

# F54 CONTROLLER

## Operation Manual

Modified Date: 05-09-2024



Vietnamese CNC Controllers

# INTRODUCTIONS:

Thank you for your interest and choose our motion controller. QS Technology Co.,LTD provide controllers with a modern design also with operation interface. The F54 controller was designed for multi applications. This controller can support a wide range of applications thanks to the flexible integration of the main core (Motion control), PLC and Macro.

This user guide provides you with an overview of the range of functions of QS Technology milling controllers and gives you a good experience for your daily work.

QS Technology Co., Ltd. We are proud to be a pioneer in developing, applying, and marketing CNC controller products "Made by Vietnam." After many years of development, products under the QS Technology brand have increasingly gained the trust and interest of customers both domestically and internationally. Additionally, with strengths and experience accumulated over many years in machine manufacturing, automation systems, and electronic circuit boards, we are confident in our mastery of the technology and our ability to meet our customers' needs.

## OUR WEBSITE



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# CHAPTER 1.

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## CONTROLLER OVERVIEW



## 1.1 APPERANCE



Figure 1-1. F54 controller



Figure 1-2. F54 controller outside box

## 1.2 DIMENSION



Figure 1-3. Front view of F54 controller

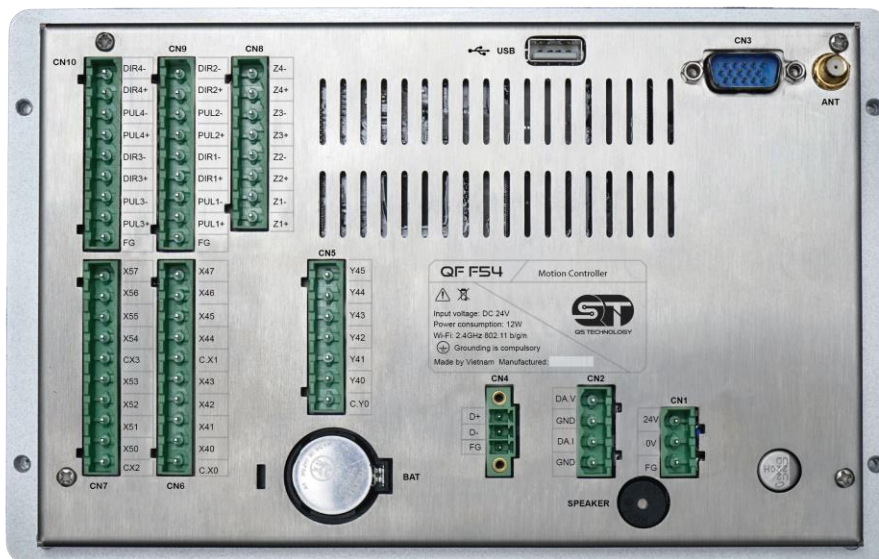


Figure 1-4. Back view of F54 controller





Figure 1-5. Side view of F54 controller

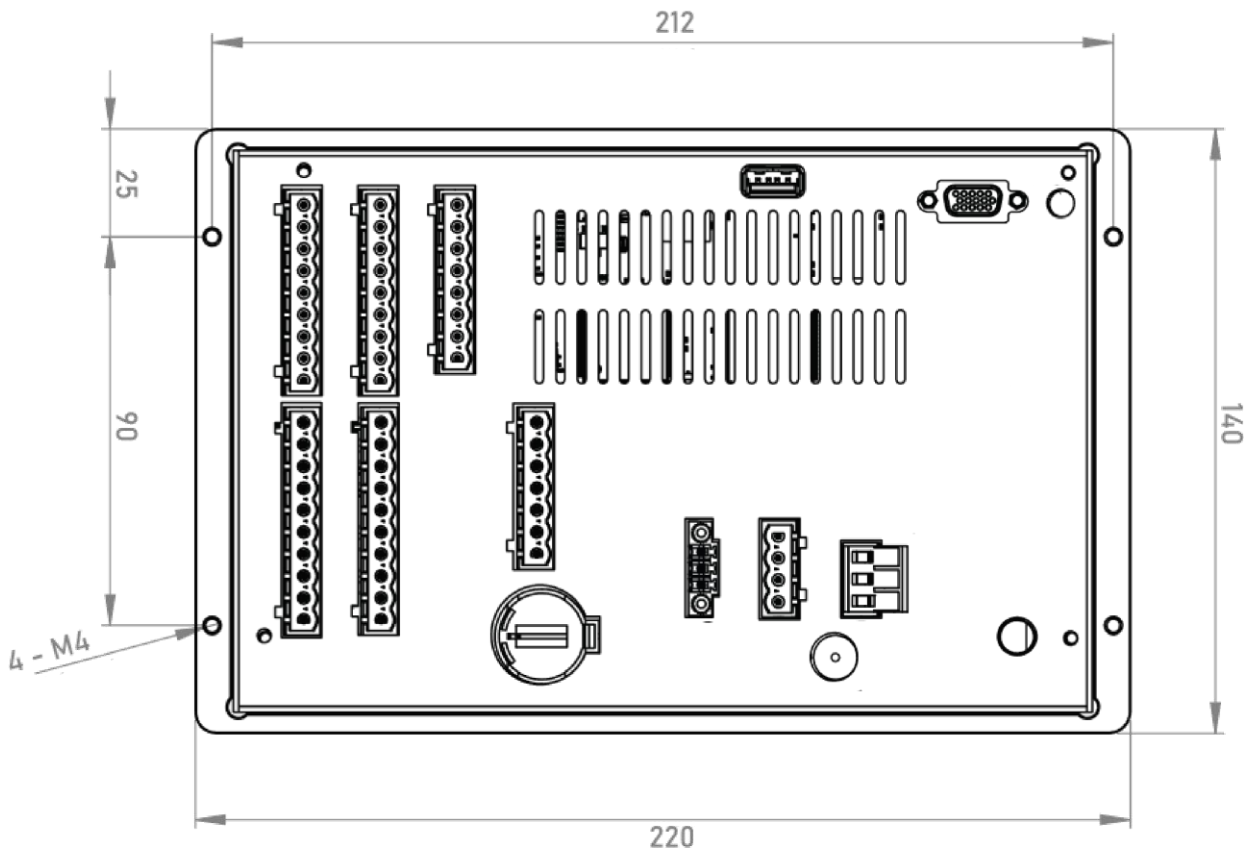


Figure 1-6. Details dimension of F54 controller



# 1.3 SOFTWARE STRUCTURE

Model: F54 Controller

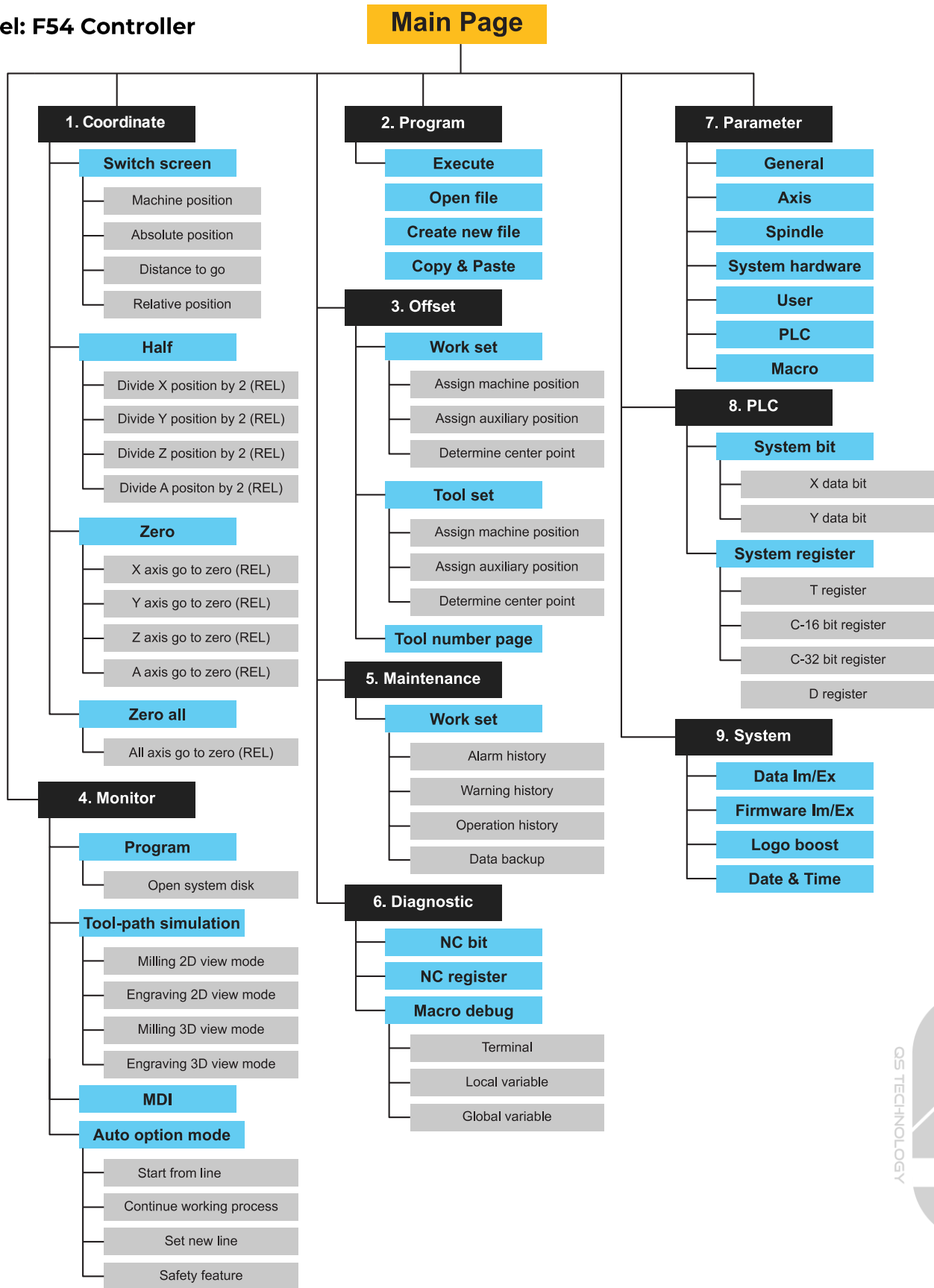


Figure 1-7. F54 controller software structure

# CHAPTER 2.

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## WIRING - CONNECTION



## 2.1 POWER SUPPLY



Figure 2-1. Power supply widely use

### Note:

- Using switching power supply is better than voltage transformer
- Voltage input forced to connect FG pin to against the noise signal for controller

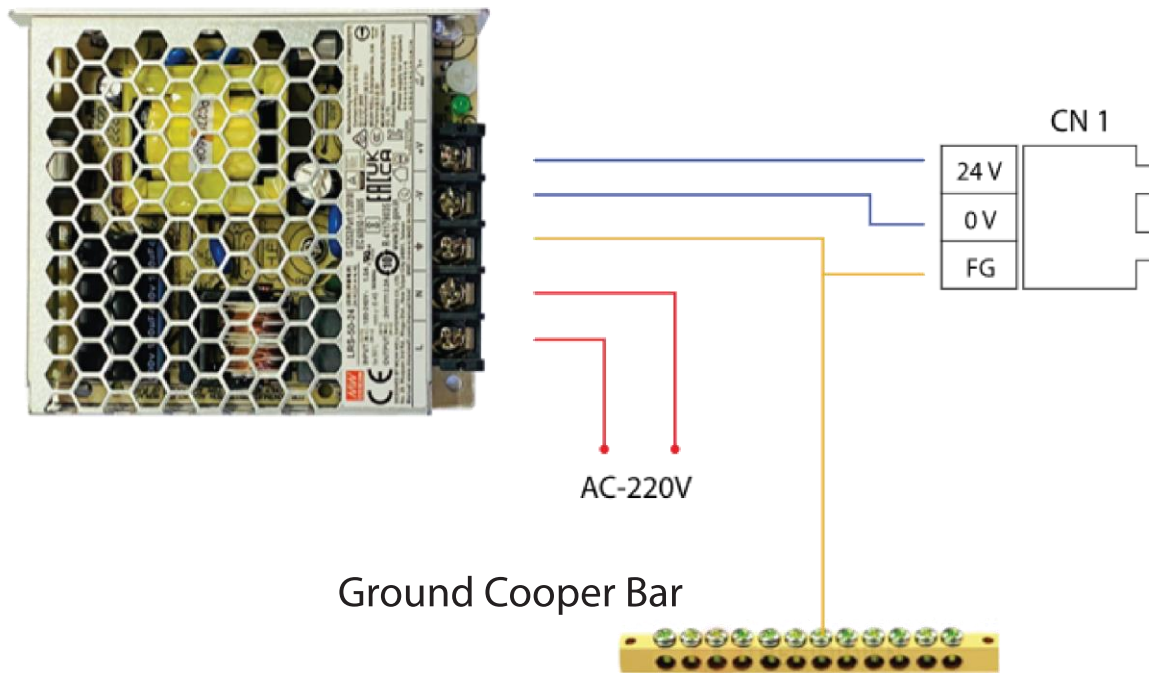


Figure 2-2 Power connection diagram

## 2.2 SENSOR CONNECTION PORT

There are 2 type of sensor that is widely used is high input (PNP) and low input (NPN).

