16, Grasp the positive limit value of the X direction of the workpiece (um)

3.9.10 Driver Parameter

The driver parameter works with NEWKer NK series drivers only. Press 7 and input 1

means read all driver parameters.

★、 8-0,Current drive parameter setting shaft[1--8]

Choose the Axis No. to modify parameter, 1-8 means XYZABC/Xs/Ys.

★、 8-1,Modify the current axis parameter password(11:valid,Others:invalid)

Only when P8-11=11, can the following parameter be modified. Details refer to driver manual.

★、 8-8,Current loop proportional gain

Set motor current loop proportional gain, the bigger value sets, the faster current gain becomes. When motor vibrates or squeals, increase the P8-8; if the motor is small power and becomes hot, decrease P8-8.

★、 8-9,Speed loop proportional gain

St motor speed loop proportional gain, the bigger value sets, the higher gain is, and the stronger rigidity becomes, but easier to vibrate; if without squeal, the bigger value is better.

★、 8-10,Position feed-forward gain

Set position feed-forward gain, the bigger value is, the higher gain is, and the stronger rigidity becomes, but easier to vibrate; if without vibration, the bigger value is better.

★、 8-11,Position loop proportional gain

Set motor Position loop proportional gain, the smaller value set, the smoother motor rotates, but the worse rigidity becomes; the bigger value set, the faster position orients, the smaller following offset becomes, the stronger rigidity becomes, but easier to vibrate or overshoot; if without vibration or overshoot, the bigger value is better.

★、 8-31,Driving alarm overload percentage

Used to set the overload percentage alarm, if the load is over the value of motor torque*P8-13/100, driver will alarm.

★、 8-32,Rated current of motor(0.1A)

Set current motor rated current.

★、 8-33,Rated torque of motor(0.1NM)

Set current motor rate torque.

★、 8-44,Current loop filter constant

Set motor motor current loop filter constant, the smaller value is, the louder motor current squeal becomes. If motor inertia is big, and mechanical part has vibration squeal, increase P8-44.

★、 8-34,Zero position motor encoder

★、 8-35,Motor pole logarithm

★、 8-48,Driving control parameters(12:Current initialization current)

When driver works abnormally, set P8-48=12, to initialize current and driver parameter.

★、 8-51,Check the encoder alarm [0:Yes,1:No]

★、 8-57,Number of motor coder lines

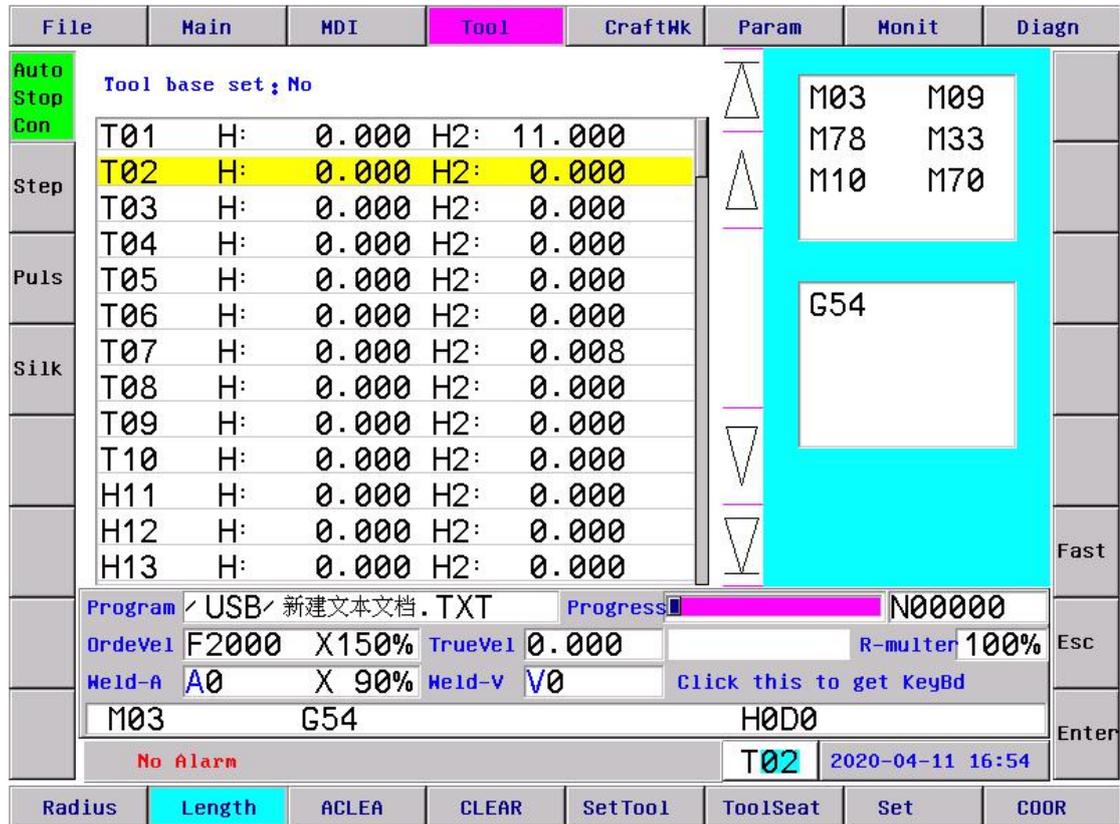
2517 means 17 bit multi-turn, 2523 means 23 bit multi-turn, 17 means 17 bit single turn, 23 means 23 bit single turn.

★、 8-59,Motor stop current locking ratio

Attention: Other parameter P29=1, to make sure when driver works well, controller will output Y05 signal to control motor brake.

3.10 Parameter of tool compensation

Tool compensation interface, including “Radius compensation” “Length” “Clear all value” “Clear current value” “Set tool” “Toolseat” “Set”, total 7 functions, correspond to press “F1-F7” to enter corresponding interface, press “Esc” to back the primary menu interface.



3.10.1 Radius compensation

Press “F1 radius compensation” in interface of tool set. Set the radius of tool, it’s compensation of CNC controller.

Method: Press “↑” “↓” to make cursor move to the corresponding tool and press “Enter” to popup a dialog box, import corresponding tool radius(Absolute value), press “Enter” at last.

3.10.2 Length compensation

Press “F2” to enter length of redeem interface. The parameter is used to modify the length which is adopt or reset the length.

Method: Press “↑” “↓” to make cursor move to the corresponding tool and press “Enter” to popup a dialog box, input the requested value.

Initialize the tool radius and the method of length compensation:

Press “F3”(Clear all to be 0), or “F4”(The current to be 0)

3.10.3 Tool set(Redeem)

Used to set coordinate of tool coordinate, and establish tool coordinate.

3.10.4 Table for tool-case

Press “F6” in redeem interface. To set the tool-case type when radius of tool is compensating.

Method: Press “↑”“↓” to chose the number of tool and press “Enter”, input the type of tool-case will be fine.

Press “F1” to initialize the tool-case type of all tool.

3.10.5 Set the number of tool

Press “F7” in redeem interface to arrange the total quantity of tools, could set as 99 tools at the most.

3.11 Diagnosis

Press “Diagn” to enter this interface.

Could check all input, output and alarm. Press “F2 I/O” and “page up”“page down” to check input and output point. Press “F4” to check alarm.

Input signal interface, 1 means effective, 0 means invalid.

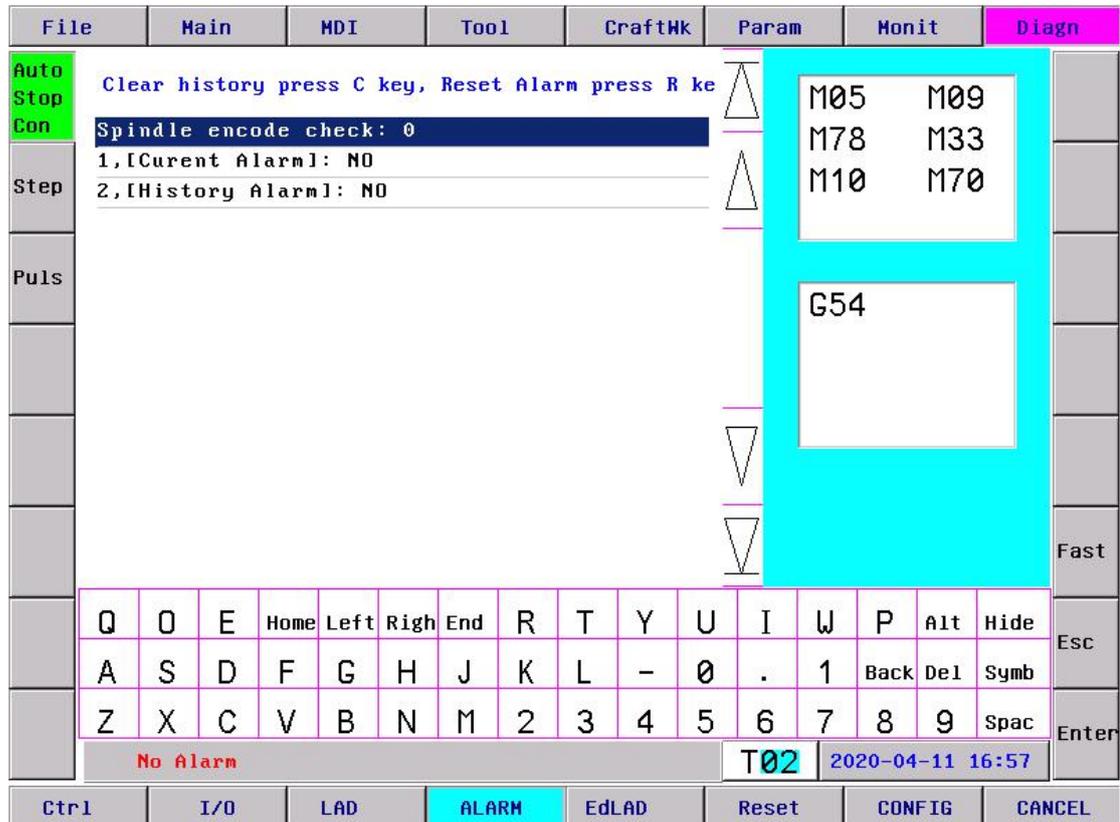
File	Main	MDI	Tool	CraftWk	Param	Monit	Diagn									
Auto Stop Con	Input point 1							M05 M09								
Step	X00 起弧检测	X01 焊机故障	X02 变频报警	X03 熔敷检测	X04 冷却报警	X05 润滑报警	X06 电弧耗尽	M78 M33								
Puls	X07 气压耗尽	X08 A0	X09 -L	X10 +L	X11 Y0	X12 X0	X13 Z0	M10 M70								
	X16 YS0	X17 HALT/XSOKRUN	X18 ESTOP	X19 ALM	X20 ALM1	X21 ALM2	X22 ALM3	G54								
	X24	X25 M28/C0	X26 M24/B0	X27 M22	X28 预约1	X29 安全门	X30 毛坯爪									
	X31 成品爪	X32 毛坯盘	X33 成品盘	X34 毛坯夹紧	X35 成品夹紧	X36 卡盘夹紧	X37 卡盘松开									
	X38 预约9	X39 加工完成	X40 松闸到位	X41	X42	X43	X44									
	X45 拖动模式	X46 无金属丝	X47 电源异常													
Fast																
Esc	Q	O	E	Home	Left	Right	End	R	T	Y	U	I	W	P	Alt	Hide
Enter	A	S	D	F	G	H	J	K	L	-	0	.	1	Back	Del	Symb
	Z	X	C	V	B	N	M	2	3	4	5	6	7	8	9	Spac
	No Alarm										T02	2020-04-11 16:57				
Ctrl	I/O	LAD	ALARM	EdLAD	Reset	CONFIG	CANCEL									

Input signal interface, 1 means effective, 0 means invalid.

