

DDCS-*V*4.1

Standalone Motion Controller Users Manual V1



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深圳市众联拓数控科技有限公司 Shenzhen Digital Dream Numerical Technology Co., Ltd.

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1 Controller Brief Introduction

1.1 DDCS V4.1 Product Introduction

Thank you for your interest in our standalone motion controller and for taking the time to read this manual.

Digital Dream is a numerical control company specializing in the research, development and production of various CNC (Computer Numerical Control) systems since 2008. Digital Dream aims to combine high quality and high reliability with affordability.

The DDCS V4.1 3-4 axes motion controller for stepper and servo system, is updated from DDCS V3.1 on software and hardware. It combines great advancement with tiny footprint of each days from past 8 years, when we released the first DDCS products DDCS V1.1. After a very short time you will be familiar with the functions and this manual will help you.

The DDCS numerical control system adopts the ARM+FPGA design framework. ARM controls the human-computer interface and G-code analysis and the FPGA provides the underlying algorithms and creates the control pulse. This guarantees reliable control and easy operation. The internal operating system is Linux based.

The panel layout structure of the DDCS V4.1 is very rational to save space. All operations are controlled by only 17 keys and the keys are composite keys that can act as function keys or numeric keys. DDCS V4.1 support comprehensive Fanuc G code set.

The DDCS can be used for many styles and types of CNC machines. Lathes, Routers, Pick&Place and Mills are just a few examples. The DDCS operates as a Stand Alone system without the need of a computer. This guarantees high precision, accuracy and reliability. The interface, even though very comprehensive, can be learned in a very short time.

1.2 DDCS V4.1 Brief technical feature:

1) 18 photoelectric isolated digital inputs,3 photoelectric isolated digital outputs.

2) The spindle can be configurated as Analog spindle(0~10V) and also Servo spindle.

3) 3-4 axes motor Control. Differential Mode and Double Pulse Mode output signal for optional, Maximum interpolation pulse output frequency is 500Khz/Axis, 2-4 Axis linear interpolation, any 2 axis circular interpolation;

4) ARM9 main control chip, FPGA core algorithm chip.

5) 7 inches TFT screen, Size: 1024x600 Pixels, Resolution: 72 Pixels/Inch; 17 operation keys.

6) The Power Supply for IO Port is 24VDC, minimum current is 0.5A, the Power Supply for Controller system is also 24VDC, minimum current is 0.5A. Controller needs both power to work properly.

7) USB flash disk support for G code file input; Can transfer the files by Ethernet communication between the computer and DDCS V4.1 controller; No size limited of the G-code file.

8) Compatible with standard G-code, support popular CAD/CAM software, such as ArtCam, MasterCam, ProE, JDSoft SurfMill, Aspire, Fusion 360 and so on;

9) Support standard MPG.

10) Support function of "Try cutting" (handwheel guiding) function.

11) Support Jog function for each axis (continuous, step, defined distance), Customer can define the distance.

12) Support Float Probe, Fix Probe, Vertex Probe and Tool Length Measurement.

13) Support the operation of quickly go to specify line and closest position.

14) Support Array Machining, Sequence Machining, Milling Plane Machining, and Milling sylindrical machining.

15) Support Bias for XYZA axis, and can defind the Bias distance.

16) Support Pause breakpoint, Power-Cut Recovery Beakpoint and loaded breakpoint; And Support Start from the specific line and closest line.

17) Support Multiple origin points operation, the users can create an origin point and load it.

18) Support Find Middle for X and Y axis.

19) Improved the simulation function. During the simulation, you can adjust the FRO and observe whether the programming path meets the expectations and check the soft limits. During the simulation, it can be paused, and when press the Start key again, the system will continue to simulate from the pause breakpoint.

20) Slave X, Slave Y Or Slave Z, for Gantry machine with two independent motors on main axes.

21) Now English and Chinese language is available; System also support International coding, almost support all language, the users can add their own language to the control system.

22) DDCS V4.1 Only Supports NPN Type Limited Switch.

23) Support 4 kinds operation rights: visitor, operator, admin, super admin.

DDCS V4.1 New features compared to previous version:

1) Added USB port and Ethercat Port on DDCS V4.1.

2) Slave X, Slave Y Or Slave Z, for Gantry machine with two independent motors on main axes.

3) Added Servo Spindle option.

4) Add Polar coordinate programming commands and Rotation commands, and completed Radius compensation commands on DDCS V4.1 controller.

5) DDCS V4.1 controller upgrades the motion algorithm, by Machining profile accuracy configuration, makes a long g-code program with short line segments running smoother.

6) No matter how big program file it is, system can quickly active the function of Start from Specified line and Start from closest point in few seconds.

7) Improve the simulation function. During the simulation, you can adjust the FRO and observe whether the programming path meets the expectations and check the soft limits. During the simulation, it can be paused, and when press the Start key again, the system will continue to simulate from the pause breakpoint.

8) DDCS V4.1 added driver alarm input ports, and can configurate the ports No.as you want. Same as DDCS-Expert.

9) We add cycle encoder for A axis, which is good for unlimited rotation for A axis.

10) Added the window for analysis prompt.

11) Support International coding, almost support all language, the users can add his language for the control system.

12) Increased the Parameters about the acceleration when Estop, to avoid collision by Stop when Estop the machine in high speed, edit the related parameters and system can give a smooth stop, this means there is no position loss.

13) System FPGA cited 32 -bit speed generator, with higher resolution for the speed / acceleration, it means higher positioning accuracy.

1.3 Appearance, Structure and Size of Product



Figure 1-1 DDCS V4.1 Front panel



Figure 1-2 DDCS V4.1 Back Side of the controller

The DDCS V4.1 is a small box that can fit in a window of a small control box or control cabinet. Four locking hooks fix this controller from the frame. The dimension you find in Figure 1-3.

The front panel is 237 mm * 153.7 mm * 5.2 mm;

The main body is 237 mm * 153.7 mm * 48.2 mm;

To mount the unit in an equipment cabinet, cut the hole 228.5 mm * 83.7 mm.

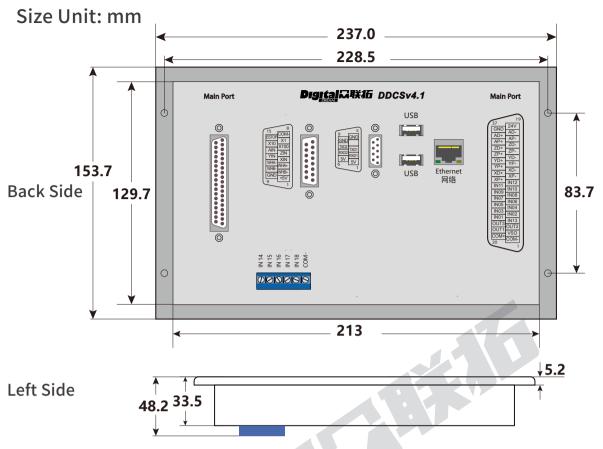


Figure 1-3 DDCS V4.1 Back view, Side view and dimensions

Accessories:

1) The Wiring Board for DDCS V4.1 and DDCS V3.1; 2) DB37 Cable, for the wiring between the board and DDCS V4.1 controller, 3 meters; 3) USB Extension cable 50cm; 4) USB stick; 5) screws.



Figure 1-4 DDCS V4.1 Main controller and accessories

1.4 Software Structure



Figure 1-5 DDCS V4.1 Software Structure

1.5 Explanation of Abbreviations

When operating the DDCS, the users will come across some English abbreviations. Here a

list with explanations

FRO: Feed Rate Override

SRO: Spindle Rate Override

- SJR: Jog Speed Setting
- F: Feed rate, unit is mm/min
- S: Spindle Speed, unit rev/min.
- X: The coordinate code of the X axis.

Y: The coordinate code of the Y axis.

Z: The coordinate code of the Z axis.

A: The coordinate code of the A axis

BUSY: The system is busy. You still can adjust FRO and SRO

READY: READY mode, any operation can be done

RESET: Reset mode, controller is in "OFF" mode, no operation can be performed

CONT: Continuous mode, each axis can be manually jogged with the arrow keys

Step :Manual Step Mode, each axis can be jogged in defined steps

MPG: MPG mode. Operate the machine with the MPG (Manual Pulse Gener ator)

AUTO: Run G code. Auto is showing when file is processing

1.6 Notes and Warnings

Keep away from exposure to moisture or water. This product contains sophisticated electronics and must not get wet.

Wiring warning: the IO input terminal of this controller supports equipment with sourcepower (such as Inductive Proximity Switch). When using this kind of equipment, pay attention to the polarity. Avoid the +terminal to be connect with GND. This controllers has analog output for spindle control (0-10V). Please avoid this terminal to ever connect with GND as damage to the controller may occur.

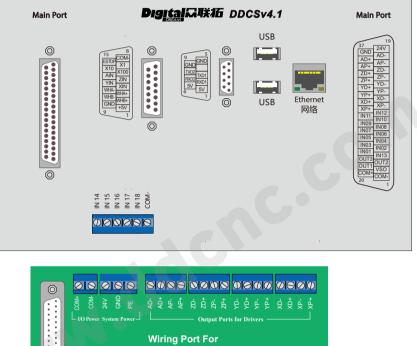
Operation warning. Please observe all security measures when operating the machine. The ESTOP must be connected and properly labelled. In case of a problem, press the E-stop at once to avoid damage to humans, animals and the equipment.

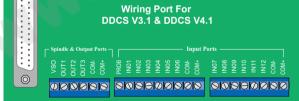
High voltage danger. The DDCS is connected to 24V DC. Obey and follow the electricity safety rules of your country when connecting this equipment.

2 Wiring2.1 DDCS V4.1 Wiring Board

In order to facilitate engineers to install controller into the control cabinet, DDCS V4.1 provides a wiring terminal board. The wiring board is connected to the controller host through DB37 shielded cable. There are screw fittings at the interface, which is very firm and reliable.

The user can install the wiring board in the control cabinet with the matching C45 guide rail, the size of the guide rail is shown in the following figure.







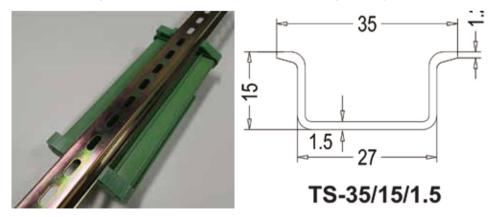
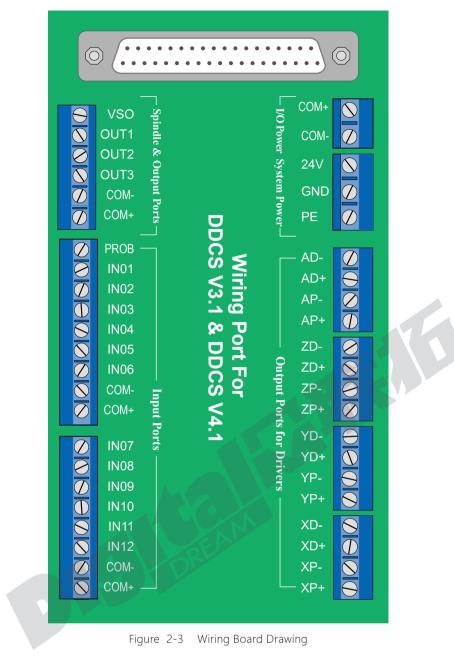


Figure 2-2 guide rail drawing, the unit is mm



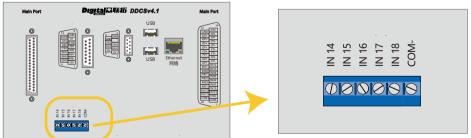


Figure 2-4 The Ports at the back of DDCS V4.1 controller

All the input and output ports are fixed in DDCS V3.1. And the input and output port for DDCS V4.1, the users can configurate themself. The users can go to the Parameter page and find "Output signal parameters" and "Input signal parameters" to configurate the ports number.

		-						
PIN No.	Mark on V3.1	Mark on V4.1	Kinds	Definition	Signal			
20	COM+	COM+	Power Supply Input					
1	COM-	COM-	for IO ports	Negative side of Power Supply for IO Port	24VDC 3A			
19	24V	24V	Power Supply Input					
37	GND	GND	for Controller System	Negative Side of Power Supply for Controller	24VDC 3A			
18	AD-	AD-		A axis Direction Signal Negative Output				
36	AD+	AD+	A axis signal output					
17	AP-	AP-		A axis Pulse Signal Negative Output				
35	AP+	AP+						
16	ZD-	ZD-		Z axis Direction Signal Negative Output				
34	ZD+	ZD+	Z axis signal output					
15	ZP-	ZP-		Z axis Pulse Signal Negative Output	Cable-driven			
33	ZP+	ZP+		Z axis Pulse Signal Positive Output	Output;			
14	YD-	YD-		Y axis Direction Signal Negative Output	Max. Interpolation			
32	YD+	YD+	Y axis signal output	Y axis Direction Signal Positive Output	Pulse Frequency 500Khz.			
13	YP-	YP-		Y axis Pulse Signal Negative Output	Trequency Sookinz.			
31	XP+	XP+		Y axis Pulse Signal Positive Output				
12	XD-	XD-		X axis Direction Signal Negative Output				
30	XD+	XD+	X axis signal output	X axis Direction Signal Positive Output				
11	XP-	XP-		X axis Pulse Signal Negative Output				
29	XP+	XP+		X axis Pulse Signal Positive Output				
2	VSO	VSO	Analog Output	Connect with Analog input port	0-10V Analog			
21	M3	OUT1	In the Parameter Page	By Para #127~#130, can configurate	The Max. capacity			
3	M8	OUT2	can configurate the port numbers.	the output port 0, 1, 2, 3 to: M3 port M4 port	of the output ports is 30V, 500mA.			
22	M10	OUT3		M8 port M10 port				
1	COM-	COM-	Spindle COMMON					
4	PROB	IN13		By Para #136~#161, can configurate				
23	LIMITX+	IN01		the 18 input ports to these options:				
5	LIMITX-	IN02		X axis driver alarm port; Y axis driver alarm port;				
24	HOMEX	IN03		Z axis driver alarm port;				
6	LIMITY+	IN04		A axis driver alarm port; X axis positive limit port;				
25	LIMITY-	IN05		Y axis positive limit port;				
7	HOMEY	IN06		Z axis positive limit port;	Course and M. L. S.			
26	LIMITZ+	IN07	In the Devenestor De	A axis positive limit port; X axis negative limit port;	Support Mechani- cal,photoelectric			
8	LIMITZ-	IN08	In the Parameter Page can configurate the	Y axis negative limit port;	and promixity			
27	HOMEZ	IN09	port numbers.	Z axis negative limit port; A axis negative limit port;	switch,24VDC;			
9	LIMITA+	IN10		X axis home port;	Type: NPN			
28	LIMITA-	IN11		Y axis home port; Z axis home port;				
10	HOMEA	IN12		A axis home port;				
		IN14		Probe Port;				
Input port	s behind	IN15		External emergency stop port; Extended Function Key 1 Port;				
the con		IN16		Extended Function Key 2 Port;				
	in oner	IN17		Extended Function Key 3 Port; Extended Function Key 4 Port;				
		IN18						

2.2 DDCS V4.1 Power Supply Input

COM+ and COM- is the power input ports for Input/Output Port and MPG, 24V and GND is the power input ports for controller system. Please keep in mind,only when the two power supplies are connected correctly the controller can be work properly.

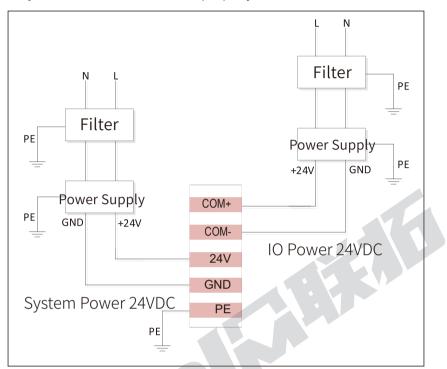


Figure 2-5 DDCS V4.1 Power Supply Wiring Methods

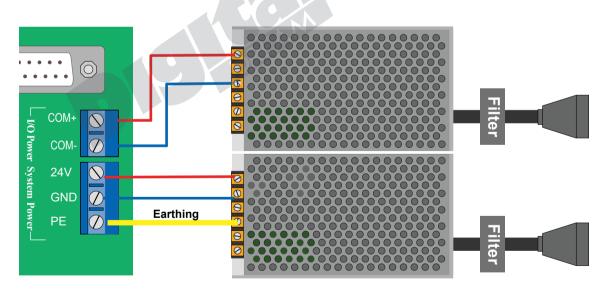


Figure 2-6 DDCS V4.1 Power Supply Wiring Methods

2.3 DDCS V4.1 Stepper/Servo Control Output

The stepper/servo control output, we cite differential Pulse and Direction output method. By the Para #012~015, the users can configurate the drive mode for the 4 axis. There is 3 or 4 axis for optional.

Max. output frequency is 500Khz, please take attention to the max. pluse input frequency of the driver.

No support Common anode wiring or common cathode wiring methods.

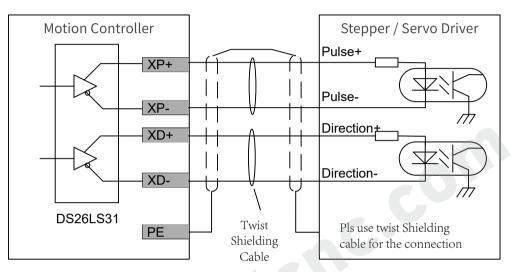


Figure 2-6 DDCS V4.1 Pluse and direction signal wiring methods

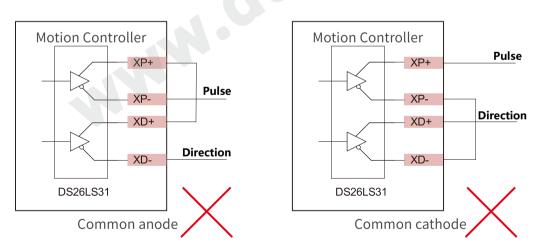


Figure 2-7 DDCS V4.1 No support Common anode or common cathode wiring methods

DDCS V4.1 added Driver Alarm input ports the users can configurate the input port number and wire. For example: we already configurate the Z axis driver alarm input port to Number 12.

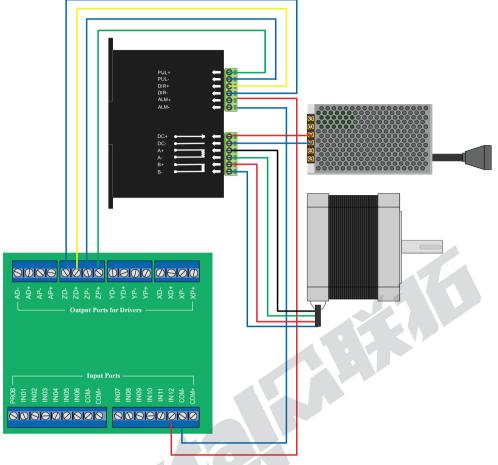


Figure 2-8 DDCS V4.1 Wiring example with stepper driver

There is motor parameters settings at the Parameter Page, the users can set the pulse equivalent (= numerator /denominator), the driver mode, the slave or master axis and so on. We also explain the motor parameters in details in the Parameter Chapter.

2.4 DDCS V4.1 Spindle control outputs

DDCS V4.1 Support 2 kinds Spindle Mode: Analog Spindle / Servo Spindle (PUL+DIR). By Para #188 configurate the spindle as Analog or Servo Spindle, By Para #189 we select the servo spindle channel. Here we take the example of the analog spindle.

The spindle control output ports (OUT01-OUT03) offer connections for Start and Stop of the Spindle (M3/M5), Start/Stop of Cooling (M8/M9), Start/Stop of Lubrication (M10/M11). These three output terminals are signals open to ground. The highest electric current can be absorbed is 50mA. The speed controlling output terminal can output 0-10V. It can adjust the speed of the spindle motor by sending the voltage between 0 and 10V to the VFD according the the Spindle Speed Se tting.



The following Figure 2-9 shows the wiring with Sunfar VFD:

Figure 2-9 DDCS and VFD wiring

Important:

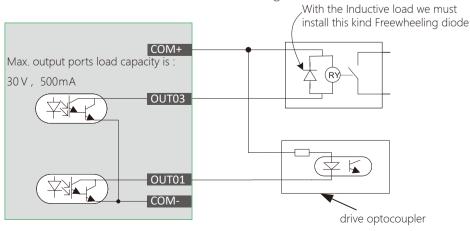
1) The internal of the analog circuit is isolated from the IO power supply, and it is forbidden to short-circuit with IO power supply.

2) M3 is the spindle forward rotation output or start-stop output;

3) If the IO port is not powered, even if the inverter is connected correctly, it will not work; all IO ports must be powered to work properly.

When the spindle mode is Servo spindle, we need to choose the servo spindle channel, and wire with according driver ports to the spindle servo driver.

The general output circuits are all open-collector output structures as shown in the figure, which can be used to drive relay coils or optocoupler loads, the load capacity as shown in the figure; With the Inductive load we must install this kind Freewheeling diode.



OUT0-OUT3 can be used as General comman output ports, for example, can be used as the solid relay output ports, take the example of the figure below:

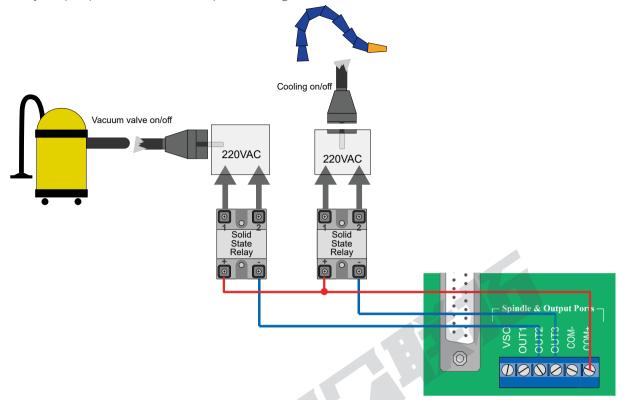


Figure 2-11 DDCS V4.1 output ports wiring with Relay

After Wiring, in the View page, we can check the wiring situation.

The related Parameter settings:

In the Parameter Page, the Sub-menu "Output signal Para", we can configurate the output number of M3/M5, M8/M9, M10/M11 and the electrical level.

In the Parameter Page, the Sub-menu "M output code Para", we can set the delay time of M3/M4, M8/M9 and M10/M11.

2.5 Input Ports (IN01-IN18) Wiring

2.5.1 Limit, Home and Probe Input ports

The digital input circuit has the mechanical limit switch connection method and the open collector of the triode connection method. It supports the NPN type proximity limit switch.