### Notice:

- High input (PNP): When we connect CX pin to 0V and using high input sensor type (PNP). This signal will lead to the input signal of controller
- Low input (NPN): When we connect CX pin to 24V and using low input sensor type (NPN). This signal will lead to the input signal of controller

### 2.2.1 HIGH INPUT VOLTAGE

User can choose 1 of 2 port CN6, CN7 to connect the high input voltage to controller

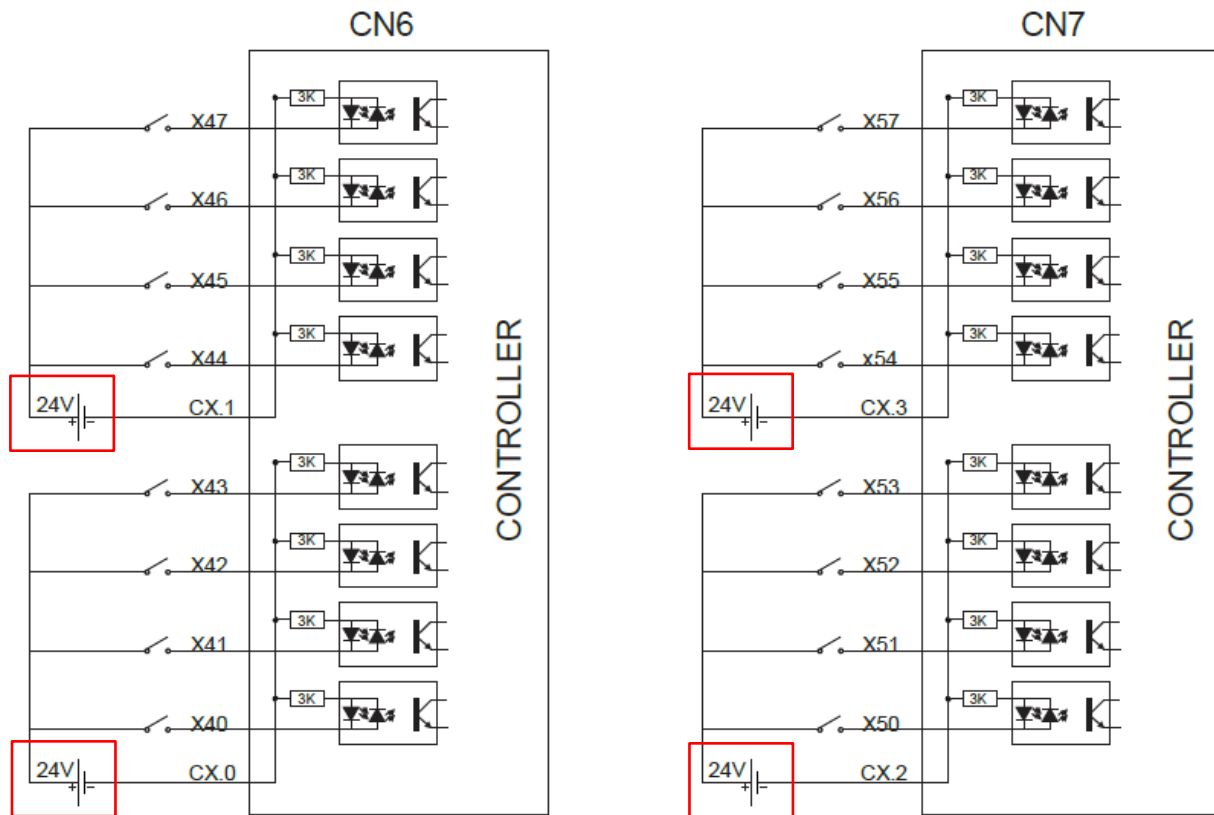


Figure 2-3. High input voltage of CN6, CN7 port



## 2.2.2 LOW INPUT VOLTAGE

User can choose 1 of 2 port CN6, CN7 to connect the high input voltage to controller

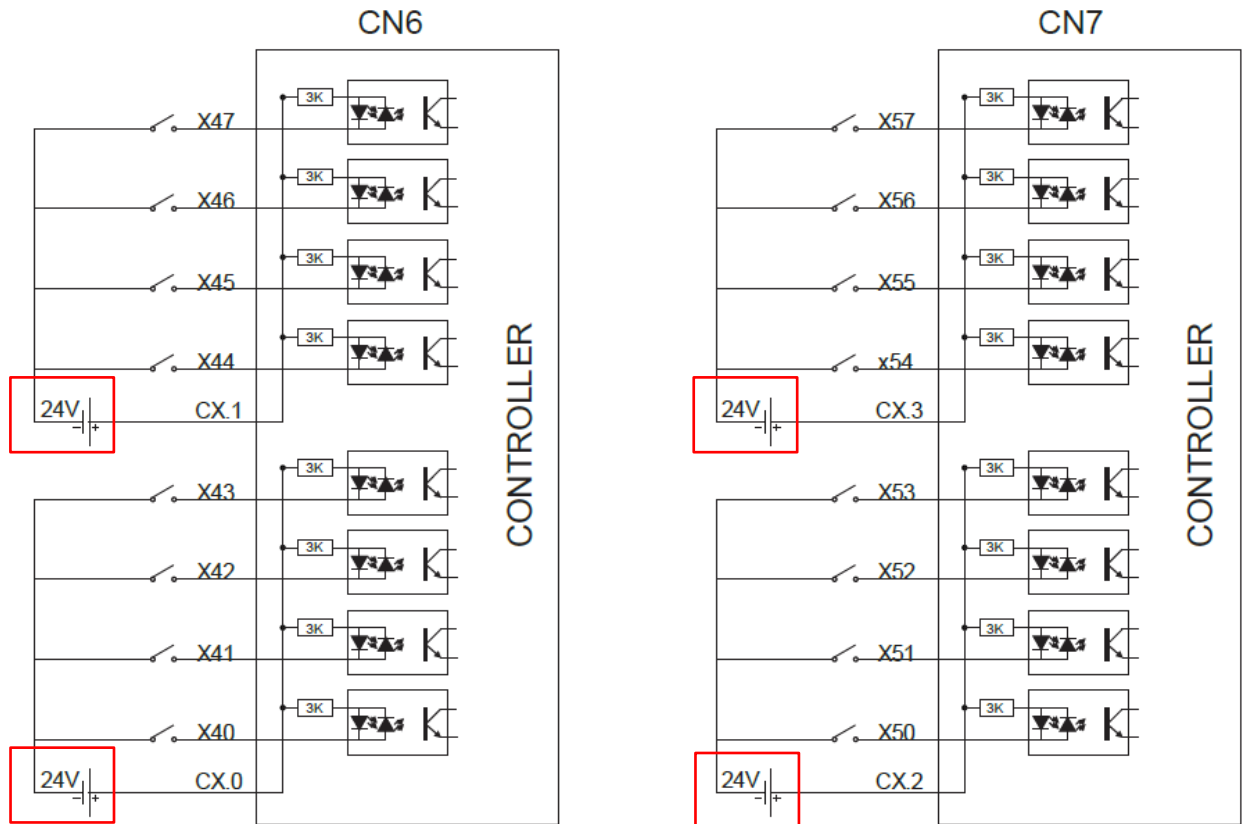


Figure 2-4. Low input voltage of CN6, CN7 port

### Note:

- CX.0, CX.1, CX.2, CX.3 is a COM separate input signal pins
- Recommend the operators to wire the input signal at the same type
- **DO NOT wire 2 difference type of voltage input signal at the same time to the controller**



### 2.2.3 F54 CONTROLLER INPUT CONNECTION TABLE

Refer the reference connection table of F54 controller at **(2.9)** below to avoid connecting wrong signal cause damage to device.

### 2.3 TOOL LENGTH SENSOR

Tool length sensor is a device to measure the length, wear of cutting tools and these values will be calculated to determine the tool wear compensation. And the controller will be able to adjust suitable working value achieve the desired dimensions and tolerances of machined parts.

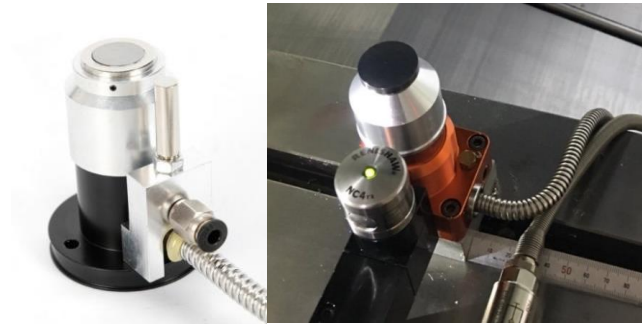


Figure 2-6. Tool length sensor

#### 2.3.1 3 WIRES TYPE

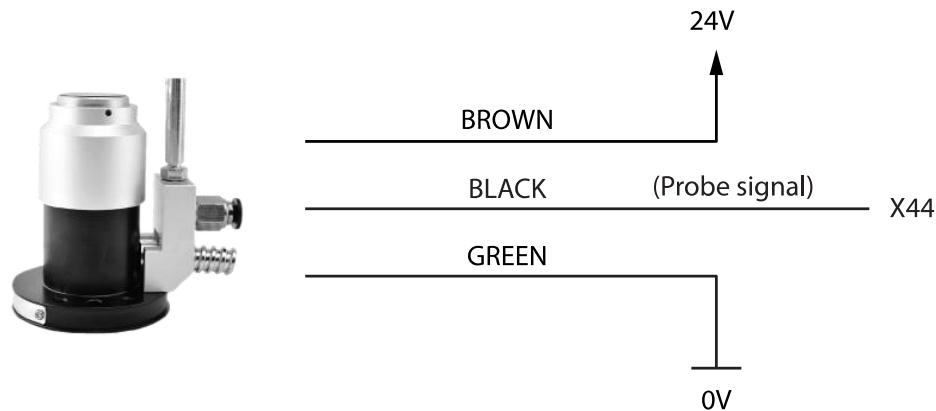


Figure 2-7. Tool length sensor wiring diagram (3 wires type)



### 2.3.2 4 WIRES TYPE-NPN OUTPUT SIGNAL

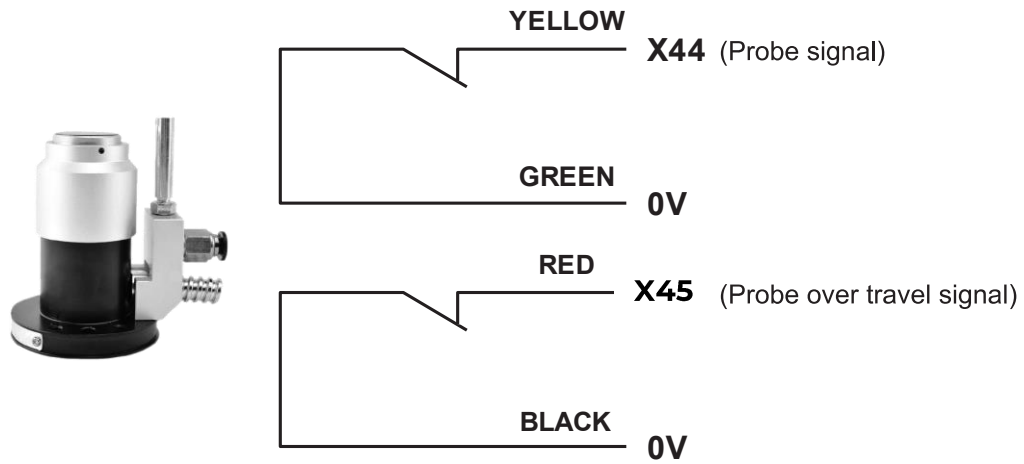


Figure 2-8. Tool length sensor (4 wires-NPN)

### 2.3.2 4-WIRES TYPE-PNP OUTPUT SIGNAL

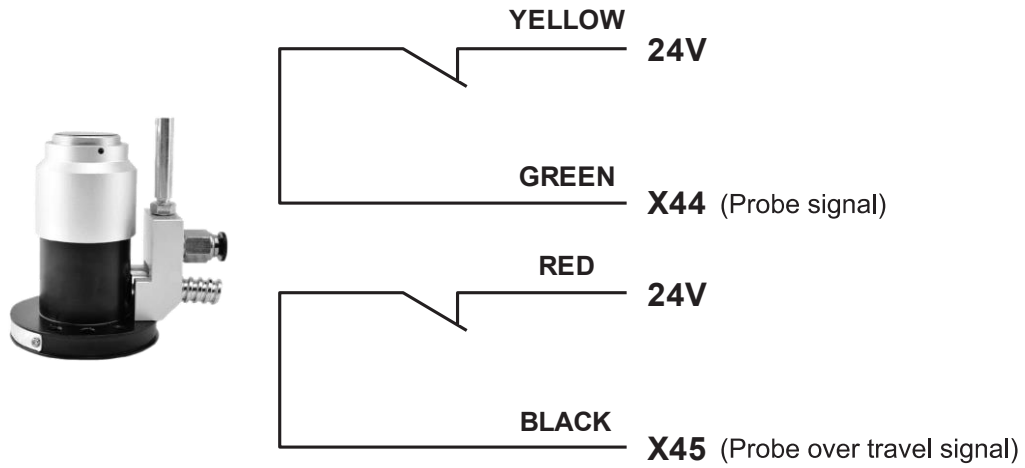


Figure 2-9. Tool length sensor (4 wires-PNP)