File	Main	MDI	Tool	CraftWk	Param	Monit	Diagn									
Auto Stop Con	Output Point							M05 M09								
Step	Y00 M3330	Y01 M3331	Y02 M3332	Y03 M3333	Y04 M3334	Y05 松闸使能	Y06 M3336	M78 M33								
Puls	Y07 M3337	Y08 M10	Y09 机床照明	Y10 自动润滑	Y11 机床启动	Y12 M05	Y13 M3343	M10 M70								
	Y14 M3344	Y15 M3345	Y16 EN	Y17 INTN	Y18 毛坯爪	Y19 成品爪	Y20 毛坯盘	G54								
	Y21 成品盘	Y22 毛坯夹紧	Y23 成品夹紧	Y24 吹气	Y25 卡盘夹紧	Y26 卡盘松开	Y27 M3357									
	Y28 M203	Y29 M204	Y30 M3360	Y31 M3361	Y71	Y72	Y73									
	Y74	Y75	Y76	Y77	Y78	Y79	Y80									
	Y81	Y82	Y83	Y84	Y85	Y86										
Fast																
Esc	Q	O	E	Home	Left	Right	End	R	T	Y	U	I	W	P	Alt	Hide
Enter	A	S	D	F	G	H	J	K	L	-	0	.	1	Back	Del	Symb
	Z	X	C	V	B	N	M	2	3	4	5	6	7	8	9	Spac
	No Alarm										T02	2020-04-11 16:57				
Ctrl	I/O	LAD	ALARM	EdLAD	Reset	CONFIG	CANCEL									

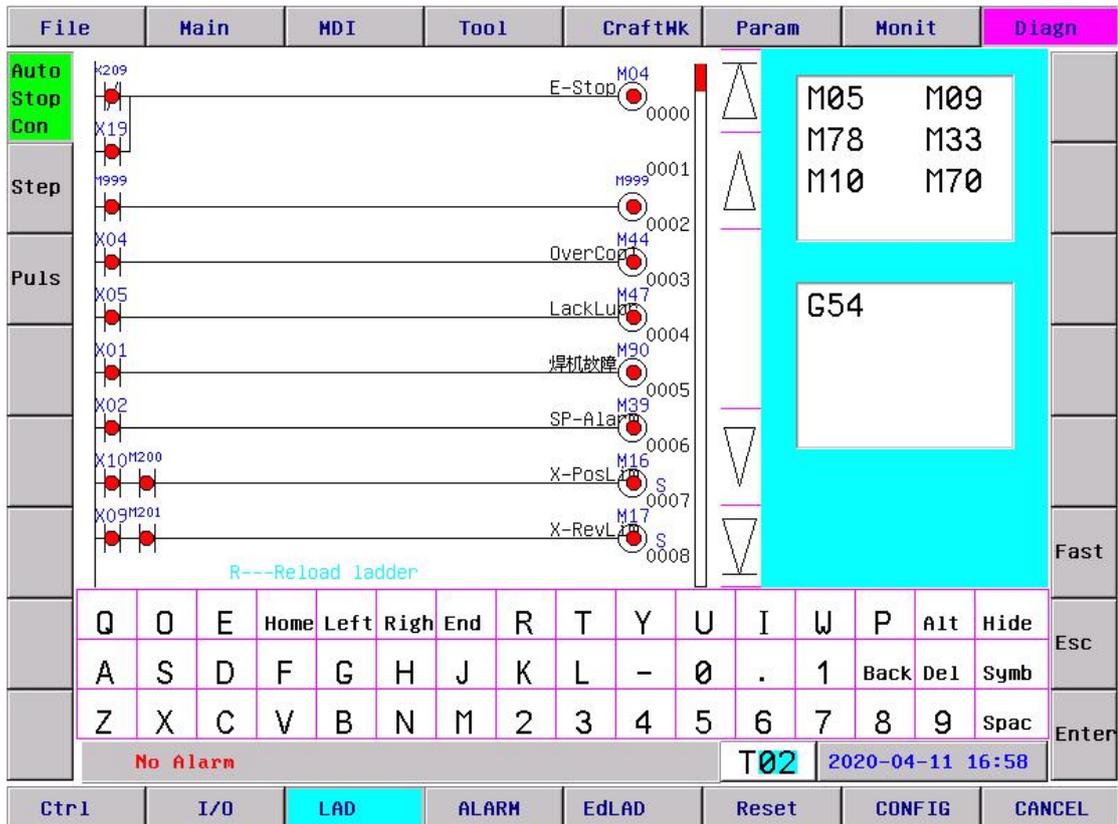
Alarm information interface

The first line in this interface shows the number of spindle encoder, the number of current and historical alarm information is record total 10, the superfluous part is clear automatically, only shows 10 alarm information recently.



Check and edit PLC

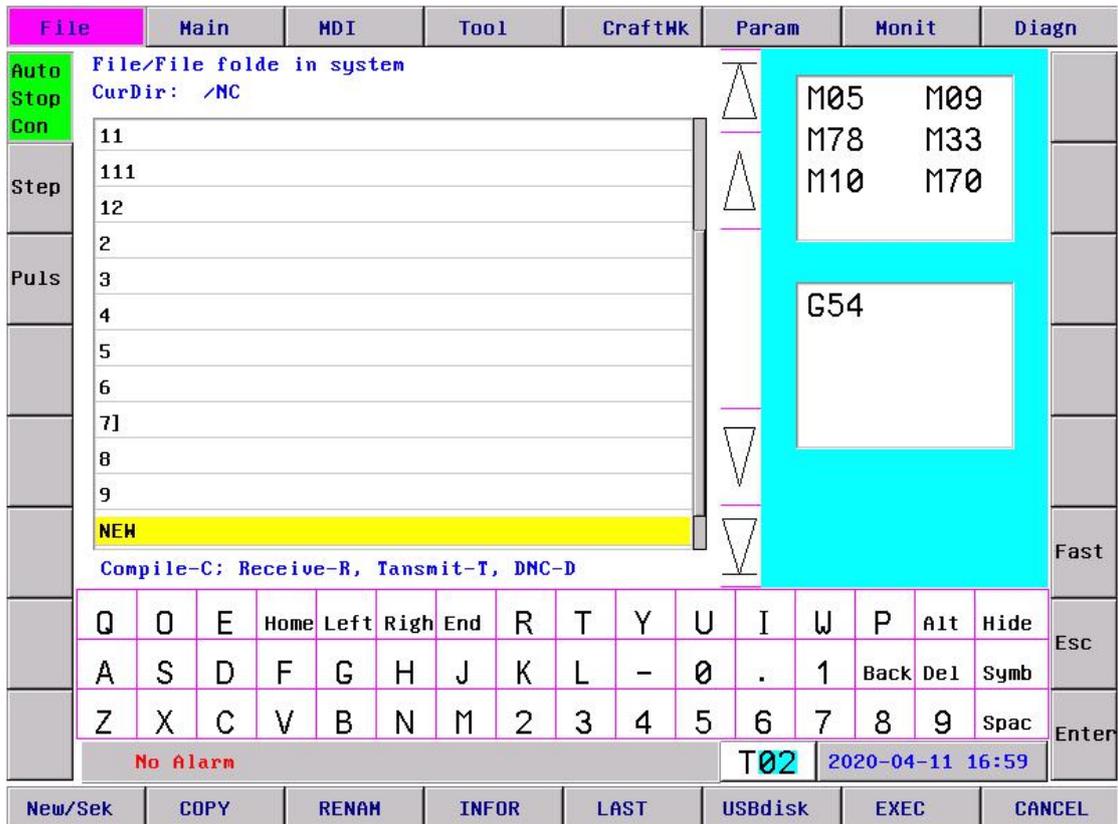
Press "F3" to check PLC, "F5" to edit, "S" to search. After finishing edit, please restart the controller. If immediate execution is necessary, press "R".



3.12 Operation of program

Press “File” to enter into the program interface.

Program management is the same as file management, the storage of the system is 128M(The max could be expand to 32G) bits to contain program and there is no limit for quantity of program. Programming adopts full screen operation.



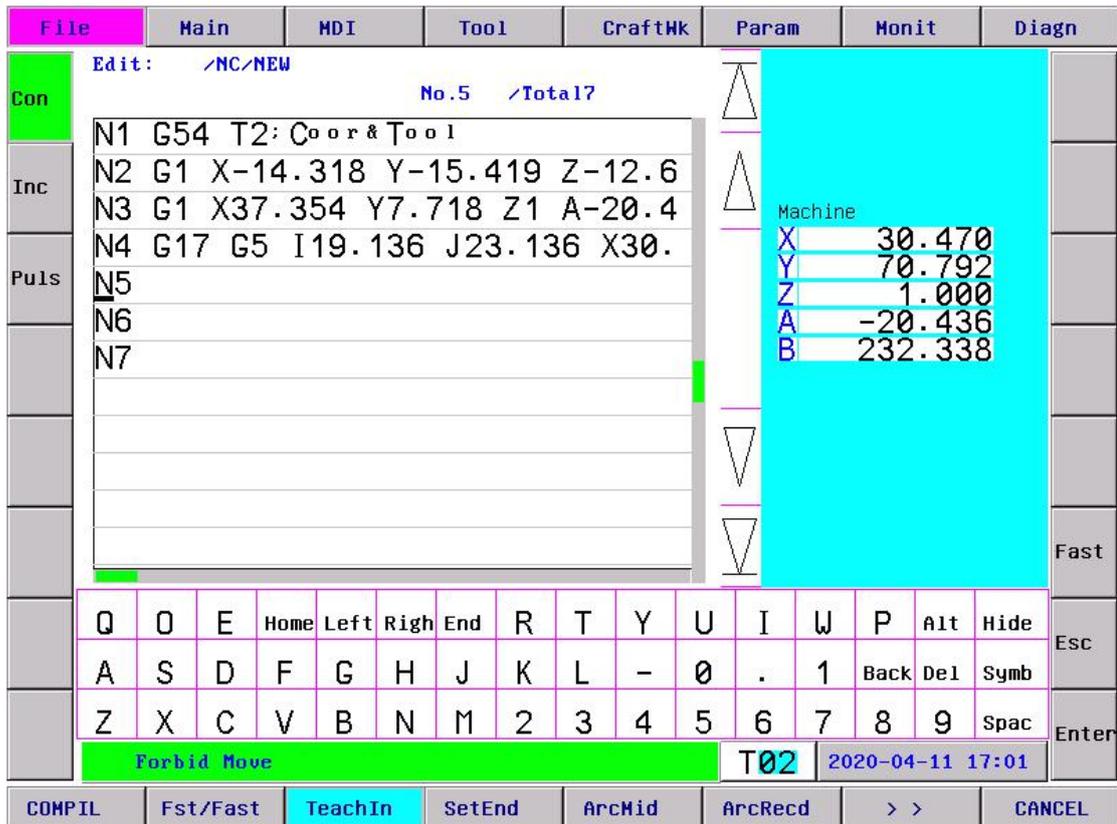
Center part of screen for program display, current program is showed by reverse display, press “PgUp”、 “PgDn” to choose program, and then press“Enter”to edit current program. Functional keys“F1、 F2、 F3、 F4、 F5、 F6、 F7、 F8” include: “new file/search”、 “copy”、 “rename”、 “information”、 “last grade”“USB disc”、 “execute program”、 “cancel”.

3.12.1 Editing

Select “New file/search” to popup a dialog box to import the name of program, if the name is existent, the quondam program is called up; If the name is nonexistent, the system will build a new file.

The name of program can be number, letter or mix, the length is 100 bits.

The system doesn’t allow the namesake, build a new program or select a program and press “Enter” to enter the editing interface.