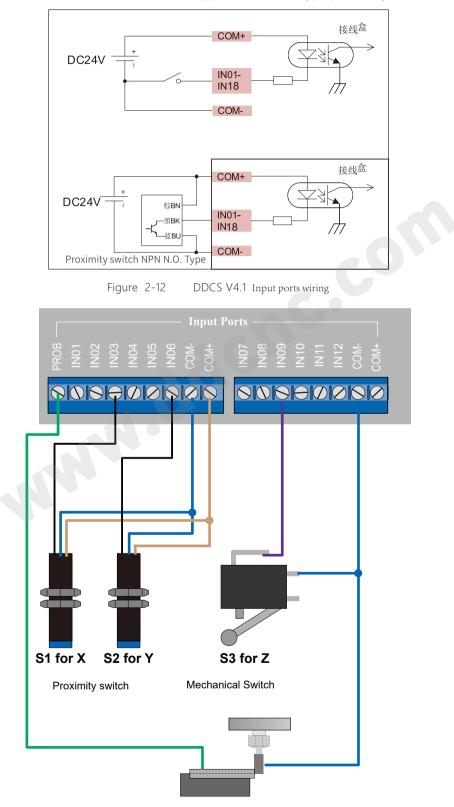


Figure 2-13 DDCS V4.1 wiring with limit switch and Probe

The example above, we already set at Submenu "Input signal Para" in the Parameters page as:

#151: X axis Home port is 03, then IN03 is the X axir home signal input port;

#152: Y axis Home port is 06, then IN06 is the Y axir home signal input port;

#153: Z axis Home port is 09, then IN09 is the Y axir home signal input port.

#156: Probe Port is 13, then IN13 is the probe signal input port.

Some users asked for the wiring methods for the probe with over-strock alarm, here we also set one sample for it.

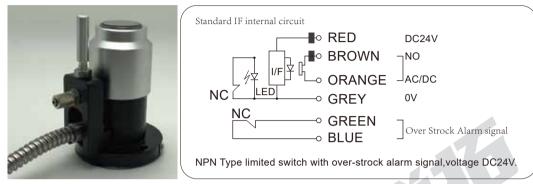


Figure 2-14 The Probe sensor with over-strock alarm signal

In the example, we configurate the IN13 as the Probe signal input port, and IN05 as the Z-- hard limit signal input port. Then wiring as below:



Figure 2-15 The Probe sensor with over-strock alarm signal

After completing the wiring, we can check the input ports status at the View page.

In the Sub-menu "Home Para" of the Paramters page, we can set the Home direction of each axis, the Home Speed, the back-distance and so on. And comparing with DDCS V3.1, the 4.1 version controller added the coordinate setting of the 4 references points.

The meaning of the related parameters, please refers to Parameter Chapter.

2.5.2 DDCS V4.1 Extended Function Inputs

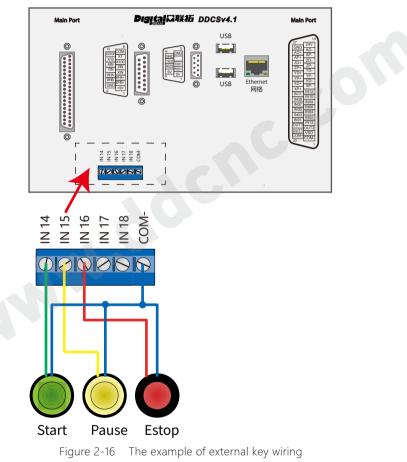
#250~#253 Extended function key functions: 0 "Start"; 1 "Pause"; 2 "XY Zero"; 3 "Z Zero"; 4 "Home"; 5 "Floatting probe"; 6 "Fixing probe"; 7 "Vertex probe"; 8 "X 1/2"; 9 "Y 1/2; 10 "extkey1.nc"; 11 "Disable". The users can select the function as they want.

Take the example, how to defind the "Start", "Pause" and "E-stop" Extended function to the external keys.

By Submenu "Input signal Parameters" in the Parameters page:

Set "#157 External emergency stop port" to No. 16 input port; Set "#158 Extended Function Key 1 Port" to No. 14 input port; "#159 Extended Function Key 1 Port" to No. 15 input port.

Then set #250 to 0, then define input port 14 as "Start"; Set # 251 to 1, to defind the input port 15 as the "Pause".



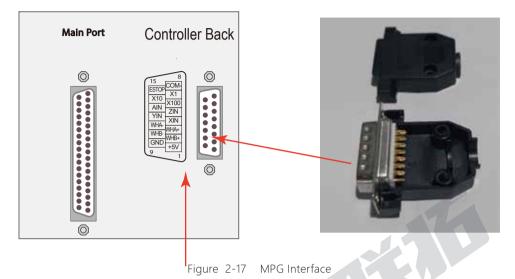
The users also can edit Macro to self-define the external key function by "extkey.nc".

The appendix also includes a list of macro definitions.

2.5.3 DDCS V4.1 MPG Wiring

MPG handwheel interface is showed as figure 2-15.

The users need to weld the MPG cables to the DB15 male parallel port, then plug into the controller DB15 female parallel port.



It is 15 pins interface for the MPG plug, in the table below we defind each pins.

Pin No.	Mark	Definition	Notes
1	+5V	Power Supply +	MPG Power supply input positive terminal
2	WHB+	Encoder B Phase +	MPG B differential input positive terminal
3	WHA+	Encoder A Phase +	MPG A phase differential input positive terminal
4	X-IN	Selection switch of X axis	Connect with GND, then X axis is selected
5	Z-IN	Selection switch of Z axis	Connect with GND, then Z axis is selected
6	X100	Selection switch 100 X	Connect with GND, then X100 ratio is selected
7	X1	Selection switch 1 X	Connect with GND, then X1 ratio is selected
8	COM-	Switch Signal common terminal	MPG power supply ground
9	GND	MPG Power supply Ground	MPG power supply ground
10	WHB-	Encoder B Phase -	MPG B differential input negative terminal
11	WHA-	Encoder A Phase -	MPG A differential input negative terminal
12	Y-IN	Selection Y Axis	Connect with GND, then Y axis is selected
13	A-IN	Selection A Axis	Connect with GND, then the 4th axis is selected
14	X10	Selection switch 10 X	Connect with GND, then X10 ratio is selected
15	ESTOP	ESTOP Input	Connect with GND, then Estop is active

MPG PIN	No. and Mark	Pin definition	MPG Pin and Mark	MPG Output Cable Color
1	+5V	Power Supply +	5V	RED
2	WHB+	B Phase +	B+	PURPLE
3	WHA+	A Phase +	A+	GREEN
4	XIN	X Axis	Х	YELLOW
5	ZIN	Z Axis	Z	BROWN
6	X100	X100 Ratio	X100	ORANGE
7	X1	X1 Ratio	X1	Grey
8	COM-	MPG common COM-	СОМ	ORANGE/BLACK
9	GND	Ground	GND	BLACK
10	WHB-	B Phase -	B-	PURPLE/BLACK
11	WHA-	A Phase -	A-	WHITE
12	YIN	Y Axis	Y	YELLOW/BLACK
13	AIN	A Axis	A	BROWN/BLACK
14	X10	X10 Ratio	X10	GREY/BLACK
15	ESTOP	ESTOP	EP	BLUE

Note: It you want to use the single-terminal MPG (there is no A-B-MPG), please refer to the table below for reference. As for the unlisted MPG, please take the differential MPG wiring mode.

DDCS Wiring Pin Mark	MPG Pin Mark and Color					
WHA+	A+	Green				
WHA-	OV	Black				
WHB+	B+	White				
WHB-	OV	Black				

Important:

1) All the input signal COMMON termimal is COM-, not GND; Never short connect GND and COM-;

2) The MPG need the power from IO power port (COM+ / COM-), or the MPG c annot work;

3) When the MPG is wired up, the control system can detect it and shift to MPG mode automatically;

4) Via View Page, we can check the MPG signal status;

5) In the Parameter Page -- Param Type -- MPG Parameters, we can set the speed and acceleration of every axis in MPG mode, and also we can set the MPG Precision, motion direction and so on; One point is important, When open the MPG control Mode, controller will execute each signals the MPG generates, even you already stopped turnning the wheel; When the MPG control mode is closed, if you stopped turnning the wheel, controller also stopped.

2.5.4 View Page

In the view page, we can check the input and output ports status.

CON	т	READ	DY N	ıdisk-	sda1/b	all1.ne	c				+00:0	0:00		Guest
X10.000	LIMIT+		LIMIT		IOME		ARM LOV		FRO	:			1	00%
Y1 <mark>1</mark> .000 Z10.000	002LO				ині Ні		LOV LOV		SRC	:			1	00%
A0.000	00 LO		O LOV	12			LOV		JSR				1	00%
Ext.IO	Probe 13 Hi		ESTOP	6					F		0		3	000
Ext.IO	Ext-key		Ext-key2		xt-key:		t-key LOV		s		0		12	2000
MPG	X-sel		Y-sel Hi	7 🖡	-sel HI	A-s	н		G54	H00	M5	M9		M11
0x3	Х1 <mark>—</mark> ні)	X10 HI	X	(100 HI	ES	itop HI		Soft	ware Ve	er: 202	22-05-2	29-0	01-NOR
									Sync	hronize	e netw	ork tim	ie	
									ID:04	4-01050	0001-3	365196	531	ea215b6
Start	Pau	se	Res	set	Vi	ew	Мрд	Guid	le	Spindle		File		00:00:37
						2 10				-	-/		_	

In the main page, press the View key two times and enter into the view page.

Figure 2-18 View Page

1: It's the Mechanical Coordinates.

2: The numbers are the limit++ signal input port numbers for the each axis; Red Square shows the current signal is Invalid, and Green Square shows the current signal Effective; HI means High level and LOW means low level.

3: The numbers are the limit-- signal input port numbers for the each axis; Red Square shows the current signal is Invalid, and Green Square shows the current signal Effective; HI means High level and LOW means low level.

4: The numbers are the HOME signal input port numbers for the each axis; Red Square shows the current signal is Invalid, and Green Square shows the current signal Effective; HI means High level and LOW means low level.

5: The numbers are the ALARM signal input port numbers for the each axis; Red Square shows the current signal is Invalid, and Green Square shows the current signal Effective; HI means High level and LOW means low level.

6: The column includes the Probe signal, E-stop Signal and 4 extended function key input signals; Red Square shows the current signal is Invalid, and Green Square shows the current signal Effective; HI means High level and LOW means low level.

7: It's for the MPG input ports. X-sel/Y-sel/Z-sel/A-sel show the input signal for XYZA axis Respectively; X1/X10/X100分 show the input signal for the Ratio of the XYAZ axis; Red Square shows the current signal is Invalid, and Green Square shows the current signal Effective; HI means High level and LOW means low level.

In Parameter Page -- Param type -- input signal parameters, we can configurate the input ports numbers and the Active electric level.

3 Software and opeation

3.1 DDCS V4.1 Key definition

										DDCS	5 V4.1
CONT	READ	Y /local/b	all1.nc			•	00:00:00	Guest			
Axis		Mach		Abs	FRO:			100%		USB	
οX	10.0	000	0.0	000	SRO:			100%		Tab	
⊙Y	10.0	000	0.0	000	JSR:			100%			
© 1	10.0	000	0.0	000	F	C)	47999		- 6	
⊙Z	50.0	000	0.0	000	s	C)	8000		Shift	MODIFY PROBE
⊙A	10.0	000	0.0	000	G54 Softw	H00 are Ver	M5 M	9 M11 29-001-NO	R	5 Mode	
<u> </u>					ID:04	010500	01-36519	64b91a215			4
Start	Pause	Reset	View	MpgGu	uide S	pindle	File	1912-02			ENTER HOME
START	PAUSE		VIEW	TryC						ZERO	×

Figure 3-1 DDCS-V4.1 Controller Panel

Кеу	Definition	Description
	The indicator for Ethernet	When the Ethernet communication is hooked up the LED indicator lights up.
USB DISK 🌒	The indicator for USB port	When controller detected the USB stick the red LED indicator lights up.
START	1: Start operation 2: F1 function key	 After loading the G code file, please press this key to start the operation. In case of Pause Status, press this key to continue the processing operation. In different page, the F1 function key can be given with different function.
PAUSE	1: Pause operation 2: F2 function key	 Press this key to Pause the operation. In different page, the F2 function key can be given with different function.
(5 RESET	1: Reset and E-STOP 2: Number key 0 3: F3 function key	 If Reset is blinking, press this key to activate the controller. Press this key to stop processing urgently. When the number function is enabled, this key can be used as number key "0" In different page, the F3 function key can be given with different function.
	1: Main Page/Simulation/View 2: Number key 1 3: F4 function key	 When in Main page, press the key one time go to Simulation page, and press it again, go to View Page. When the number function is enabled, this key can be used as number key "1" In different page, the F4 function key can be given with different function.
TryCut	1:Try Cut (handwheel guide) 2: Number key 2 3: F5 function key	 Press this key to enable and disable the Try cut (Handwheel guiding) status. When the number function is enabled, this key can be used as number key "2" In different page, the F5 function key can be given with different function.
SPINDLE	1:Spindle ON/OFF 2: Number key 3 3: F6 function key	 Press this key to manually switch the spindle on or off. Can not be used if Reset is blinking and while processing an operation (Busy). When the number function is enabled, this key can be used as number key "3" In different page, the F6 function key can be given with different function.
PAGE R	1: Main Page/File Page/Para Page 2: Number key 4 3: F7 function key	 When in Main page, press the key one time go to the File page, and press it again, go to Parameters Page. When the number function is enabled, this key can be used as number key "4" In different page, the F7 function key can be given with different function.
Tab	1:FRO/SRO/SJR/F/S/G 2: Number key 8	 This switch will highlight the processing parameters FRO/ SRO/S- JR/F/S/G54-59-MACH/M3-M11; While in BUSY it can activate FRO and SRO. When the number function is enabled, this key can be used as number key "8"

Кеу	Definition	Description
6	1: 2nd Mode	1. When #313 Param is Menu: A) goto zero, B) zero, C) home, D) Probe, E) Advanced Machin- ing, F) Bias management, G) Breakpoint, H) Coordinate origin, I) Center, J) Silumation
Shift	2: Menu Mode 3: Number Key 6	2. When <code>#313</code> Param is 2nd function: With the according keys active Goto Zero/Zero/Home/Probe ect. funcitons
	lo. Number Rey o	3. When the number function is enabled, this key can be used as number key "6".
5 Mode	1: Mode switch 2: Number Key 5	1. In the main page, when in the ready status, press this key to switch the manual mode of each axis. There are three manual modes, namely "step", "continuous" and "MPG" mode; when the controller detects MPG is hooked up, the system will automatically switch to the MPG mode. At this time, pressing this key will switch between the three modes; when the system does not detect the MPG, pressing this key will only Rotate between continuous and step; in addition, when switching to step, the system will pop up a dialog box of step distance.
		2. When the number function is enabled, this key can be used as number key "5".
ботоо	1:X axis moves left 2:Cursor moves left 3:Goto Zero function	 In "CONT Mode", the X axis will Continuously move negative after pressing this key. In "STEP Mode" X will move negative in steps. When in "Line/Value Editing" or default F/S value modification, this key moves the cursor left.
		3. When in "2nd Function", this key has the goto Zero function.
	1:X axis moves right	1. In "CONT Mode", the X axis will Continuously move positive after pressing this key. In "STEP Mode" X will move positive in steps.
×	2:Cursor moves right 3:X axis select	 When in "Line/Value Editing" or default F/S value modification, this key moves the cursor right. X axis selection
	1: Y axis moves forward	1. In "CONT Mode", the Y axis will continuously move positive after pressing this key. In "STEP Mode" Y will move positive in steps.
	2: Para value increases	2. When in "Line/value Editing" or default F/S value modification, this key increases the value.
<u> </u>		3. Y axis selection.
	1: Y axis move backward	1. In "CONT Mode", the Y axis will continuously move negative after pressing this key. In "STEP Mode" Y will move negative in steps.
	2: Para value decreases3: Current coordinate 0	2. When in "Line/value Editing" or default F/S value modification, this key decreases the value.
\smile		3. When you start the 2nd function, this key has the Y coordinate function.
	1: Z axis Lift up	1. In "CONT Mode", the Z axis will continuously move positive after pressing this key. In "STEP Mode" Z will move positive in steps.
	2: Z axis select 3: Cancel	2. When in "home/zero-clearing/ gotoz", this key opens Z axis coordinate edit window.
	J. cancer	3. This key is also CANCEL key.
4	1: Z axis down	1. In "CONT Mode", the Z axis will continuously move negative after pressing this key.
ENTER HOME	2: Home 3: Enter/select	2. In "STEP Mode" Z will move negative in steps.
	J. Enter/select	3. This key serves as the ENTER key and also is the HOME key.
	1: A axis rotates CW	1. In "CONT Mode", the A axis will continuously move positive after pressing this key. In "STEP Mode" A will move positive in steps.
	2: A axis select	2. When in "home/zero-clearing/gotoz", this key opens the A axis coordinate edit window.
SELECT	3: Value increases 4:F/S elect/cancel	3. When in FRO/ SRO/ SJR this key increases the parameter value.
	5: Number Key 9	4. When in F or S, this key switches between default value or G code value.
	5. Number Rey 5	5. When the number function is enabled, this key can be used as number key "9".
	1: A axis rotates CCW	1. In "CONT Mode", the A axis will continuously move negative after pressing this key. In "STEP Mode" A will move negative in steps.
	2: Probe function	2. When in 2nd function, this key activates the PROBE.
PROBE	3: Value decreases 4: F/S default modify	3. When in FRO/ SRO/ SJR this key decreases the parameter value.
	5: Number Key 7	4. When in F or S, this key will open the Editing Window.
		5. When the number function is enabled, this key can be used as number key "7".

"Shift" key can be defined as "Menu" or "2nd function" by parameter #313, among which the menu function is the newly added content of DDCS V4.1, and the 2nd function is roughly the same as DDCS V3.1, please pay attention to the differences.

It should be noted that since DDCS V4.1 has correspondingly added many functions, only 17 keys is really not enough, so we defined the "Start" and other keys totally 7 keys to be composite keys, and at the same time, namely F1-F7, which can be Perform corresponding operations according to the on-screen prompts.

At the same time, when the number input function is activated, such as inputting parameter numbers and passwords, some keys are also activated as number keys, see the example below:

								DDCS	5 V4.1
STEP	READY	/iocal/b	all1.nc		ĺ	+00:00:00	Guest		
Name			Size		Mo	dify time	1	USB	DISK 🔵
			[DIR]			05/29 20:46		8	9
ball1.nc			165324	1	1912/0	02/27 17:58	LocalDisk	Tab	SELECT A
							U-Disk	Shift	MODIFY PROBE
							NetDisk Free space:	Mode	CANCEL
Emulation	Сору	Edit	New	Delete	Renam	e Param	3473MB		ENTER HOME
START)		() SET		TryCut	SPIND	NLE PAGE	R GOTOO		NOME X

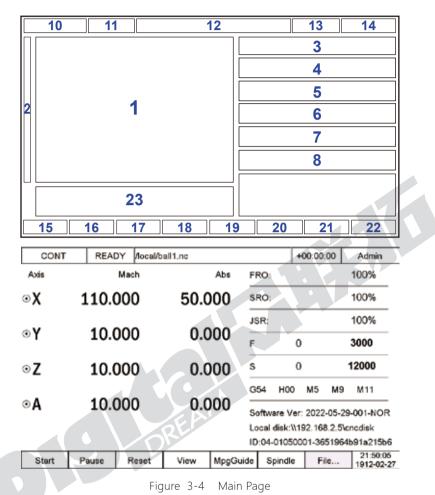
Figure 3-2 F1-F7 Function Key

5	STEP READY /local/ball1.nc	+00:00:00	Guest	
No.	Param. Name	Value	Unit	
318	Tool path page display coordinates	Yes		
319	X axis rotation angle in 3D mode	0.0000	deg	Tab
320	Y axis rotation angle ir input Dialog	0.0000	deg	SELEC.
321	Z axis rotation angle in	0.0000	deg	
322	Monitoring page disabl Enter the operator passwor	d: Yes		
323	Enable of beep 000000	Enable		
324	Color reversal	No		
325		Dk No		
326	Obtain IP address automaucany	No		
327	Local IP address	192.168.2.5		
328	Net mask	255.255.255.0	_	
329	Router IP address	192.168.2.1	_	
330	Shared host IP address	192.168.2.8		
331	Time zone settings	0	4	
	0 1 2	3 4	18:16:49 1912-02-27	
			1012-02-27	

Figure 3-3 Number Key is active

3.2 DDCS V4.1 Interface description

The software interface contains 3 pages. Main page, File page and Parameters page. By pressing File key, the 3 pages swiched sequentially.



3.2.1 Main Page

The Figure 3-4 shows the Main page of the DDCS. It is divided into status column, coordinate display column, basic parameter column, and notification column. In total, it is divided into 23 sections in detail. Here the detailed description of the 23 sections :

1. The mechanical coordinate and current workpeice coordiante for XYZA axis

This column shows the mechanical coordinate value of each axis, the display range is -99999.999~+99999.999, the precision is 0.001; Please note the current unit is in metric or imperial. The default is metric, we can edit it in Parameter #001.

In the MPG mode, we can check the symbol of """ to check which axis is active by MPG.

2. Home symbol: The Home symbol is "①", Non-Home symbol is "②", by the symbol the users can check if the system is homed or not.

3、FRO

FRO controls the feedrate override. Press Tab key till FRO is highlighted by Flashing red and blue color. When the value is less than 100% the color becomes to Blue, and bigger than 100% the color becomes to Red. By A+/A- keys to adjust the value in 5% increments, the range is 0% - 300%.

When in Auto mode, the FRO also can be edited in time.

4、SRO

SRO controls the spindle rate override. Press Tab key till SRO is highlighted by Flashing red and blue color. When the value is less than 100% the color becomes to Blue, and bigger than 100% the color becomes to Red. By A+/A- keys to adjust the value in 5% increments, the range is 0% - 150%.

When in Auto mode, the SRO also can be edited in time.

5、JSR

SJR controls the jogging of the machine. Press Tab Key until JSR is highlighted by Flashing red and blue color. When the value is less than 100% the color becomes to Blue, and bigger than 100% the color becomes to Red. The range is 0% - 150%.

Firstly to confirm which mode the controller is in, Cont or Step or MPG.

In the mode of CONT, by A+/A- key we can adjust the value in 5% increments;

IN the mode of Step, by A- key to pop up the windows of Step distance. Now the number key is active, we can use the number key to input the distance value. This value can replace the value of #98"Jog-1 moving distance"

There are 3 Jog distaces set by the parameter "#98 Jog-1 moving distance", "#99 Jog-2 moving distance" and "#100 Jog-3 moving distance", by A+ key the users can swith the 3 distances sequentially.