### 2.3.3 6 WIRES TYPE-NPN OUTPUT SIGNAL

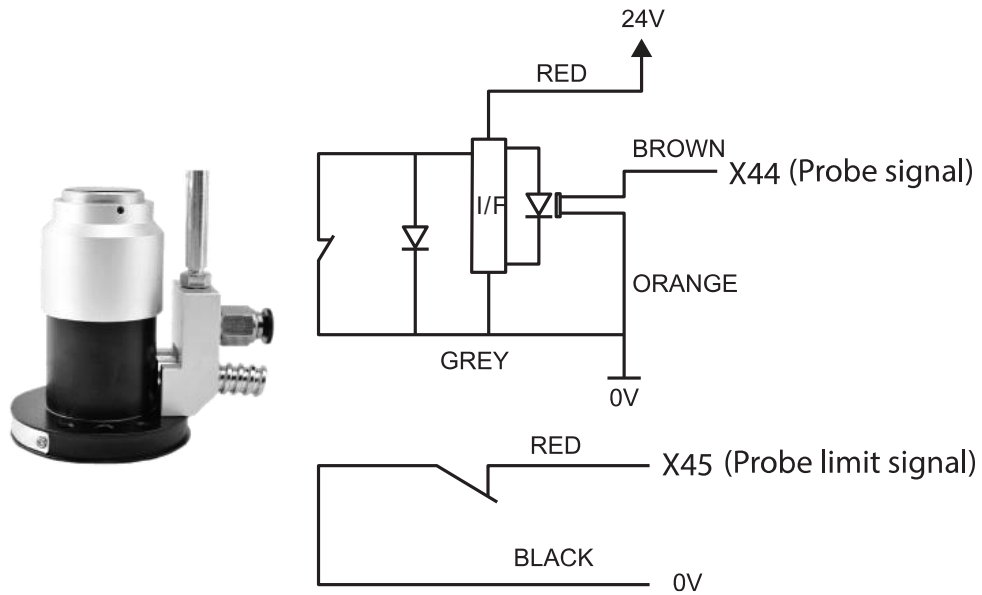


Figure 2-10. Tool length sensor (6 wires-NPN)

### 2.3.4 6 WIRES TYPE-PNP OUTPUT SIGNAL

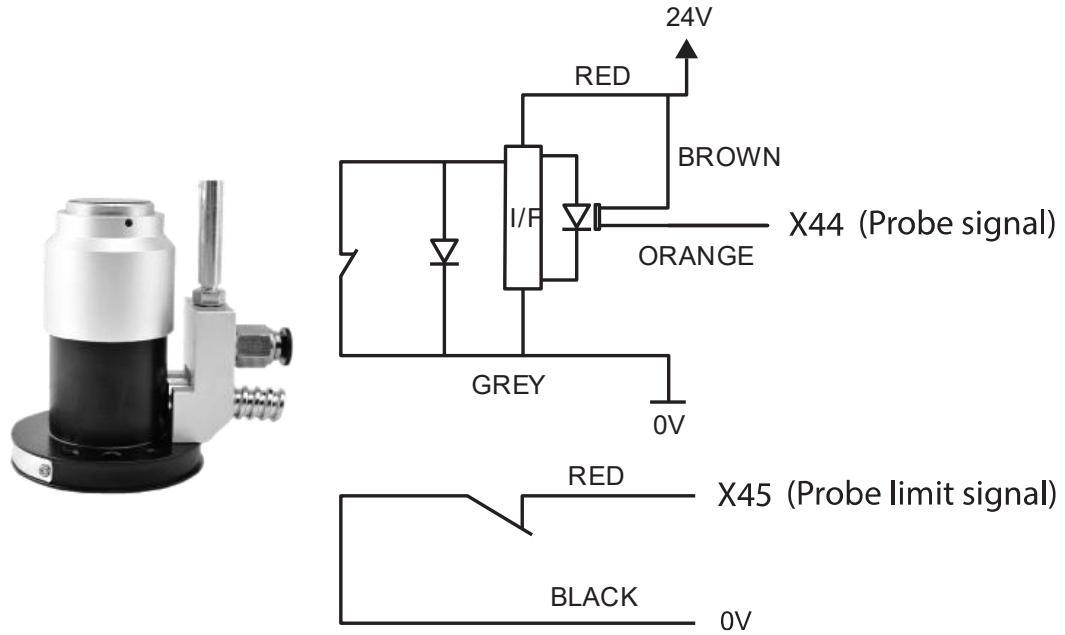


Figure 2-11. Tool length sensor (6 wires-PNP)



## 2.4 AXIS WIRING DIAGRAM

### 2.4.1 WIRING DIAGRAM X-Y AXIS (PUL/DIR)

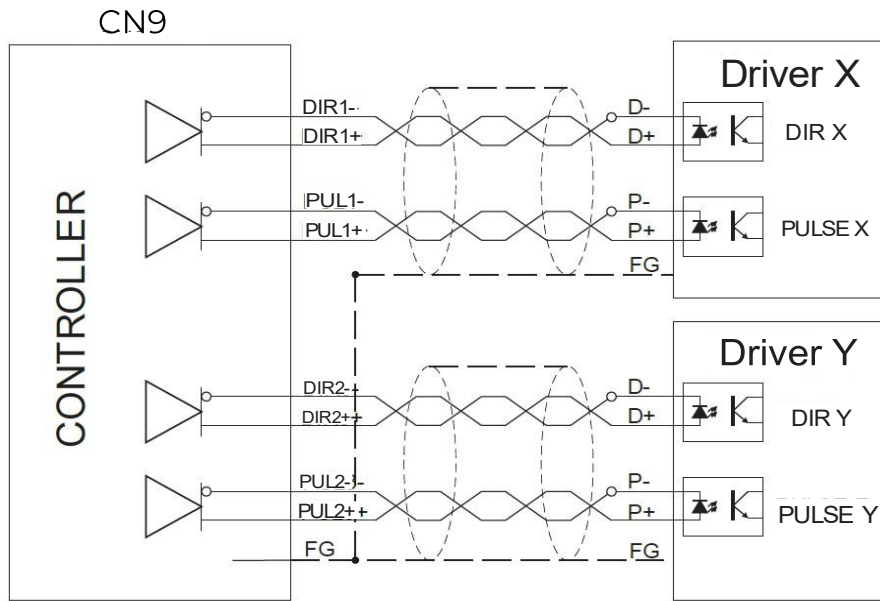


Figure 2-12. X,Y axis pulse/direction wiring diagram

### 2.4.2 WIRING DIAGRAM Z-A AXIS (PUL/DIR)

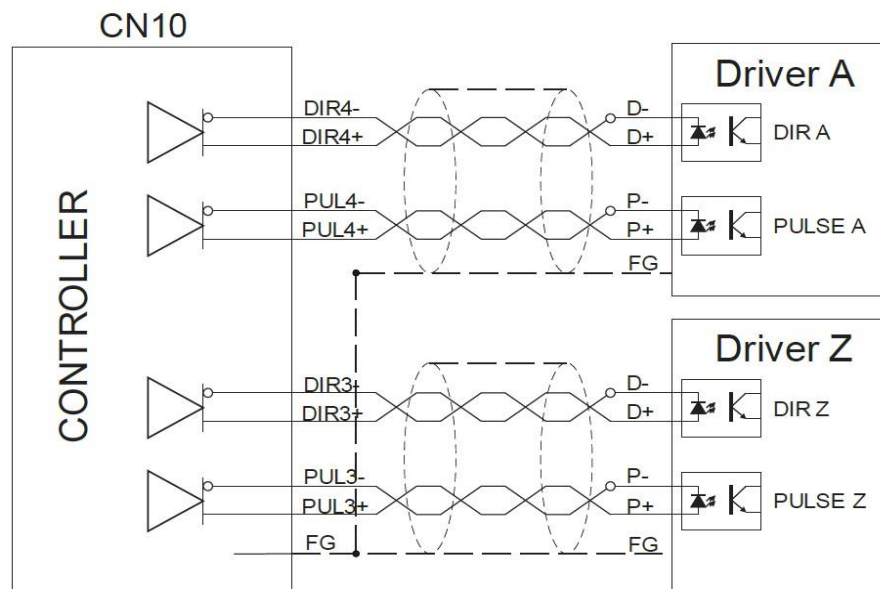


Figure 2-13. Z,A axis pulse/direction wiring diagram



### 2.4.3 PULSE FEEDBACK OF Z PHASE FROM X,Y,Z,A SERVO DRIVE

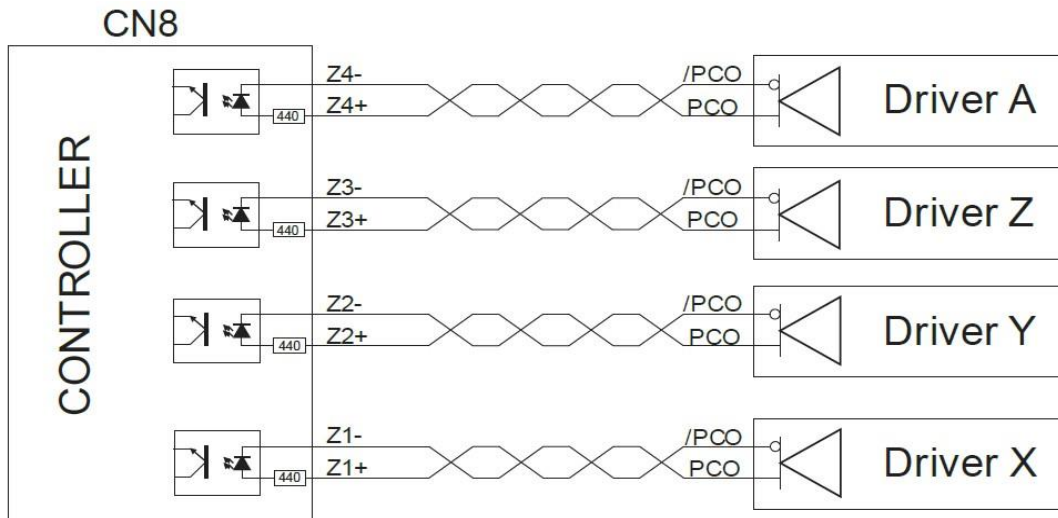


Figure 2-14. Z phase pulse feedback from X,Y,Z,A servo drive wiring diagram

#### Note:

- Control cable must have a shield wire and be soldered to the connector to against the noise signal (Refer image below)

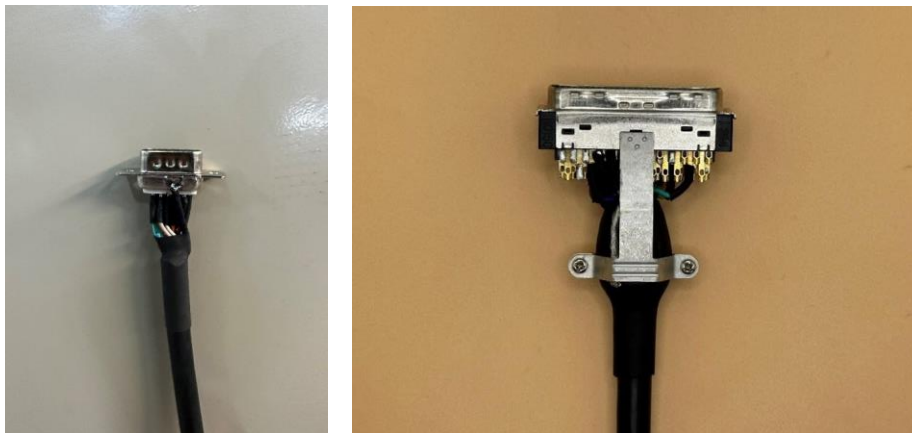


Figure 2-17. Control cable shield wire be soldered to the connector



## 2.5 CONNECT ANALOG SIGNAL TO INVERTER

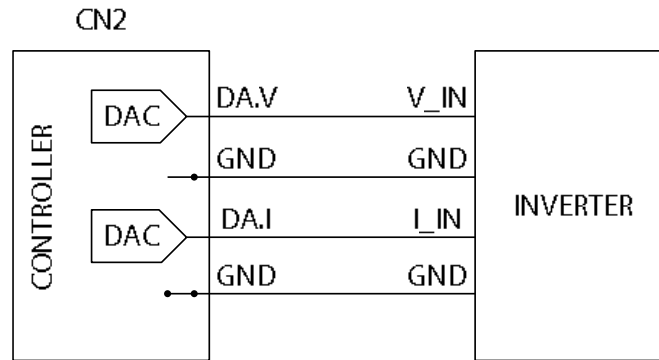


Figure 2-18. Analog signal wiring diagram to inverter

### 2.5.1 CONNECT ANALOG SIGNAL TO INVERTER USING 0-10V (INVT brand)

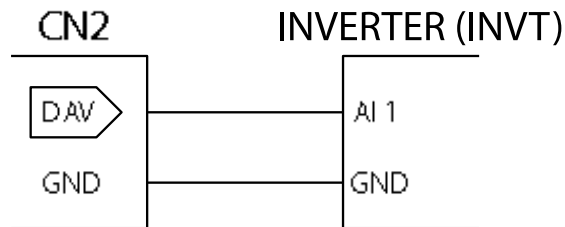


Figure 2-19. 0-10V analog wiring diagram to inverter (INVT brand)

### 2.5.2 CONNECT ANALOG SIGNAL TO INVERTER USING CURRENT 0-20mA (INVT brand)

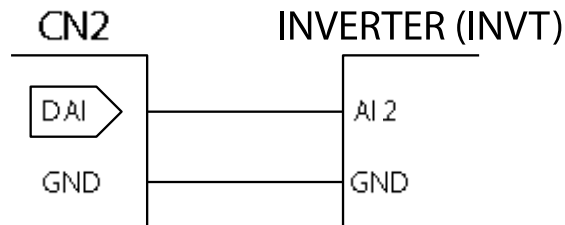


Figure 2-20. 0-20mA analog wiring diagram to inverter (INVT brand)