The screen prompts the editing program name at the top left corner in the editing status; The left is the content, the right is the information for machine status, the operation in the editing status as follows:

(1) The current cursor locate:

Press “up” or “down” to move the cursor to any position of program content

Press "Pgup" to the last page.

Press "Pgdn" to the next page.

(2) Character modification: Delete the character at the position of the cursor, then enter the new character.

(3) The character insertion: Enter a new direct character at the cursor position. When the input is the letter, the letter in front of automatically generating space. If you want to enter a space, first enter a letter, and then delete this letter.

(4) The character deletion: Press "Del" directly at the cursor position

(5) Insert the line: Press "Enter" directly, insert a line in front of the current line if the cursor is at the first line, otherwise insert a line after the current line.

(6) Edit the position data of program line

“Home in touch screen”: If not at the head of line, press this button, it will back to the head of line, if at the head of line, it will show the data of the current position.

“End in touch screen”: If not at the end of line, press this button, it will go to the end of line, press again, it will show the data of the current position, and could be modified.

This button will be useless if there isn't data of current position.

(7) “F7>>” The next page:

The first page of function:

A、“F1”: Compile the current program.

B、“F2”: To the first line or the last line of program.

C、“F3”: Teach function, could press “F2/F4/F5” to record the current user coordinate of XYZABCXsYs.

the mode of teach could be divided into two methods by P13 parameter:one is generate MOVJ/MOVL/MOVC instruction ; Another is generate G0/G1/G6 instruction.

F2: When in the first line, press this mean this line is the first line of PLAY, otherwise it will generate MOVJ/MOVL/MOVC or G0/G1/G6 instruction.

F3: Teach, be used to open and close the teach function.

F4 : Record the end point, used to record the end point of straight line interpolation and arc interpolation, generate G01/G02/G03 instruction or G1/G6. When cursor stay on arc instruction line, if press F4<SetEnd>, the current point will be the endpoint of arc(start point and middle point will not change). it will prompt after successful change.

F5: The middle point of arc, record the middle point of arc, after pressing this button, it will shows G02/G03..... or G6 I**J**K** , to prompt user the next end point position of arc. When cursor stay on arc instruction line, if press F5<ArcMid>, the current point will be the middle point of arc(start point and end point will not change). it will prompt after successful change.

Steps:

(1) Press “F3” to open teach function;

(2) Press “F2”;

(3) Move to the starting point, Press “F2”;

(4) Move to the next point according to the trajectory and requirement:

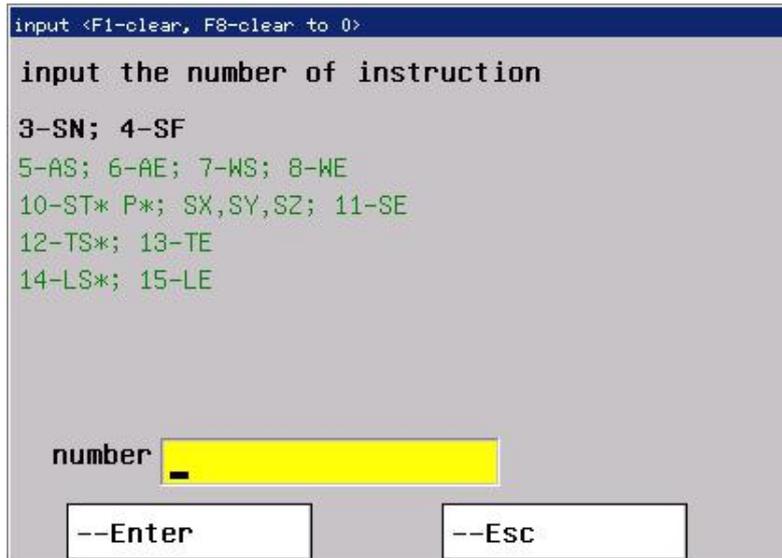
A) Rapid instruction: Press “F2” to input the rapid ratio and position level. It will generate rapid instruction G00.

B) Straight line instruction: Press “F4” to input feeding speed, position level and position point, to generate straight line instruction G01.

C) Arc instruction: Press “F5” to record the centre of arc, move to the end point of arc, press “F4” to input feeding speed, position level and position point, it will generate arc line instruction G02/G03.

D、“F4”: Locate to the specified line.

E、“F5”: To input number to choose instruction in graphic dialog.



(1) Input 3 to use translation instruction SN*, * means the number of group it will use in technique parameter 0-99. It can be checked and modify by No.501-No.506 technique parameter.

SN*,SF instruction can let robot generate translation motion, be used in palletizing and flitting, could make programme easier.

(2) Input "4" to close the translation function SF.

(3) Input "5" to execute instruction AS*,execute the corresponding program ProgramUser0 (User could edit this file as they want) ."*" means it will invoke 0-9 group of technique parameter, could be checked and modified by No.1-0/No.1-9 technique parameter.

(4) Input "6" to the end of arc welding instruction AE*, execute the corresponding program ProgramUser1 (User could edit this file as they want) 。

(5) Input "7" to the start of swing welding instruction WS*, "*" means it will invoke 0-9 group of technique parameter, could be checked and modified by No.2-0/No.2-9 technique parameter.

WS*, WE instruction mean it will swing when execute G01 and G06 according to the parameter, used when weld bead is very wide.

(6) Input "8" to end of swing welding instruction AE*.

(7) Input "10" to call searching start instruction ST*P*, * behind ST means searching group number, * behind P means translation data group number which records searching result.

(8) Input "11" to call searching end instruction SE.

(9) Input "12" to call arc tracking start instruction TS*, * behind TS means technique group number.

(10) Input "13" to call searching end instruction TE.

(11) Input "14" to call instruction LS* to turn on laser function, * behind LS means technique group number.

(12) Input “15” to call instruction LE to turn off laser function.

F、 “F6”： Delete the current line.

G、 “F7”： The first, second page to choose.

H、 “F8”： Chang between Chinese and letters.

The second page:

A、 “F1”： Delete segment of program.

B、 “F2”： Copy the program.

C、 “F3”： Arrange the program.

D、 “F4”： Search the specified letters.

E、 “F5”： Replace the specified letters.

F、 “F6”： Replace the specified letters with all content.

G、 “F7”： Choose the first or second page.

H、 “F8”： convert between Chinese character and letters.

3.12.2 Copy

Press “↑ ↓” in program main interface to select program which need to copy and press “F2” to popup a dialog box to import a new name of program, to copy which is the same content but different name so that to modify, rename and back-up copy.

Add “[” in the end of new file name, controller will delete messy code in original file.

3.12.3 Delete

Press “↑ ↓” in program main interface to select program which need to delete and press “Del” to delete the program.

Pay attention : The operation of delete need to be careful, it can't be recovery after deleting.

3.12.4 Rename

Press “↑ ↓” in program main interface to select program which need to rename and press “F3” to popup a dialog box to import a new name.

3.12.5 Information

Press “↑ ↓” in program main interface to select program which need to check and press “F4” to popup a dialog box to check the size of program and the remainder space of the system.

3.12.6 Folder management

You can build a file in this system, Press “F1” in program main interface to import a file name and press “.” to build a folder and it will prompt a “folder” after the name.

Move the cursor to the file name and press “Enter” to open to build a new file or folder in it.

Press “F5” go to the last folder.

Move the cursor to the file name and press “Del” to delete the folder.

3.12.7 Select program running in auto mode

Press “↑ ↓” in program interface to select a program and press “F7” to select the program and switch into the last interface.

3.12.8 Program communication

The system could adopt the RS232 serial port to deliver files.

(1) Delivery (Send)

Deliver the selected program in this system to another system or to PC to save. Press “↑ ↓” in program main interface to select program and press “T” to deliver, press “Reset” to interrupt in the deliver process.

(2) Reception

Receive the selected program in another system or PC (Must be text file form). Press “R” to import the name of received program into the dialog box in program main interface, then press “Enter”. Press “Reset” to interrupt during receive process.

Pay attention: 1. Using the exclusive communication software to deliver program in User’s PC.

2. The speed of deliver of PC must be the same as the speed of receive, defeat otherwise.

3. The length of RS232 can’t over 10 meters.

4. The number of serial port must be the same as the system setting.

5. Editing program of PC must be text file form.

3.12.9 U-disk management

To exchange files of parameter or program with other system or PC by U-disk. It also can upgrade or back-up the software or parameter in system.

Pay attention: The name of folder can’t have space symbols.

Press “F6” to enter the U-disk management interface in program main interface when U-disk connects the USB port. Press “F6” again to back to the system interface.

A. The processing program management

Copy files or folder of U-disk into system

After connecting the U-disk, press “F6” to enter the U-disk directory in program main interface. Press “↑ ↓” to move cursor to select file or folder to copy and press “F4” to popup a dialog box to import name, press “Enter” to confirm. If there is the same name of program in the system, it will popup a dialog box to ask if cover the file or folder or not.

Press “R” to copy all the programs in USB into system.

Copy files or folder of system into U-disk

Press “↑ ↓” to move cursor to select file or folder and press “F6”, press “F3” to pop

up a dialog box to import name in U-disk interface and press “Enter” to confirm. If there is the same name of program in the system, it will pop up a dialog box to ask if cover the file or folder or not.

Press “T” to copy all the program in system into USB.

Pay attention: Before unplugging the U-disk must return to the display system of program files directory interface. (Exit U-disk interface)

Otherwise the data which is copied just now will be lost.

The name of folder can’t have space symbol when using U-disk.

B. Using U-disk to manage parameter and system software

The system could use U-disk to deliver files or system software to upgrade and update, back-up files and parameter, the method of operation is as follows:

Using U-disk to copy parameter and system software into system(Upgrade, update).

First U-disk inserts the USB port and press “Page” to enter the main interface, press “F6” to show the files in U-disk. Press “↑ ↓” to move the cursor to select a folder which is going to be copied into system and press “Enter” to open it, press “F2 Restore” to import password when appearing the files and press “Enter” to confirm, wait for seconds to copy the parameter successfully. Press “F6” to exit U-disk after copying successfully, restart the system, the system will reloads the new files to upgrade the parameter.

Pay attention: The parameter is better to be derived into a separate folder in U-disk to protect controller from core file being destroyed for mistaken operation.

To derive or back-up parameter files into USB-disk

Firstly, USB-disk inserts the USB port and press “Page” to enter the main interface, press “F6” to show the files in U-disk. Press “F1 Backup” to input the password and press “Enter” to confirm, wait for seconds to derive successfully. The parameter in system is already derived into U-disk. Press “F6” to exit U-disk.

Pay attention: The U-disk is empty better to arrange the files (Parameter files is lots of about several dozens) so that derive parameter or create a folder on your computer first, open the folder before deriving, then backup the parameters into the folder.

3.12.10 Convert offline file into G code program

After send the offline file into controller, need add user coordinate system and the number of tool at the head of program, and the initial located point of each joint to make sure the posture of robot is the same. The operation: First move each joint to the initial located point of the offline file, choose the program in program interface and press “-” to pop up the dialog, input the user coordinate system G and the number of tool T, VJ, PL, press “Enter”, it will generates the same name file which is RBT. If the file is .DXF or .dxf, it will be G code file.

When generate G code file, it will generate the head code and end code according to if there is HEADXF.TEX and ENDDXF.TXT files(headxf.txt and

enddx.txt) in current file directory.

Attention: head code and end code file must be in current file directory.

3.12.11 The operation for FTP server file

If the controller connect with Internet or Wi-Fi, could enter folder of FTP server.

1. Press “N” in program interface.
2. After entering folder of FTP server, press “N”(or F6) as the above operation to quit.

The advantage of FTP: You can see the contents of the PC folder on the controller , and you can choose the files you want to transfer freely, and it is more convenient to use it.