6、F Feed speed

Press Tab key till F is highlighted by Flashing red and blue color. The value in middle shows the real time Feeding speed, the value in right shows the default F speed, we can edit the default F speed by A- key. Then the number key is active, we can use the number key to input the speed value. This value can replace the value of #102 default operation speed".

When execute a program, the actual F is the default F speed or the F from G code program, that can be decied by the parameter "#101 Speed Selection".

7、S Spindle speed

Press Tab key till S is highlighted by Flashing red and blue color. The value in middle shows the real time spindle speed, the value in right shows the default spindle speed, we can edit the default spindle speed by A- key. Then the number key is active, we can use the number key to input the speed value. This default spindle speed value can replace the value of #191 Default spindle speed".

When execute a program, the actual F is the default spindle speed or the S from G code program, that can be decied by the parameter "#190 Spindle speed selection".

8、G54 H00 M5 M9 M11

G54: Press Tab key till G54 is highlighted by Flashing red and blue color. Press A- key to call up g54~g59 coordinate system management. You can select the coordinate by Y+ and Y- keys and press Enter to confirm.

H00: Press Tab key till H00 is highlighted by Flashing red and blue color. Press the A- key to call up the Tool management window. You can select the tool through the Y+/Y- key and X+/X- key. Short press the Enter key to activate the number keys, then you can enter the values. Long press the Enter key to confirm the value and exit the tool management window.

M3/M5: Press A- key to switch between the start and stop the spindle.

M8/M9: Press A- key to switch between the start and stop the coolant.

M10/M11 : Press A- key to switch between the start and stop the Lubricant.

9、Display software version No., Local disk path and controller unique tracking number

About the Local disk path, 192.168.2.5 shows the the controller P address.

About the ID, 03 means 3 axis and 04 means 4 axis.

Software Ver: 2022-05-29-001-NOR Local disk:\\192.168.2.5\cncdisk ID:04-01050001-3651964b91a215b6

10、Feed status

This window shows the feed status of Jogging and File Pr ocessing.

AUTO: displayed while processing and executing the G code file.

CONT: indicates Jog CONTINUOUS. You can Jog manually with the" -" or" +" keys of X Y Z

and A. A short click will move the axis in the defined step, a long click will move the axis till you

let go.

Step: Jogging in Step Mode.

MPG: MPG mode. MPG takes over Jog control.

Note: When in Try cut is active, the background of this column is blue, and current mode isn't changed.

11、Operating Status

This column shows the operating state. The status and implications can be displayed as follows:

Busy: Operation is running.

Reset: Reset flashing = controller not active. To activate the controller click Reset.

READY: Ready state. Controller is ready and all operations can be performed.

Bias: The controller in Bias mode.

And when the background of this column is blue, means Trycut is active.

12、Processing file

This column shows the name of the processing files. In the formal situation, it only shows the filename and file path. Under the situation of CONT adjust, it will also show the content of the file. When system cannot find this file, the background turns to red color.

13、Work Time

The working time for the current G-code file. When restart the program, it will start to count.

14、User's Rights

This controller Support 4 kinds operation rights: visitor, operator, admin, super admin. This column shows the current rights.

15、Start and F1 keys

This is a composite key. In the main page, it is a Start function key; In the file page It is a Simulation function key; In the parameters Page it is a Parameter Type function key.

And the system will give different functions to the control system under different states. Please refer to the system prompt.

16、Pause and F2 Key

This is a composite key. In the main page, it is a Pause function key; In the file page It is a Copy function key; In the parameters Page it is a Search function key. And the system will give different functions to F2 under different states. Please refer to the system prompt.

17、Reset and F3 Key

This is a composite key. In the main page, it is a Reset function key; In the file page It is a Edit function key; In the parameters Page it is a Visible function key. And the system will give different functions to F3 under different states. Please refer to the system prompt.

18、View and F4 Key

This is a composite key. In the main page, it is a View function key; In the file page It is a New function key; In the parameters Page it is a Backup function key.

And the system will give different functions to F4 under different states. Please refer to the system prompt.

When number keys is active, it can be used as 1 number..

19、Try Cut and F5 Key

This is a composite key. In the main page, it is a Try cut function key; In the file page It is a Delete function key; In the parameters Page it is a Backup function key.

And the system will give different functions to F5 under different states. Please refer to the system prompt.

When number keys is active, it can be used as 2 number.

20、Spindle ON/OFF and F6 Key

This is a composite key. In the main page, it is a Spindle ON/OF function key; In the file page It is a Rename function key; In the parameters Page it is a Exit function key.

And the system will give different functions to F6 under different states. Please refer system prompt.

When number keys is active, it can be used as 3 number.

21、File and F7 key

This is a composite key. In the main page, By pressing it can switch to File page and parameters page.

When number keys is active, it can be used as 4 number.

22、Date and Time

23、Status prompt bar

When controller is running a program, the code of this line will be displayed here in real time; The point is that DDCS v4.1 has added a parsing error prompt. DDCS v3.1 does not have this function. If there is a parsing error, it will be stopped directly. If there is an error in DDCS v4.1, there will be a red letter warning on a yellow background in the prompt column. The user can find out the cause of the error according to the prompt.

3.2.2 FRO

FRO controls the Feed Rate Override. Press Tab key till FRO is highlighted by Flashing red and blue color. When the value is less than 100% the color becomes to Blue, and bigger than 100% the color becomes to Red. By A+/A- keys to adjust the value in 5% increments, the range is 0% - 300%. When in Auto mode, the FRO also can be edited in time.

Current Feeding Speed F#=Fixed Feeding Speed F * FRO

3.2.3 SRO

SRO controls the spindle rate override. Press Tab key till SRO is highlighted by Flashing red and blue color. When the value is less than 100% the color becomes to Blue, and bigger than 100% the color becomes to Red. By A+/A- keys to adjust the value in 5% increments, the range is 0% - 150%. When in Auto mode, the SRO also can be edited in time.

Current Spindle Speed S#=Fixed Spindle Speed F * SRO

3.2.4 JSR

Firstly to confirm which mode the controller is in, Cont or Step or MPG.

When in Cont Mode, SJR controls the jogging of the machine. Press Tab Key until JSR is highlighted by Flashing red and blue color. When the value is less than 100% the color becomes to Blue, and bigger than 100% the color becomes to Red. The range is 0% - 150%.

Current Jogging Speed FS#=Fixed Manual Speed FS * JSR

In the mode of STEP, by A- key to pop up the windows of Step distance. Now the number key is active, we can use the number key to input the distance value.

The Step distances also can be set by "098~#100 Jog 1-3 moving distance", the default Step distance is "#098 Jog-1 moving distance", . When press the A+ key, system will display "#098~#100" the 3 values in turn. And if Press A- key, system also pop up window for the step distance editing. New step distance will replace the value of "#098~#100".

寸动	设备忙	/local/ball	1.nc			+	00:00:0	0	超级管理员
轴	机械坐	标	工件	坐标	进给修训	¥:			100%
⊙X	10.00	00	0.0	00	主轴修训				100%
⊙Y	10.00	<mark>输入参数</mark> (寸动距i			X				0.100
	10.00		000 <mark>0</mark> 1000)		0		1	99999
⊙Z	49.99	S 取	M.		确认	0			15000
۰ ۸	10.00		0.0	01	G54 I	100	M5	М9	M11
⊙A	10.00	1	0.0	01	软件版本	8号: 2	022-04	-11-0	01-NOR
					ID:04-01	10500	01-365	1964	b91a215b6
		0	1	2	:	3	4	,	18:06:51 1912-02-2

Figure 3-5 Wirte in the step distance

3.2.5 F Feeding speed

F Feeding speed controls the default feeding speed of the control system. Press Tab key till F is highlighted by Flashing red and blue color, it is editable. Now Press A- to modify the value. By X+/X- to move the cursor, by Y+/Y- to increase or decrease the current position number, also you can use the number key to input the number directly.

CONT	READY	/local/b	all1.nc			+00:00:00		Guest	
Axis	Ма	ch		Abs	FRO:			100%	
эχ	10.00	0	0.0	000	SRO:			100%	
∍Y	10.00	0	0.000		JSR:		100%		
9 T	10.00	0	0.000		F	0		4 <mark>7</mark> 999	
ͽZ	10.00	0.000 0.000		00	s	0)	8000	
~ ^	10.00	~			G54	H00	M5 M	9 M11	
∍A	10.00	U	0.000		Netwo	ork not a	connected	-29-001-NOR 64b91a215b6	
		0	1	2		3	4	17:45:04	

Figure 3-6 Write in the F value

As we set the Feeding speed number, and press A+, the current number becomes to a thicker font, it means the default F speed number is the current machining Feeding speed which is not from F value from G code file. Press A+ again, the number becomes to a normal font, then cancel it as the default Feeding speed, system will cite the feeding speed from the G code file.

CONT	REAL	DY /local/t	all1.nc			+	00:00	:00	Guest	
Axis		Mach		Abs	FRO:				100%	
οX	10.(10.000		00	SRO:				100%	
					JSR:				100%	
⊙Y	10.0	000	0.0	00	F	0	0		47999	
⊙Z	10.0	10.000		00	s	0)		8000	
⊙A	10.000		0.0		G54	H00	М5	М9	M11	
					Local disk:\\19		92.16	2022-05-29-001-NO 2.168.2.5\cncdisk 1-3651964b91a215b		
					_		_			
Start	Pause Figure	Reset	View	MpgGuid	_	pindle eedin		il e		
Start CONT	Figure	3-7 th	View ne default f		_	eedin		eed		
	Figure	3-7 th	e default f	F is syst	_	eedin	g spe	eed	1912-02	
CONT	Figure	3-7 th DY Mocal/t Mach	e default f	F is system Abs	em F	eedin	g spe	eed	Guest	
CONT Axis ⊙X	Figure REAL	3-7 th DY Mocal/t Mach	e default f pall1.nc 0.0	Abs	em F	eedin	g spe	eed	1912-02 Guest 100%	
CONT	Figure REAL	3-7 th DY Mocal/t Mach	ie default F pall1.nc	Abs	em F FRO: SRO:	eedin	g spe	eed	Guest 100%	
CONT Axis ⊙X	Figure REAL 10.0 10.0	3-7 th DY Mocal/t Mach	e default f pall1.nc 0.0	Abs	em F FRO: SRO: JSR:	eedin	g spe	eed	100% 100% 100%	
CONT Axis ⊙X ⊙Y ⊙Z	Figure REAL 10.0 10.0	3-7 th DY (nocal/t Mach 000 000	e default F 0.0 0.0 0.0	Abs 00 00	em F FRO: SRO: JSR: F	eedin	g spe	eed	Guest 100% 100% 100% 47999	
CONT Axis ⊙X ⊙Y	Figure REAL 10.0 10.0	3-7 th DY /local/t Mach 000	e default f pall1.nc 0.0 0.0	Abs 00 00	em F FRO: SRO: JSR: F S G54 Softw	eedin + 0 0 H00 are Ver	g spe 00:00 M5	eed :00 M9 -05-2:	Guest 100% 100% 47999 8000 M11	
CONT Axis ⊙X ⊙Y ⊙Z	Figure REAL 10.0 10.0	3-7 th DY (nocal/t Mach 000 000	e default F 0.0 0.0 0.0	Abs 000 000	em F FRO: SRO: JSR: F S G54 Softw Network	eedin + 0 0 H00 are Ver	g spe 00:00)) M5 : 2022 connect	M9 -05-22	Guest 100% 100% 47999 8000	

Figure 3-8 the F from G code is system Feeding speed

3.2.6 S Spindle speed

S spindle speed controls the default spindle speed of the control system. Press Tab key till S is highlighted by Flashing red and blue color, it is editable. Now Press A- to modify the value. Press A- to modify the value. By X+/X- to move the cursor, by Y+/Y- to increase or decrease the current position number, also you can use the number key to input the number directly.

CONT	READY	/local/b	all1.nc			+	00:00:00	Guest		
Axis	Ma	ch		Abs	FRO:			100%		
∍X	10.00	0	0.0	000	SRO:			100%		
	10.00	0		00	JSR:			100%		
∍Y	10.00	0	0.0	000	JU _F			47999		
∍Z	10.000		0.000		s	0		0 <mark>8</mark> 000		
	40.00				G54	H00	M5 M	9 M11		
∍A	10.00	00	0.0	00	Softw	are Ver	2022-05-	29-001-NOR		
						Network not conr		nected		
					ID:04	010500	01-36519	64b91a215b6		
		0	1	2		3	4	17:45:40 1912-02-27		

Figure 3-9 Write in the S value

As we set the Spindle speed number, and press A+, the current number becomes to a thicker font, it means the default S speed number is the current machining spindle speed which is not from S value from G code file. Press A+ again, the number becomes to a normal font, then cancel it as the default Feeding speed, system will cite the spindle speed from the G code file.

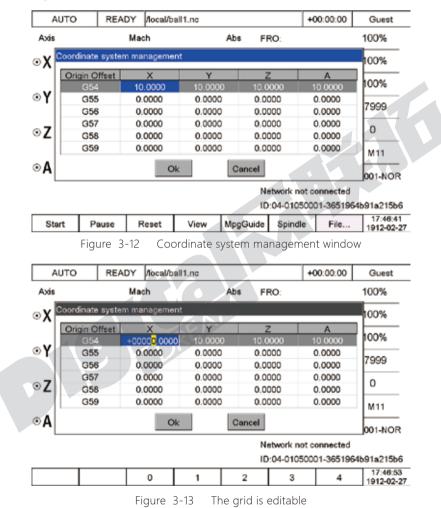
CONT	REAL	DY /local/t	all1.nc			•	00:00	:00	Guest		
Axis		Mach Abs		FRO:			100%				
οX	10.0	10.000		10.000		000	SRO	SRO:			100%
~ 1	10			0.000		JSR:			100%		
⊙Y	10.0	10.000		0.000		F 0			47999		
⊙Z	10.0	10.000		0.000		s 0		6000			
	10.000		0.000		G54	H00	M5	М9	M11		
⊙A	10.0	000	0.0	/00	Software Ver: 2022-05 Network not connecte ID:04-01050001-3651				d 964b91a215b6		
Start	Pause	Reset	View	MpgG	uide	Spindle	Fi	le	17:45:58		
CONT	Figure REAL		he default	S is s	ystem		e spe		Guest		
Axis		Mach	Abs		FRO				100%		
⊙Χ	10.0	000	0.0	00	SRO	c			100%		
۰V	40.4			0.000					100%		
⊙Y	10.0	000	0.0	000	F		0		47999		
⊙Z	10.0	000	0.0	000	s	0)		6000		
	10.000		0.0	0.000		H00	M5	М9	M11		
<u>م</u>		JUU	0.0	000	Software Ver: 2022-05			-05-2	9-001-NOR		
⊙ A	10.0										
⊙A	10.0					ork not (1-010500			lb91a215b6		

Figure 3-11 the S from G code is system Spindle speed

3.2.7 Coordinate system management

In the Coordinate system management we can set the offset and select the current coordiante system.

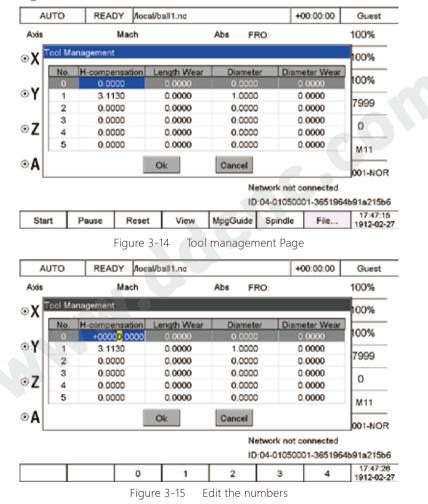
Press Tab key till G54 is highlighted by Flashing red and blue color. Press A+/A- key to jump up the window g54~g59 coordinate system management. Press Y+/Y- and X+/X- to select the grid. Short press enter key to make the grid is editable, we can move the cursor by X+/X- and increase or decrease the current position number by Y+/Y- key, also you can use the number key to input the numbers directly. And then long press the enter to confirm the setting and exit the window of "coordinate system management".



3.2.8 Tool management

By the tool managerment, we can input the Tool length compensation, tool length wear, Tool diameter, and diameter wear. By the values we can reduce the tool errors which made by tool change and cutter wear.

Press Tab key till G54 is highlighted by Flashing red and blue color. Press A+/A- key to jump up the window g54~g59 coordinate system management. Press Y+/Y- and X+/X- to select the grid. Short press enter key to make the grid is editable, we can move the cursor by X+/X- and increase or decrease the current position number by Y+/Y- key, also you can use the number key to input the numbers directly. And then long press the enter to confirm the setting and exit the window of "coordinate system management".



3.3.9 M5/M9/M11

Press Tab key till M5 is highlighted by Flashing red and blue color. Press A+/A- key to switch between the start and stop the spindle.

Press Tab key till M9 is highlighted by Flashing red and blue color. Press A+/A- key to switch between the start and stop the coolant.

Press Tab key till M11 is highlighted by Flashing red and blue color. Press A+/A- key to switch between the start and stop the Lubricant.

3.3 Menu function on the Main page

DDCS V4.1 kept the same functions as DDCS V3.1, and also added new Features. By the parameter #313 to define the shift key as Menu key, we press the Shift key and can see that there are new feature list. Here we describe these new features one by one.

The drawing below shows the tree structure of the Menu functions.

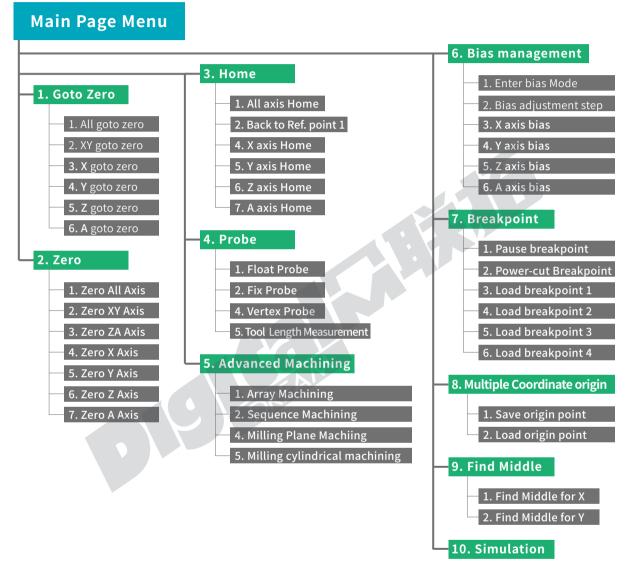


Figure 3-16 Tree Structure of Menu fanctions on Main page

3.3.1 Goto Zero

In the Sub-Menu of the Shift key, we can select sub-menu of "Goto Zero" By Y+/Y-, and press enter to the selection list of the "Goto Zero". Here are 6 goto zero orders for selection, the users can select by Y+/Y- and press enter to execute, if press Cancel key, then exit from the sub-menu.

CONT	READ	DY /local/b	all1.nc		+	00:00:00	Guest	
Axis		Mach		Abs	Got	o zero sub	menu	
x	38.9	515	28.5	515	All	axis goto z	zero	
~	00.	010	20.0		XY	axis goto :	zero	
Y	73.0	609	63.6	609	X axis goto zero			
-			-21.465		Y axis goto zero			
Z	-11.4	465	-21.4	165	Z axis goto zero			
A	80.1	120	70.1	20	A a	ixis goto z	ero	
~	00							
Start	Pause	Reset	View	MpgGuide	Spindle	File	18:36:33 1912-02-2	
		Figure	3-17 Su	ub-Menu (of Goto Z	ero		
CONT	REAL			ub-Menu (ero 00:00:00	Guest	
CONT	REAL						Guest	
Axis	REAL	DY /local/b Mach	all1.nc	Abs FF	+			
Axis X	10.0	Mach	all1.nc 0.0	Abs FF 	+ RO:		100%	
Axis		Mach	all1.nc 0.0	Abs FF	+ RO: RO:	00:00:00	100% 100%	
Axis X	10.0	Mach DO DO Mach DOO DOO	all1.nc 0.0 0.0	Abs FF 000 SF 000 JS	+ RO: RO: BR: 0	00:00:00	100% 100% 100%	
Axis X Y Z	10.0 10.0 10.0	Mach DY /rocal/b Mach DOO DOO	all1.nc 0.0 0.0 0.0	Abs FF 000 SF 000 F 000 F G	+ RO: RO: SR: 0 0	00:00:00	100% 100% 100% 47999 6000	
Aodis X Y	10.0 10.0	Mach DY /rocal/b Mach DOO DOO	all1.nc 0.0 0.0 0.0	Abs FF 000 SF 000 F 000 S 000 S 000 S 000 S	+ RO: RO: SR: 0 0 54 H00	00:00:00	100% 100% 100% 47999 6000	
Axis X Y Z	10.0 10.0 10.0	Mach DY /rocal/b Mach DOO DOO	all1.nc 0.0 0.0 0.0	Abs FF 000 SF 000 F 000 S 000 S 000 S 000 S 000 S 000 S 000 S 000 S	+ RO: RO: SR: 0 54 H00 54 H00 oftware Ver scal disk:\\1	00:00:00 M5 M5 : 2022-05-: 92.168.2.5	100% 100% 100% 47999 6000 9 M11 29-001-NOR	
vis X Y Z	10.0 10.0 10.0	Mach DY /rocal/b Mach DOO DOO	all1.nc 0.0 0.0 0.0	Abs FF 000 SF 000 F 000 S 000 S 000 S 000 S 000 S 000 S 000 S 000 S	+ RO: RO: SR: 0 54 H00 54 H00 oftware Ver iccal disk:\\1 :04-010500	00:00:00 M5 M5 : 2022-05-: 92.168.2.5	100% 100% 100% 47999 6000 9 M11 29-001-NOR Nencdisk	

3.3.2 Zero

In the Sub-Menu of the Shift key, we can select sub-menu of "Zero" By Y+/Y-, and press enter to the selection list of the "Zero". Here are 7 zero orders for selection, the users can select by Y+/Y- and press enter to execute, if press Cancel key, then exit from the sub-menu.