## 2.6 I/O LINK BOARD CONNECTION

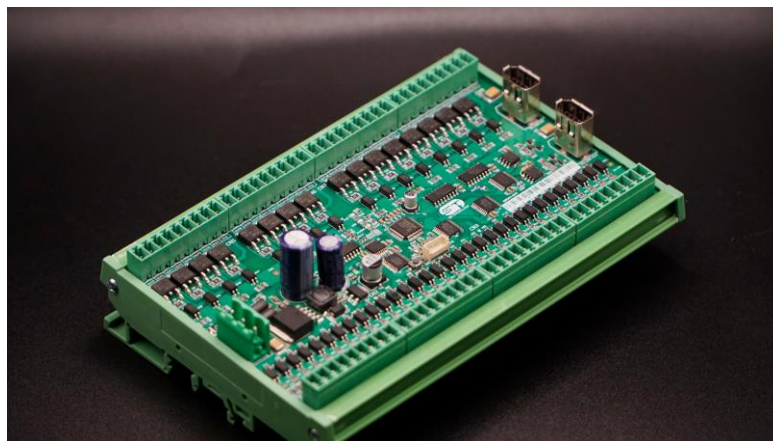


Figure 2-21. I/O link 32\_V1.1\_0722 board

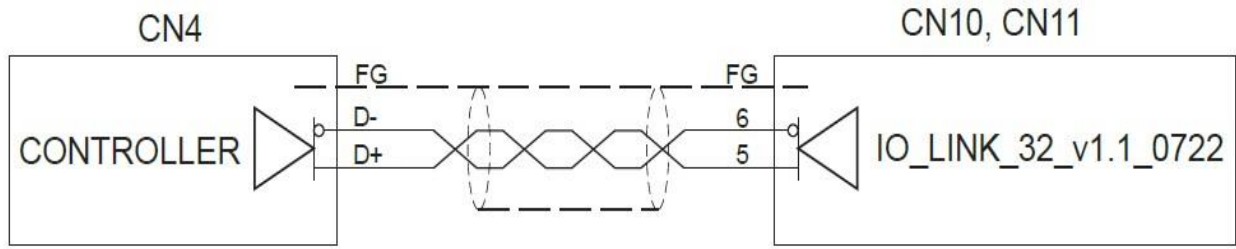


Figure 2-22. I/O link board wiring diagram

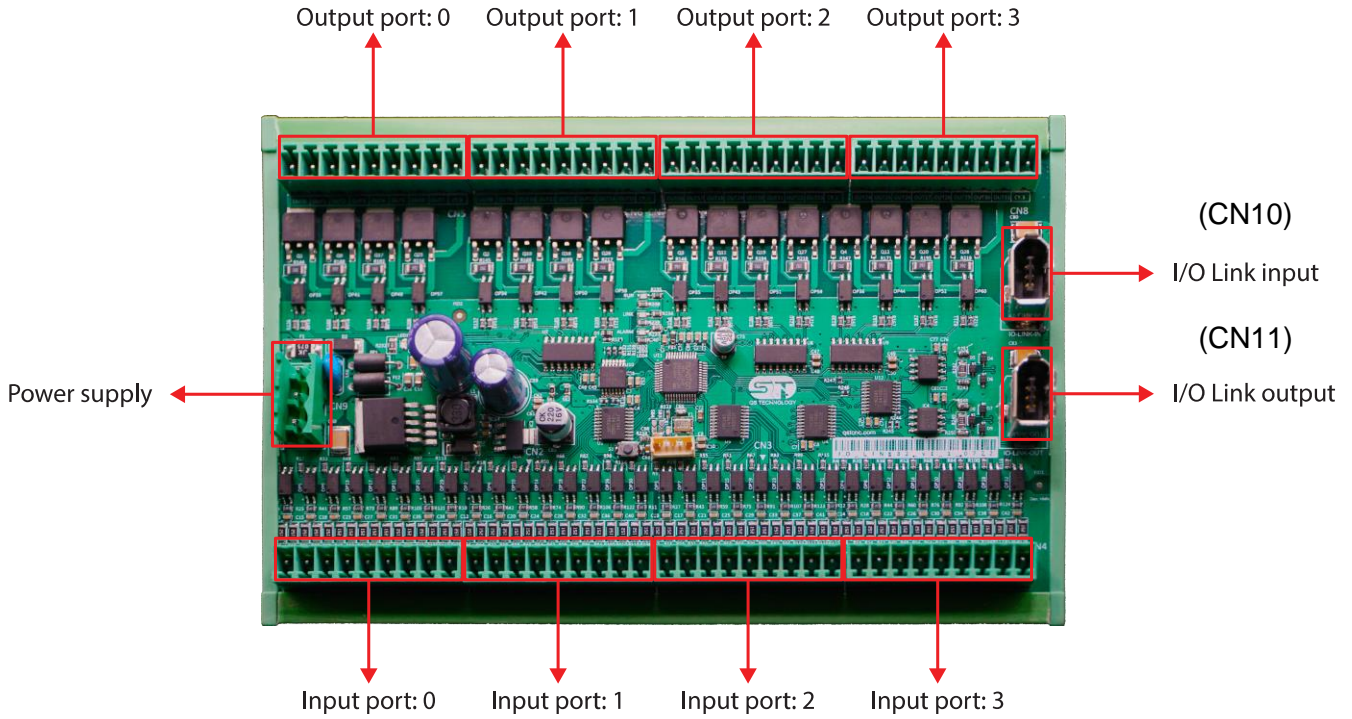
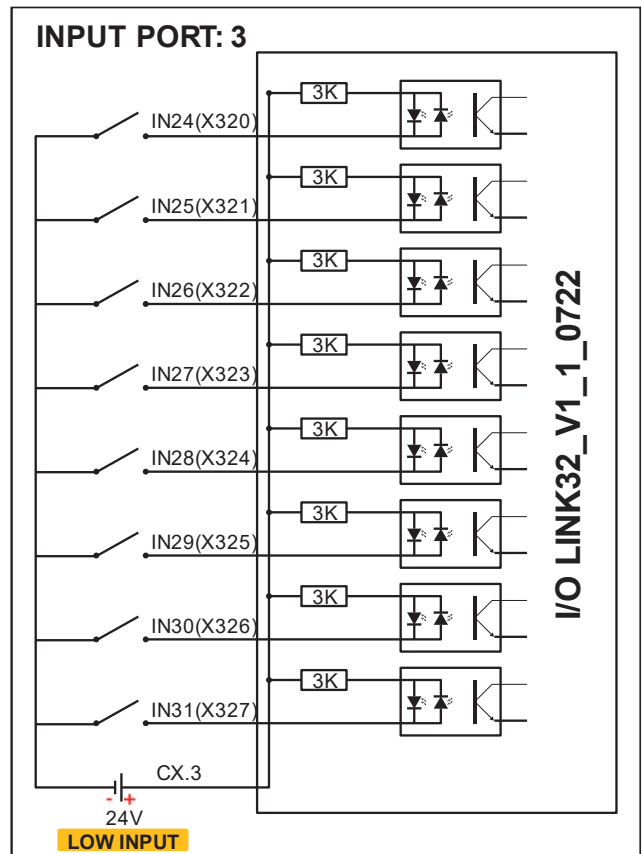
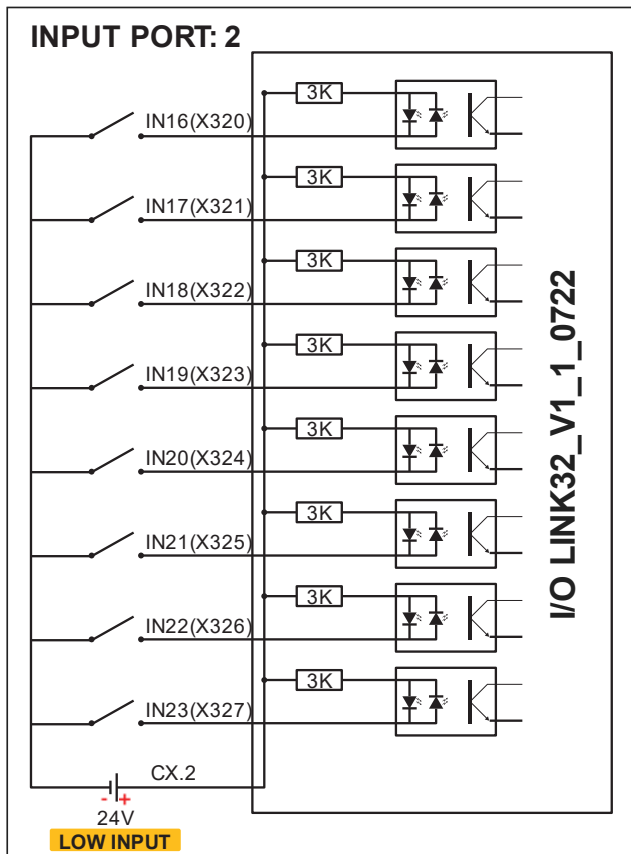
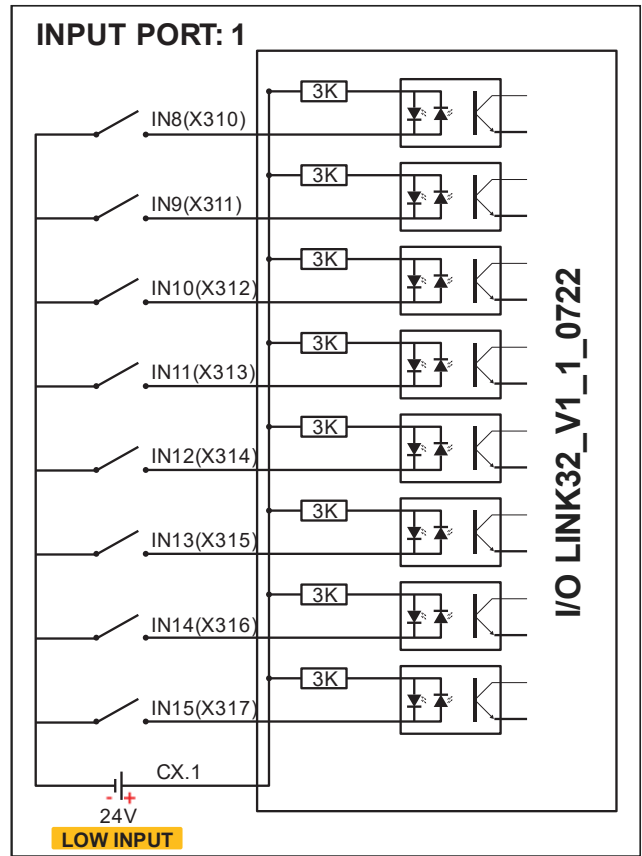
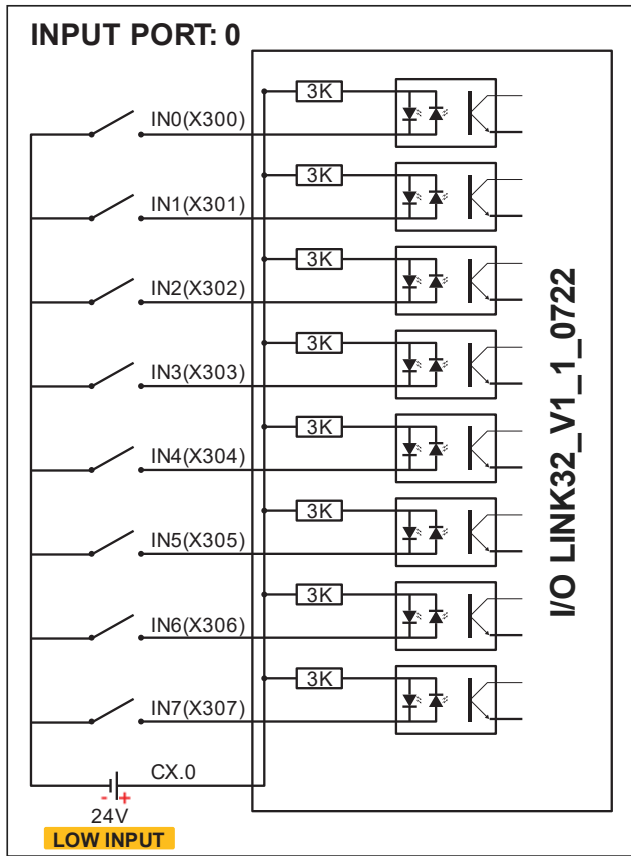