Chapter 4 Programming

Industrial robot is the automatic device which performs according to technique program in advance. Program is used to define the routine and auxiliary performance by robot instruction on requests of processing technique. Perfect robot program will not only perform the motion function according to drawing, but also reach the reasonable application and play the full role of robot system. So it is vitally important to program well. The section introduces instructions and usage of the system, play pay for your full attention.

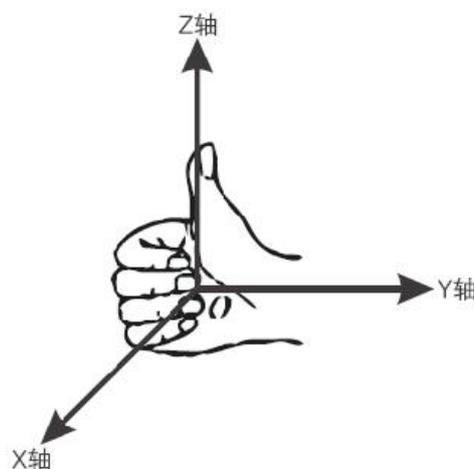
Note: This robot controller could use the instruction of CNC milling controller, please check the instruction of CNC milling with milling controller manual.

4.1 Basic conception

Segment: Made by the instruction and date.(Program line)

Program: Run all program lines according to the logic.

User-coordinate system: The establishment of user coordinate system is based on the right-handed spiral rule. The Descartes rectangular coordinate system is used as the programming standard coordinate system (the following figure), and the positive direction of Z is in the thumb direction of X to Y rotation. When the workpiece coordinates are established, the positive direction of Z is usually far away from the workpiece, so it is necessary to consider the edge of the X and Y direction in the establishment of the workpiece coordinates.



Two methods to set user coordinate system:

- 1 、 Press “F8” in teach status;
- 2 、 Use G54/G54.1-G54.48/G55/G56/G57/G58/G59 instruction;

Must use these methods if use absolute value.

Programme with absolute coordinate : **Absolute coordinate** is relative to the original point of processing. Use G90 instruction, X、 Y、 Z、 A、 B、 C、 Xs、 Ys.

For example: G00 G90 X200 Y200 Z300

Relative coordinate: Also named incremental coordinate, means the direction and direction from the end point to starting point. Relative coordinate means the motion position relative with the in front position, not relative to the fixed position. Use G91, X、 Y、 Z、 A、 B、 C、 Xs、 Ys.

For example: G00 G91 X200 Y200 Z300

The minimum unit: 0.001mm.

Mode instruction : Means keep the status, not only work in this program, but also the behind program until the other mode instruction replace it.

Maybe there are multi mode instructions, such as M03, M04, M05 are mode, it is a mode group. Only be one of them in any time, because of the only status, the mode instruction invoked initially is called initial mode. such as M05.

Stop mode: Such as M30, it means end, back to the starting status, transfer all of mode instruction into initial mode.

Non-mode: Without keep function, only working in this program.

4.2 Programme instruction

4.2.1 Programme

(1) Multi instructions: Could be multi instructions in one program line, but the same group instruction can't be in the same program line.

(2) You can edit the sequence as you want

Example: M03 G01 X20 Y-30 Also could be: G01 Y-30 X20 M03

(3) The same instruction cannot appear twice in one program line.

(4) Can't be irrelevant data or parameter in the same program line.

(5) 0 in front of the instruction could be omitted, example: G01 M03, also could be G1 M3.

(6) Start from any point and any line, after changing tool, must use absolute programme.

(7) Non-mode instruction only works in the specified program line, example: G04.

(8) Mode instruction is always working before the same group appear.

4.2.2 Instruction of robot controller

(1) Analog output AA/S,VV/SS

AA means welding current; S could be this meaning.

VV means welding voltage; SS could be this meaning.

AA and VV could be edited in the same line, but S and SS can't be the same line.
AA/S output the first analog 0~10V, VV/SS output the second analog 0~10V.

(2) Start arc welding AS*

Start arc welding: AS*. if welding technique parameter No.1-9=+6, controller will execute the corresponding user-defined program ProgramUser0(User could edit this file as needed).

“*” means invoke the group number 0-9 of technique parameter, correspond to No.1-0.

If execute this instruction, program will invoke the preset arc welding parameter.

Example:

AS1 ; Use group 1 technique parameter of arc welding technique to start
..... ; The route of arc welding
AE1 ; The end

Pay attention: This instruction need to be one line, can't be with other instruction in one line.

(3) The end instruction of arc welding AE*

Execute the corresponding program ProgramUser1(User could edit this file as needed).

(4) Starting arc tracking TS*

The “*” behind TS means the group number of parameter in this research[0--9].

(5) End arc tracking TE

Example:

G54 T1; specify user coordinate system and tool number.
G00....; locate at the starting point.
TS2 ; invoke user parameter group 2 to start arc tracking.
G01...; execute straight bead welding.
G01....; execute straight bead welding.
TE; end arc tracking.

(6) Start swing welding WS*, T.I.G Welding:WS99

Starting instruction of swing welding: WS*

“*” means the group number 0-9 of technique parameter, correspond to No.2-0.

If execute this instruction, program will invoke the preset swing welding parameter.

Example:

WS2 ; Use group 1 technique parameter of swing welding technique to start
..... ; The route of swing welding

WE ; The end

T.I.G Welding:WS99

Format: P specifies the time of point weld(time:s); Q specifies the distance(unit:mm); R specify the distance with idle run.(unit:mm)

(7) **The end instruction of swing and T.I.G welding WE**

WS*, WE swing according to the parameter when executing MOVL and MOVC, be used for wide weld bead.

(8) **Motion instruction of robot (G00/G01/G02/G06)**

a, Quick movement: G0.

b, Straight line: G1.

c, Arc: G6 P6.

If P6 is inserted in program, the posture of arc processing will be defined by posture at the start teach point, the postures at middle teach point and end teach point will be ignored. And if arc is big, J6 will be limited, please attention to it.

For example: G6 P6.

If P6 is not inserted in program, posture of arc processing will transform from the start teaching point to the end teach point successfully, the posture at middle point will be ignored.

(9) **Speed F**

Use F+number to specify the feeding ratio. Example F120, means running speed is 120mm/min.

This is non-mode code, only work in the current segment.

(10) **Start translation SN***

“*” means the group number 0-99 of technique, corresponding No.501-No.506 parameter.

(11) **End translation SF**

SN*,SF specify the robot to transit, flitting, palletizing.

(12) **Start searching position ST* P***

The “*” behind ST means the group number of parameter in this research[0--9];

The “*” behind P means the data number of transition in this research[0--99];

It will clear the transition which is behind P when executing this code.

(13) **End searching SE**

(14) Search in straight running

Instruction:

SX search in the direction of X axis, laser searching in the direction of X and Z

SY search in the direction of Y axis;

SZ search in the direction of Z axis;

The number behind SX/SY/SZ means the repeat times, controller will calculate the average, the most times is 9, only once if no number. For example, SX5; SY6; SZ4; SY; SX.

Example1:

G54 T1 ; Specify the user coordinate system and tool number

MOVJ ; Locate to the starting point of search

ST2 P3 ; Start searching, invoke parameter group 2, it will be saved into data number 3 of transition data

MOVL ; Locate to the starting point of search

MOVL SX ; Search in the direction of X axis, the MOVL point of this line is resultant point of calibrated workpiece, system will orient according to this point and starting point.

MOVL ; Locate to another starting point of search

MOVL SY3 ; Search in the direction of Y axis(Repeat 3 times), the MOVL point of this line is resultant point of calibrated workpiece, system will orient according to this point and starting point.

SE ; End searching

MOVJ ; Locate to the middle point

SN3 ; Specify the number 3 of position offset data

AS4 ; Start arc welding

MOVL ; Execute straight line weld, according to teach point of calibrated workpiece.

MOVL ; Execute straight line weld, according to teach point of calibrated workpiece.

AE4 ; End arc welding

SF ; Close position offset

(15) Open laser function: LS*/LS*C

“*” behind LS refers to parameter group number[0-4] in the searching. LS*C means full calibration mode.

(16) Close laser function: LE

Execute laser searching instructions:

SX search in the direction of X axis;

SY search in the direction of Y axis;

SZ search in the direction of Z axis;

SX3 search in the direction of X axis, if failed, then return and search again, 3 times at most.

SY5 search in the direction of Y axis, if failed, then return and search again, 5 times at most.

Start laser tracking: TS* is similar to arc tracking, but the invoking parameter group is laser tracking parameter group instead of arc tracking parameter group.

End laser tracking: TE is the same to end arc tracking instruction.

(17) Read the current user coordinate PK***

Example: PK5 means set the current user coordinate position of robot as the data of fifth point in controller.

(18) Calculate the translation according to number of two position

PX*=PT***-PT*****

Example: PX3=PT5-PT6 means the number 5 position of robot minus the number 6 position, the result as the number 3 transition data.

(19) Plus and minus in translation PX***=PX***+PX*** and

PX*=PX***-PX*****

Example: PX3=PX3+PX8 means the No. 3 translation value of robot plus the No. 8 translation value, the result as the number 3 transition data.

PX3=PX5-PX7 means the No. 5 translation value of robot minus the No. 7 translation value, the result as the No. 3 transition data.

Multiplication and division of translation, for example:

PX3=PX3*8 means No.3 translation data multiply 8, then assign to No.3;

PX3=PX5/7 means divide No.3 translation data by 7, then assign to No.3;

PX3R means reset XYZABCXsYs value of No.3 translation;

PX12R means reset XYZABCXsYs value of No.12 translation;

PT12X=I3 X value of 12th position increase 3 based on original value;

PT13Y=I-6 Y value of 13th position decrease 6 based on original value;

PT14Z=I-4 Z value of 14th position decrease 4 based on original value;

PT12X=8 X value of 12th position is assigned as 8;

PT13Y=-9 X value of 13th position is assigned as -9;

PX12X=I5 X value of 12th position increase 5 based on original value;

PX13Y=I-9 Y value of 13th position decrease 9 based on original value;

PX19Z=I8 Y value of 19th position decrease 8 based on original value;

PX12X=8 X value of 12th position is assigned as 8;

PX13Y=-12 Y value of 13th position is assigned as -12;
 PX12XS=I5 Xs value of 12th position increase 5 based on original value;
 PX13YS=I-9 Ys value of 13th position decrease 9 based on original value;
 PX12XS=8 Xs value of 12th position is assigned as 8;
 PX13YS=-12 Ys value of 13th position is assigned as -12;
 PX3=PX2 Assign XYZABCXsYs value of 3rd position as 2nd position;
 PX12=PX5 Assign XYZABCXsYs value of 12th position as 5th position;

(20) Whole operation of depalletizing PW**

Before executing PW**, controller will execute PR** once automatically to reset the current value.

Note:

- 1) The macro variable of depalletizing #9001--#9099 correspond to total count of each depalletizing group, all finished if it is negative number.
- 2) The macro variable of depalletizing #9101--#9199 correspond to the current layer number of each depalletizing group.
- 3) The macro variable of depalletizing #9201--#9299 correspond to the current row number of each depalletizing group.
- 4) The macro variable of depalletizing #9301--#9399 correspond to the current column number of each depalletizing group.
- 5) The macro variable of depalletizing #9401--#9499 correspond to the current stack number of each depalletizing group.

(21) Reset the current value of depalletizing PR**

Pay attention:

- 1) If the number is 9999, then controller finished the Reset;
- 2) The current value of depalletizing includes the current line, column, layer, stack, total stack;

(22) Whole operation of once depalleziting PA**

After finishing PA**, need to execute PR** to reset, then execute PA**.