CONT	READ)Y /local/t	all1.nc		+	00:00:00	Guest		
Axis		Mach		Abs	Z	ero submen	u		
∞X	107.9	944	97.9	944	All axis zero				
						XY axis zero			
⊗Y	95.0)44	85.0	85.044 ZA axis zer					
~ 7	24.0		21.697		×	(axis zero			
⊗Ζ	31.6	597	21.6	9 <i>1</i>	Y	′axis zero			
⊗A	-39.6	.618 -49.618		518	z	axis zero			
- //	00.0				م	axis zero			
Start	Pause	Reset	View	MpgGuide	Spindle	File	18:38:35 1912-02-27		
		Figure	3-19 Si	ub-menu	of Zero				

Digital Dream Controller System

CONT	READ	DY NocalA	ball1.nc			+	00:00:0	0	Guest
Axis		Mach		Abs F	RO				100%
⊗X	107.9	944	0.0	000	SRO:				100%
⊗Y	95.0	144	0.0	000	ISR:				100%
© 1	95.0	J44	0.0	,000	F 0			47999	
⊗Ζ	31.0	697	0.0	000	5	0			6000
					354	H00	M5	М9	M11
⊗A	-39.0	518	0.0			are Ver: disk:\\1!			-001-NOR nodisk
				I	D:04	010500	01-365	1964	91a215b6
Start	Pause	Reset	View	MpgGuide	s s	pindle	File	e	18:38:44 1912-02-27
		Fig	ure 3-20	Zero al	l axi	S			

3.3.3 Home

In the Sub-Menu of the Shift key, we can select sub-menu of "Home" By Y+/Y-, and press enter to the selection list of the "Home". Here are 9 zero orders for selection, the users can select by Y+/Y- and press enter to execute, if press Cancel key, then exit from the sub-menu.

In the sub-menu of Home, we added 4 "Back to references point" selection. In Home Parameters of Parameters Page, we can define the 4 mechanical references points position, and execute in the sub-menu, very effective and convenient.

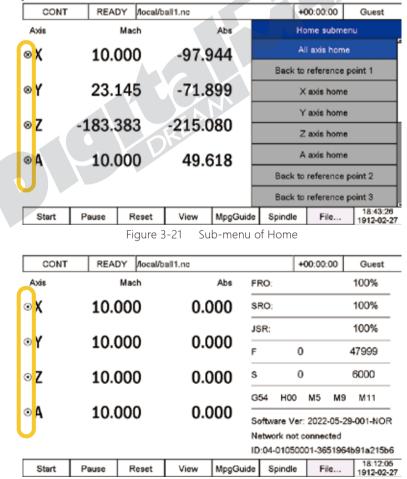
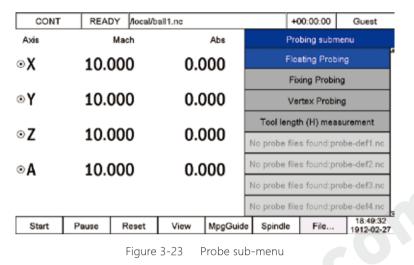


Figure 3-22 Home all axis, notify the Home symbol

3.3.4 Probe

The tools will be worn down after long time working,or during the processing the users need to change another cutters to finish job,we need to meansure the new positon of the cutter point. In DDCS V4.1 control system, we supply Floating Probe, Fix Probe, Vertex Probe and Tool Length (H) meansurements to the operator.



3.3.4.1 Floating Probe

The floating Probe is to place a floating sensor on the surface of the workpiece, and the tool slowly comes down to the sensor. Because the sensor is floating on the workpiece, it is called floating probe. The floating probe is used to set the origin point of the Z axis. Before execute the floating probe, the users need to measure the thickness of the sensor and fill in the this value.

PROBE	. READY	/local/ball1.nc			+0	00:00:00	Guest
Floating prot	bing 🧹						
Tool sensor	thickness: +1	0.0000 f	eedrate:	010	Bac	k dis.: 🖣	0000.0000
Operating I	nstructions:						
1.The tool s	ensor is place	d on the surface of	of the wo	rkpiece,	check the pr	robe signa	al;
2.Move the	tool over the t	pol sensor;			-	-	
3.Enter this	page and ent	er the tool sensor	thicknes	s param	eter;		
		ing probe and the				bing spec	ed:
•	,	stected, thickness		-			-
o.minen pro	oe eignane a	100100, 11001000	01 001 3	511501 50	10 2-000	coordina	
	neter via [TAB meter via [X-/)	i].hold [OK] to con <+/Y-/Y+].	tinue.			Ok	Cancel
							18:49:41

Figure 3-24 Floating Probe Management Page

When input the number, we can move the cursor by X+/X- and increase or decrease the number by Y+/Y-. Press Tab key to go to next column, or you short press Enter cursor go to next column. After setting well, Long press Enter key the system start to execute the floating probe.

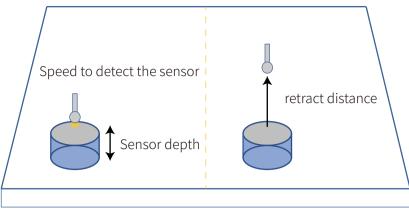


Figure 3-25 Floating Probe Sequence

3.3.4.2 Fixed probe

The fixed probe refers to the probe operation on a fixed position on the machine, the probe sensor is installed on a fixed position, so it is called fixed probe. The users must determine the Probe mechanical position of XYZ axis, safety height, then can execute the fixed probe.

Before fixed probe, no forget to Home all axis.

The operation of numbers input as same as the Floating probe.

-		-											
PROBE.	REAL	DY /local/b	all1.nc		+(00:00:00	Guest						
Fixing probi	ng												
feedrate: 010 Probeing position(Mach) X: +0020.0000 Back dis.: +00.0000 Probeing position(Mach) Y: +0020.0000 Safety beight(Mach): +0020.0000 Probeing position(Mach) Y: +0020.0000													
Safety height(Mach): +0020.0000 Probeing position(Mach) Z: +0010.0000													
2.Check the 3.Enter this 4.Press [O axis to pro Mach coo	Operating Instructions: 1. Tool sensor is mounted in fixed position on machine, HOME is required before probing; 2. Check the probe signal; 3. Enter this page and set the relevant parameters correctly; 4. Press [OK] to start fixed probing, rise Z-axis to safe height, first move XY-axis, then move Z- axis to probing position, then downward at probing feedrate, when probe signal checked, Z-axis Mach coordinates send to the Z-axis bias, Then Z-axis back and fixed probing is finished. Note: When the position of tool sensor on machine changes, please perform fixed probing!												
select parameter via [TAB],hold [OK] to continue. Adjust parameter via [X-/X+/Y-/Y+]. Ok Cancel													
Start	Pause	Reset	View	MpgGuide	Spindle	File	18:58:52 1912-02-27						

Figure 3-26 Fixed Probe Management Page

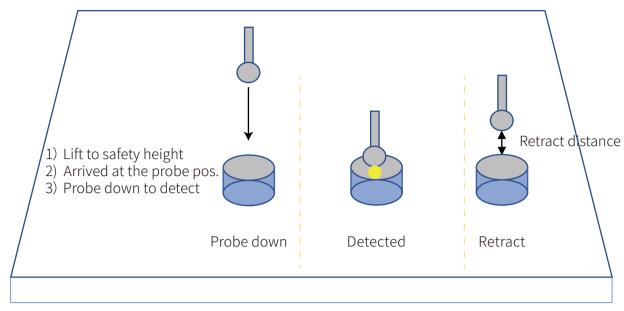


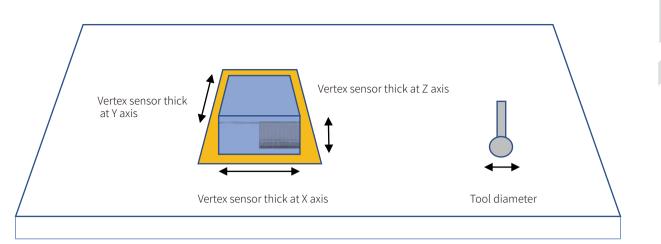
Figure 3-27 Fixed Probe Sequence

3.3.4.3 Vertex Probe

The difference between Vertex probe and Floating/fixed probe, Floating/fixed probe only can calibrate the Z axis potion, but Vertex probe can calibrate X/Y and Z axis position. For Vertex probe, we need the probe sensor must be a metal square with no coating on the surface, and the sensor must be a good conductive body and the XYZ three planes are vertically at 90 degrees.

PROBE.	REAI	DY /local/b	all1.nc		+	00:00:00	Guest
Vertex Prob	ing						
feedrate: Operating I 1.Perform 2 2.Z-axis ba 3.X-axis m 4.Z-axis dr 5.Perform 2 6.X-axis ba 7.Z-axis ba 9.Z-axis dr 10.Y-axis b 11.Z-axis dr select para	010 diame nstructions: Z-axis plane ck, Back dis oves to outs ops below si X-axis plane ick, Back dis ck,Y-axis m ops,Perform ack, Back di rops, XY ax meter via [T	probing, Z-a stance is set ide of workp urface of wo probing, X-a stance is set oves to outs Y-axis plan listance is set is moves to AB],hold [OI	axis plane co to: iece edge, N rkpiece, Mov axis plane co to: ide of workp e probing, Y- et to: vertex of wo	oordinate is s Noving distar ving distance oordinate is s iece edge, N -axis plane c rkpiece, Pro	et to: is set to: is set to: et to: loving distan oordinate is	- - - - - - - - - - - - - - - - - - -	z +09.0000 +10.0000 +0010.0000 +25.0000 +0010.0000 +0010.0000 +0010.0000 +0010.0000 +0010.0000
Adjust para	meter via [X	(-/X+/Y-/Y+]					
Start	Pause	Reset	View	MpgGuide	Spindle	File	19:04:17 1912-02-27

Figure 3-28 Vetex Probe Management Page





The values needed to write in:

- 1. Perform Z-axis plane probing, Z-axis plane coordinate is set to:
- 2. Z-axis back, Back distance is set to:
- 3. X-axis moves to outside of workpiece edge, Moving distance is set to:
- 4. Z-axis drops below surface of workpiece, Moving distance is set to:
- 5. Perform X-axis plane probing, X-axis plane coordinate is set to:
- 6. X-axis back, Back distance is set to:
- 7. Z-axis back,Y-axis moves to outside of workpiece edge, Moving distance is:
- 9. Z-axis drops, Perform Y-axis plane probing, Y-axis plane coordinate is:
- 10. Y-axis back, Back distance is set to:
- 11. Z-axis drops, XY axis moves to vertex of workpiece, Probing complete.

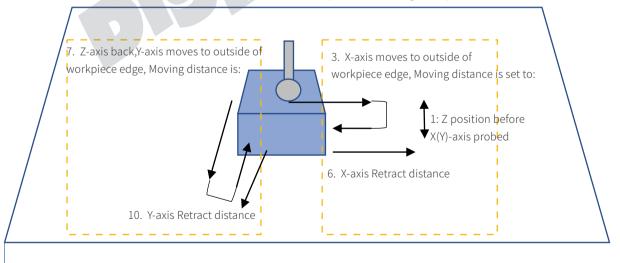
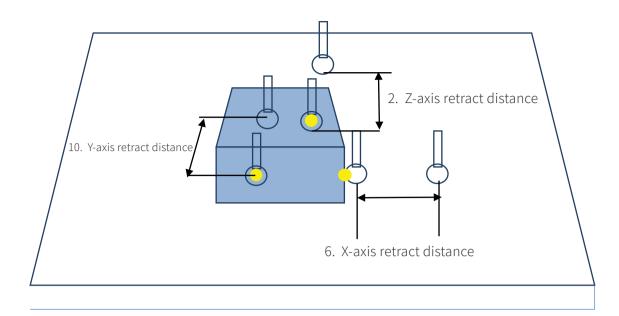
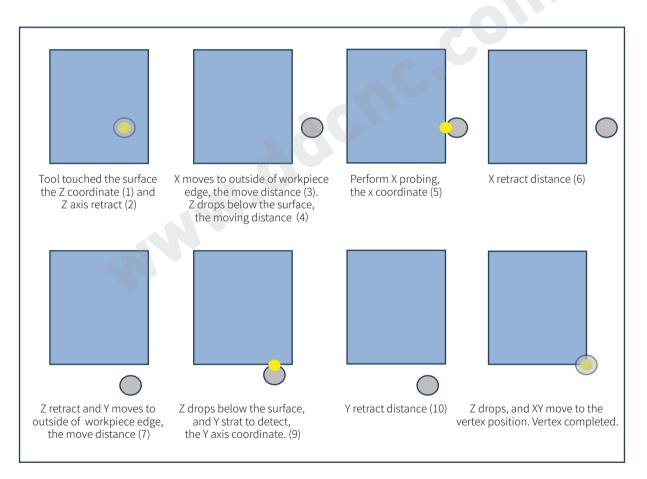


Figure 3-30 Detection Sequence in Vertex probe







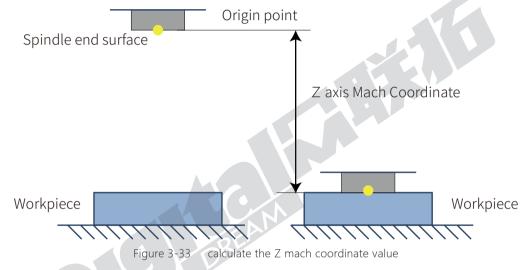


3.3.4.4 Tool length (H) Measurement

The tools position changes caused by the tool wear or reinstallation of the tools. After the establishment and execution of the tool position compensation, no need to create a new program to fix new situation. Generally, we use the cutter tip as the control point and the length of the tool is the baseline length. If you replace the tool during processing, we need to make the length compensation. The compensation value is equal to the length difference between the new tool length and the baseline length. In addition, when the measurement reference surface of the baseline tool length is used as the control point, the tool length compensation always exists. No matter which tool you will use system must execute the absolute length compensation.

In the program, the length compensation command is $G43 H_{-}$. G43 is tool length compensation, H_{-} is the tool number in the CNC machine, we can use G49 to cancel the compensation.

1) Use the spindle end surface to directly contact the upper surface the workpiece, and go to Z0 in G54. Then system calculate the Z mach coordinate value.



2) The control system go to "Shift – Probe – Tool length (H) measurement"

3) Firstly measure the baseline length. Install the baseline tool, and in the page of "Tool length (H) measurement" we choose how to measure the length, by floating probe or fixed probe, and write in the according numbers and execute.

When the baseline tool probed down and contacted the surface of the workpiece, the system can calculate the baseline length=Z mach coordinate - detect distance.

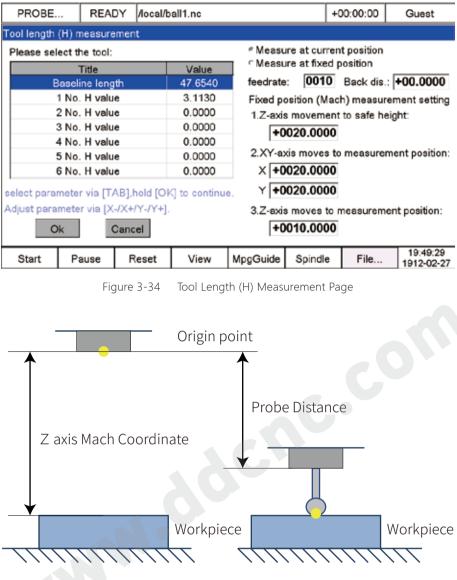


Figure 35 Meansure the Baseline length

4) Now we start the measure the No. 1 tool compensation. By Y+/Y- we select "1 No. H value" and long press the enter key, tool starts to detect down and when it touched the surface of the work-piece, system can calculate the length difference and write the difference to No.1 tool compensation.

5) By same methods to measure No.2 tool and No. 3 tool.

PROBE	. REAL	DY	/local/b	all1.nc			+	00:00:	00	Guest
Axis		Maq	Tool ler	ngth (H) mea	surement				100%	
⊙ X	10.0	00	Measu	urements are	complete!					100%
				Title	Value					100%
⊙Y	10/	hor l	Bas	eline length	47.6540					100%
Οĭ	10.0	JUI	11	lo. H value	3.1130		0			47999
			21	lo. H value	10.6940					
οZ	58.3	DA.	31	lo. H value	0.0000		0			0
٥Z	oc	54	41	lo. H value	0.0000		-			÷
			51	lo. H value	0.0000		02	M5	М9	M11
οA	10.0	hor	61	lo. H value	0.0000					
®A	10.0	50			_		Ver	2022	05-29	-001-NOR
					Ok Ca	ancel	ew 1	02 168	2 510	ncdisk
		_			ID	:04-010	500	01-36	51964	b91a215b6
Start	Pause	Re	eset	View	MpgGuide	Spind	lle	Fi	e	20:03:24
LI	2.26									

Figure 3-36 The system calculate the Tool 2 compensation and write in

3.3.5 Advanced machining

dvance	d mac	hining	5				
连续	空闲	/local/b	all1.nc		-0	0:03:55	超级管理员
独	机机	成坐标	工作	+坐标	高	级加工子募	莱 单
οX	33	327	33	27	Â	级启动策F	略
~ X	0.0		0.0			阵列加工	
⊙Y	5.0	080	4.0	80		序列加工	
_					Ŷ	先平面加工	
⊙Z	8.5	582	-1.4	18	ť	先圆柱加工	;
ΘA	0 (000	0.0	000			
~н Г	0.0	100	0.0				
启动	暂停	复位	视图	手轮引导	主轴启停	文件页面	19:02:44 1912-02-2

Figure 3-37 Sub-Menu of Advanced machining

Page - 48

3.3.5.1 Advanced startup

In the page, we can execute "Specified line" and "closest location" .

Specified line: We can enter the line number, the system will process from this line.

Closest Location: System will search the closest point from current position and process from this closest location.

AUTO	READ	Y /local/b	all1.nc			+00:00:00	Guest
Advanced S	tartup						
Current m	achining:Sing	gle workpied	e machining	Machining f	file informa	ation:	
Startup m	ethod:			Number o	of lines:95	108	
○ Specif	fied line			X-axis rar	nge:[-100.	0000-100.00	000]
Close:	st Location			Y-axis rar	nge:[-100.	0000-100.00	000]
Specified	line:			Z-axis rar	nge:[-3.00	000.5000]	-
00006	162			Machining	g time:0h0	m0s	
2.Soft limit (3.When using select parameters)	ocation] funct of XY axis m ng [closest lo meter via [T/ meter via [X-	ust be enab ocation], nee	led in order to ed to move to <] to continue	to use [close pol to area th	st location] function;	
							20:03:40
Start	Pause	Reset	View	MpgGuide	Spindle	File	1912-02-27
		Figure 3	8-38 Adva	anced startu	up page		

3.3.5.2 Array machining

Write in properly of "Array Rows", "Array Columns", "Row spacing", "Column spacing", "Rotation angle", "Rotation Center X", "Rotation Center Y".

When input the number, we can move the cursor by X+/X- and increase or decrease the number by Y+/Y-. Press Tab key to go to next column, or you short press Enter cursor go to next column. After setting done, Long press Enter key the system start to execute.

AUTO	READ	DY /local/b	all1.nc			+00:00:00	Guest			
Array machi	ning									
Array	Rows: 00			Machining fi	e informat	tion:				
Array Co	lumns: 00			Number o	f lines:95	108				
Row spacing: +0000.0000 X-axis range:[-100.0000,100.0000] Y-axis range:[-100.0000,100.0000] Y-axis range:[-100.0000,100.0000]										
Column spacing: +0000.0000 Z-axis range:[-3.0000,-0.5000]										
Rotation	angle: +0	000.000		Machining	; time:0h0	mOs				
Rotation Ce	nter X: +0	000.000								
Rotation Ce	nter Y: +0	000.000								
Note: The r	otation setti	ng is used fo	or each cell,	not the entire	array!					
select parameter via [TAB],hold [OK] to continue. Adjust parameter via [X-/X+/Y-/Y+]. Ok Cancel										
Start	Pause	Reset	View	MpgGuide	Spindle	File	20:03:51 1912-02-27			

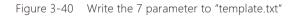
Figure 3-39 Array machining page

3.3.5.3 Sequence machining

By "Origin-X", "Origin-Y", "Origin-Z", "Origin-A", "Rotate-angle", "R-Center-X", "R-Center-Y" the 7 parameters, the system execute the sequence machining.

The values about sequence machining cannot write in the controller by keys. We need to find out the template.txt file in the system software, and write in the values there. Add these 7 values in the file and separate them by the space key.

The software with new "template.txt" file, system update with it and we can check it out.



The software with new "template.txt" file, system update with it and we can check it out at the page of Sequence machining.

AUTO READY /local/ball1.nc +00:00:00 Guest												
Sequence machining												
Sequ	ience mach	ining nod	e informat	ion:								
No.	Origin-X	Origin	-Y Or	igin-Z 🛛 🤇	Drigin-A	Rotate-angle	R-Center-X	R-Center-Y				
1	50.0000	0.000	0 0.	0000	0.0000	45.0000	50.0000	25.0000				
2	50.0000	0.000	0 0.	0000	0.0000.0	-45.0000	50.0000	25.0000				
3	50.0000	0.000	0 0.	0000	0.0000.0	0.0000	50.0000	25.0000				
4	50.0000	0.000	0 0.	0000	0.0000.0	45.0000	50.0000	25.0000				
1. The template file for serial machining is template.txt in the system directory; 2. Please write the template file in the order of the fields in the list above; Machining file information: Number of lines:95108 X-axis range:[-100.0000,100.0000] Y-axis range:[-3.0000,-0.5000] C-axis range:[-3.0000,-0.5000]												
Mach Nun X-a Y-a Z-a	hining file in hber of lines his range:[-1 his range:[-3 his range:[-3	the templa formation 195108 100.0000, 100.0000, 3.0000,-0.	ate file in t 100.0000 100.0000	the order of			ove;	Cancel				
Mach Nun X-a Y-a Z-a	hining file in hber of lines kis range:[-1 kis range:[-1	the templa formation 195108 100.0000, 100.0000, 3.0000,-0.	ate file in t 100.0000 100.0000	the order of				Cancel 20.04:18				

Figure 3-41 Sequence machining Page

3.3.5.4 Milling Plane Machining

Before Milling Plane machining, no forget to Home all axis.

After all the settings done, long press the Enter key to execute the program. And the program converts to G code and saved to the file of "macroMillRect.nc" in the system software.

AUTO	REAL	DY /local/b	all1.nc		+(00:08:08	Guest				
SIMULATIC	N										
 Single v Array m 	achining sin	achining sim		Number o X-axis rai Y-axis rai Z-axis rai	g file informa of lines:9510 nge:[-100.00 nge:[-100.00 nge:[-3.0000 g time:0h0m)8 000,100.0(000,100.0(0,-0.5000]	000]				
Machining time:0h0m0s Simulation operation instructions: 1.The coordinates will be changed with simulation process and soft limit check will be performed; 2.The simulation speed can be adjusted by [FRO] (full speed simulation at FRO >= 100%); 3.Pressing [Pause] key will exit the simulation and enter the pause state; 4.During the simulation, breakpoints can be saved manually through the breakpoints menu; 5.Start simulation in pause state, the system will start the simulation from the pause breakpoint;											
Adjust para	meter via [X	(-/X+/Y-/Y+]				Ok	Cancel				
Start	Pause	Reset	View	MpgGuide	Spindle	File	17:52:02				

Figure 3-42 Milling Plane Machining Page

3.3.5.5 Milling cylindrical machining

Before Milling cylindrical machining, no forget to Home all axis.

After all the settings done, long press the Enter key to execute the program. And the program converts to G code and saved to the file of "macroMillCylinder.nc" in the system software.