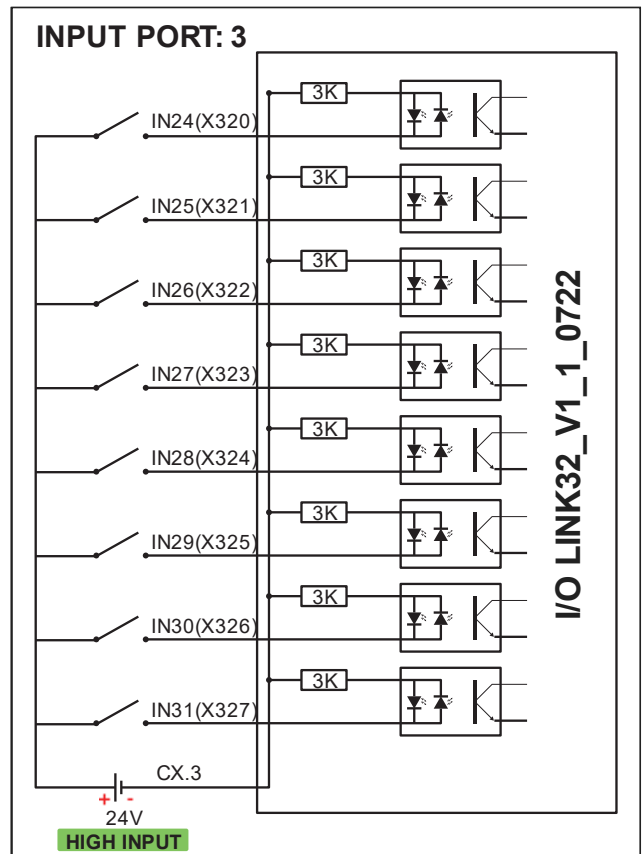
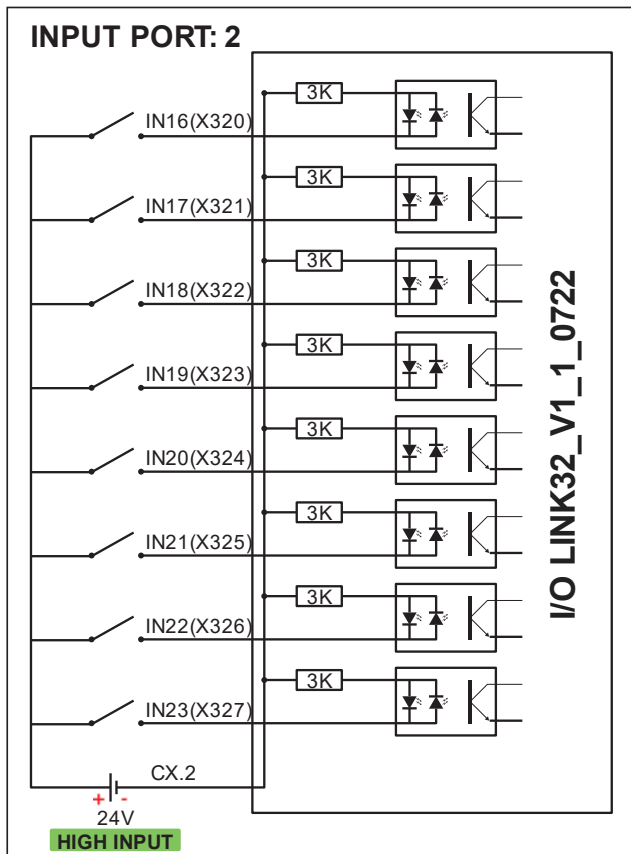
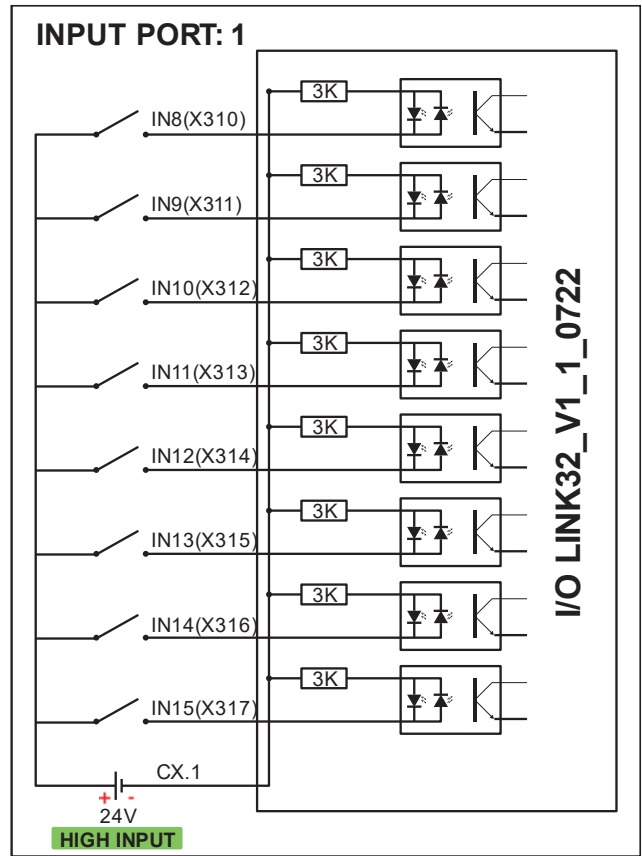
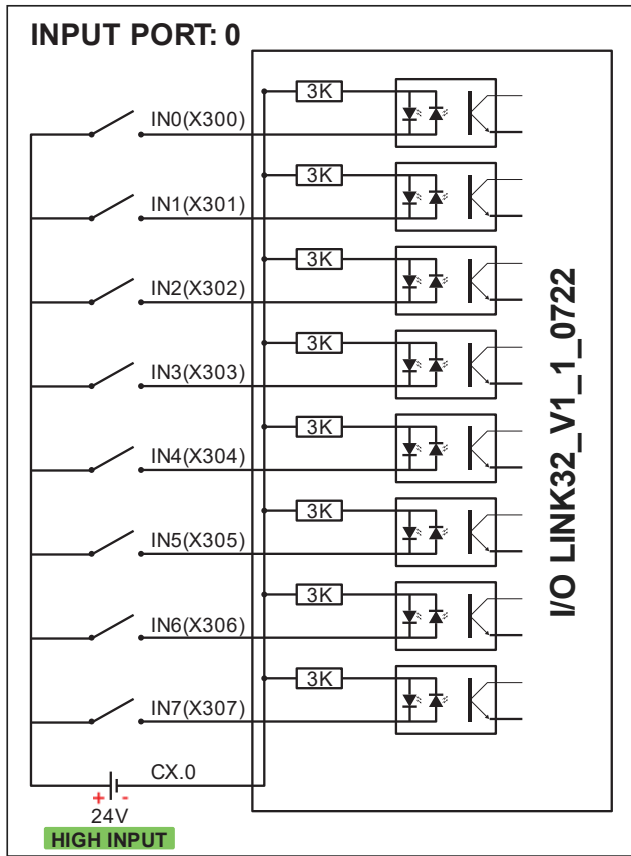
Figure 2-23. I/O link 32\_V1.1\_0722 board connection port



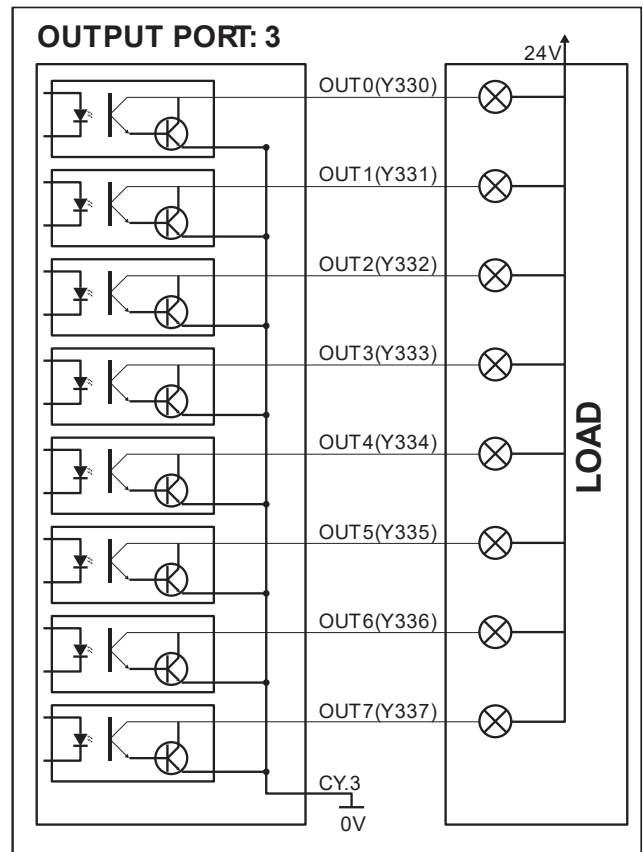
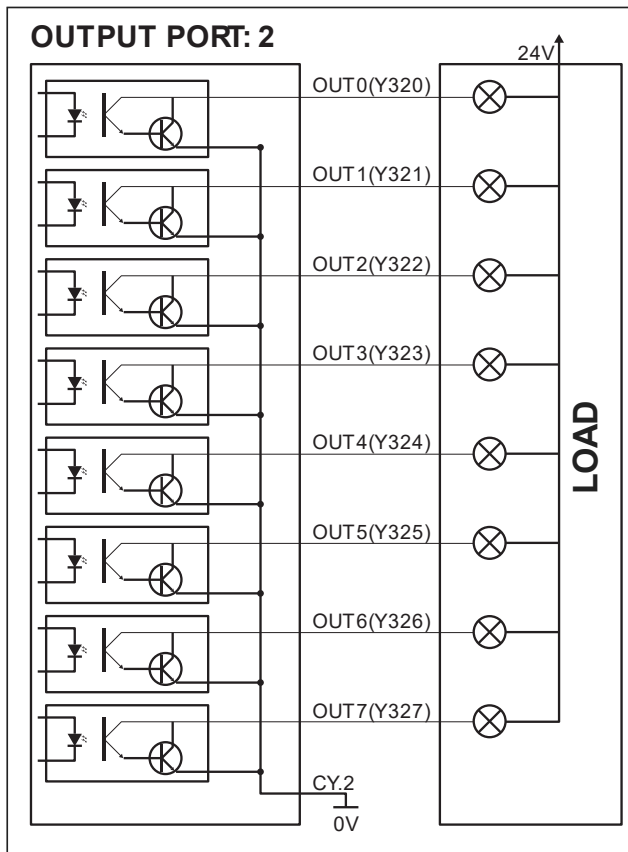
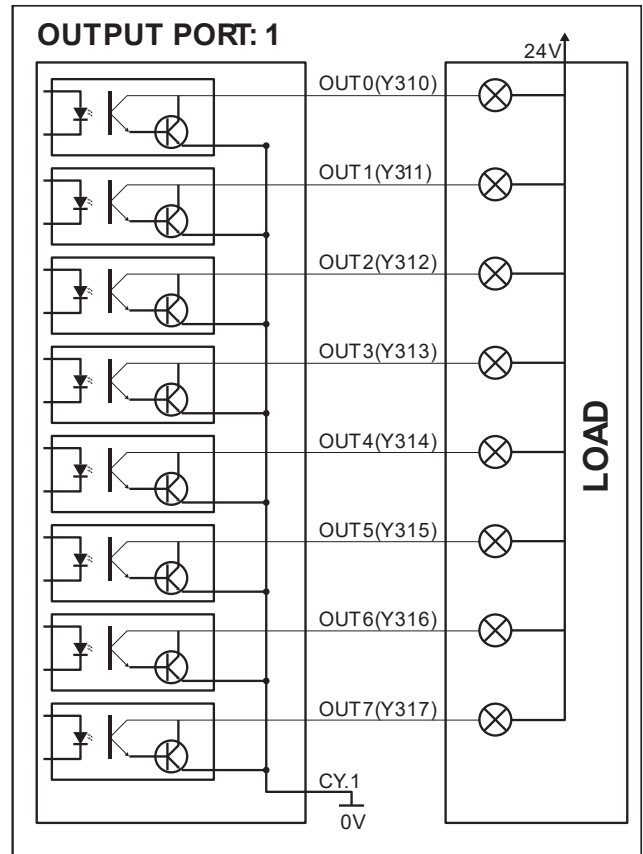
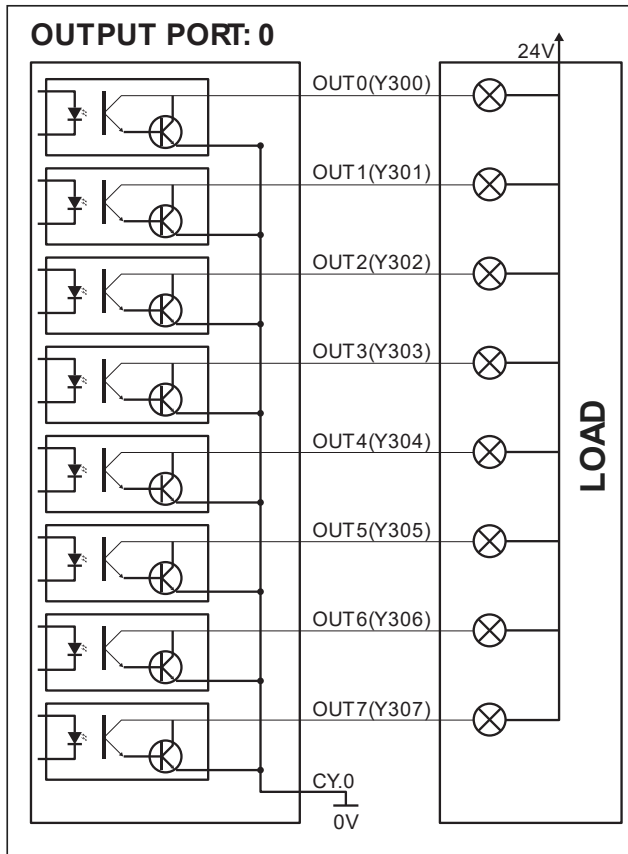
## 2.6.1 I/O LINK BOARD - INPUT PORT (LOW INPUT)



## 2.6.2 I/O LINK BOARD – INPUT PORT (HIGH INPUT)



### 2.6.3 I/O LINK BOARD - OUTPUT PORT





**Note:**

- RS485/IO Link cable recommend using the cable have shield wire to against noise signals (Refer the image below)