(23) Choose user coordinate system (G54.1-G54.48/G54-G59)

G53/US0 World coordinate system
 G54/US1 user coordinate system 1
 G54.1/G54.48 user coordinate system54.1/54.48
 G55/US2 user coordinate system2
 G56/US3 user coordinate system3
 G57/US4 user coordinate system4
 G58/US5 user coordinate system5
 G59/US6 user coordinate system6

Other parameter P900, +256 means display G54-G59 by USxx, otherwise display G54-G59 by Gxx.

(24) **Choose tool coordinate system (T01-T99)**

T01 Number 1 tool coordinate system

T01 Number 2 tool coordinate system

.....

T01 Number 99 tool coordinate system

(25) **Programme mode (G90/G91) and positioning mode(G64/G60)**

Two kinds of movement: Absolute and incremental. User G90 and G91 to specify, in absolute, it's coordinate of end point. In incremental, it's movement distance.

Pay attention: Absolute programme of rotation axis is calculated with proximity, incremental programme is calculate according to program.

G60: accurate positioning instruction (mode instruction)

G64: smooth instruction (mode, initial state)

(26) **Rapidly locate (G00)**

Format: G00 X-Y-Z-A-B-C-Xs-Ys-

Note: X, Y, Z, A, B, C, Xs, Ys, could use absolute or incremental to programme.

Point out value of movement and direction.

Each axis goes rapidly to the end point in G00 separately. Also could use linkage mode: through P10 parameter D6=0 to set.

The speed of G00 is set by speed parameter.

(27) **Interpolation of straight line (G01)**

Format: G01 X-Y-Z-A-B-C-Xs-Ys- F-

Note: X, Y, Z, A, B, C, Xs, Ys, could use incremental or absolute to programme. The speed is specified by F.

Feeding speed of G01 F could be modified by feeding ratio on panel, the range is 0%~150%.

G01 could be edited as G1.

(28) **Circle arc in 3D space G06**

Format: G06 L88 I_ J_ K_ X_ Y_ Z_ (means whole circle instruction)

I_ J_ K_ means incremental coordinate of the first middle point based on start point(unit: mm)

X_ Y_ Z_ means coordinate of the second middle point(G90 is absolute, G91 is incremental)(unit: mm)

Format: G06 X__ Y__ Z__ I__ J__ K__ F__

Function: If don't know the center and radius of circle arc in 3D space. But 3 points is known on arc, then could use G06, could make sure the direction of arc by the starting point, end point and the third point between them.

Note: G06 is mode code;

I: The coordinate from the middle point to the starting point of circle arc(X)(direction);

J: The coordinate from the middle point to the starting point of circle arc(Y)(direction);

K: The coordinate from the middle point to the starting point of circle arc(X)(direction).

Pay attention:

1) Middle point: Point Between the starting point and the end point on circle arc;

2) If three points on the same line, it will alarm;

3) I=0, K=0 and J=0 when not specify; If not specify three points, it will alarm.

4) I、J、K like the I, J, K in G02/G03 which is from center to the starting point;

For example:

G54

G0 X10 Y28 Z10

G06 X30 Y98 Z10 I5 J-6 K-5 F100

X130 Y198 Z120 I55 J-86 K-65

G0X0Z0

M02

(29) Delay (G04)

Applying to delaying for certain time before other motions during process.

Format: G4 Xxx unit:second

TMxx unit: millisecond

Function: Every axis stop and mode instruction keeps working when carry out this instruction, after delaying the specified time then execute the next program segment.

Instruction:

1. The unit of P delay time is ms(Millisecond)

2. The unit of X and U delay time are S.

3. Example:

G04 X2.5; pause for 2.5s.

TM2300; pause by 2300ms

Pay attention: Also could set P7 processing parameter to eliminate the over cutting.

(30) Return to zero(G28/G281-G288/G301-G308)

G28	; all axis return to zero of G53
G281	;only X return to zero of G53
G282	;only Y return to zero of G53
G283	;only Z return to zero of G53
G284	;only A return to zero of G53
G285	;only B return to zero of G53
G286	;only C return to zero of G53
G287	;only Xs return to zero of G53
G288	;only Ys return to zero of G53
G301	;X axis return to zero of user coordinate system
G302	;Y axis return to zero of user coordinate system
G303	;Z axis return to zero of user coordinate system
G304	;A axis return to zero of user coordinate system
G305	;B axis return to zero of user coordinate system
G306	;C axis return to zero of user coordinate system
G307	;Xs axis return to zero of user coordinate system
G308	;Ys axis return to zero of user coordinate system

If equipped with incremental servo type motor and the home type is in mechanical way, then use G281/G282/G283/G284/G285/G286 corresponds to J1/J2/J3/J4/J5/J6 (X0/Y0/Z0 /A0 /B0/C0) back to mechanical zero point..

(31) Program loop instruction (G22--G800)

G22 is program circulation instruction; G800 is an instruction to end circulates. But G22 must be used with G800 for repeated processing. L means circulation times, the range is 1-99999. The circulation instruction can nest.

Format: G22 L2 ; begin
:
: ; circulating
G800 ; end

(32) Go back the start point of program (G26/G261-G268)

Format : G26 ; ZXY all go back starting point of program.
G261 ; X go back starting point.
G262 ; Y go back starting point.
G263 ; Z go back starting point.
G264 ; A go back starting point.
G265 ; B go back starting point.
G266 ; C go back starting point.
G267 ; Xs go back starting point.

G268 ; Ys go back starting point.

(33) Memory the current point(G25)

Format: G25; To remember the coordinate of X Y Z A B C Xs Ys

(34) Return to the memorial point(G61/G611-G618)

Used to return to the memorial point by G25.

Format: G61 ; Return to X Y Z of memorial point
G611 ; Return to X of memorial point
G612 ; Return to Y of memorial point
G613 ; Return to Z of memorial point
G614 ; Return to A of memorial point
G615 ; Return to B of memorial point
G616 ; Return to C of memorial point
G617 ; Return to Xs of memorial point
G618 ; Return to Ys of memorial point

Note: G61 goes back with G00 speed to memorial point of G25.

(35) Detect skip(G31、G311)

Format: G31 X_Y_Z_A_B_C_Xs_Ys_F_P_ ; if no signal, No alarm
G311 X_Y_Z_A_B_C_Xs_Ys_F_P_ ; if signal, alarm

The difference between G31 and G311 is if detect signal failed, G311 will alarm, G31 will not and continue running.

Data behind P: Number of line+(X00/X39+1000 or 2000), 1000 means availability and skip,2000 mean if invalidation then skip.

For example: G31 X50 Z100 F100 P331022; if X22 availability then goes to N33.
G311 X50 Z100 F100 P2021; if X21 invalidation then goes to next line. If X21 is always valid, it will alarm all the time.

Pay attention: Number X00-X47 could be checked on the Diagnosis interface.

(36) M Function

Y05: Output of motor with brake, X40 is the input point to detect brake;

M03: Feeding welding wire or spindle rotate CW, output Y18;

M04: Back welding wire or spindle rotate CCW, output Y19;

M05: Stop welding or spindle, output Y12;

M203: The second spindle rotate CW, output Y28;

M204: The second spindle rotate CCW, output Y29;

M205: The second spindle stop, close Y28, Y29;

M11/M10: Loosen/Tighten tool, output Y10;

M08/M09: Cool switch on/off, output Y11;

M32/M33: Lubrication on/off, output Y08;

M59/M58: Huff on/off, output Y20;

M71/M70: welding start/end, output Y09; X00 is detection input of arc welding.

M73/M72: Cladding switch on/off, output Y21, X02 is detection input of cladding;

M3330/M4330: User-defined output 0 on/off, output Y00;

M3331/M4331: User-defined output 1 on/off, output Y01;

M3332/M4332: User-defined output 2 on/off, output Y02;

M3333/M4333: User-defined output 3 on/off, output Y03;

M3334/M4334: User-defined output 4 on/off, output Y04;

M3336/M4336: User-defined output 6 on/off, output Y06;

M3337/M4337: User-defined output 7 on/off, output Y07;

M3343/M4343: User-defined output 13 on/off, output Y13;

M3344/M4344: User-defined output 14 on/off, output Y14;

M3345/M4345: User-defined output 15 on/off, output Y15;

Enable signal of drive EN: Controller is ready then output Y16;

Reset signal of drive INTH: Output Y17 when rest driver alarm;

OUT output instruction: +Y30/+Y31/+Y74/-Y30/-Y31/-Y74;

M3352/M4352: User-defined output 22 on/off, output Y22;

M3353/M4353: User-defined output 23 on/off, output Y23;

M3354/M4354: User-defined output 24 on/off, output Y24;

M3355/M4355: User-defined output 25 on/off, output Y25;

M3356/M4356: User-defined output 26 on/off, output Y26;

M3357/M4357: User-defined output 27 on/off, output Y27;

Pay attention: M3330-M3361, M4330-M4361 can't be in the same line

M14/M15: (Pxxxx) Check X30 valid/invalid(Start from Nxxx line if there is P);

M16/M17: (Pxxxx) Check X31 valid/invalid (Start from Nxxx line if there is P);

M22/M23: (Pxxxx) Check X27 valid/invalid (Start from Nxxx line if there is P);

M24/M25: (Pxxxx) Check X26 valid/invalid (Start from Nxxx line if there is P);

M28/M29: (Pxxxx) Check X25 valid/invalid (Start from Nxxx line if there is P);

WAT+/- : User-defined input valid or invalid, X0-X47, total 48 ways;

M1xxx: wait for auxiliary relay being valid, example: M1076 means wait for M76 being valid;

M2xxx: wait for auxiliary relay being invalid, example: M1078 means wait for M78 being invalid;

M3xxx: set auxiliary relay as valid, example: M3330 means set M330 as valid;

M4xxx: set auxiliary relay as invalid, example: M3331 means set M331 as invalid

M38xx: Set output point Yxx is valid, example: M3809 means set Y09 as valid;

M48xx: Set output point Yxx is invalid, example: M4807 means set Y07 as invalid;

M18xx: Wait for input point Xxx being valid and run the next step, example: M1809 means wait input X09 valid and run the next.

M28xx: Wait for input point Xxx being invalid and run the next, example: M2807

means wait input X07 invalid and run the next.

M18xx Pxx: According to Xxx; Runs when valid; Skip to Pxx when invalid;

Example: M1809 P234 means if input X09 is valid then run the next, skip to P234 when X09 is invalid.

M28xx Pxx: According to Xxx; Runs when invalid; Skip to Pxx when valid;

Example: M2807 P456 means input X07 is invalid and run the next, skip to P456 when X07 is valid.

Process parameter P19, set M18xx/M28xx/WAT max waiting time before alarm(ms)[>=10 valid]

M97 Pxxx: skip and starts from Nxxx program line;

M98: Pxxx Lyyy to use sub program xxx, times is yyy;

M99: Back to use sub program;

M87: Number of work piece plus 1 if Processing parameter No.5 = 0;

M00: Pause

M01 : Program conditional stop, input valid X41 and execute M01 then program pause;

M02: Program end;

M30: M05、M09 program end;

M20: Repeat the program automatically;

M133: driver rotate by specified speed(multiple of 30), for example: M133 XS60;

M500: Read joint coordinate of absolute motor XYZABC Xs Ys;

M501-M508: Read joint coordinate of the encoder of XYZABCXsYs separately;

M312-M319: Clear the current user coordinate of XsYsABCXYZ separately;

M412-M419: Clear the joint coordinate of CXsYsABXYZ respectively;

Specific instruction in Cartesian coordinate robot.