AUTO	REA	DY //ddcs	v4/macroMilK	Vinder no		+00:00:03	Admin
			- Inflation Chilling	- Jin laor ino			
Milling cyline			_				
	central axis:	Roughcas	t diameter: +(0000.0000	Cylinde	r diameter:	+0000.0000
° <mark>X-axis</mark> ⊂ Y-axis		Workpi	ece length: +(0000.0000	I	ayer depth:	+0000.0000
		Cutt	er diameter +(00.000	Tool	tip spacing:	+00.0000
		Drillin	g feedrate: 00	00100	Millin	g feedrate:	000500
Tips:							
1.Press [Ca	ancel] to exi	t page, the	n simulate to	ensure the sa	afety of n	nachining;	
2.The millin	ng file is mad	roMillCylin	der.nc in the	system direct	tory, It is	written usin	g Class B-
macros, W	hen file nam	ie is prefixe	d with macro	system will	automatio	cally enter m	nacro parsing
			ows, users ca				
select para	meter via [T	AB1 hold [0	DKI tr				
	meter via [)					Ok	Cancel
	-		-				
Start	Pause	Reset	View	MpgGuide	Spindle	File	18:11:21 1912-02-27

Figure 3-43 Milling cylindrical machining Page

3.3.6 Bias Management

When entered Bias management mode, the system mode turns to Bias mode, we can check it at the column 10. Now by the key of X+/X-, Y+/Y-, Z+/Z-, A+/A-, we can easily adjust the Bias of each axis, each press we make is one distance of "Bias adjustment step".

CONT	REAL	DY /ddcsv	4/macroMillO	ylinder.nc	•	-00:00:07	Admin			
Axis		Mach	SEP	Abs	Bias ma	anagement	submenu			
οX	10.0	000	0.0	000	Enter bia	s managem	ent mode			
					Bias adjustment step					
⊙Y	10.0	000	0.0	000		X axis bias				
						Y axis bias				
⊙Z	5.0	000	-5.0	000		Z axis bias				
⊙A	10 (000	0.0	000		A axis bias				
~7	10.0	000	0.0							
Start	Pause	Reset	View	MpgGuide	Spindle	File	18:11:38 1912-02-27			

Figure 3-44 Enter Bias Management Mode

BIAS	READ	DY /ddcsv	4/macroMillO	Cylinder.nc		+	00:00:	07	Admin
Axis		Bias		Abs	FRO				100%
⊙Χ	0.0	000	0.0	000	SRO:				100%
۰V	~	200	0.000		JSR:				100%
⊙Y	0.0	000			F 0)	47999	
οZ	47.0	654	0.0	000	s	0)		8000
	~				G54	H00	M5	М9	M11
⊙A	0.0	000	0.0	000	Bias a	lias adjustment mode			
			[axis ctrl key] adjust axis bias						bias
					[mode	e key] se	et step	:1.000	
Start	Pause	Reset	View	MpgGuid	uide Spind		Fi	e	18:12:43 1912-02-27

Figure 3-45 System is in Bias Mode

The Bias trip step range in Bias adjustment step, is from 0.0001 to 1. The Bias of each axis, the range is from 0.0001 to 9999.9999.

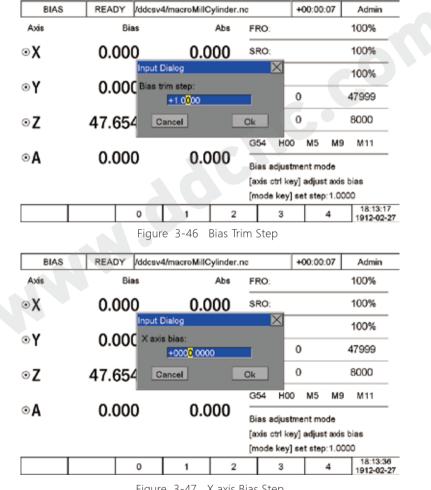


Figure 3-47 X axis Bias Step

If we didn't exit from the Bias management mode, the controller will be always in Bias mode. Only after we exit from the Bias management mode, we can operate other functions.

3.3.7 Breakpoint

In DDCS V4.1 there is Pause breakpoint, Power-down breakpoint, and 4 record breakpoint.

Pause Breakpoint: The system can remember the line number of last pause, the users can select to process from pause breakpoint.

Power-down Breakpoint: The system can remember the line number when power-cut, the users can select to process from the power-cut line.

Recorded breakpoint: The uses can record the breakpoint when system is processing a program. The system will make a record of the program line and create a breakpoint. We can record 4 breakpoints.

CONT	REAL	DY /de	lcsv4/macroM	illRect	.nc		+00:00:08	Guest		
Axis		Mach		Breakpoint submenu						
οX	10.0	000	10	Pause Breakpoint macroMillCylinder.nc 92						
				Powe	r-down E	Breakpoint	macroMillCy	linder.nc 92		
⊙Y	10.0	000	10		Load	breakpoin	t1 ball1.nc 6	162		
. 7			-	Load breakpoint2 ball1.nc 13698						
⊙Ζ	5.0	000	-5		Load	breakpoint	3 ball1.nc 17	7335		
⊙A	0.0	000	0		Load	breakpoint	4 ball1.nc 21	1589		
	•		•							
Start	Pause	Rese	et View	Мр	gGuide	Spindle	File	21:03:57 1912-02-27		

Figure 3-48 3 kinds breakpoints are created

When the controller is in Ready Mode, we can load the breakpoint.

After loading the breakpoint, we can enter into the load breakpoint page, in the page, the users still can have 3 choices: Go to specified line, go to closest line and go to the breakpoint that you selected.

Long press Enter key to execute.

Αυτο	READ		DY /local/ball1.nc +00:00:42 Guest								
AUTO	REAL	J T Nocal/d	all'I.nc			+00:00:42	Guest				
Load breakp	oint										
machining	method:Sin	gle Progran	n mode:Norr	nal Line No.:	13698						
Startup m	ethod:			Machining	file informa	tion:					
○ Specif	ied line			Number of	of lines:95	108					
Closes	st Location			X-axis rai	nge:[-100.	0000-100.00	000]				
Break	point			Y-axis rai	nge:[-100.	0000-100.00	000]				
Specified	line:			Z-axis rar	nge:[-3.00	000.5000]	-				
00013	698			Machining time:0h0m0s							
Message											
1.[closest lo	cation] func	tion position	s file starting	g line accordi	ing to XY p	osition of t	ool;				
2.Soft limit of	of XY axis m	ust be enab	led in order	to use [close	st location] function;					
				ool to area th			nachined;				
	meter via [T/										
	meter via [X	2 · · · · ·	q to continu	0.		Ok	Cancel				
Start	Pause	Reset	View	MpgGuide	Spindle	File	21:04:12 1912-02-27				

Figure 3-49 Load the Breakpoint Page

3.3.8 Multiple Coordinate origin

The Multi coordinate by setting different origins, can process the multi-workpiece under the same coordinate system. The user can save the origin point of the workpiece by saving the mechanical coordinates of the origin point. When the users need it just load the coordinate origin.

CONT	REAL	DY /local/t	all1.nc		+0	0:00:19	Guest		
Axis		Mach		Abs	Mai	n page m	enu		
οX	10.0	000	0.00	00	G	oto zero			
				.		Zero			
⊙Y	10.0	000	0.00	00	Home Probe Advanced machining Bias management breakpoint Coordinate origin Seindle Eile 17:44:10				
⊙Z	10 (000	0.00	nn	1	Probe			
~ L	10.0	000	0.00		Advanc	ed machi	ning		
⊙A	10.0	000	0.00	00	Bias n	nanageme	int		
6162:X-2.2	47 Y4.203				br	eakpoint			
					· · · · ·				
Start	Pause	Reset	View	MpgGuide	Spindle	File	1912-02-27		
	Figure	e 3-50 N	Aultiple Coo	ordinate	origin sele	ection			
CONT	REAL	DY /local/t	all1.nc		+0	0:00:19	Guest		
Axis		Mach		Abs	Coordina	te origin :	submenu		
οX	10.0	000	0.00	00	Save coordinate origin				
					Load coordinate origin				
⊙Y	10/	~~~	~ ~ ~ ~						
-	10.0	000	0.00	00					
∘z	-	000	0.00						
	10.0			00					
⊙Z	10.0 10.0	000	0.00	00					
⊙Z ⊙A	10.0 10.0	000	0.00	00	Spindle	File	17:44:18 1912-02-27		
⊙Z ⊙A 6162:X-2.24	10.0 10.0	000 000 Reset	0.00	00 00 MpgGuide			1912-02-27		
⊙Z ⊙A 6162:X-2.24	10.0 10.0 47 Y4.203 Pause	000 000 <u>Reset</u> 3-51 Sub	0.00 0.00	00 00 MpgGuide	Coordinat		1912-02-27		
⊙ Z ⊙ A 6162:X-2.24 Start	10.0 10.0 47 Y4.203 Pause Figure	000 000 <u>Reset</u> 3-51 Sub	0.00 0.00 View 1 D-menu of M	00 00 MpgGuide Multiple	Coordinat +0 Save coordin	e origin 0:00:19 nate origin	Guest		
• Z • A 6162:X-2.24 Start Start STEP Axis	10.0 10.0 47 Y4.203 Pause Figure	000 000 Reset 3-51 Sub Dy flocal/t Mach	0.00 0.00 View 1 D-menu of M	00 00 MpgGuide Multiple Abs	Coordinat +0 Save coordin 10.000 Y10.0	e origin 0:00:19 nate origin 00 Z10.00	Guest Submenu 00 A10.000		
 ✓ Z ✓ A 6162:X-2.24 Start Start STEP Axis ✓ X 	10.0 10.0 47 Y4 203 Pause Figure : REAL	000 000 Reset 3-51 Sub DY /local/t Mach	0.00 0.00 View 1 0-menu of N pall1.nc	00 00 MpgGuide Multiple	Coordinat +0 Save coordin 10.000 Y 10.0 50.000 Y 60.0	e origin 0:00:19 nate origin 00 Z10.00	Guest Guest 1 submenu 00 A10.000 00 A10.000		
⊙ Z ⊙ A 6162:X-2.24 Start Start Axis ⊙ X	10.0 10.0 47 Y4.203 Pause Figure : REAL	000 000 Reset 3-51 Sub DY /local/t Mach	0.00 0.00 View 1 p-menu of N pall1.nc	00 00 MpgGuide Multiple	Coordinat +0 Save coordin 10.000 Y10.0 50.000 Y60.0 10.000 Y110.	e origin 0:00:19 nate origin 00 Z10.00 00 Z10.00	Guest Guest 1 submenu 00 A10.000 00 A10.000		
 Z A 6162:X-2.24 Start Start STEP Axis Axis X Y 	10.0 10.0 47 Y4.203 Pause Figure : READ 110.0 110.0	000 000 Reset 3-51 Sub DY /local/t Mach	0.00 0.00 View 1 0-menu of N pall1.nc	00 00 MpgGuide Multiple Abs 00 X XI	Coordinat +0 Save coordin 10.000 Y10.0 50.000 Y60.0 10.000 Y110. No	e origin 0:00:19 nate origin 00 210.00 00 210.00 000 210.00	Guest Guest 1 submenu 00 A10.000 00 A10.000		
 Z A 6162:X-2.24 Start Start Axis X Y Z 	10.0 10.0 10.0 47 Y4.203 Pause Figure 3 REAL 110.0 110.0 10.0	000 000 Reset 3-51 Suk Mach 000 000	0.00 0.00 View / 0-menu of M 0-menu of M 0-menu of M 0.00 0.00	00 00 MpgGuide Multiple Abs 00 ×1 00 ×1 00	Coordinat +0 Save coordin 10.000 Y10.0 50.000 Y60.0 10.000 Y110. No	e origin 0:00:19 0:00:210.00 00:210.00 00:210.00 0:00:20 0:00:210.00 0:00:210.00 0:00:210.00 0:00:210.00 0:00:20 0:00	Guest Guest 1 submenu 00 A10.000 00 A10.000		
 Z A 6162:X-2.24 Start Start Axis X Y Z 	10.0 10.0 10.0 47 Y4.203 Pause Figure 3 REAL 110.0 110.0 10.0	000 000 Reset 3-51 Sub DY /local/t Mach 000	0.00 0.00 View 1 0-menu of N 0-menu of N 0.00 0.00	00 00 MpgGuide Multiple Abs 00 ×1 00 ×1 00	Coordinat +0 Save coordin 10.000 Y10.0 50.000 Y60.0 10.000 Y110. No No	e origin 0:00:19 hate origin 00 210.00 00 210.00 000 210.00 0 record 0 record 0 record	Guest Guest 1 submenu 00 A10.000 00 A10.000		
 ○ Z ○ A 6162:X-2.24 Start Start STEP Axis 	10.0 10.0 10.0 47 Y4.203 Pause Figure : REAL 110.0 10.0 10.0	000 000 Reset 3-51 Suk Mach 000 000	0.00 0.00 View / 0-menu of M 0-menu of M 0-menu of M 0.00 0.00	00 00 MpgGuide Multiple Abs 00 ×1 00 ×1 00	Coordinat +0 Save coordin 10.000 ¥10.0 50.000 ¥60.0 10.000 ¥110. No No No	e origin 0:00:19 0:00:210.00 00:210.00 00:210.00 0:00:20 0:00:210.00 0:00:210.00 0:00:210.00 0:00:210.00 0:00:210.00 0:00:210.00 0:00:210.00 0:00:20 0	Guest Guest 1 submenu 00 A10.000 00 A10.000		

Figure 3-52 Create the coordinate oringins

The users can save a lot of coordinate origins when need just select and load it.

STEP	READ	DY /local/b	all1.nc				+00:00:19	Guest		
Axis		Mach		Abs		Load coor	dinate origir	n submenu		
⊙X	110.0	000	100.0	000	X10.000 Y10.000 Z10.000 A10.000					
					X60.000 Y60.000 Z10.000 A10.000					
⊙Y	110.0	000	100.0	000	X11	0.000 Y1	10.000 Z10.	000 A10.000		
- 7	40.4	200	~				No record			
⊙Z	10.0	JUU	0.0	000			No record			
⊙A	10.0	000	0.0	000			No record			
							No record			
6162:X-2.24	5162:X-2.247 Y4.203						No record			
Start	Pause	Reset	View	MpgGu	Guide Spindle File 17:47:3 1912-02					

Figure 3-53 Load the coordinate origin 1

3.3.9 Centers

DDCS V4.1 only support find middle for X and Y axis. The Operation:

1. First, place the tool against the x-axis side of the workpiece and zero x-axis;

2. Then place the tool against the other side of the x-axis of the workpiece;

3. Long Press enter key and x-axis origin will be set to center point of the workpiece. Y axis Find center operation as the same.

CONT	READY	/ddcsv	4/macroMillC	ylinder.nc		+	00:00:	17	Admin
Axis	Ma	ch		Abs	FRO:				100%
⊙X	10.00	0	0.0	00	SRO:				100%
~ V	40.00				JSR:				100%
⊙Y	10.00	U	0.0	00	F	0)		3000
∘z	10.00	0	0.0	00	s	0)		12000
					G54	H00	M5	М9	M11
⊙ A 92:N14G91	10.00 G1A360	0	0.0			are Ver disk:\\1			-001-NOR
					ID:04-	010500	01-365	51964	b91a215b6
Start	Pause	Reset	View	MpgGuid	e S	pindle	Fil	e	21:36:18 1912-02-27

STEP	READ	DY /ddcsv	4/macroMillO	ylinder.nc	+0	0:00:17	Admin
Axis		Mach		Abs	Cer	nters submo	enu
⊙X	110.0	000	100.0	000	X axis 1/2		
						Yaxis 1/2	
⊙Y	10.0	000 0.000					
⊙Z	10.0	10.000 0.000		000			
-							
⊙A	10.0	000	0.0	000			
92:N14G91	G1A360						
							1
Start	Pause	Reset	View	MpgGuide	Spindle	File	21:36:42 1912-02-27

Figure 3-55 place the tool against the other side of the x-axis of the workpiece

AUTO	REA	DY /ddcsv	4/macroMilK	Sylinder.	nc	+00	:00:17	Admin
Axis		Mach		Abs	FRO:			100%
(axis 1/2								
Operating Ir	structions:							
		against the x	-axis side of	the wor	kpiece ar	nd zero x-	axis:	
		against the o						
3.Now ente	r this page	and click [O	K],x-axis ori	gin will b	e set to o	center poi	nt of the	e workpiece;
							Ok	Cancel
92:N14G91	G1A360				Local e	fisk:\\192	168.2.5	Nonodisk
					ID:04-0	01050001	-36519	64b91a215b6
Start	Pause	Reset	View	MpgGu	uide Sp	bindle	File	21:36:50 1912-02-27
		Figure 3-	-56 Long	g press	the En	ter key		
STEP	REA	DY /ddcsv	4/macroMilK	Cylinder.	nc	+00	:00:17	Admin
Axis		Mach		Abs	FRO:			100%
X	110.	000	50.0	000	SRO:			100%
	40				Jog St	ep:		50.000
٧	10.	000	0.0	000	F	0		3000
Σ	10.	000	0.0	000	s	0		12000
					G54	H00 N	15 M	9 M11
A	10.	000	0.0	000	Softwa	re Ver: 2	022-05-	29-001-NOR
2:N14G91	G1A360				Local	fisk:\\192	168.2.5	Nonodisk
					ID:04-	01050001	-36519	64b91a215b6
								21:37:02

Figure 3-57 Find Middle for X aixs completed

3.3.10 Simulation

DDCS V4.1 supports the simulation is 3 modes:

Single workpiece machining simulation: Simulate as the program.

Array machining simulation: Firstly Array the program and then simulate

Sequential machining simulation: Firstly array the program and then simulate.

AUTO	REAL	DY /local/b	all1.nc		•	00:00:00	Admin
IMULATIC	ON						
 Single Array n 	method sele workpiece m nachining sin ntial machinir	achining sim nulation		Number o X-axis rai Y-axis rai Z-axis rai	nge:[-100.0	08 000, 100.00 000, 100.00 00,-0.5000]	000]
The coord The simu Pressing During the Start simu	lation speed [Pause] key e simulation,	e changed v can be adju will exit the breakpoints use state, the	sted by [FR0 simulation ar can be save e system will	D] (full speed and enter the ed manually f	l simulation pause state through the	at FRO >: e; break poin	ts menu; e breakpoint; Cancel
Start	Pause	Reset	View	MpgGuide	Spindle	File	21:43:08 1912-02-23
		Figure	- 3-58	Simulation	n Daga		

Figure 3-58 Simulation Page

3.4 File Management Page

3.4.1 File Management Page Introduction

								DDCS	5 V4.1
STEP	READY	/local/b	all1.nc			+00:00:00	Guest		
Name			Size		Mo	dify time	1	USB	DISK 🔵
ddcsv4			[DIR]		1935/0	5/29 20:44			9
local			[DIR]		1935/0	5/29 20:44			SELECT
share			[DIR]		1935/0	5/29 20:44	LocalDisk	Tab	SELECT
udisk-sda			[DIR]		1935/0	5/29 20:44			
udisk-sda1			[DIR]		1935/0	5/29 20:44			
udisk-sdb			[DIR]		1935/0	5/29 20:44			
udisk-sdb1			[DIR]		1935/0)5/29 20:44	U-Disk	Shift	PROBE
							NetDisk	Mode	
Emulation	Сору	Edit	New	Delete	Renam	e Param	3473MB	P	ENTER HOME
START PA		() ESET	VIEW	TryCut	SPIND	E PAGE	R GOTOO		x

Figure 3-59 File management Page

Press Page R key 1 time and go to File page.

ddcsv4: It is system folder, all the system files are in this folder.

Local: Local folder, we can send the program in this folder.

share: It is the folder when we build the communication with the computer, share folder is created on the host computer. udisk-sda1: USB stick folder. Emulation: After selected the program, press F1 to emulate.

Copy: After selected the program, press F2 to copy. Edit: After selected the program, press F3 to delete. New: Press F4 key to create a new nc file. Delete: After selected the program, press F5 to delete. Rename: After selected the program, press F6 to rename the file. Param: Press this key enter to Parameter Page. LocalDisk: Press Tab key go to Local disk. U-disk : Press Shift key go to USB Disk. NetDisk: Press Mode key, go to Share folder when ethernet communication is built.

And if the "#313 Shift key operation mode" is Menu mode, by pressing shift key, there is File page menu. In the Menu, we can Select disk, copy file, load file, copy and paste file to other disk, delete file, clear up system disk and so on.

3.4.2 Build the Ethernet communication

Ethernet Interface is standard , by the interface we can build the communication between conputer and controller DDCS V4.1.