Figure 2-24. I/O link cable using shield wire and be soldered to the controller

## 2.7 MPG HANDWHEEL

### 2.7.1 4 AXIS TYPE – DIFFERENTIAL OUTPUT SIGNAL

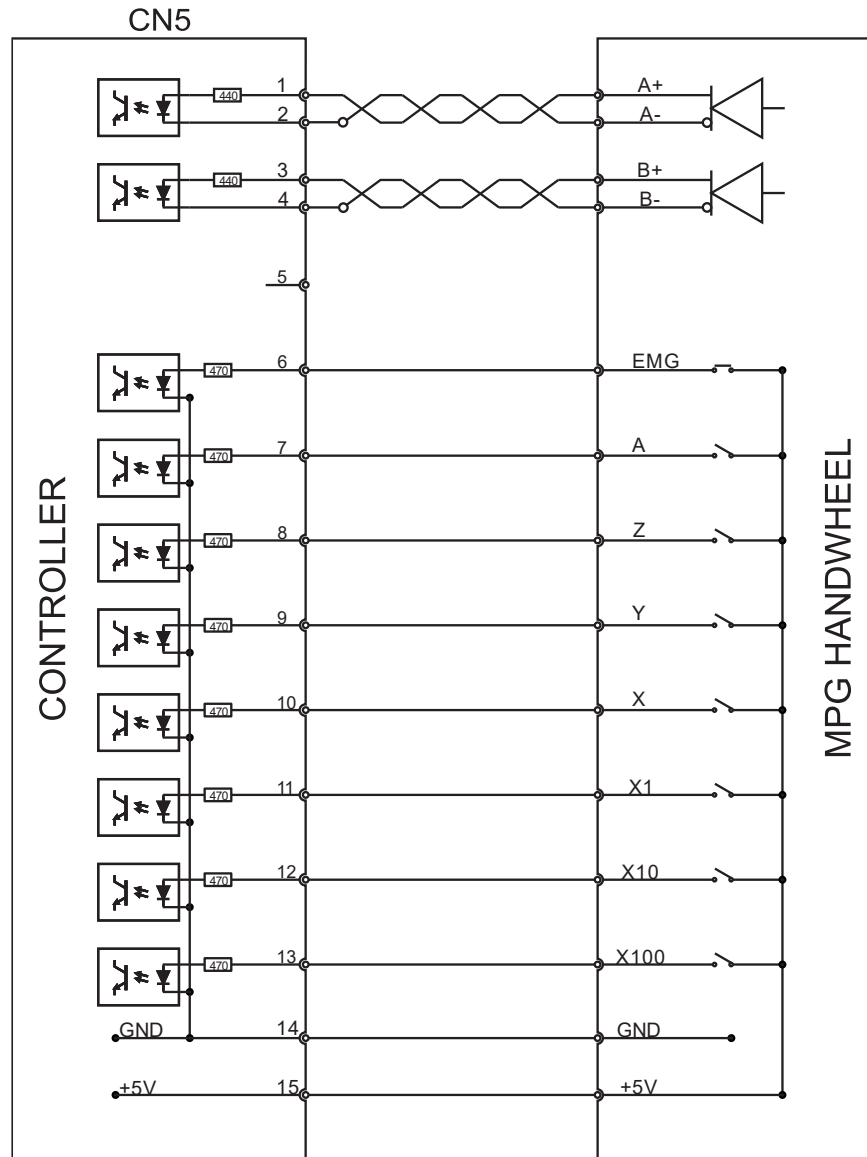


Figure 2-21. 4 axis MPG handwheel with differential output signal & EMG button

## 2.7.2 6 AXIS TYPE – DIFFERENTIAL OUTPUT SIGNAL

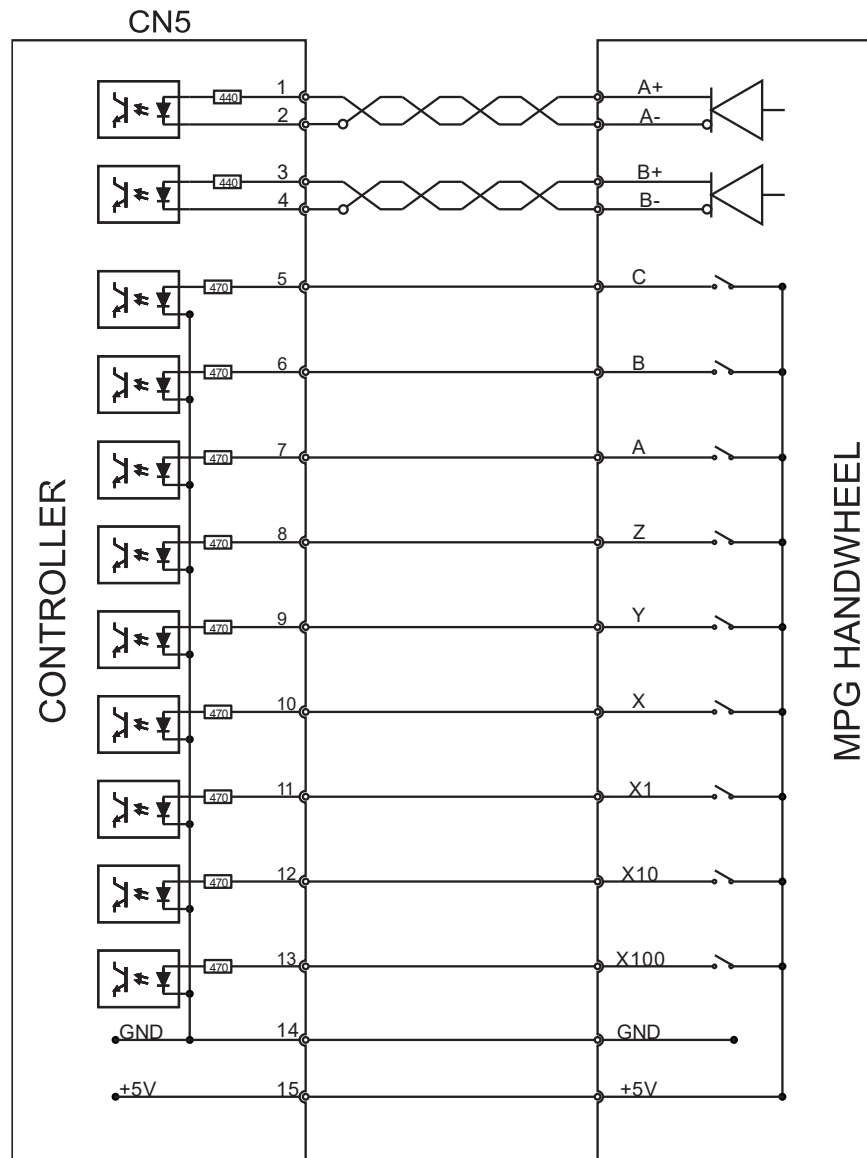


Figure 2-22. 6 axis MPG handwheel with differential output signal & EMG button

### 2.7.3 4 AXIS TYPE – NPN OUTPUT SIGNAL

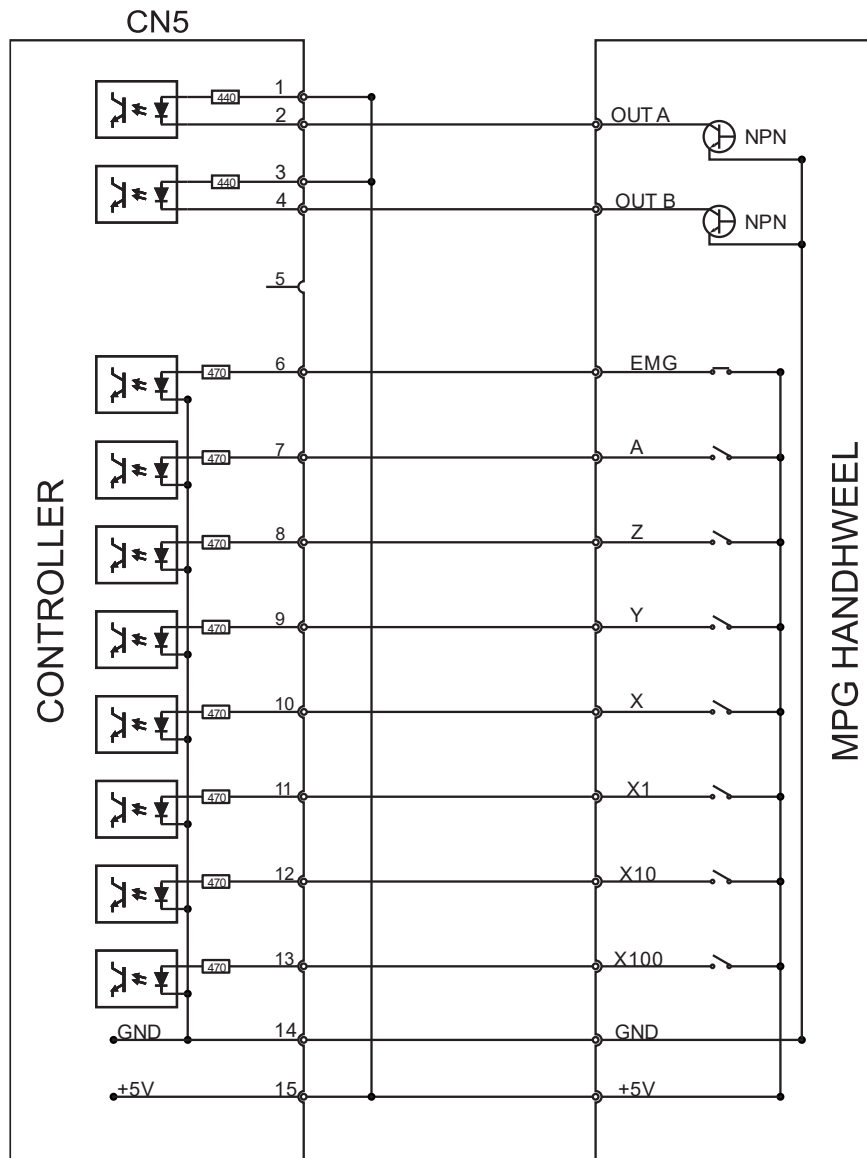


Figure 2-23. 4 axis MPG handwheel with NPN output signal

## 2.7.4 6 AXIS TYPE – NPN OUTPUT SIGNAL

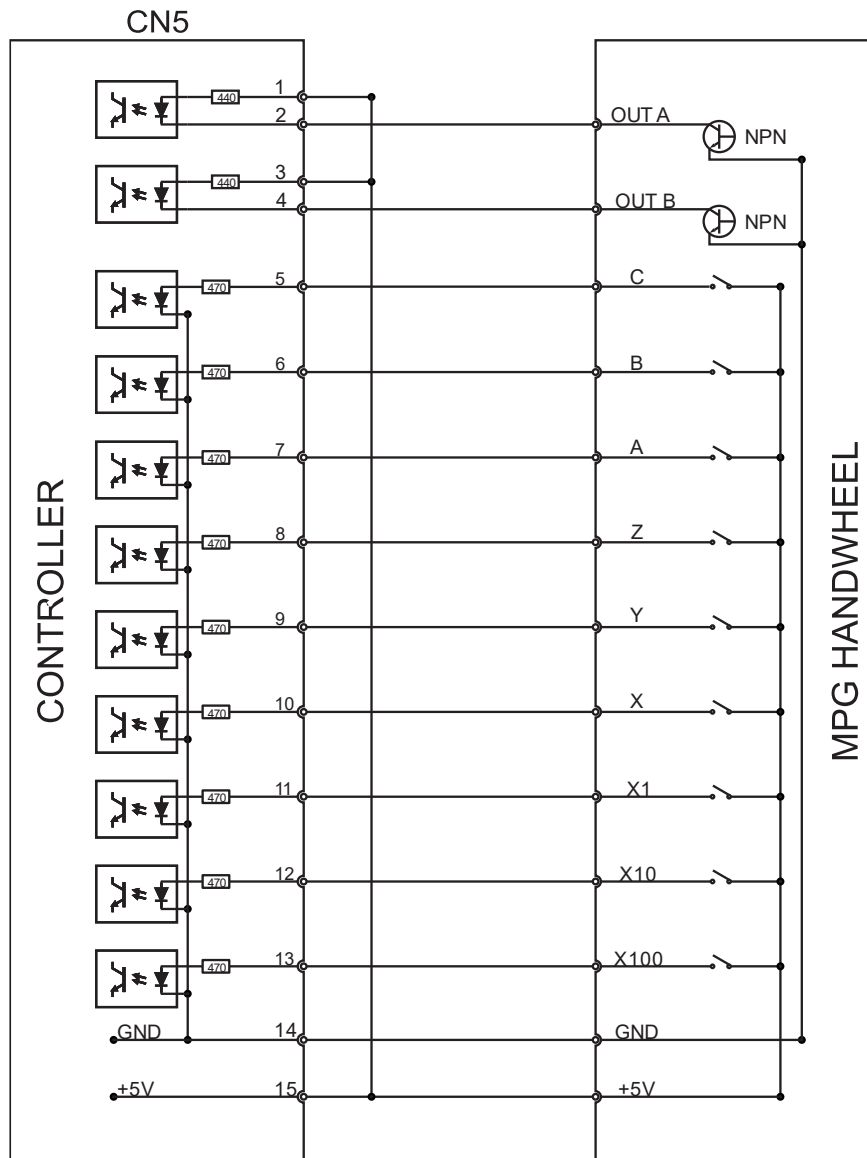


Figure 2-24. 6 axis MPG handwheel with NPN output signal

## 2.7.5 4 AXIS TYPE – PNP OUTPUT TYPE

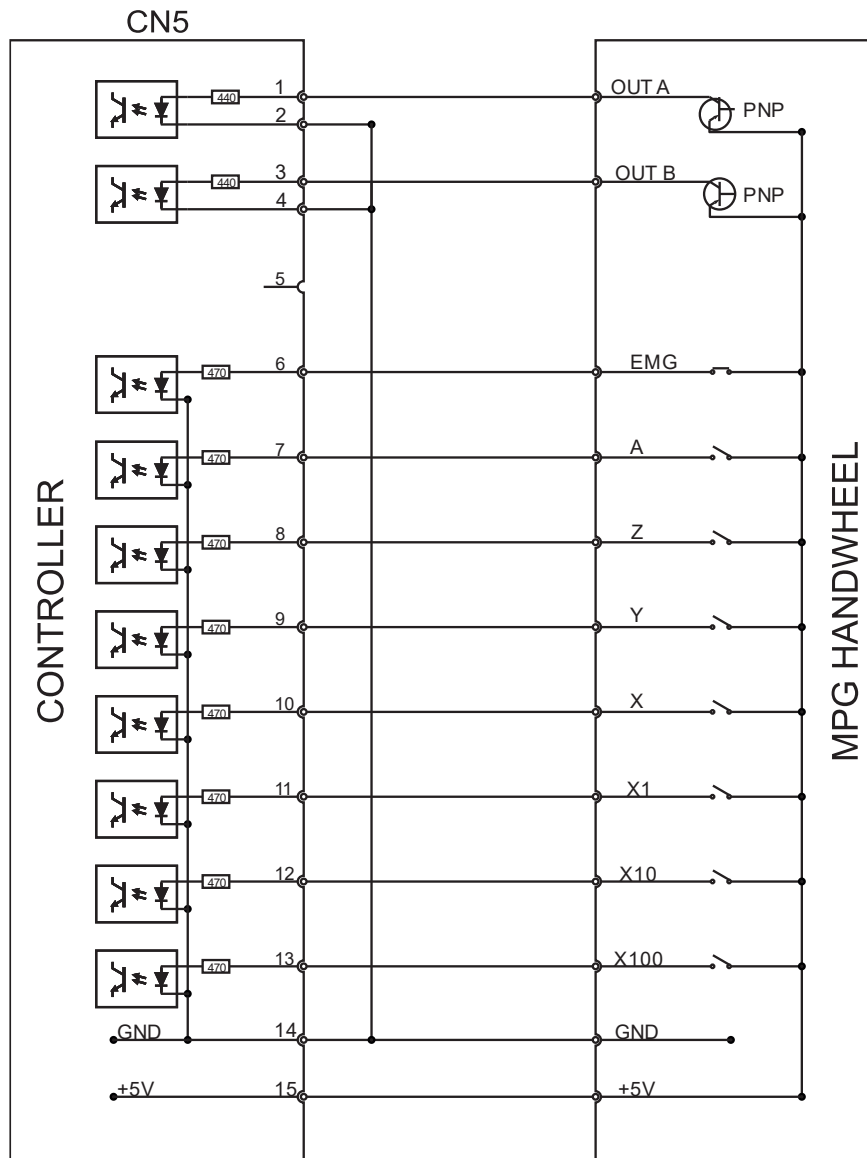


Figure 2-25. 4 axis MPG handwheel with PNP output signal

## 2.7.6 6 AXIS TYPE – PNP OUTPUT TYPE

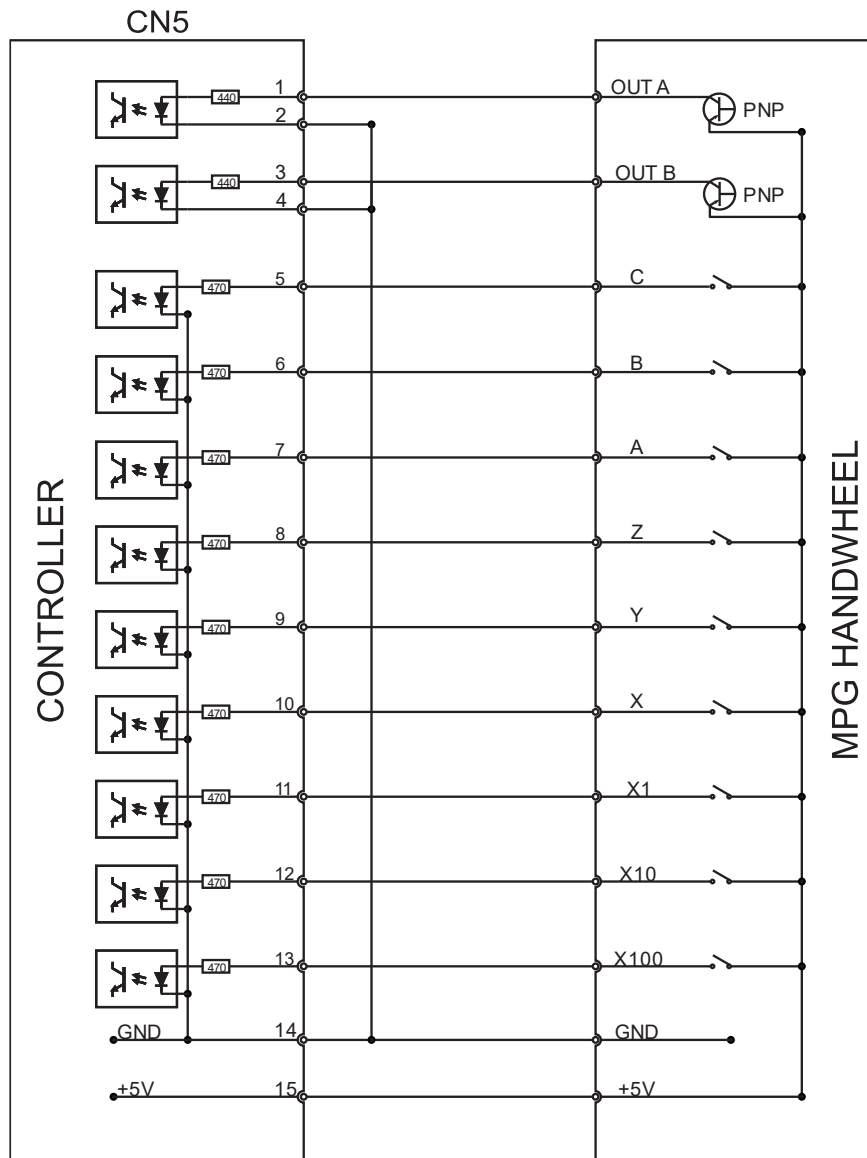


Figure 2-26. 6 axis MPG handwheel with PNP output signal

## 2.8 HOME SWITCH WIRING DIAGRAM

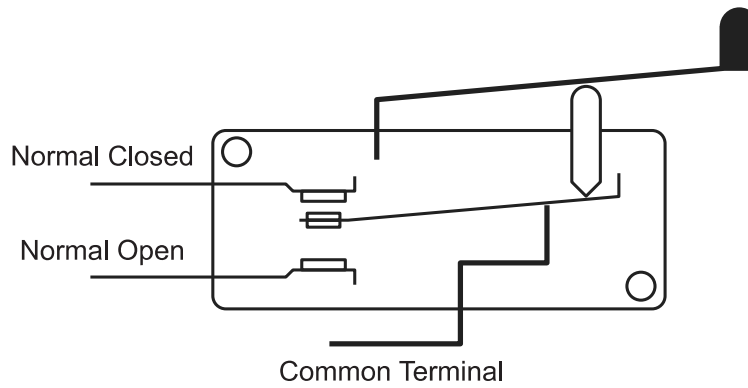


Figure 2-27. Home switch structure

### 2.8.1 PNP WIRING



### 2.8.2 NPN WIRING





## 2.9 REFERENCE CONNECTION PORT

### 2.9.1 AXIS CONTROL

DESCRIPTION	TERMINAL
X axis	PUL (1+) PUL (1-) DIR (1+) DIR (1-)
Y axis	PUL (2+) PUL (2-) DIR (2+) DIR (2-)
Z axis	PUL (3+) PUL (3-) DIR (3+) DIR (3-)
A axis	PUL (4+) PUL (4-) DIR (4+) DIR (4-)

### 2.9.2 INPUT SIGNAL

DESCRIPTION	TERMINAL
Home switch (X axis)	X40
Home switch (Y axis)	X41
Home switch (Z axis)	X42