Function	Instruction	Output	Input detect
Workblank/finish work chuck	M901/M902	Y18/Y19	X30/X31
Workblank/finish work tray	M903/M904	Y20/Y21	X32/X33
Workblank clamping/unclamping	M905/M906	Y22	X34
Finish work clamping/unclamping	M907/M908	Y23	X35
Huff	M909/M910	Y24	X36
Machine chuck clamping/unclamping	M911/M912	Y25/Y26	X37/X38
	M913/M914	Y25/Y26	/
	M915/M916	Y25/Y26 jog	/

Machine lighting	M917/M918	Y09	
Auto lubricant		Y10	
Machine start	M919	Y11 Jog	
Airpressure Alarm			X07
Door Alarm			X29
Oil Alarm			X05
Machine finish detection	M1839		X39

(37) Use program M97、M98、M99

Unconditional skip

M97 Pxxx skip to the line number which is specified by P without addition;

Use sub program

In this controller the subroutine should be an independent program.

M98 Pxxx Lyyy unconditionally call subroutine instruction. P is to specify the name and path of subroutine call, L refers to the calling times for address of subroutine.

The M98 instruction can be omitted, format: PP file name, the file name can be hidden files, the first character of hidden files must be "HIDEFILE" at the beginning. Such as the file "HIDEFILE01", this program in the program area is not displayed, can use the instruction M98/G65 PHIDEFILE01 or M98/G65 P*01 or PP*01 or PPHIDEFILE01 when calling.

For example:

P sub/1390 means subroutine is tmp/NC/sub/1390

Note:

- 1.tmp/NC/ is the system's default path, sub is a folder for the following
- 2.The subroutine must be a independent program.
- 3.Method of the main program in USB calls the subroutine in USB: P[or P].

For example:

M98 P[A1234 means calling the subroutine A1234 in USB;

M98 P]SS12 means calling the subroutine SS12 in USB;

PP[FFDE means calling the subroutine FFDE in USB;

It needs to write the path of file if call the subroutine in folder of USB.

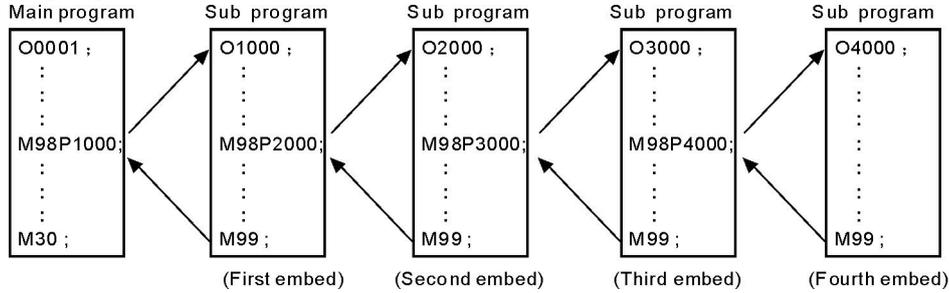
There must be space in front of L(Subroutine calling times). Return to the next program segment of main program when subroutine running to the end.If the program contains a fixed sequence or repeated pattern, then the sequence or pattern can be compiled to subroutine to save in memory storage in order to programme easily, the subroutine can be called by main program which is also can be called by another subroutine.

M99 is an instruction of ending subroutine return, must have this instruction to end the subroutine.

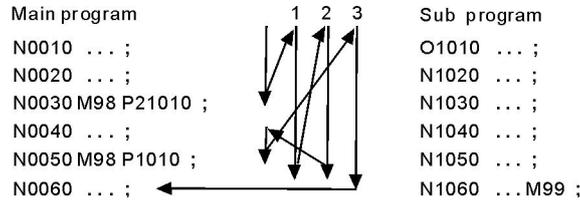
Pay attention:

- 1) M99 in the main program is the same as M02;
- 2) M99 with P in the main program is the same as M97;
- 3) M99 returns to main program call in subroutine is in the next line;
- 4) M99 with P in the subroutine returns to P program line in main program;

The Sub-program can embedded call as follow :



For example:



The calling instruction can be used for 9999 times at the most.

(38) Macro program

1. Input instruction: WAT

Waiting for the input port X valid or invalid instruction

Format: WAT+ (-) X

Note: "+" to means the input is effective;

"-" means the input is invalid;

"X" means the input port X00-X47; see the I/O diagnosis;

2. The output instruction: OUT

Set the output port Y is valid or invalid instruction

Format: OUT +(-)Y

Note: "+" means the output is effective;

"-" means the output is invalid;

"Y" means the output port Y00-Y31; see the I/O diagnosis;

3. Variable and assignment: =

1) #0--#20 local variable: local variables only can be used to store data in macro program, such as a result of operation, when power is off, the local variables are initialized to the empty. The argument assignment to the local variable when calling the macro program.

2) #21--#999 global variables: The meanings are the same in different macro program.

When power is off, the variable #21--#100 is initialized to zero, the variable #101--#999 data is saved not to lose even if the power is off.

3) #1000-- system variable: the system variables are used to change various data

when reading the running CNC. For example, the current position and the compensation of tool.

Special note: macro variables #100--#155 and #190--#202 have been used by the system, users can not use.

4)The I/O variables:

#1800: X00-X07 (D0-D7)

#1801: X08-X15 (D0-D7)

#1802: X16-X23 (D0-D7)

#1802: X16-X23 (D0-D7)

#1803: X24-X31 (D0-D7)

#1804: X32-X39 (D0-D7)

#1805: X40-X47 (D0-D7)

#1806: X60-X67 (D0-D7)

#1808: Y00-Y15 (D0-D15)

#1809: Y16-Y31 (D0-D15)

Format:#i=Expression

4.The arithmetic and logic operation

Table:

Function	Format	Note
Definition	#i = #j	
Addition Subtraction Multiplication Division	#i = #j + #k ; #i = #j - #k ; #i = #j * #k ; #i = #j / #k ;	
Sin Asin Cos Acos Tan Atan	#i = SIN(#j) ; #i = ASIN(#j); #i = COS(#j) ; #i = ACOS(#j); #i = TAN(#j); #i = ATAN(#j);	90.5 degrees mean 90 degrees 30 minutes
Square root Absolute value Rounding off Round down Round up Natural logarithm Exponential function	#i = SQRT(#j); #i = ABS(#j) ; #i= ROUND(#j); #i = FIX(#j); #i = FUP(#j); #i = LN(#j); #i = EXP(#j);	
Or Exclusive or And	#i = #j OR #k ; #i = #j XOR #k ; #i = #j AND #k ;	Executing with binary system

5. Unconditional transfer: GOTO N

Transfer to the program line with sequence number n, appears error when specifying beyond the 1-99999, could use expression to specify the sequence number.

For example: GOTO 5, GOTO #100

6. Conditional transfer: IF (Conditional expression) GOTO or THEN

If the conditional expression specified is met, execute this segment; if the conditional expression specified is not met, execute the next segment.

For example: IF (#100 EQ 2) THEN #100=5

IF (#101 GT 2) GOTO 6

Operation meaning:

EQ equal

NE not equal

GT greater than >

GE greater than or equal

LT less than <

LE less than or equal

7. Loop: WHILE (conditional expression) DO 1, 2, 3

Specifies a conditional expression in front of WHILE. When the specified conditions are met, execute the program between DO and END. Otherwise, turn to the program line after END. Cycle of the embed is 3 at the most.

For example: WHILE (#100 LT 3) DO 1

.....

WHILE (#103 EQ 5) DO 2

.....

WHILE (#200 GE 20) DO 3

.....

END 3

.....

END 2

.....

END 1

8. Non-mode to call macro program:G65

Format: G65 P- L- <A-B-C-..... Argument passing data >

P is the name of macro program, L is the calling times, A B C are argument, the name of argument as follows:

#0->A、 #1->B、 #2->C、 #3->D、 #4->E、 #5->F、 #6->H、 #7->I、 #8->J、 #9->K、 #10->M、 #11->Q、 #12->R、 #13->S、 #14->T、 #15->U、 #16->V、 #17->W、 #18->X、 #19->Y、 #20->Z.

Special attention: The address G、 L、 N、 Q、 P can't be used in argument.

For example:

Main program:9000

G00 X0 Z0

G65 P8000 L1 A5 B6

G0 X0 Z0

M30

Macro program:8000

N1 #2=#0+#1

N2 IF (#2 EQ 10) GOTO 4

```

N3 GOO X#2
N4 G00 Z#1
N5 M99                ; Return

```

9. Mode to call macro program: G66 G67

G67 instruction is to cancel G66 instruction. The format is the same as G65.

For example:

```

Main program: 9000
G00 X0 Z0
G66 P8000 L2 A5 B6
A8 B1
A9 B10
G67
M30
Macro program: 8000
N1 #2=#0+#1
N2 IF (#2 EQ 10) GOTO 4
N3 GOO X#2
N4 G00 Z#1
N5 M99                ; Return

```

10. Prompt dialog

Format: MSG(parameter) or MSG[parameter]; if parameter is information string, pause.

Pay attention: This instruction usually be used in NC program(not macro).

After prompting dialog, controller switch into pause status automatically.

Format: STAF(parameter) or STAF[parameter]; not pause if the parameter is information string.

(39) User-defined macro program (G101—G170, M880—M889)

Must use PC to edit and copy into controller.

1、G101-G170 is macro program of G code, correspond to ProgramGxxx, use instruction of robot controller.

2、M880-M889 is inner macro program, correspond to macro ProgramUser0 — ProgramUser9, including inner macro programs of robot controller:

1) Output: OUT

Format: OUT+(-/A)Y(M)**+

Note: “+” means output effective;

“-” means output invalid;

“A” means output reversal(effective to invalid, invalid to effective);

For example: OUT+Y5-Y7+Y9+Y11-Y15

Mean: Y5,Y9,Y11 output effective; Y7,Y15 output invalid

For example: OUT+M12-M13+Y14+Y8-Y16

Mean: M12,Y14,Y8 output effective; M13,Y16 output invalid

2) Wait instruction: WAT

Wait X, Y, M effective or invalid

Format: WAT+(-)X(Y/M)**+(-)X**+(-)X**+(-)X**+(-)X**

Note: "+" wait for effective;

"-" wait for invalid;

Y or M only to be one or none, X could be used many times.

2.1, The longest time of WAT: MAXWAT

Format: MAXWAT****

Note: The range is 0-99999, unit is ms.

Controller will alarm and quit the running program when time is over.

If value is 0 or MAXWAT instruction alone means the function is disabled, namely no limit in the longest time.

2.2, Hold time for meeting condition of WAT: HOLDWAT

Format: HOLDWAT****

Note: The range is 0-99999, unit is ms.

If value is 0 or HOLDWAT instruction alone means the function is disabled, namely no limit in the hold time.

2.3, The longest wait mode: MODWAT

This instruction work with MAXWAT

Format: MODWAT1/MODWAT2/MODWAT3/MODWAT4;

Default: MODWAT1。

MODWAT1 the controller will alarm and quit when time is over;

MODWAT2 the controller will alarm and continue to run;

MODWAT3 not alarm and quit when time is over;

MODWAT4 not alarm and continue to run.

For example: Wait for 5 seconds to get X0 signal failed, it will alarm No.9

MODWAT4

MAXWAT5000

WAT+X0

IF (-X0) THEN

OUT+M89

ERREXIT

ENDIF

3) Delay: PAUS

Format: PAUS****

Note: The range is 0-99999, unit is ms.

4) Assignment: =

Assignment for variable

Format: =

Example: #251=890.34

5) Prompt dialog

Format: MESSAGEBOX(parameter 1);parameter 1 is information string.

Also could be abbreviated as MSG(parameter 1).

6) Information of changing tool

Format: STATUSINFO(parameter 1);parameter 1 is information string.

Also could be abbreviated as STAF(parameter 1).

Pay attention: If only use STATUSINFO or STAF or STATUSINFO() or STAF() , it will close the current prompt.