Step 1:

Make sure the SMB status is open on your computer, let's take the example with Win 10 system:

1. Clike WIN button and -> Setting on your PC:

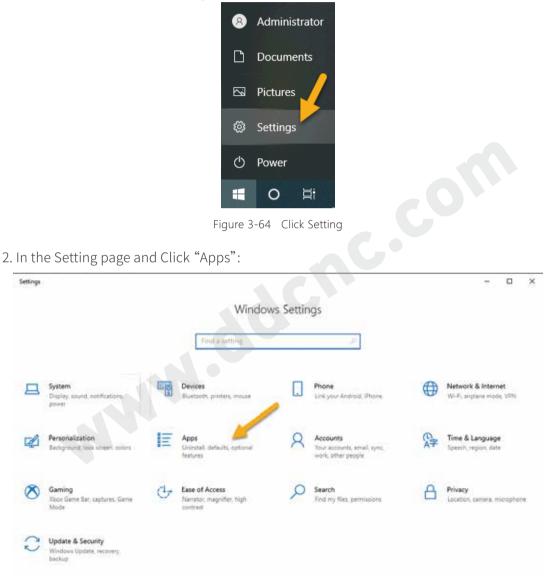


Figure 3-60 Setting -- Apps

3. In the new pop-up window click the "Programs and Features":

+ Settings		
∅ Home	Apps & features	
Find a setting p	Windows Driver Package - EdingCNC (usbcnc_cd	5/18/2022
Арря	WioRAR 6.10 (54-10)	5/10/2022
🖉 Apps & features	Xbox Carecle Companion Microsoft Corporation	16-0 KB 4-(25/2022
15 Default appr	Xbox Game Bar	2.86 MB
ICE Offine maps	Microsoft Corporation	4(28/2022 16.0 KB
Apps for websites	Microsoft Corporation	2/23/2012
Cal Video playback	中文條件本地体設督 Microsoft Corporation	95/0 KB 5/18/2022
₽ Statup	图 制始会开程	5/18/2022
	0 FFIND	\$/18/2022
	國 除的協 入語 117.0正式版	5/10/2022
	○ 西皮用盘	457 MB 5/18/2022
	B WELQO	297 MB 3/12/2022
	Related settings Programs and Features	
	Cert help	
Figure 3-61	Apps & features Related settir	ngs

4. Click "Turn Windows features on or off" at the left side of the page:

+ 🖸 > Centrel	Panel + Programs + Programs and Features		~	Ö
Control Panel Home	Uninstall or charge a program			
Mary Install, doing down				
View installed updates	To use a program, select it from the list and then click Ur	vinstall, Change, or Repair.		
Turn Windows features on or off				
U II	Organize 💌			
	Name	Publisher	Installed On	Si
	Q 360祭事	360安全中心	5/18/2022	
	Adobe Acrobat DC	Adobe Systems Incorporated	3/29/2022	
	Adobe Flash Player 34 NPAPI	Adobe	5/18/2022	
	Adobe Flash Player 34 PPAPI	Adobe	5/18/2022	
	Adobe Genuine Service	Adobe Inc.	5/19/2022	
	Adobe Illustrator 2020	Adobe Systems Incorporated	5/18/2022	
	Adobe Photoshop 2020	Adobe Systems Incorporated	5/18/2022	
	🕝 Alibaba Supplier	Alibaba (China) Ltd	2/16/2022	
	Aspire 4.0	Vectric	5/18/2022	
	🖾 Autodesk App Manager 2020-2021	Autodesk	4/1/2022	
	🛕 Autodesk AutoCAD 2021 - 简体中文 (Simplified Chinese)	Autodesk	5/18/2022	
	Autodesk Desktop App	Autodesk	4/1/2022	
	Autodesk Featured Apps 2020-2021	Autodesk	4/1/2022	
	Autodesk Genuine Service	Autodesk	4/1/2022	
	Autodesk Material Library 2021	Autodesk	4/1/2022	
	Autodesk Material Library Base Resolution Image Library 2021	Autodesk	4/1/2022	
	Autodeck Save to Web and Mobile	Autodetk	4/1/2022	

Figure 3-62 "Turn Windows features on or off"

5. Now we can find out there is the SMB options, tick all the SMB check box please:

Windows Features	_		×
Turn Windows features on or off			?
To turn a feature on, select its check box. To turn a check box. A filled box means that only part of the			
Microsoft XPS Document Writer			^
🗄 🔲 🚽 MultiPoint Connector			
🕀 🔳 🔤 Print and Document Services			
Remote Differential Compression API S	upport		
Services for NFS			
Simple TCPIP services (i.e. echo, daytim	e etc)		
🖃 🗹 🔤 SMB 1.0/CIFS File Sharing Support			
SMB 1.0/CIFS Automatic Removal			
SMB 1.0/CIFS Client			
SMB 1.0/CIFS Server			
SMB Direct	-		
Telnet Client			V
	ОК	Can	cel

Figure 3-63 Turn the SMB options ON

Now the SMB options are ON and we go on next step.

Step 2:

Configurate the Ethernet settings on the controller DDCS V4.1.

0	CONT	READ	DY /udisk-	sda1/ball1.n	c		+0	00:00:00	Guest
No.			Param	. Name			V	/alue	Unit
318	Tool pat	h page di	isplay coord	,	Yes				
319	X axis ro	tation an	gle in 3D m		0.	0000	deg		
320	Y axis ro	tation an	gle in 3D m	ode			0.	0000	deg
321	Z axis ro	tation an	gle in 3D m	ode			0.	0000	deg
322	Monitori	ng page (disabled in r	nachining			,	Yes	
323	Enable of	of beep		-			E	nable	
324	Color rev	versal						No	
325	Disable network functionality							No	
326	Obtain II	P addres	s automatic	ally				No	
327	Local IP	address					192.		
328	Net mas	k					255.2		
329	Router I	er IP address 192.168.2.1			168.2.1				
330	Shared host IP address						192.	168.2.8	
331	Time zor	ne setting	js					0	
Param	nType S	earch	Visible	Export	Import	Lo	gout	Main	00:01:34 1970-01-01

Figure 3-64 Settings about the Ethercat Networks

"#325 -- disable network function": Firslty We must enable the network function, or the controller don't work on the network at all. Enable it and then next step.

"#327 -- Local IP address": We already set IP address for the controller DDCS V4.1 on our hands.

"#330 -- Shared host IP address": #330 is to set the IP address for the computer.

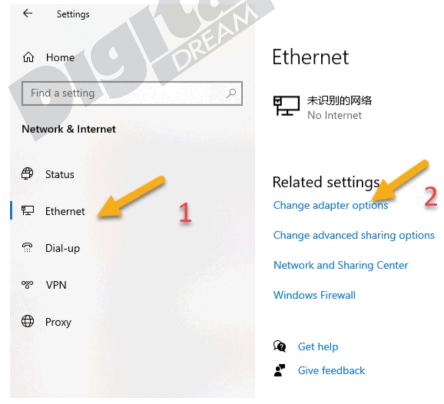
The settings are done and we back to the main page and we can see the local IP address here:

		DY /udisk	-sda1/ball1.n	c			+00:00	00:00	Guest
Axis		Mach		Abs	FR	D:			100%
•X	10.0	10.000		10.000		D:			100%
ΩV	10.0	200	10.000		JSF	₹:			100%
⊙Y	10.0	000	10.000		F		0		3000
⊙Ζ	10.0	10.000		0.000			0		12000
					G54	4 HO) M5	М9	M11
					Sof	tware V	er: 2022	2-05-2	9-001-NOR
					Loc	al disk:'	192.16	8.2.5	enedisk
					ID:0	4-0105	0001-36	551965	531ea215b6
Start	Pause	Reset	View	MpgG	uide	Spindle	e F	ile	00:01:59 1970-01-01

Figure 3-65 IP address showed on the Main page

Step 3: Set the IP address for the computer.

1. Setting -- Network & Internet and will pop up the page as below:





2. Click "Ethernet" at the left page and click "change adpater options" at the right page, screen pops up a new window:

Network Connections	
← → ✓ ↑ 🔮 > Control Panel :	> Network and Internet > Network Connections
Organize 🔻	
ADSL Disconnected WAN Miniport (PPPOE)	以太网 未识别的网络 Realtek Gaming GbE Family Contr
	Figure 3-67 Ethernet set up

3. Left click the mouse on the Ethernet button and select "properties", pop up the window to set up the IP addres of the computer. At the Parameters of the controller, we already set the "#330 -- Shared host IP address" as "192.168.2.8", here we must follow it:

s capability. Otherwise, you need r the appropriate IP settings.	to ask your network administrator
Obtain an IP address automatic	cally
Use the following IP address: –	
IP address:	192.168.2.8
Subnet mask:	255 . 255 . 255 . 0
Default gateway:	
Obtain DNS server address aut	comatically
• Use the following DNS server a	ddresses:
Preferred DNS server:	
Alternate DNS server:	

Figure 3-68 Ethernet set up

Please note that the IP address for the computer and the controller, the last number must be different. The last number range is "1-255".

Now we already set up the communication between the computer and the controller DDCS V4.1, we can visit the controller via our host computer.

On the computer in the address bar input "\\192.168.2.5\cncdisk" and Enter, the screen pops up a page as below, this is the local disk of the controller DDCS V4.1.

File Home		Manage m	cliffe .					
access	Cut Copy path Paste shortcut	Ntove Copy to+ to+ Ory	Delete Rename	New folder	New Item •	Properties	Edit Den •	Select all Select none Invert selection Select
← · · · ↑ 및	 Network > 192.168. Name 	2.5 + cnedisk	De	s modil	ied Ty	pe	Sipt	
🔲 Desktop 🕹 Downloads	New Text D	locument (2).bit locument.bit			Te	nt Documen nt Documen VIP File	Ł	0 85 0 88 201 68
Documents	1							

Figure 3-69 Local disk of the controller DDCS V4.1

Now, we can easily visit the local disk of the DDCS V4.1 on computer, and can we visit computer via controller DDCS V4.1? Yes!

Step 4: Create a folder of "share" on host computer and visit it via controller.

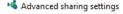
1. Change sharing the options for different network profiles.

Setting -- Network & Internet and will pop up the page as below:

← Settings	
යි Home	Ethernet
Find a setting	更 网络 3
Network & Internet	No Internet
🗭 Status	Related settings
문 Ethernet	Change adapter options
🕾 Dial-up	Change advanced sharing options 🥌
	Network and Sharing Center
% VPN	Windows Firewall
Proxy	
	Get help
	Give feedback

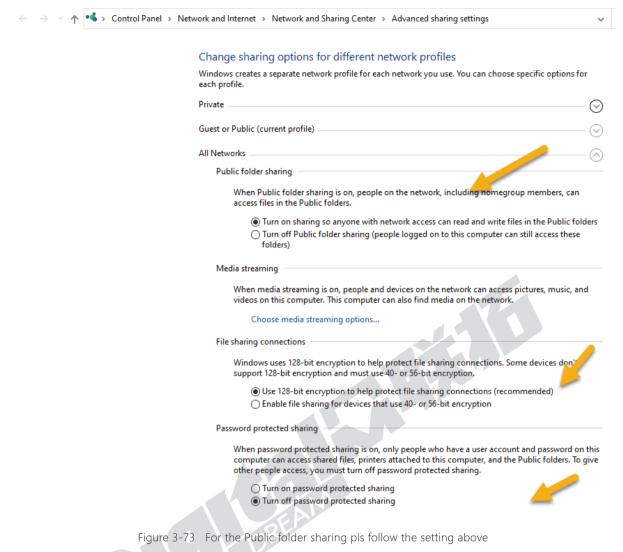
Figure 3-70 Ethernet Page at the Computer

2. Click "Ethernet" at the left page and click "change advanced sharing options" at the right page, screen pops up a new window:









2. Create a folder named it "share" on computer, right click the share foler and click "properties", Click "Sharing" Option and click "Share..." button.

In the new pages, choose Everyone to share with; Choose the Permission level as "Read/Write", and click "share".

	C > Local Disk (F:)
s I	Name Date modified
*	share 6/10/2022 4:17 PM
5 🖈	📜 share Properties 🛛 🕹
s 🖈	General Sharing Security Previous Versions Customize
*	
	Network File and Folder Sharing
	Not Shared
	Network Path:
;	Not Shared
s	Share
5	Advanced Sharing
	Set custom permissions, create multiple shares, and set other advanced sharing options.
	Advanced Sharing
x64 (C:)	Password Protection
(D:)	People without a user account and password for this computer
(E:)	can access folders shared with everyone.
(F:)	To change this setting, use the <u>Network and Sharing Center</u> .
(G:)	
(H:)	OK Cancel Apply
ort (l:)	
Network access	Figure 3-74 share progerties to share with
be a name and th	hen click Add, or click the arrow to find someone. 🛛 📩 🏒
veryone Iministrator	Add
iest eryone	Z Level
eate a new user	
having trouble :	sharing

Figure 3-75 Choose Everyone to share with

Retwork access

Choose people to share with

Type a name and then click Add, or click the arrow to find someone.

Name	Permission Level	
🔏 Administrator	Owner 上 🔔	
🥵 Everyone	Read/Write 🔻 Read	
	Read/Write	te 🧲
	Remove	2
m having trouble sharing	> 3	
	Share Ca	ncel
Figure 3-76 Choose	Share Care the Permission level as "Read/White"	ncel
Figure 3-76 Choose		ncel
_		ncel

 \times

Individual Items	^
share \\BF-202202081819\share	
Shared items aren't accessible when your computer is asleep. Show me all the network shares on this computer.	
	Done

Figure 3-77 Sharing setting is completed

The shareing setting for the "share" folder is finished, and now we take our controller DDCS V4.1, go to file page, and select "Net Disk", check what s in.

CONT	READ)Y /udi	sk-sda	1/ball1.n	c		+00:00:00	Guest
Name			Size M		Мо	dify time	0	
				[DIR]		1935/0	05/01 08:58][
2002.nc			414678	6	2022/0	04/26 02:17		
CARTRAGE 24	4MM 120	00RPM I	F1050 6	5159193		2021/0	05/25 09:16	LocalDisk
NEWBALL.nc				248503	9	2020/0	05/24 02:20	
ball1.nc				165322	1	1979/1	12/31 16:00	
butterfly.nc				129950	6	1979/1	12/31 16:00	
dbc-b.NC				142599	753	2022/0	04/29 01:15	U-Disk
fish.nc				183041	5	2021/1	11/24 09:18	
rl.nc				600870	04	2022/0	04/29 01:14	
testtiny.nc				470181	48	2022/0	05/01 13:24	
								NetDisk
								Free space:
							-	488269MB
Emulation	Copy	Edit	1	New	Delete	Renam	e Param	00:01:31 1970-01-01

Figure 3-78 The files in the Net Disk of the controller

→ This PC → Local Disk (F:) → share

	Name	Date modified	Туре	Size
	2002.nc	4/26/2022 10:17 AM	NC File	4,050 KE
*	ball1.nc		NC File	1,615 KE
*	butterfly.nc		NC File	1,270 KE
*	CARTRAGE 24MM 12000RPM F1050 6MM	5/25/2021 5:16 PM	NC File	156 KE
*	🗐 dbc-b.NC	4/29/2022 9:15 AM	NC File	139,258 KE
	fish.nc	11/24/2021 5:18 PM	NC File	1,788 KE
	NEWBALL.nc	5/24/2020 10:20 AM	NC File	2,427 KE
	/ rl.nc	4/29/2022 9:14 AM	NC File	58,679 KE
	testtiny.nc	5/1/2022 9:24 PM	NC File	45,917 KE
	Figure 3-79 The files in th	e "share" folder of the co	omputer	

3.4.3 Software Update

According to the customer feedback, we will endeavour to update the software in DDCS V4.1, to enhance the performance, fix the bugs or add new features. In order for customer to download the latest firmware, please visit our website :

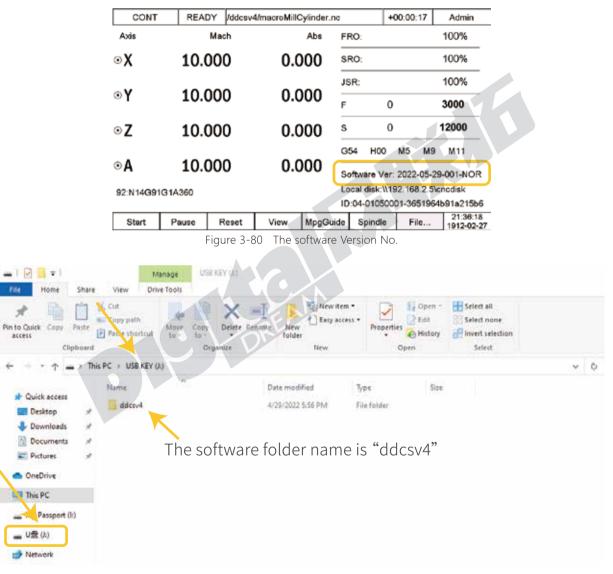
www.ddcnc.com

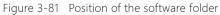
or our Facebook Forum:

https://www.facebook.com/groups/1724999967517167/?ref=group_header or join our forum

http://bbs.ddcnc.com/forum.php

There you can find the latest version firmware for DDCS. At the Left-bottom side of the Main-Page,there is the firmware version as the Figure 3-80:





The DDCS V4.1 software install folder name is not "INSTALL", it is "ddcsv4", its very important please pay attention to.

Download the firmware upgrade file to your computer and prepare a totally empty USB key. Best is to quickly reformat the USB key to MS-DOS FAT32 (right click on the USB key icon and choose Format. Follow the prompts)

After downloading the firmware file check the file name, it may look like this or similar install(2022-05-29)-zip. (example)

This is done to allow the download. Files called ".ZIP" are sometimes blocked.

Change the file name to install(2019-08-16-112).zip (example)

Now your zip program can recognise the file as a compressed file and you can decompress it to the USB key.Please note the upgraded file should be in the Root-directory in the USB Stick and the file name must be "ddcsv4".

Now your USB key is ready for action.

Shut down your DDCS controller for 10 seconds.Insert the USB key into the USB port of your DDCS controller .

Start your DDCS controller. The controller will read the "ddcsv4" folder on the USB key and upgrade automatically. The screen will be blocked for about 30 seconds, then the controller will start with the new firmware.

On the Main Screen lower right you can see the firmware version the controller is using.

After upgrading successfully, don't forget to remove the Intsall folder from the USB key. If you do not remove the "ddcsv4" folder the controller will update again next time you start the controller.

	~			
	Name	Date modified	Туре	Size
*	💹 adjush.nc	4/11/2022 7:58 AM	NC File	1 KE
	📄 adjush.rc	4/11/2022 7:58 AM	RC File	8 KE
*	advstart.nc 📃	4/11/2022 7:58 AM	NC File	1 KE
Å	advstart.rc	4/11/2022 7:58 AM	RC File	14 KE
*	advstart-array.rc	4/11/2022 7:58 AM	RC File	17 KE
	advstart-sr.rc	4/11/2022 7:58 AM	RC File	15 KE
	💹 array.nc	4/11/2022 7:58 AM	NC File	1 KE
	array.rc	4/11/2022 7:58 AM	RC File	19 KE
)	break.rc	4/11/2022 7:58 AM	RC File	14 KE
·	📄 break-array.rc	4/11/2022 7:58 AM	RC File	17 KE
	break-sr.rc	4/11/2022 7:58 AM	RC File	15 KE
	center.rc	4/11/2022 7:58 AM	RC File	8 KI
	centerx.nc	4/11/2022 7:58 AM	NC File	1 KE
	centery.nc	4/11/2022 7:58 AM	NC File	1 KE
	📄 chs	4/11/2022 7:58 AM	File	27 KI
	📄 coord1	4/11/2022 7:58 AM	File	1 KI
	📄 custom	4/11/2022 7:58 AM	File	27 KI
	ddcsv4.out	4/11/2022 7:58 AM	OUT File	4,815 Ki
	🦳 end.nc	4/11/2022 7:58 AM	NC File	1 KI
	📄 eng	4/11/2022 7:58 AM	File	27 KI
	error.nc	4/11/2022 7:58 AM	NC File	1 K
	gotoz.nc	4/11/2022 7:58 AM	NC File	1 K
	gotozxy.nc	4/11/2022 7:58 AM	NC File	1 K
	home_0.nc	4/11/2022 7:58 AM	NC File	1 K
	home_1.nc	4/11/2022 7:58 AM	NC File	1 K
	home_2.nc	4/11/2022 7:58 AM	NC File	1 K
	home_3.nc	4/11/2022 7:58 AM	NC File	1 K
	home_4.nc	4/11/2022 7:58 AM	NC File	1 KI
	home_ref1,nc	4/11/2022 7:58 AM	NC File	1 K
	home_ref2.nc	4/11/2022 7:58 AM	NC File	1 K
	home_ref3.nc	4/11/2022 7:58 AM	NC File	1 KI
	home_ref4.nc	4/11/2022 7:58 AM	NC File	1 KI
	loadbreak.nc	4/11/2022 7:58 AM	NC File	1 KI
	🛋 logo.bmp	4/11/2022 7:58 AM	BMP File	1,801 KI
	M3.nc	4/11/2022 7:58 AM	NC File	1 KI
	M4.nc	4/11/2022 7:58 AM	NC File	1 KI
	M5.nc	4/11/2022 7:58 AM	NC File	1 K
	M6.rc	4/11/2022 7:58 AM	RC File	18 Ki
	/// m30.nc	4/11/2022 7:58 AM	NC File	0 KI
	macroMillCylinder.nc	4/11/2022 7:58 AM	NC File	2 KI
	macroMillCylinder.rc	4/11/2022 7:58 AM	RC File	21 KI
	macroMillRect.nc	4/11/2022 7:58 AM	NC File	2 KI
	macroMillRect.rc	4/11/2022 7:58 AM	RC File	24 KI
	 motiondev.ko	4/11/2022 7:58 AM	KO File	14 K
	msg-chs	4/11/2022 7:58 AM	File	17 K
	msg-custom	4/11/2022 7:58 AM	File	17 K
	msg-eng	4/11/2022 7:58 AM	File	17 K
	null.nc	4/11/2022 7:58 AM	NC File	1 K
	pause.nc	4/11/2022 7:58 AM	NC File	1 Ki
	probe-fix.nc	4/11/2022 7:58 AM	NC File	1 Ki
	probe-fix.rc	4/11/2022 7:58 AM	RC File	19 KI
	probe-float.nc	4/11/2022 7:58 AM	NC File	1 KI

Figure 3-82 The files a "ddcsv4" folder included

File Name	File description
array	Array Executable file
break	Breakpoint Executable file
center	Find Middle Executable file
chs	Parameters File in Chinese
eng	Parameters File in English
custom	Parameters file in custom language.
ddcsv4.out	System program file
error.nc	When work in error, system execute this file, Prohibit to modify it.
goto	Go to Zero Executable File
home	Home Executable File
loadbreak.nc	Load Breakpoint Executable File
logo.bmp	Open Page LOGO file, size is 1024p x 600 px, 72px/inch. The users can customize their own open page.
macroMillCylinder.nc	Milling Cylinder Machining File
macroMillRect.nc	Milling plane processing file
motiondev.ko	.ko file is a hard drive, Modification is prohibited.
M3/M4/M5	Manual M-code execution file
msg-chs	Chinese interface character display configuration
msg-eng	English interface character display configuration
msg-custom	Interface character display configuration in custom language.
pause.nc	Executable file for Pause
probe	Executable file for Probe
simulate	Executable file for Simulation
slib-g.nc	System library file
slib-m.nc	The users self-define M code library file.
zero	Executable file for Zero
setting Image Size	Parameters setting file



Figure 3-83 Setting for Open Page

3.5 Parameters Management Page

In the Parameters Management Page, beside the parameters adjustment, we can search the parameter by numbers, configurate invisible parameters, export setting file, import settings, login, set the password and so on.

									DDCS V4.1
с	ONT	READY	/local/b	all1.nc		_	+00:00:00	Super Adm	
No.			Param	Name			Value	Unit	USB DISK 🌒
	Motor pa	rameters							
1	Unit sele	ction					mm		
2	X axis pu	ilse equivale	ency(nun	nerator)			1000.0000		
3	Y axis pu	lse equivale	ency(nun	nerator)			1000.0000		
4	Z axis pu	ise equivale	ency(nun	nerator)			1000.0000		
5	A axis pu	ilse equivale	ency(nun	nerator)			1000.0000		
7	X axis pu	ilse equivale	ency(den	ominator)			1.0000		Shift
8	Y axis pu	ilse equivale	ency(den	ominator)			1.0000		PROBE
9	Z axis pu	lse equivale	ancy(den	ominator)			1.0000		
10	A axis pu	ilse equivale	ency(den	ominator)			1.0000		
12	X axis dr	ive mode				pt	lse/direction		
13	Y axis dr						ise/direction		
14	Z axis dr						ilse/direction		
15	A axis dr	ive mode				р	ise/direction		
Param	Type S	earch \	/isible	Export	Import	Logou	t Main	· 1912-02-2	
								1012-02-0	Y
STAR					TryCut	SPIND		ER GOT	

Figure 3-84 Parameters Management Page

Parameters type:

Press F1 pop up parameter type table, by Y+/Y- keys we can select the type that we need and Press Enter key to jump to.