Home switch (A axis)	X43
Tool length sensor	X44 (Probe signal) X45 (Probe limit)
Start button	X46
Hold button	X47
Emergency switch	X50
Alarm X driver	X51
Alarm Y driver	X52
Alarm Z driver	X53
Alarm A driver	X54
Spindle alarm	X55
Coolant alarm	X56
Empty Input	X57

### 2.9.3 OUTPUT SIGNAL

DESCRIPTION	TERMINAL
Servo-ON	Y40
Spindle forward	Y41
Coolant-ON	Y42
Air pressure	Y43
Indicator light	Y44
Alarm light	Y45

### 2.9.4 OTHER DEVICES

DESCRIPTION	TERMINAL
Power supply	CN1
Inverter	CN2
I/O link board Communication	CN4
MPG handwheel	CN3



# CHAPTER 3.

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## OPERATION INTERFACE



### 3.1 MAIN PAGE

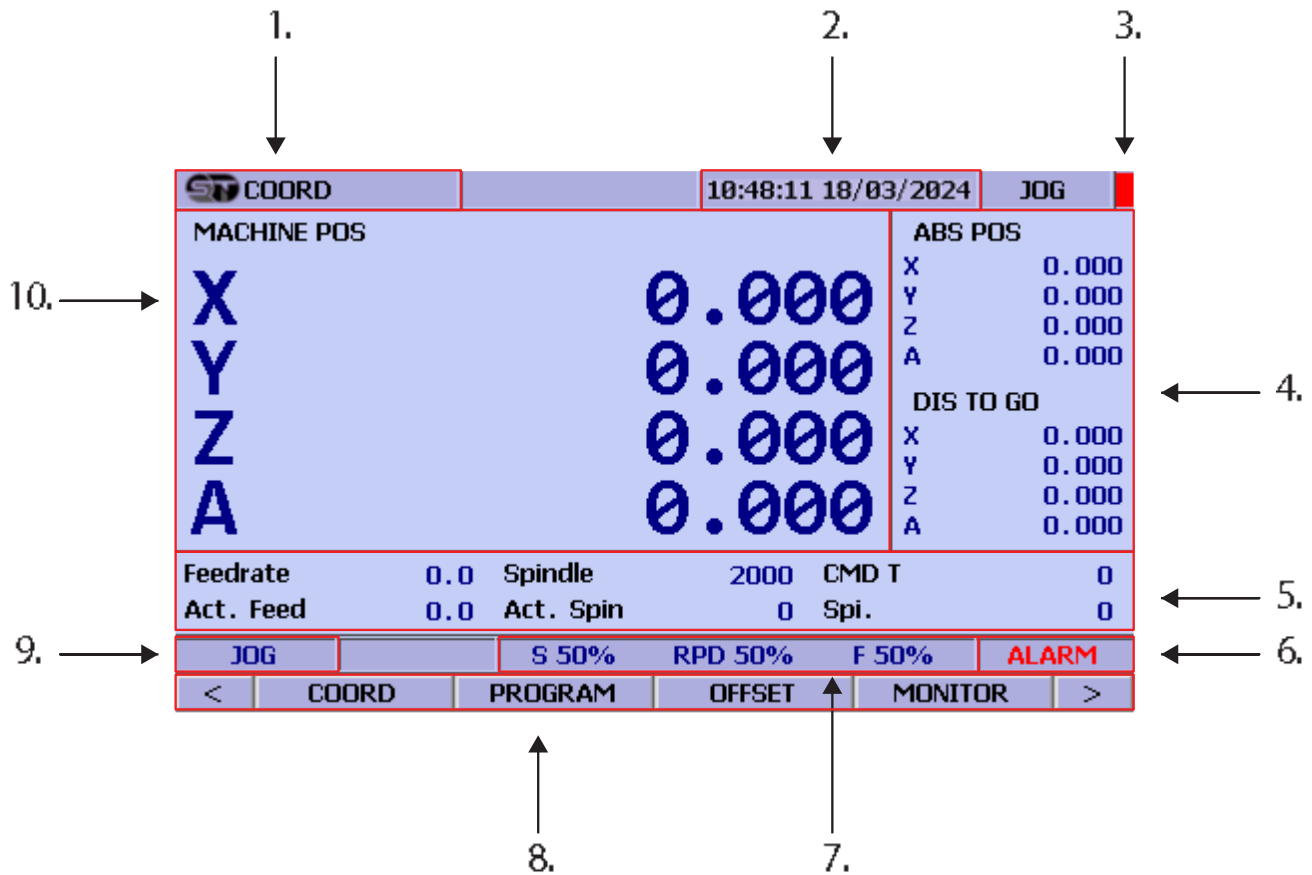


Figure 3-1. F54 controller main screen

MODEL	F54
1	Screen name
2	Date & Time information
3	Status light
4	Absolute coordinate system and Distance to go
5	Feedrate, Spindle speed in program and in actual, current tool in spindle
6	Status (Alarm/Busy/Warning)
7	Spindle, Rapid, Feedrate speed percent
8	Functions bar
9	Operation mode
10	Machine coordinates system

Note:

- **Distance to go:** The remaining distance that the machine needs to move to complete a command or machining program.
- **Absolute coordinate system:** It is a coordinate system used to determine the position of the cutting tool based on a fixed reference point.

### 3.2 COORDINATE PAGE

On the coordinate page, the users can view and get the information of machine and coordinate systems. Including: Absolute coordinate systems, Relative coordinate systems and Distance to go values.