7) Condition instruction: execute if meet condition, otherwise skip.

Format: IF (Relay or input point or macro variable) THEN

ENDIF

+Mxx means relay is effective.

-Mxx means relay is invalid.

+Xxx means input point is effective.

-Xxx means input point is invalid.

+Yxx means output point is effective.

-Yxx means output point is invalid.

+#xx means macro variable is not 0.

-#xx means macro variable is 0.

8) Move coordinate axis

Format : MOVE(parameter G, parameter F, parameter XYZABCXsYs, parameter W)

The first parameter is G90 or G91 to specify it is relative or absolute;

F to specify the speed, XYZABCXsYs to specify the coordinate of machine;

W to specify some input signal satisfy the condition, it will stop,

for example:W+5 means it will stop when X5 input point is effective.

9) Set the current user coordinate and save

Format: SETWK(parameter XYZABCXsYs);

10) Go to some line: GOTO xx

11) Return: RETURN

Chapter 5 Connection

5.1 Character of robot controller

- High performance industrial level 32 bits ARM+DSP+FPGA
- 128M(Could be expand to 32G) user storage
- 800x600 TFT LCD touch screen
- USB connection
- Power supply of high anti-interference
- Hand held
- 48x32 I/O
- 2 ways 0-10V analog output
- 1 way orthogonal input of encoder
- 6 ways output of motor with brake

5.2 Technical index

- Number of controlling axis: J1-J8XsYs 8 axis
- Pulse value: 0.001mm
- The max speed: 240m/min
- Processing speed: 0.01-30000mm/min
- The minimum input unit: 0.001mm
- Range of programme size: ± 99999.999 mm
- Programme code: ISO-840 international standard
- Definition of programme coordinate system: ISO-841 international standard
- Time of fault-free on average(MTBF): Bigger than 6000 hours

5.3 Using environment of controller:

- Power: AC 220V (+10%,-15%), frequency 50Hz \pm 1%
- Torque of power \leq 150W
- Power supply must use isolation transformer
- Running temperature 5 \sim 45 $^{\circ}$ C, relative humidity 40-80%
- Temperature of storage and transportation 0 \sim 55 $^{\circ}$ C, relative humidity less than 90%(40 $^{\circ}$ C)
- To avoid an oil mist and dust, corrosive gas, corrosion, good ventilation

5.4 Installation connection

Firstly check the controller, power, motor, electrical board is good or not.

Must save some space around, keep air circulation, the position of controller need to be easy to operate and avoid scalding when machine is working.

Leave away from strong electricity in case of interference, all input signal is the best not connect with controller directly; Must connect with ground.

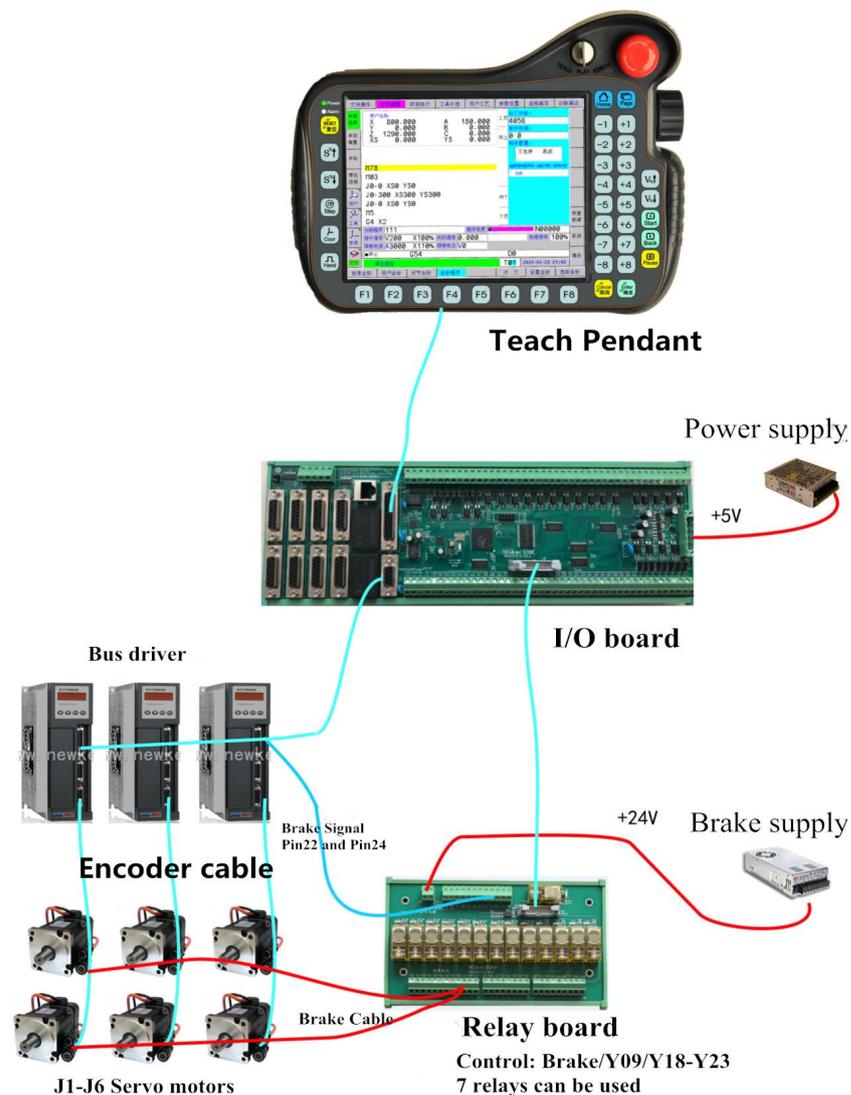
Can't hot-plugging all cables when power on.

Put controller into clean and fixed position.

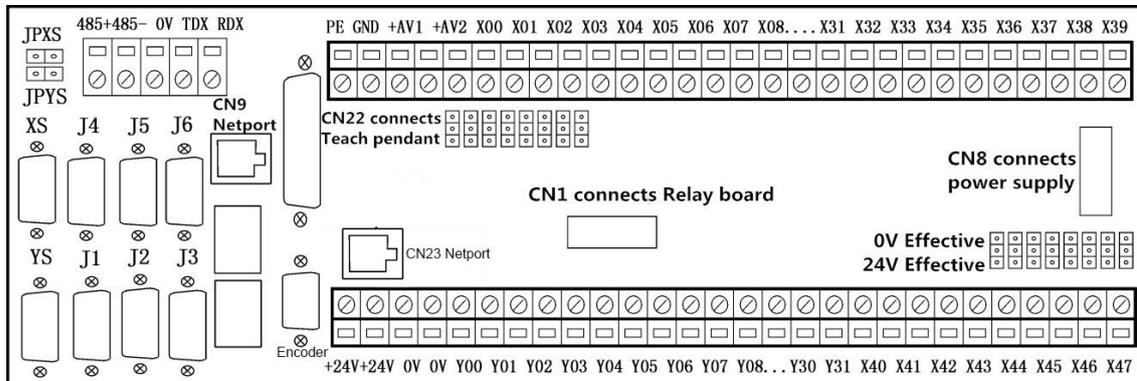
Pay attention:

- 1、 Controller need to install a place which got lightning-protection
- 2、 Controller must be a fixed place in case of vibration
- 3、 Keep controller away from combustibile

5.4.1 Connection diagram



1、 I/O board



- 1) CN22 connects with Teach pendant(robot controller).
- 2) CN23 connects with encoder
- 3) CN24 connects with POWERlink bus driver.
- 4) CN9 connects with 1000 Mbps Ethernet port(also can connect EtherCAT bus driver);
- 5) CN4 connects with 5V power supply.
- 6) CJ1,CJ2 connect input and output signal.
- 7) CJ3,CJ4 connect standard RS485 and RS232;
- 8) XYZABC,Xs,Ys connect with pulse type servo driver;
- 9) JPXS,JPYS plunger pin. When connecting with pulse type drivers, if alarm signal is normal close, and there is no JPXS and JPYS corresponding to XS axis and YS axis, JPXS,JPYS plunger pin are applicable(if there is Xs or Ys, corresponding plunger should be take off).
- 10) +AV1.+AV2 are isolated two-way analog 0-10V signal output, GND is signal ground, they are used to control current and voltage of welding machine.
- 11) CN1 connects with relay board, including:
 - 1 relay of controller output brake control;
 - 6 relays of controlling brake of motor;
 - 7 relays of Y09,Y18,Y19,Y20,Y21,Y22,Y23;
 - Y05 is relay of controller output brake control,user can't use it in other ways.
- 12) Input signal X00-X07,X40-X47 could choose +24V or 0V effective by pin. X40 is detection signal of brake of relay board, when the brake of all joints is open, X40 is valid, user cannot use this in other ways.

Attention:

PE connect terminal should be grounded in case of interfere.

- 1、 X0: detection of start arc;

X01: malfunction of welder;
 X02: alarm of converter;
 X04: alarm of cooling;
 X05: alarm of lubrication;
 X06: alarm of no arc;
 X07: alarm of no gas;
 X46: alarm of no wire;
 X47: alarm of power;
 X20: alarm of J1-J4 driver ALM;
 X21: driver J5/J6/XS/YS alarm ALM1;
 X22: external alarm ALM2;
 X23: welding gun collision alarm ALM3;
 X17: remote pause HALT;
 X18: remote start RUN;
 X19: remote emergency stop ESTOP;
 X40: detection of motor brake;
 X42: M01(pause instruction) detect switch(X42=1, program will pause);
 X45: the switch into drug mode;
 X28,X29,X32-X39: detection of reservation function(10 reservation program at most);
 X09: negative limit switch -L;
 X10: positive limit switch +L;
 X08/X11/X12/X13/X26/X25/X16/X15: home signal

A0/Y0/X0/Z0/B0/C0/XS0/YS0 of A/Y/X/Z/B/C/XS/YS axis;

So, user could use X14, X24, X42-X44, total 6 input points.

2、Y05 is controller output brake control relay. Y16 is enable signal EN of driver, Y17 is alarm clear signal INTH of driver.

So, user could use Y00-Y04,Y06-Y15, Y18-Y31, total 29 output points.

3、the signal may not be stable when power on, so EN enable signal must be connect to driver when use pulse type driver.