There are 16 kinds parameters type: 1) Motor parameters; 2) Manual control parameters; 3) Automatic control parameters; 4) Output signal parameters; 5) Input signal parameters; 6) Spindle parameters; 7) M output code parameters; 8) Home parameters; 9) Probe parameters; 10) Vertex probe parameters; 11) Software limit parameters; 12) MPG parameters; 13) External key parameters; 14) Backlash parameters; 15) Tool offsets; 16) System settings

Search the Parameters:

Press Key F2 it pops up a dialog asking for number input. With X+/X- key, move the cursor, with Y+/Y- key increase or decrease the current position number. Meanwhile, the number key is active, we also can input the numbers directly. Press Enter key the system just search out the parameter.

Visible:

Under super administrator rights, select a parameter and Press F3 key, then the background for the parameter turns to dark. Then the guest, operator or administrator cannot see this parameter, it is invisible. Only the super administrator can see it in the dark background. If the users want to make the invisible parameters to visible, login in as super administrator, select the visible parameter, press F3 again.

C	ONT	READ	Y /local/t	ali1.nc		+	00:00:00	Super Admin	0	CONT	REA	DY /local	/ball1.nc		+	00:00:00	Guest
No.			Param	. Name		1	Value -	Unit	No.			Para	n. Name		1	/alue	Unit
	System :	settings								Syster	m settings						
312	language	e setting					Eng		313	Shift k	ey operatio	on mode			Mer	nu Mode	
313	Shift key	operatio	n mode			Mer	nu Mode		316	Tool p	ath paint e	nable			D	isable	
316	Tool pati	h paint er	nable			D	isable		317	Tool p	ath paint n	node			Stat	ue Mode	
317	Tool pat	h paint m	ode			Stat	ue Mode		318	Tool p	ath page d	isplay coor	dinates			Yes	
318	Tool pati	h page d	isplay coord	inates			Yes		319	X axis	rotation an	ngle in 3D i	mode		0	.0000	deg
319	X axis ro	tation an	gle in 3D m	ode		0	.0000	deg	320	Y axis	rotation an	ngle in 3D i	mode		0	.0000	deg
320	Y axis ro	tation an	gle in 3D m	ode		0	.0000	deg	321	Z axis	rotation ar	ngle in 3D r	node		0	.0000	deg
321	Z axis ro	tation an	gle in 3D m	ode		0	.0000	deg	322	Monite	oring page	disabled in	machining			Yes	
322	Monitorin	ng page (disabled in r	machining			Yes		323	Enable	e of beep				E	nable	
323	Enable o	fbeep				E	nable		324	Color	reversal					No	
324	Color rev	versal					No		325	Disabl	e network	functionalit	У			Yes	
325	Disable r	network f	unctionality				Yes		326	Obtair	n IP addres	s automati	cally			No	
326	Obtain II	P addres	s automatic	ally			No		327	Local	IP address				192	168.2.5	
Param'	Type S	iearch	Visible	Export	Import	Logout	Main	17:49:27 1912-02-27	Paran	nType	Search	Visible	Export	Import	Logout	Mein	17:50:06 1912-02-27

Figure 3-85 As Super Admin, we make language setting visible

Figure 3-86 As Guest, the language setting is invisible

Export (F4) and Import (F5) Parameters

All the parameters setting information, is saved in the file named "setting" in the system software. Export is to copy the setting file from controller system to root directory of USB stick; Import is to copy the setting file from root directory of USB stick to control system.

C	ONT	READY	/local/b	all1.nc			+00:00:00	Super	Admin		CONT	REA	DY /local/t	ali1.nc		+	00:00:00	Super Admin
No.			Param.	. Name			Value	U	nit (No			Param	. Name			Value	Unit
	Motor par	ameters									Mot	or parameter	8					
1	Unit selec	tion					mm			1	Unit	selection					mm	
2	X axis 📻									2	Xq							
3	Y axis 💾	essage								3	Ye	Aessage						
4	Zaxis	The para	meter file	(setting) has	s been backed	d up to us	b stick			4	Zs	The paran	neter file (se	tting) was su	iccessfully imp	orted from	h usb stick	
5	Aaxis									5	Αa							
7	X axis									7	Xa							
8	Y axis (8	Y٤							
9	Zaxis (9	Z٥				N. 1			
10	A axis (C	NK I					10	Ar				Xk -			
12	X axis dm	ve mode				puis	e/cirection			12	Xat	as anve moa	e			puise	s/cirection	_
13	Y axis driv	ve mode				puls	e/direction			13	Yax	cis drive mod	e			pulse	direction	
14	Z axis driv	ve mode				puls	e/direction			14	Zao	ós drive mod	e			pulse	s/direction	
15	A axis driv	ve mode				puls	e/direction			15	A as	is drive mod	e	_		pulse	direction	
Param	Type Se	arch	Visible	Export	Import	Logout	Main		:50:48 2-02-27	Para	mType	Search	Visible	Export	Import	Logout	Main	17:50:57 1912-02-27



Figure 3-87 Recovery parameter setting from USB Stick

When the Shift key operation mode is Menu mode, Press Shift key to call out the Parameter page menu. The Sub-menus are: 1) User Login; 2) Password setting; 3) Parameters backup; 4) Parameter recovery.

Users Login: The users can login in as Operator, Administrator, Super Administrator;

The initial password of the super administrator is 888888. DDCS V4.1 password judgment is a numerical judgment, as operator and super administrator, password is 0 or don't input anything, the effect is the same.

Password setting: We can set the password for operator, administrator and super administrator.

Parameter Backup: Here we can backup the setting file to USB stick, system disk or the Net disk, when the ethernet communication is built up.

Parameter Recovery: We can recovery the settings from USB stick, system disk or the Net disk, when the ethernet communication is built up.

4 Parameter Instruction

1. Motor Parameters

Para#	Parameter Definition	Default	Range	Unit
#001	Unit selection	0: mm	0: mm, 1: inch	
#002	X axis pulse equivalency(numerator)	1000.0000	4.0.000 ~ 99999.999	
#003	Y axis pulse equivalency(numerator)	1000.0000	0.000 ~ 99999.999	
#004	Z axis pulse equivalency(numerator)	1000.0000	0.000 ~ 99999.999	
#005	A axis pulse equivalency(numerator)	1000.0000	0.000 ~ 99999.999	
#007	X axis pulse equivalency(denominator)	1.0000	1.000 ~ 99999.999	
#008	Y axis pulse equivalency(denominator)	1.0000	1.000 ~ 99999.999	
#009	Z axis pulse equivalency(denominator)	1.0000	1.000 ~ 99999.999	
#010	A axis pulse equivalency(denominator)	1.0000	1.000 ~ 99999.999	
#012	X axis drive mode	pulse/direction	0: pulse/direction, 1: Two-pulse	
#013	Y axis drive mode	pulse/direction	0: pulse/direction, 1: Two-pulse	
#014	Z axis drive mode	pulse/direction	0: pulse/direction, 1: Two-pulse	
#015	A axis drive mode	pulse/direction	0: pulse/direction, 1: Two-pulse	
#017	Direction-pulse time interval(pulse/direction)	7000	0.000~9999.000	
#018	X axis motion direction(pulse/direction mode)	Positive	0: Negative, 1: Positive	
#019	Y axis motion direction(pulse/direction mode)	Positive	0: Negative, 1: Positive	
#020	Z axis motion direction(pulse/direction mode)	Positive	0: Negative, 1: Positive	
#021	A axis motion direction(pulse/direction mode)	Positive	0: Negative, 1: Positive	
#023	X axis pulse signal level(pulse/direction mode)	Low	0: low, 1: high	
#024	Y axis pulse signal level(pulse/direction mode)	Low	0: low, 1: high	
#025	Z axis pulse signal level(pulse/direction mode)	Low	0: low, 1: high	
#026	A axis pulse signal level(pulse/direction mode)	Low	0: low, 1: high	
#028	X axis motion direction(two-pulse mode)	Positive	0: Negative, 1: Positive	
#029	Y axis motion direction(two-pulse mode)	Positive	0: Negative, 1: Positive	
#030	Z axis motion direction(two-pulse mode)	Positive	0: Negative, 1: Positive	
#031	A axis motion direction(two-pulse mode)	Positive	0: Negative, 1: Positive	
#033	Enable axis mapping function	No	0: No 1: Yes	
#034	Master axis selection	X axis	0: X, 1: Y, 2: Z, 3: A	
#035	Slave axis selection	Y axis	0: X, 1: Y, 2: Z, 3: A	
#036	Enable A axis cyclic encoding	No	0: No 1: Yes	
#037	A axis cyclic encoder upper	180.0000	-9999.000 ~ 9999.000	Unit
#038	A axis cyclic encoder lower	-180.0000	-9999.000 ~ 9999.000	Unit
#039	AB axis Selection	A axis	0: A axis, 1: B axis	

#001: DDCS V4.1 adopts two kinds length units, metric system and imperial system respectively, and both directly participate in the internal algorithm of the control system. Be careful all the parameter settings in this system, pay attension they are based on the metric system or the inch system.

#002~#010: Numerator: The number of pulses required for one revolution in one direction; Denominator: The feeding distance the motor moves one revolution in one direction. The pulse equivalent = numerator /denominator

#017 has the same function as parameter #416 in DDCS V3.1. After years experience and debugging,7000 is a suitable value for stepper system. ; but in the case of losing step, if exclude any other causes and still cannot find out where the problem from, you can try to debug this parameter.

#023~#026: The setting of the input pulse to driver has two kind, falling edge or rising edge. If the setting doesn't match with controller parameter, then each first input pulse the controller send will be missed by driver. When the axis changes direction frequently, the accumulated error will get bigger and bigger. #033~#035: This parameter can be used to set the master axis and the slave axis. The slave axis simply follows the master axis to move, and runs the same code as the master axis. It is not an independent axis, and limit switches cannot be used. The master axis is an independent axis and can use limit switches.

#036~#038: For the G code of the A axis is always increasing, the cyclic encoder can be turned on, so that the actual displayed value is between the upper limit and the lower limit. For example, the upper limit is 360 and the lower limit is 0. If the command is 361°, the actual operation is to run 1°.

Para#	Parameter Definition	Default	Range	Unit
#040	Motor start speed	50.0000	0.000 ~ 999.000	unit/min
#041	X axis manual control speed	5000.0000	1.000 ~ 99999.000	unit/min
#042	Y axis manual control speed	5000.0000	1.000 ~ 99999.000	unit/min
#043	Z axis manual control speed	5000.0000	1.000 ~ 99999.000	unit/min
#044	A axis manual control speed	5000.0000	1.000 ~ 99999.000	Degree/min
#046	X axis start Acc in M_Ctrl mode	300.0000	0.3 ~ 9999.000	unit/s2
#047	Y axis start Acc in M_Ctrl mode	300.0000	0.3 ~ 9999.000	unit/s2
#048	Z axis start Acc in M_Ctrl mode	300.0000	0.3 ~ 9999.000	unit/s2
#049	A axis start Acc in M_Ctrl mode	300.0000	0.3 ~ 9999.000	Degree/s2
#051	X axis stop Acc in M_Ctrl mode	600.0000	0.3 ~ 9999.000	unit/s2
#052	Y axis stop Acc in M_Ctrl mode	600.0000	0.3 ~ 9999.000	unit/s2
#053	Z axis stop Acc in M_Ctrl mode	600.0000	0.3 ~ 9999.000	unit/s2
#054	A axis stop Acc in M_Ctrl mode	600.0000	0.3 ~ 9999.000	Degree/s2
#056	X axis emergency stopAcc in M_Ctrl mode	1600.0000	0.3 ~ 9999.000	unit/s2
#057	Y axis emergency stopAcc in M_Ctrl mode	1600.0000	0.3 ~ 9999.000	unit/s2
#058	Z axis emergency stopAcc in M_Ctrl mode	1600.0000	0.3 ~ 9999.000	unit/s2
#059	A axis emergency stopAcc in M_Ctrl mode	1600.0000	0.3 ~ 9999.000	Degree/s2
#091	X Axis max speed in M_Ctrl mode	12000.0000	99.000 ~ 99999.000	unit/min
#092	Y Axis max speed in M_Ctrl mode	12000.0000	99.000 ~ 99999.000	unit/min
#093	Z Axis max speed in M_Ctrl mode	12000.0000	99.000 ~ 99999.000	unit/min
#094	A Axis max speed in M_Ctrl mode	12000.0000	99.000 ~ 99999.000	unit/min
#096	Jog support in CONT mode	Yes	0: No, 1:Yes	unit
#097	Jog moving distance in CONT mode	1.0000	0.000 ~ 999.000	unit
#098	Jog-1 moving distance	5.0000	0.000 ~ 999.000	unit
#099	Jog-2 moving distance	1.0000	0.000 ~ 999.000	unit
#100	Jog-3 moving distance	10.0000	0.000 ~ 999.000	unit

2. Manual Control Parameters

A) The FRO override range is 0~300%, However the real feed speed may be too high for the machine, so we use #41-44-to set a limited speed for safety reason.

B) Please note that the Max. speed cannot be set as Manual control speed. In the controller system we desgined the algorithm for the speed plan based on the manual control speed, if the max. speed is smaller than manual control speed, will disturb the algorithem plan.

C) DDCS V4.1 supports Asymmetric Acc/Dec speed. But when the MPG is in Precision control mode, the controller will excute each pulse the MPG made, in this situation controller don't support Asymmetric Acc/Dec speed mode, when stop the system the system also cites the Start Acc Speed.

D) In the mode of STEP, Start&Stop Acc/Dec speed both cites the start acc speed.

3. Automatic control Parameters

Para#	Parameter Definition	Default	Range	
#101	Speed Selection	1:default speed	0: set by G code, 1: use default speed	
#102	default operation speed	3000.0000	min=1.000 -max=99999.000	unit/min
#103	G0 Speed	3000.0000	min=1.000 -max=99999.000	
#104	operation acceleration	500.0000	min=0.3 -max=9999.000	unit/s2
#105	Speed drop rate during pause	5.0000	min=1 -max=99.000	
#106	Speed drop rate during Estop	20.0000	min=1 -max=99.000	
#107	Uniaxial acc is limited by M_Ctrl start acc	No	0:No;1:Yes	
#108	Restore the machining start point position (when #36=No)	Pause position	0: Pause line start; 1: Pause position	
#109	Machining accuracy	0.0020	min=0.000 -max=0.1	
#110	arc algorithm chord error	0.0010	min=0.001 -max=0.1	
#111	Circular centrifugal acceleration	0.0000	min=0.000 -max=9999.000	
#112	Circular speed adjustment factor	1.0000	min=0.1 -max=2.0	
#113	maximum speed	8000.0000	min=99.000 -max=99999.000	
#114	X axis protection speed	99999.0000	min=1.000 -max=99999.000	unit/min
#115	Y axis protection speed	99999.0000	min=1.000 -max=99999.000	
#116	Z axis protection speed	3000.0000	min=1.000 -max=99999.000	unit/min
#117	A axis protection speed	99999.0000	min=1.000 -max=99999.000	
#119	Z axis dropping protection speed	3000.0000	min=1.000 -max=99999.000	unit/min
#120	G0 instruction movement mode	Interpolation	0: Independent; 1:Interpolation	
#121	Is FRO valid for G0?(when #120=Interpolation)	Yes	0: No; 1: Yes	
#122	Macro programming mode	Disable	0: Disable; 1: Enable	
#123	Macro program file main program No.	0	min=0.000 -max=9999.000	
#124	Interpolation period	0.0050	min=0.002 -max=0.010	
#125	Bias coordinate adjustment step	1.0000	min=0.000 -max=1.000	unit
#126	Bias coordinate adjustment speed	500.0000	min=1.000 -max=99999.000	
#900	Z axis return to machine safe height when starting machining	Yes	0: No; 1: Yes	
#901	Z axis return to machine safe height when restore machining	Yes	0: No; 1: Yes	
#902	Z axis machine safe height	5.0000	min=-9999.000 -max=9999.000	unit
#903	Pause action selection	Z-axis lift	0: Z-axis lift; 1:Reference point 1	
#904	Z axis lift distance when pause	5.0000	min=0.000 -max=999.000	unit
#905	Tool change command M6 back to reference point 1 pause	No	0: No; 1: Yes	
#906	Z axis positioning when goto zero	Workpiece safe height	0: Workpiece safe height; 1: Machine safe height	
#907	Z axis Workpiece safe height	0.0000	min=-9999.000 -max=9999.000	

#104: Tangential Velocity is Compound Velocity

#105~#106: The buffer space is added for pause and emergency stop. It's the acceleration for pause and emergency stop;

#107: For axial speed protection, in auto mode, the acceleration is only set by one parameter #104. However, due to the different mechanical conditions of XYZA axis, only one acceleration cannot be guaranteed to be suitable for all axes. Then create the parameter #107 to control the acceleration speed for each axis is limited by Start Acc In M_Ctrl Mode or not; When #107=1, if the X Start Acc in M_Ctrl Mode is small then Acceleration which Operation Acceleration (#104) projected onto the X axis, the system will cite the Start Acc In M_Ctrl Mode of X axis.

#109~#110: Machining accuracy and arc algorithm chord error are with similar concepts, that is, after re-planning the contour, the maximum distance between the theoretical contour and the planned contour.

#111: Circular centrifugal acceleration is Tangential speed: In the case of small radius, the speed can be effectively limited and to avoid too high rotation speed due to too small radius.

#112: Since there is only one value an F value to control the speed in G-code, many users need to reset the speed when run the arc, so they can use the Circular speed adjustment factor, arc speed = F * # 125.

#113: In the auto mode, we can adjusted FRO to 300%. If the speed is too high, it may not match the machine structure. #113 is limited for this situation;

#114~#117: In Auto Mode, the feed speed is set by F value. System will calculate out a projection speed on X/Y/Z/A axis seperately by F value. The control system will cite a slower speed between the protection speed and projection speed on each axis.

#122: When the system needs to analyze a subprogram, this parameter must be enabled, otherwise the subprogram will be invalid.

#124: The shorter the interpolation period, the shorter and finer the small line segment will be, the smoother the processing will be, but the processing time will be longer, and the more system memory will be consumed at the same time; the larger of the setting, the shorter the processing time, but the rush on the machine It will be strong, and it is recommended to use the default value.

#905: This parameter is helpful for manual tool change. When encountering program M6, the machine will return to reference point 1 and pause, and the user can start manual tool change.

4. Output signal Parameters

Para#	Parameter Definition	Default	Range
#127	M3 Output Port CW Rotation	1	0~3
#128	M4 Output Port CCW Rotation	0	0~3
#129	M8 Output Port	2	0~3
#130	M10 Output Port	3	0~3
#131	M3 active electric level	High	0: Low; 1: High
#132	M4 active electric level	High	0: Low; 1: High
#133	M8 active electric level	High	0: Low; 1: High
#134	M10 active electric level	High	0: Low; 1: High

Para#	Parameter Definition	Default	Range
#135	IO input filter time width	20.0000	0.001 ~ 9999.999
#136	X axis drive alarm port	0	min=0 -max=18
#137	Y axis drive alarm port	0	min=0 -max=18
#138	Z axis drive alarm port	0	min=0 -max=18
#139	A axis drive alarm port	0	min=0 -max=18
#141	X axis positive limit port	0	min=0 -max=18
#142	Y axis positive limit port	0	min=0 -max=18
#143	Z axis positive limit port	0	min=0 -max=18
#144	A axis positive limit port	0	min=0 -max=18
#146	X axis negative limit port	0	min=0 -max=18
#147	Y axis negative limit port	0	min=0 -max=18
#148	Z axis negative limit port	0	min=0 -max=18
#149	A axis negative limit port	0	min=0 -max=18
#151	X axis Home Signal port"	2	min=0 -max=18
#152	Y axis Home Signal port"	2	min=0 -max=18
#153	Z axis Home Signal port"	2	min=0 -max=18
#154	A axis Home Signal port"	2	min=0 -max=18
#156	Probe Port	13	min=0 -max=18
#157	External emergency stop port	0	min=0 -max=18
#158	Extended Function Key 1 Port	0	min=0 -max=18
#159	Extended Function Key 2 Port	0	min=0 -max=18
#160	Extended Function Key 3 Port	0	min=0 -max=18
#161	Extended Function Key 4 Port	0	min=0 -max=18
#162	X axis drive alarm active electric level	Low	0: Low; 1: High
#163	Y axis drive alarm active electric level	Low	0: Low; 1: High
#164	Z axis drive alarm active electric level	Low	0: Low; 1: High
#165	A axis drive alarm active electric level	Low	0: Low; 1: High
#167	X axis positive limit port active electric level	Low	0: Low; 1: High
#168	Y axis positive limit port active electric level	Low	0: Low; 1: High
#169	Z axis positive limit port active electric level	Low	0: Low; 1: High
#170	A axis positive limit port active electric level	Low	0: Low; 1: High
#172	X axis negative limit port active electric level	Low	0: Low; 1: High
#173	Y axis negative limit port active electric level	Low	0: Low; 1: High
#174	Z axis negative limit port active electric level	Low	0: Low; 1: High
#175	A axis negative limit port active electric level	Low	0: Low; 1: High
#177	X Axis Home active electric level	Low	0: Low; 1: High
#178	Y Axis Home active electric level	Low	0: Low; 1: High
#179	Z Axis Home active electric level	Low	0: Low; 1: High
#180	A Axis Home active electric level	Low	0: Low; 1: High
#182	Probe active electric level	Low	0: Low; 1: High
#183	External emergency stop active electric level	Low	0: Low; 1: High
#184	Extended Function Key 1 active electric level	Low	0: Low; 1: High
#185	Extended Function Key 2 active electric level	Low	0: Low; 1: High
#186	Extended Function Key 3 active electric level	Low	0: Low; 1: High
#187	Extended Function Key 4 active electric level	Low	0: Low; 1: High

5. Input signal Parameters

6. Spindle Parameters

Para#	Parameter Definition	Default	Range	Unit
#188	Spindle interface type	Analog	0: Analog; 1: PUL/DIR	
#189	Spindle mapping axis	A axis	0: X ; 1: Y ; 2: Z ; 3: A	
#190	Default spindle speed	Default	0: G code; 1: Default	
#191	Default spindle speed	12000.0000	min=10.000 -max=99999.000	
#192	Maximum spindle speed	24000.0000	min=99.000 -max=99999.000	
#193	Whether Stop Spindle when pause	Yes	0: No; 1: Yes	
#194	Spindle start-up waiting time	0.0000	min=0.000 -max=99.000	Second
#195	Spindle off waiting time	0.0000	min=0.000 -max=99.000	Second
#412	Automatic spindle shutdown after machining is completed	Yes	0: No; 1: Yes	