4、I/O point of Cartesian coordinate robot

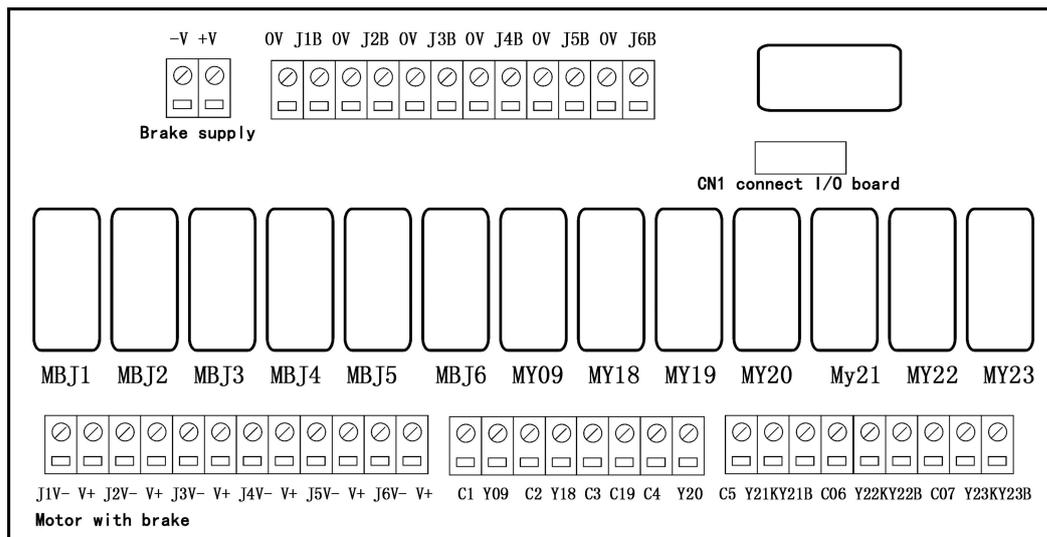
Function	Instruction	Output	Input detect
Workblank/finish work chuck	M901/M902	Y18/Y19	X30/X31
Workblank/finish work tray	M903/M904	Y20/Y21	X32/X33
Workblank clamping/unclamping	M905/M906	Y22	X34

Finish work clamping/unclamping	M907/M908	Y23	X35
Huff	M909/M910	Y24	X36
Machine chuck clamping/unclamping	M911/M912	Y25/Y26	X37/X38
	M913/M914	Y25/Y26	/
	M915/M916	Y25/Y26 jog	/
Machine lighting	M917/M918	Y09	
Auto lubricant		Y10	
Machine start	M919	Y11 Jog	
Airpressure Alarm			X07
Door Alarm			X29
Oil Alarm			X05
Machine finish detection	M1839		X39

Note:

1. within defined time(specified by User parameter P307), if did not detect valid X30/X31,X32/X33,X34,X35,X36, then controller will alarm.
2. Y18/Y19, Y20/Y21, Y25/Y26 are two-way solenoid valve output.
3. Y27 is jog signal.
4. door switch is set by Other parameter P7 and P8.
5. I/O point is 0V effective, if +24V effectiveness is necessary, it can be switch by plunger pin.

3、Relay board



- 1、 CN1 connect with CN1 of I/O board, control output:
Y09,Y18,Y19,Y20,Y21,Y22,Y23 user could use 7 relays.
- 2、 0V of brake connect CN3-22 pin of driver, J1B/J2B/J3B/J4B/J5B/J6B connect

with CN3-24 pin of driver(NEWKer driver).

3、 -V,+V connect with brake supply.

4、 J1V-/J2V-/J3V-/J4V-/J5V-/J6V-,V+ connect with brake of motors.

5.4.2 DB44 pin connector CN22 to controller's bus socket

The socket connects to CN22 of I/O Board.

CN22 Bus Pulsed Signal DB44 Pinhead(match 338E with 11+2 pairs, match 337F with 24pairs)			
Signal	338E(11+2 pairs cable)	337F(24 pairs cable)	Function
TXB+/TXB-	44/29(1st pair)	337F: Y71/Y72	100M Net B signal
TXA+/TXA-	43/28(2nd pair)	337F: Y73/Y74	100M Net A signal
+5V/0V	1/3(3rd pair)	1/3	Power
+5V/0V	1/3(4th pair)	1/3	Power
+5V/0V	1/3(5th pair)	1/3	Power
+5V/0V	2/4(6th pair)	2/4	Power
RS485+/RS485-	34/19(7th pair)	34/19	RS485 communication
TXD/RXD	6/7(8th pair)	337F: Y200/Y75	RS232 communication
RXA+/RXA-	31/16(9th pair)	337F: Y201/+24V	1000M Net A signal
RXB+/RXB-	32/17(10th pair)	337F: Y203/Y202	1000M Net B signal
PA+/PA-	33/18(11th pair)	337F: Y205/Y204	Encoder A signal
PB+/PB-	30/5(12th pair)	337F: Y207/Y206	Encoder B signal
PC+/PC-	14/15(13th pair)		Encoder Z signal
J1CP+/J1CP-		40/25	J1 Pulse
J1DIR+/J1DIR-		39/24	J1 Direction
J2CP+/J2CP-		38/23	J2 Pulse
J2DIR+/J2DIR-		37/22	J2 Direction
J3CP+/J3CP-		36/21	J3 Pulse
J3DIR+/J3DIR-		35/20	J3 Direction
J4CP+/J4CP-		42/27	J4 Pulse
J4DIR+/J4DIR-		41/26	J4 Direction
J5CP+/J5CP-		8/9	J5 Pulse
J5DIR+/J5DIR-		10/11	J5 Direction
J6CP+/J6CP-		12/13	J6 Pulse
J6DIR+/J6DIR-		14/15	J6 Direction

Attention:

NEWKer-A6 controller matches with NEWKer-337F board, 8*4 I/O point, 8 path inputs: X200-X207, X200 is driver alarm or external alarm input, X201-X206 are XYZABC motor home switch input signal(Axis parameter P401=1201, P406=12); 4

paths output: Y71-Y74, Y75 is driver Enable signal. Please pay attention to following points:

1. Instruction M03 controls both Y18 and Y71;
2. Instruction M04 controls both Y19 and Y72;
3. Instruction M08 controls both Y11 and Y73;
4. Instruction OUT controls Y74, for example, OUT+Y74, output Y74 valid;
5. there is no 0-10V analog output in NEWKer-A6, that means cannot match with automatic welding machine;
6. Axis parameter P401-P406=1201-1206;
7. the signal may not be stable when power on, so pulse type driver must be connected with EN enable signal.

7.4.3 DB15 pin connector XYZABCXS/YS to pulsed driver

1. the socket connects to pulsed servo driver.

XYZABC/XS/YS pulse driver DB15 pin (7 pairs)				301H driver	302H driver
Signal	Pin	I/O	Function	DB25 Pinhead	DB25 Pinhead
CP+/CP-	1/9(1st pair)	OUT	Pulse signal	6/18	6/18
DIR+/DIR-	2/10(2nd pair)	OUT	Direction signal	7/19	7/19
EN/INTH	3/4(3rd pair)	OUT	Enable driver/ Clear alarm	23/10	302G:23/10 302H:14/=
+24V/0V	11/13(4th pair)	OUT	24V Power/0V	11/21	302G:11/21 302H:2/25
BP+/BP-	15/8(5th pair)	IN	Encoder feedback B	4/16	302G:off 302H:8/1
AP+/AP-	14/7(6th pair)	IN	Encoder feedback A	3/15	302G:off 302H:21/20
ALMB-/ALMB+	6/5(7th pair)	IN	Driver alarm normal close	13/12	13/12
ALMK+/ALMK-	12/13(7th pair)	IN	Driver alarm normal open		
RS485+/RS485-				CN2-5/6	5/17
BK+/BK-				22/24	22/24
The second channel Pulsed Driver DB15 Pinhead (4 pairs)					
CP+/CP-	1/9(1st pair)	OUT	Pulse signal		3/15
DIR+/DIR-	2/10(2nd pair)	OUT	Direction signal		4/16
BP+/BP-	15/8(3rd pair)	IN	Encoder feedback B		302G:off 302H:23/9

AP+/AP-	14/7(4th pair)	IN	Encoder feedback A		302G:off 302H:11/10
ALMB-/ALMB+	6/5(short circuit)	IN	Driver alarm normal close		

Note:

1. Such the same signal as CP,DIR,RS485 should be covered by twisted shield pair, the shield connects with shell.

2. RS485+/RS485-: connect to Modbus communication signal of driver, 0V must connect to GND port of driver.

3. EN/Y16: enable driver when output 0V

4. INTH/Y17: reset driver when output 0V

5. ALM/X20,ALM/X21: Inputting 0V means driver alarm, ALMK is normal open signal, ALMB is normal close signal.

ALM detect J1-J4 driver, if rest port are unconnected, their ALMB-/ALMB+ should be short circuited.

ALM1 detect J5J6XsYs driver, if rest port are unconnected, their ALMB-/ALMB+ should be short circuited.

6. the signal may not be stable when power on, so pulse type driver must be connected with EN enable signal.

5.4.4 DB9 connector of CN24 to bus driver

(1)The socket connects to Ethernet port of servo driver which supports Powerlink communication protocol.

CN24 bus Ethernet signal port(2 pairs)				
Signal	Pin	I/O	Function	Standard Ethernet port
TXA-/TXA+	1/2	IN	A signal	2/1
TXB-/TXB+	3/6	IN	B signal	3/6

5.4.5 Connection of 1000M Net-port CN9

Match with EtherCAT driver signal, please mention it when place order

CN9 bus Ethernet signal port (2 pairs)				
Signal	Pin	I/O	Function	Standard Ethernet port
TXA-/TXA+	1/2	IN	A signal	2/1
TXB-/TXB+	3/6	IN	B signal	3/6

Attention: Signal cable must be shielded twisted pair.

USB port can be expanded into Net port. Through a UGREEN USB hub which supports RJ45 LAN, USB port can be expanded into Net ports, for example, one port for connecting with EtherCat driver, another for visual system or OPC communication. And set Other parameter P500=8, means open net function when start up.

5.4.6 DB9 connector of CN23 to Encoder

CN23 Encoder Signal DB9 pin socket				
Signal	Pin	I/O	Function	Effective Level
+5V/0V	1/4	OUT	Power Ground	+5V/0V
PA+/PA-	5/7	IN	A signal	5V
PA+/PA-	3/6	IN	B signal	5V
PA+/PA-	2/6	IN	Z zero signal	5V

5.5 Alarm Information

1. **“Forbid Move”**, will appear in following cases:

(1) no brake feedback signal(X40=0), please check if brake of motors is open. In this condition, robot cannot move in Teach/Auto/Remote mode.

(2) did not press Safety Switch(X212/X213=0) in Teach mode, in this case, robot cannot move in Teach mode.

2. **“Emergency Stop”**: Emergency stop button(X209=0) on controller was pressed, or external emergency stop signal ESTOP(X19=1) is valid, under this alarm, controller will automatically clear output Y18/Y19/Y11/Y09;

3. **“Electric arc alarm”**, when electric arc is used up, signal(X06=1) is valid.

4. **“Gas alarm”**, when gas is used up, signal(X07=1) is valid.

5. **“Metal wire alarm”**, when welding wire is used up, signal(X46=1) is valid.

6. **“Power alarm”**, when power is abnormal, signal(X47=1) is valid.

7. **“Door alarm”**, door switch signal is valid(X29=1).

8. **“Spindle driver alarm”**, spindle driver alarm signal is valid(X02=1).

9. **“Servo J1-J4 alarm”**, J1-J4 servo driver alarm is valid(X20=1), Other parameter P25 can set it be normal close/ normal open.

10. **“Servo J5J6XSYS alarm”**, J5-J8 servo driver alarm is valid(X21=1), Other parameter P26 can set it be normal close/normal open.

11. **“ALM2 alarm”**, external alarm2 signal is valid(X22=1).

12. **“Welding gun collision alarm ALM3”**, Welding gun collision alarm ALM3 is valid(X23=1), Other parameter P27 can set it be normal close/normal open.

13. **“Welder alarm”**, welding machine malfunction signal is valid(X01=1).

14. **“Reference point switch cannot be released”**, incremental motor failed reaching zero point, absolute motor failed reading motor position, Axis parameter P61=1 will close this alarm.

15. **“Arc failed”**, failed detecting arc starting signal(X00=0) when executing AS.

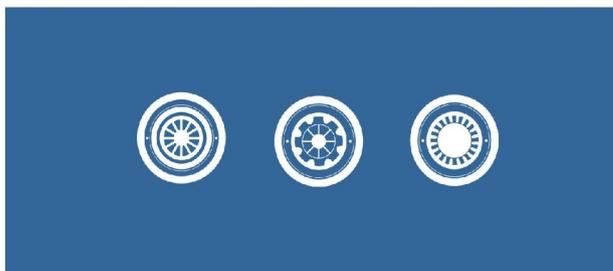
16. **“Cladding failed”**, failed detecting arc end signal(X03=0) when executing AE.

17. **“Oil alarm”**, oil detection signal is valid(X05=1).

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