7. M output code Parameters

Para#	Parameter Definition	Default	Range	Unit
#196	delay time of M8/M9	1.0000	min=0.000 -max=9.000	Second
#197	delay time of M10/M11	1.0000	min=0.000 -max=9.000	Second

8. Home Parameters

Para#	Parameter Definition	Default	Range	Unit
#198	HOME times	1	min=1.000 -max=5.000	
#199	X axis Home direction	Negative	0: Negative; 1: Positive	
#200	Y axis Home direction	Negative	0: Negative; 1: Positive	
#201	Z axis Home direction	Negative	0: Negative; 1: Positive	
#202	A axis Home direction	Negative	0: Negative; 1: Positive	
#204	X axis Home search speed	2000.0000	min=1.000 -max=99999.000	unit/min
#205	Y axis Home search speed	2000.0000	min=1.000 -max=99999.000	unit/min
#206	Z axis Home search speed	2000.0000	min=1.000 -max=99999.000	unit/min
#207	A axis Home search speed	2000.0000	min=1.000 -max=99999.000	unit/min
#209	X axis Home positioning speed	50.0000	min=1.000 -max=99999.000	unit/min
#210	Y axis Home positioning speed	50.0000	min=1.000 -max=99999.000	unit/min
#211	Z axis Home positioning speed	50.0000	min=1.000 -max=99999.000	unit/min
#212	A axis Home positioning speed	50.0000	min=1.000 -max=99999.000	unit/min
#214	X axis Home offset	0.0000	min=-999.000 -max=999.000	unit
#215	Y axis Home offset	0.0000	min=-999.000 -max=999.000	unit
#216	Z axis Home offset	0.0000	min=-999.000 -max=999.000	unit
#217	A axis Home offset	0.0000	min=-999.000 -max=999.000	unit
#219	X axis back distance after Home	10.0000	min=0.000 -max=99.000	unit
#220	Y axis back distance after Home	10.0000	min=0.000 -max=99.000	unit
#221	Z axis back distance after Home	10.0000	min=0.000 -max=99.000	unit
#222	A axis back distance after Home	0.0000	min=0.000 -max=99.000	unit
#224	Home reminder after booting	Yes	0: No; 1: Yes	
#225	Home sequence	ZXYA	0: ZXYA; 1: Sync; 2: ZYXA; 3: YXZA; 4: XYZA	
#413	Check HOME operation before machining	No	0: No; 1: Yes	
#800	X Mach Position of Reference Point 1(G28)	30.0000	min=-9999.000 -max=9999.000	unit
#801	Y Mach Position of Reference Point 1(G28)	-30.0000	min=-9999.000 -max=9999.000	unit
#802	Z Mach Position of Reference Point 1(G28)	10.0000	min=-9999.000 -max=9999.000	unit
#803	A Mach Position of Reference Point 1(G28)	0.0000	min=-9999.000 -max=9999.000	unit
#805	X Mach Position of Reference Point 2(G30 P1))	3.0000	min=-9999.000 -max=9999.000	unit
#806	Y Mach Position of Reference Point 2(G30 P1))	3.0000	min=-9999.000 -max=9999.000	unit
#807	Z Mach Position of Reference Point 2(G30 P1))	3.0000	min=-9999.000 -max=9999.000	unit
#808	A Mach Position of Reference Point 2(G30 P1))	0.0000	min=-9999.000 -max=9999.000	unit
#810	X Mach Position of Reference Point 3 (G30 P2))	4.0000	min=-9999.000 -max=9999.000	unit
#811	Y Mach Position of Reference Point 3 (G30 P2))	4.0000	min=-9999.000 -max=9999.000	unit
#812	Z Mach Position of Reference Point 3 (G30 P2))	4.0000	min=-9999.000 -max=9999.000	unit
#813	A Mach Position of Reference Point 3 (G30 P2))	0.0000	min=-9999.000 -max=9999.000	unit
#815	X Mach Position of Reference Point 4 (G30 P3))	5.0000	min=-9999.000 -max=9999.000	unit
#816	Y Mach Position of Reference Point 4 (G30 P3))	5.0000	min=-9999.000 -max=9999.000	unit
#817	Z Mach Position of Reference Point 4 (G30 P3))	5.0000	min=-9999.000 -max=9999.000	unit
#818	A Mach Position of Reference Point 4 (G30 P3))	0.0000	min=-9999.000 -max=9999.000	unit

#204~#207: DDCS V4.1 added Home search speed of each axis, the users can set as their request.

#209~#212: DDCS V4.1 added Home positioning speed of each axis, when touched the limited switch, its the speed when Exit the Home signal effective area.

9. Soft limit Parameters

Para#	Parameter Definition	Default	Range	Unit
#234	Enable software limit	Disable	0: Disable; 1: Enable	
#235	Soft-limited postion value of X	-1200.0000	min=-9999.000 -max=9999.000	unit
#236	Soft-limited postion value of Y	-600.0000	min=-9999.000 -max=9999.000	unit
#237	Soft-limited postion value of Z	-300.0000	min=-9999.000 -max=9999.000	unit
#238	Soft-limited postion value of A	000.0000	min=-9999.000 -max=9999.000	unit
#240	Soft-limited postion value of X++	1200.0000	min=-9999.000 -max=9999.000	unit
#241	Soft-limited postion value of Y++	600.0000	min=-9999.000 -max=9999.000	unit
#242	Soft-limited postion value of Z++	300.0000	min=-9999.000 -max=9999.000	unit
#243	Soft-limited postion value of A++	0.0000	min=-9999.000 -max=9999.000	unit

10. MPG Parameters

Para#	Parameter Definition	Default	Range	Unit
#061	X axis MPG X1 speed	100.0000	min=0.000 -max=99999.000	unit/min
#062	Y axis MPG X1 speed	100.0000	min=0.000 -max=99999.000	unit/min
#063	Z axis MPG X1 speed	100.0000	min=0.000 -max=99999.000	unit/min
#064	A axis MPG X1 speed	100.0000	min=0.000 -max=99999.000	Degree/min
#066	X axis MPG X10 speed	500.0000	min=0.000 -max=99999.000	unit/min
#067	Y axis MPG X10 speed	500.0000	min=0.000 -max=99999.000	unit/min
#068	Z axis MPG X10 speed	500.0000	min=0.000 -max=99999.000	unit/min
#069	A axis MPG X10 speed	500.0000	min=0.000 -max=99999.000	Degree/min
#071	X axis MPG X100 speed	0.0000	min=0.000 -max=99999.000	unit/min
#072	Y axis MPG X100 speed	0.0000	min=0.000 -max=99999.000	unit/min
#073	Z axis MPG X100 speed	0.0000	min=0.000 -max=99999.000	unit/min
#074	A axis MPG X100 speed	0.0000	min=0.000 -max=99999.000	Degree/min
#076	X axis MPG X1 Acc	3.0000	min=0.000 -max=9999.000	unit/s2
#077	Y axis MPG X1 Acc	3.0000	min=0.000 -max=9999.000	unit/s2
#078	Z axis MPG X1 Acc	3.0000	min=0.000 -max=9999.000	unit/s2
#079	A axis MPG X1 Acc	3.0000	min=0.000 -max=9999.000	Degree/s2
#081	X axis MPG X10 Acc	30.0000	min=0.000 -max=9999.000	unit/s2
#082	Y axis MPG X10 Acc	30.0000	min=0.000 -max=9999.000	unit/s2
#083	Z axis MPG X10 Acc	30.0000	min=0.000 -max=9999.000	unit/s2
#084	A axis MPG X10 Acc	30.0000	min=0.000 -max=9999.000	Degree/s2
#086	X axis MPG X100 Acc	0.0000	min=0.000 -max=9999.000	unit/s2
#087	Y axis MPG X100 Acc	0.0000	min=0.000 -max=9999.000	unit/s2
#088	Z axis MPG X100 Acc	0.0000	min=0.000 -max=9999.000	unit/s2
#089	A axis MPG X100 Acc	0.0000	min=0.000 -max=9999.000	Degree/s2
#245	MPG Precision	0.0040	min=0.001 -max=0.01	
#246	MPG motion direction	Negative	0: Negative; 1: Positive	
#247	MPG control mode	Close	0: Open; 1: Close	
#248	Enable the ESTOP signal on MPG	Enable	0: Disable; 1: Enable	
#249	Electric level of ESTOP on MPG	Low	0: Low; 1: High	

#247: When MPG is on MPG control Mode, the start and stop acceleration speed both cite Start Acceleration speed.

And on MPG control Mode, the controller will send out each pulses that MPG generate; When MPG control mode is close, when stop turnning the wheel of MPG, controller just immediately decelerate and stop.

11. Extended key Parameters

Para#	Para Definition	Default	Range
#250	Extended key 1 function	Start	0: Start; 1:Pause; 2: XY Zero; 3: Z Zero; 4: Home; 5: Floatting probe; 6: Fixing probe; 7: Vertex probe"; 8: X 1/2; 9: Y 1/2; 10"extkey1.nc; 11: Disable
#251	Extended key 2 function	Pause	0: Start; 1:Pause; 2: XY Zero; 3: Z Zero; 4: Home; 5: Floatting probe; 6: Fixing probe; 7: Vertex probe"; 8: X 1/2; 9: Y 1/2; 10"extkey1.nc; 11: Disable
#252	Extended key 3 function	Disable	0: Start; 1:Pause; 2: XY Zero; 3: Z Zero; 4: Home; 5: Floatting probe; 6: Fixing probe; 7: Vertex probe"; 8: X 1/2; 9: Y 1/2; 10"extkey1.nc; 11: Disable
#253	Extended key 4 function	Disable	0: Start; 1:Pause; 2: XY Zero; 3: Z Zero; 4: Home; 5: Floatting probe; 6: Fixing probe; 7: Vertex probe"; 8: X 1/2; 9: Y 1/2; 10"extkey1.nc; 11: Disable

By #158~#161 to configurate the extended key 1-4 output port number, and by #250~253 to defind the function of the extended key 1-4.

	Parameter Definition	Default	Range	Unit
#254	enable of X axis backlash	Disable	0: Disable; 1: Enable	
#255	enable of X axis backlash	Disable	0: Disable; 1: Enable	
#256	enable of X axis backlash	Disable	0: Disable; 1: Enable	
#257	enable of X axis backlash	Disable	0: Disable; 1: Enable	
#259	X axis backlash distance	0.9990	min=0.000 -max=0.999	unit
#260	X axis backlash distance	0.0000	min=0.000 -max=0.999	unit
#261	X axis backlash distance	0.0000	min=0.000 -max=0.999	unit
#262	X axis backlash distance	0.0000	min=0.000 -max=0.999	Degree

12. Backlash Parameters

13. Tool offsets Parameters

Para#	Parameter Definition	Default	Range	Unit
#264	H01 tool length	0.0000	min=-999.999 -max=999.999	unit
#265	H02 tool length	0.0000	min=-999.999 -max=999.999	unit
#266	H03 tool length	0.0000	min=-999.999 -max=999.999	unit
#267	H04 tool length	0.0000	min=-999.999 -max=999.999	unit
#268	H05 tool length	0.0000	min=-999.999 -max=999.999	unit
#269	H06 tool length	0.0000	min=-999.999 -max=999.999	unit
#270	H07 tool length	0.0000	min=-999.999 -max=999.999	unit
#271	H08 tool length	0.0000	min=-999.999 -max=999.999	unit
#272	H09 tool length	0.0000	min=-999.999 -max=999.999	unit
#273	H10 tool length	0.0000	min=-999.999 -max=999.999	unit
#274	H11 tool length	0.0000	min=-999.999 -max=999.999	unit
#275	H12 tool length	0.0000	min=-999.999 -max=999.999	unit
#276	H13 tool length	0.0000	min=-999.999 -max=999.999	unit
#277	H14 tool length	0.0000	min=-999.999 -max=999.999	unit
#278	H15 tool length	0.0000	min=-999.999 -max=999.999	unit
#279	H16 tool length	0.0000	min=-999.999 -max=999.999	unit
#280	H01 tool wear	0.0000	min=0.000 -max=999.999	unit
#281	H02 tool wear	0.0000	min=0.000 -max=999.999	unit
#282	H03 tool wear	0.0000	min=0.000 -max=999.999	unit
#283	H04 tool wear	0.0000	min=0.000 -max=999.999	unit
#284	H05 tool wear	0.0000	min=0.000 -max=999.999	unit
#285	H06 tool wear	0.0000	min=0.000 -max=999.999	unit
#286	H07 tool wear	0.0000	min=0.000 -max=999.999	unit
#287	H08 tool wear	0.0000	min=0.000 -max=999.999	unit
#288	H09 tool wear	0.0000	min=0.000 -max=999.999	unit
#289	H10 tool wear	0.0000	min=0.000 -max=999.999	unit
#290	H11 tool wear	0.0000	min=0.000 -max=999.999	unit
#291	H12 tool wear	0.0000	min=0.000 -max=999.999	unit
#292	H13 tool wear	0.0000	min=0.000 -max=999.999	unit
#293	H14 tool wear	0.0000	min=0.000 -max=999.999	unit
#294	H15 tool wear	0.0000	min=0.000 -max=999.999	unit
#295	H16 tool wear	0.0000	min=0.000 -max=999.999	unit
#296	D01 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#297	D02 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#298	D03 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#299	D04 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#300	D05 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#301	D06 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#302	D07 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#303	D08 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#304	D09 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#305	D10 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#306	D11 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#307	D12 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#308	D13 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#309	D14 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#310	D15 tool diameter	0.0000	min=-99.999 -max=99.999	unit
#311	D16 tool diameter	0.0000	min=-99.999 -max=99.999	unit

14. System settings

Para#	Parameter Definition	Default	Range	Unit
#312	language setting	简体中文	0: Eng; 1: 简体中文; 2: Custom	
#313	Shift key operation mode	2nd Mode	0: 2nd Mode; 1: Menu Mode	
#316	Tool path paint enable	Enable	0: Disable; 1: Enable	
#317	Tool path paint mode	Statue Mode	0: Statue Mode; 1: Line Mode; 2: 3D Mode	
#318	Tool path page display coordinates	Yes	0: No; 1: Yes	
#319	X axis rotation angle in 3D mode	0.0000	min=-180.0 -max=180.0	degree
#320	Y axis rotation angle in 3D mode	0.0000	min=-180.0 -max=180.0	degree
#321	Z axis rotation angle in 3D mode	0.0000	min=-180.0 -max=180.0	degree
#322	Monitoring page disabled in machining	Yes	0:Yes;1:No	
#323	Enable of beep	Enable	0:Disable; 1: Enable	
#324	Color reversal	Yes	0:Yes;1:No	
#325	Disable network functionality	Yes	0:Yes;1:No	
#326	Obtain IP address automatically	Yes	0: Yes; 1: No	
#327	Local IP address	192.168.2.7		
#328	Net mask	255.255.255.0		
#329	Router IP address	192.168.2.1		
#330	Shared host IP address	192.168.2.8		

Now the avaliable languages are Chinese and English, and we have opened language permissions for the system. Each user can develop a new language pack according to their own needs. There are "custom" and "msg-custom" language packs, the users can and translate and save the new language based on the format of "custom" and "msg-custom".

#313 define the operation mode of the "Shift" Key, when select the 2nd Mode option, the basic functions follow DDCS V3.1, if select the Menu Mode, you can see many new functions added, and the operation is more convenient, it is recommended to choose Menu function options.

#316 Enable of Disable the Tool path paint. When the system is not running smoothly, it is recommended to disable this option, which can effectively reduce memory consumption.

#327~#330 are Ethernet network settings, we already explained in details at Ethercat communication setup chapter.

5 G Code and M Code

G code	Description	Description and Example
GO	Rapid positioning	G0 XY Z , move as quickly as possible to a given point. In our system the G0 speed is defined by #103.
G01	Linear interpolation	G1 X Y F, move to a given point by the F speed.
G02	Clockwise circular interpolation	By Radius: G2XYZRF By the center of a circle: G2XYZIJKF
G03	Counterclockwise circular interpolation	By Radius:G3X.YZRF By the center of a circle:G3XYZIJKF
G04	Pause for a given duration of time	G4 P10000 pause for 10000 millisecond
G15	Switch back to Cartesian coordinates.	G16X10Y90: Moves to (0,10) Y180: Moves to (-10,0) Y270: Moves to (0,-10)
G16	Enable Polar Coordinates programming mode X represents the Distance and Y represents the Angle	Y0 : Moves to (10,0) G15X0Y0: Moves to (0,0) and Polar Coordinates OFF.
G17	XY Plane select	G17, all commands are now to be interpreted in the XY plane
G18	XZ plane select	G18, all commands are now to be interpreted in the XZ plane
G19	YZ plane select	G19, all commands are now to be interpreted in the YZ plane
G20	Inch mode	passed coordinates will be considered as Inches, so internally translated to millimeters
G21	Millimeter mode	passed coordinates will be considered as millimeters
G28	Go to the recorded origin position via a reference point at rapid speed	G91 G28 X10 Y0 Z0 The X axis will first move 10mm to the right, then the XYZ axes will go to the machine axis 0.
G30	Go to the recorded origin position via an alternative reference point at rapid speed	G90G30X_Y_Z_A_P_ P program cites 1,2,3, represents which reference point it will go
G31	Report current Z probe status	G31X_Y_Z_A_L_Q_K_F_ XYZA is the XYZA Probe trip L is the probe signal effective level K represents that disable or enable the hard limit during probing Q represents that when probe signal is triggered the stop mode: 0-Stop by Decelerate 1- Stop immediately F represents the Probing speed G91G31Z-1000L0Q1K0F100 Z axis probe down 1000mm and the signal effective leve is 0, disable the hard-switch and when probe signal is triggered the stop immediately.
G53	Move in absolute machine coordinate system	Need to Home each axis in advance, or system alarms and exits. G53X10Y10 XY Move to the mach coordiante position (10,10).
G54	G54 coordinate	G54, choose the active coordinate system G54
G55	G55 coordinate	G55, choose the active coordinate system G55
G56	G56 coordinate	G56, choose the active coordinate system G56
G57	G57 coordinate	G57, choose the active coordinate system G57
G58	G58 coordinate	G58, choose the active coordinate system G58
G59	G59 coordinate	G59, choose the active coordinate system G59
G68 G69	ENABLERotate program coordinate system DISABLE Rotate program coordinate system	- G68X10Y5R45 Rotate 45 degrees around (10,5)
009		

Description	Description and Example
Canned cycle - peck drilling	Need to configurate the spindle as servo spindle. G73 X_Y_Z_R_Q_F_K_; Canned cycle - peck drilling, work with F command. X_Y_: Hole Position, Z_: The distance between R position and hole bottom. R_: The distance between the initial position and R point; Q_: The drilling depth of each feeding, P_: Pause time, K_: Repeated times
Canned cycle - left hand rigid tapping	Need to configurate the spindle as servo spindle. G74 CCW rotate to the hole bottom by F speed(Z), and CW rotate to R point. G84 CW rotate to the hole bottom by F speed(Z), and CWW rotate to R point. X_Y: Hole Position, Z_: The distance between R position and hole bottom. R_: The distance between the initial position and R point; P_: Pause time G98/G99 G74 X_Y_Z_R_P_F_; G98/G99 G84 X_Y_Z_R_P_F;
Canned cycle - right hand rigid tapping	Example: M29S200 (Enter the rigid tapping mode. In the rigid tapping mode, the Z axis and servo spindle adopt the interpolation method movements.)
Canned cycle - drilling	Canned cycle - drilling, work with F command. X_Y: Hole Position, Z_: The distance between R position and hole bottom. R_: The distance between the initial position and R point; F_: drilling feeding speed, K: Repeated times G81 X_Y_Z_R_F_K_;
Canned cycle - drilling with dwell	 X_Y: Hole Position, Z_: The distance between R position and hole bottom. R_: The distance between the initial position and R point; F_: drilling feeding speed, K: Repeated times. P_:The pause time at the bottle of the hole. G82 X_Y_Z_R_P_F_K_;
Canned cycle - peck drilling	G83 deep drilling or milling with chip breaking. X_Y: Hole Position, Z_: The distance between R position and hole bottom. R_: The distance between the initial position and R point; Q_: The Depth of each feeding drilling . F_: drilling feeding speed, K: Repeated times G83 X_Y_Z_R_Q_F_K_;
Absolute distance mode	In absolute distance mode, axis numbers (X, Y, Z, A) usually represent positions in terms of the currently active coordinate system.
Incremental distance mode	In incremental distance mode, IJK numbers usually represent increments Ifrom the current controlled point.
Offset coordinates and set parameters	G92X_Y_Z_A_ By adjusting the origin point of the current coordinate system, To make the current point have the coordinates as XYAZ assigned.
Initial level return after canned cycles	Retract perpendicular to the selected plane to the position that axis was in just before the canned cycle started
R-point level return after canned cycles	retract perpendicular to the selected plane to the position indicated by the R word
Home command	G128X_Y_Z_A_ When programming word (X/Y/Z/A) set to 1, indicate that the according axis execute Home action. G128X1Y1Z1 XYZ axis execute Home action at the same time.
	Canned cycle - peck drilling Canned cycle - left hand rigid tapping Canned cycle - right hand rigid tapping Canned cycle - drilling Canned cycle - drilling with dwell Canned cycle - peck drilling Canned cycle - peck drilling Absolute distance mode Incremental distance mode Offset coordinates and set parameters Initial level return after canned cycles R-point level return after canned cycles

M code	Description	Description and Example	
MO	Program Pause	To stop a running program temporarily	
M3	Rotate spindle clockwise	To start the spindle turning clockwise at the currently programmed speed	
M5	Stop spindle rotation	To stop the spindle from turning	
M6	Tool change	M6 Start when the command is encountered. It will then wait for Cycle Start to be pressed	
M8	Flood coolant on	Coolant output signal is valid.	
M9	All coolant off	Coolant output signal is invalid.	
M10	Lubrication ON	Lubrication output signal is valid.	
M11	Lubrication OFF	Lubrication output signal is invalid.	
M29	Spindle command group command	Enter rigid tapping mode , Call before G74/G84	
M98	Call subroutine	To call a subroutine program within the current part program file code.	
M99	Return from subroutine	To return from a subroutine program	
M30	Program end	End all the program	
M105	X axis Home command		
M106	Y axis Home command	If the commands appear on same line, then all the axis execute Home action at the same time. M107 : Z axis Home, M105M106: X axis and Y aixs Home.	
M107	Z axis Home command		
M108	A axis Home command		
M47	Repeat program from first line	After the program is finished, it will be executed from the beginning, and it will continue to cycle.	
		After the program is missifed, it will be executed from the beginning, and it will continue to cycle.	