#### Coordinate features:

- **Switch screen:** Switching coordinate system display screen
- **Half:** Divide the Specified axis in relative coordinate system by 2
- **Zero:** Return the Specified axis to 0 position in relative coordinate system
- **Zero all:** Return all axis to 0 position in relative coordinate system

#### Model: F54 controller

ST COORD		00000-NO		JOG	
MACHINE POS			ABS POS		
X	0.000		X	0.000	
Y	0.000		Y	0.000	
Z	0.000		Z	0.000	
A	0.000		A	0.000	
DIS TO GO			DIS TO GO		
Feedrate 0.0			Spindle 2000		
Act. Feed 0.0			Act. Spin 0		
JOG		S 50%	RPD 50%	F 50%	ALARM
<	COORD	PROGRAM	OFFSET	MONITOR	>

ST COORD		14:51:34 16/03/2024		JOG	
RELATIVE			MACHINE		
X	50.800		X	32.030	
Y	4.903		Y	4.903	
Z	-97.461		Z	-109.878	
A	64.900		A	64.900	
ABSOLUTE			ABSOLUTE		
Feedrate 3000.0			Spindle 10000		
Act. Feed 0.0			Act. Spin 0		
JOG		S 100%	RPD 100%	F 100%	READY
<	SWITCH	HALF	ZERO	ZERO ALL	SET

Figure 3-2. Coordinate page

## Coordinate page instruction parts:

- Switching display coordinate systems **(3.2.1)**
- Divide the coordinate of Specified axis in relative position by 2 **(3.2.2)**
- Returns Specified axis in relative position to 0 position **(3.2.3)**

### 3.2.1 SWITCH SCREEN

**Description Images**  
 Model: F54

COORD		00000-NO		JOG	
MACHINE POS			ABS POS		
X	0.000	X	0.000		
Y	0.000	Y	0.000		
Z	0.000	Z	0.000		
A	0.000	A	0.000		
DIS TO GO					
X	0.000	Y	0.000		
Y	0.000	Z	0.000		
Z	0.000	A	0.000		
A	0.000				
Feedrate	0.0	Spindle	2000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG	S 50%	RPD 50%	F 50%	ALARM	
<	COORD	PROGRAM	OFFSET	MONITOR	>

COORD		00000-NO		JOG	
MACHINE POS			ABS POS		
X	0.000	X	0.000		
Y	0.000	Y	0.000		
Z	0.000	Z	0.000		
A	0.000	A	0.000		
DIS TO GO					
X	0.000	Y	0.000		
Y	0.000	Z	0.000		
Z	0.000	A	0.000		
A	0.000				
Feedrate	0.0	Spindle	2000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG	S 50%	RPD 50%	F 50%	ALARM	
<	SWITCH	HALF	ZERO	ZERO ALL	>

## Memo

Model: F54

### Step 1:

From the main screen, select COORD button.

### Step 2:

Press SWITCH button.

### Note:

Coordinate systems arrangement:

Machine→Absolute→DIS→Relative

### 3.2.2 HALF

#### Description Images

Model: F54

COORD		00000-N0		JOG	
REL POS			MACHINE POS		
X	53.875	X	53.875	Y	-63.017
Y	-63.017	Z	-37.121	A	20.273
Z	-37.121	ABS POS			
A	20.273	X	65.587	Y	-53.068
Feedrate	0.0	Spindle	2000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG	S 50%	RPD 50%	F 50%	READY	
<	SWITCH	HALF	ZERO	ZERO ALL	



COORD		00000-N0		JOG	
REL POS			MACHINE POS		
X	53.875	X	53.875	Y	-63.017
Y	-63.017	Z	-37.121	A	20.273
Z	-37.121	ABS POS			
A	20.273	X	65.587	Y	-53.068
Feedrate	0.0	Spindle	2000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG	S 50%	RPD 50%	F 50%	READY	
<	X	Y	Z	A	



#### Memo

Model: F54

#### Step 1:

Press HALF button.

#### Step 2:

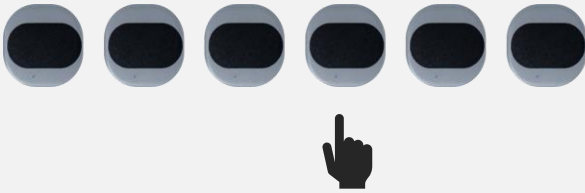
Select the axis you want to divide the coordinate by 2 in relative coordinate system.

### 3.2.3 ZERO-ZERO ALL

#### Description Images

Model: F54

COORD		14:51:34 16/03/2024		JOG	
RELATIVE			MACHINE		
X	50.800	X	32.030		
Y	4.903	Y	4.903		
Z	-97.461	Z	-109.878		
A	64.900	A	64.900		
ABSOLUTE					
X	32.030				
Y	4.903				
Z	-109.878				
A	64.900				
Feedrate	3000.0	Spindle	10000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG		S 100%	RPD 100%	F 100%	READY
<	SWITCH	HALF	ZERO	ZERO ALL	SET



COORD		14:51:42 16/03/2024		JOG	
RELATIVE			MACHINE		
X	50.800	X	32.030		
Y	4.903	Y	4.903		
Z	-97.461	Z	-109.878		
A	64.900	A	64.900		
ABSOLUTE					
X	32.030				
Y	4.903				
Z	-109.878				
A	64.900				
Feedrate	3000.0	Spindle	10000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG		S 100%	RPD 100%	F 100%	READY
<	X	Y	Z	A	



#### Memo

Model: F54

##### Step 1:

Press ZERO button.

##### Step 2:

Select axis you want to return to 0 position.



### 3.3 PROGRAM PAGE

On this page allows the users to store, edit and execute program

#### Program features:

- **Execute:** Execute program
- **New file:** Create a new file
- **Open file:** Open a file
- **Go to line:** Go to Specified line of program
- **Search:** Search for an object in program
- **Replace:** Replace an existing object with another object
- **Delete line:** Clear code line
- **Copy from:** Select object at current location to duplicate
- **Copy to:** Specified the location where to paste file
- **Paste:** confirm and duplicate the file

#### Model: F54 controller

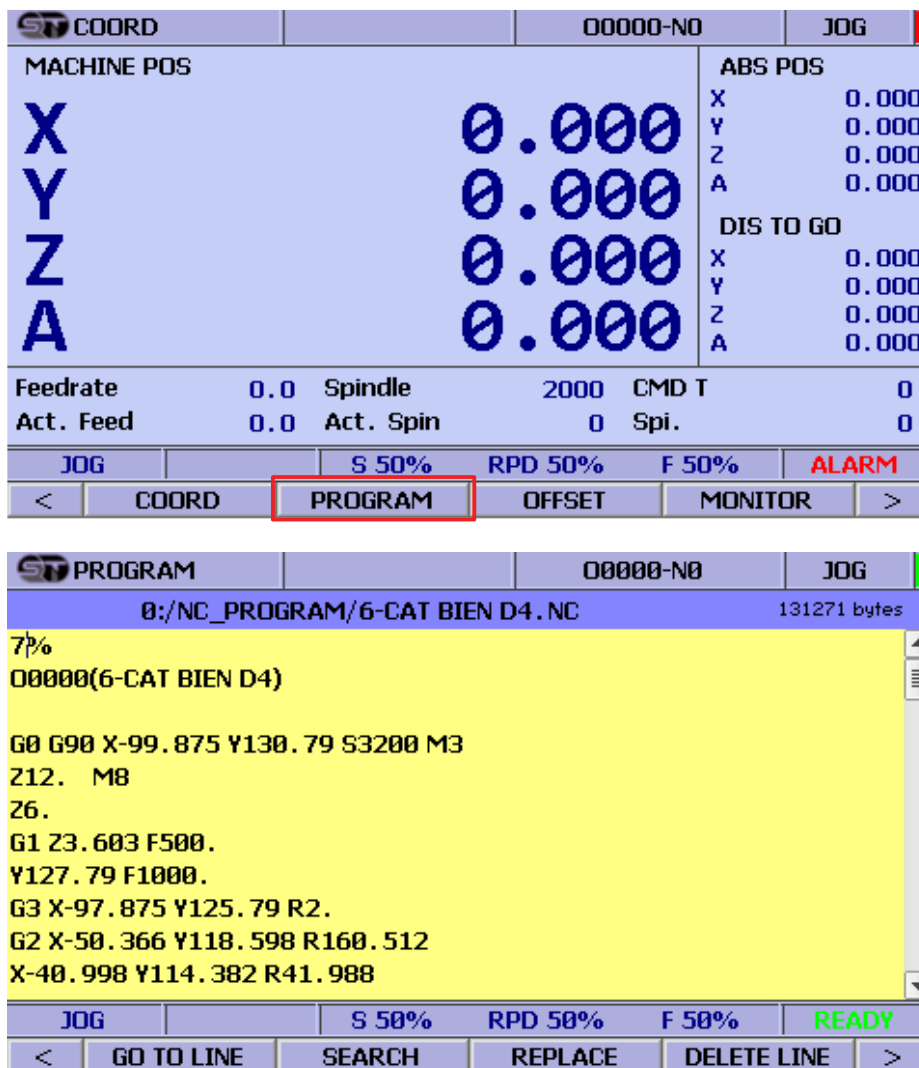


Figure 3-3. Program page

## Program page instruction parts:

- Copy data from USB to controller **(3.3.1)**
- Execute program **(3.3.2)**
- Go to any command line **(3.3.3)**
- Search for an object in program-replace object **(3.3.4)**
- Delete a command line **(3.3.5)**
- Copy and paste **(3.3.6)**

### 3.3.1 COPY DATA FROM USB TO CONTROLLER

#### Description Images

Model: F54

PROGRAM 00000-NO AUTO  
0:/NC\_PROGRAM/BBB.NC 1760 bytes  
7%  
00000(DIF FRONT VER 4 MDI MAY 1 OP 1)  
N100 G91 G28 Z0.  
N102 G40 G80 G90 G49  
N104 ( 4 FINISH )  
N106 G0 G90 G54 X-32.75 Y-10.074 S6000 M3  
N108 M8  
N110 G43 H9 Z5.  
N112 G1 Z-12. F2500.  
N114 X-32.043 Y-9.366 F800.  
N116 G3 X-31.75 Y-8.659 R1.

AUTO S 50% RPD 50% F 50%  
< EXECUTE OPEN FILE >

Hand icon pointing to the 4th button.

EXPLORER 15:36:30 16/03/2024 JOG  
SYSTEM DISK USB Network  
C3\_D1S\_3D\_0.005.NC  
G9000.NC  
..  
PRINT\_SCREEN  
6-D6R1.NC  
6-CAT BIEN D4.NC  
POTKET-D10.NC  
VET\_D10.NC  
Size: 131072 bytes  
Date: 17/11/2022 - 15:19

JOG S 100% RPD 100% F 100% READY  
< SEL/DESEL SEL/DESEL ALL OPEN FILE COPY DEL

Hand icon pointing to the 5th button.

#### Memo

Model: F54

**Step 1:**

Go to program screen and press OPEN FILE button.

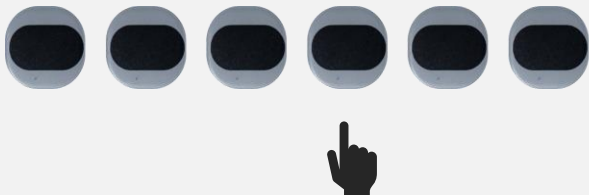
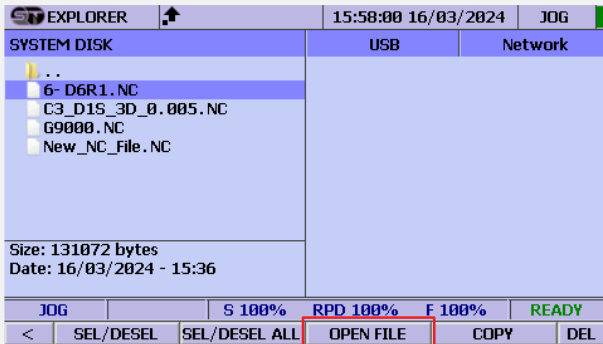
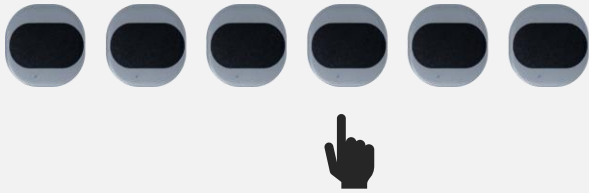
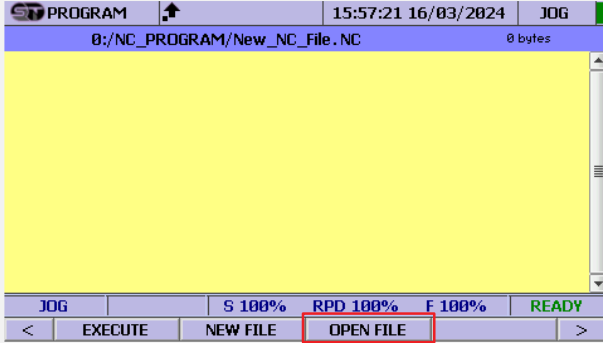
**Step 2:**

Plugin USB drive to controller, then select program and press COPY button.

### 3.3.2 EXECUTE PROGRAM

#### Description Images

Model: F54



#### Memo

Model: F54

##### Step 1:

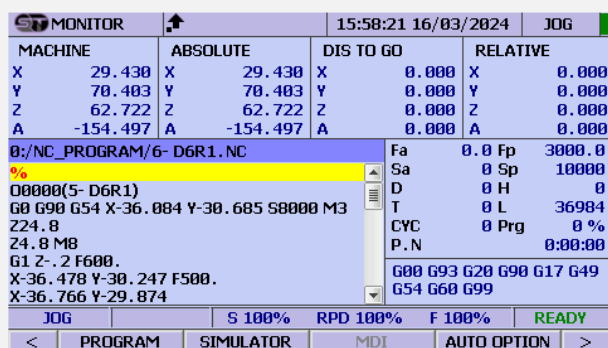
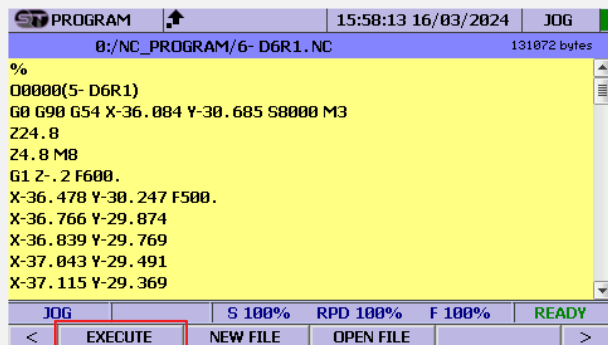
Go to program screen and press OPEN FILE button.

##### Step 2:

Select program and press OPEN FILE button.

## Description Images

Model: F54



## Memo

Model: F54

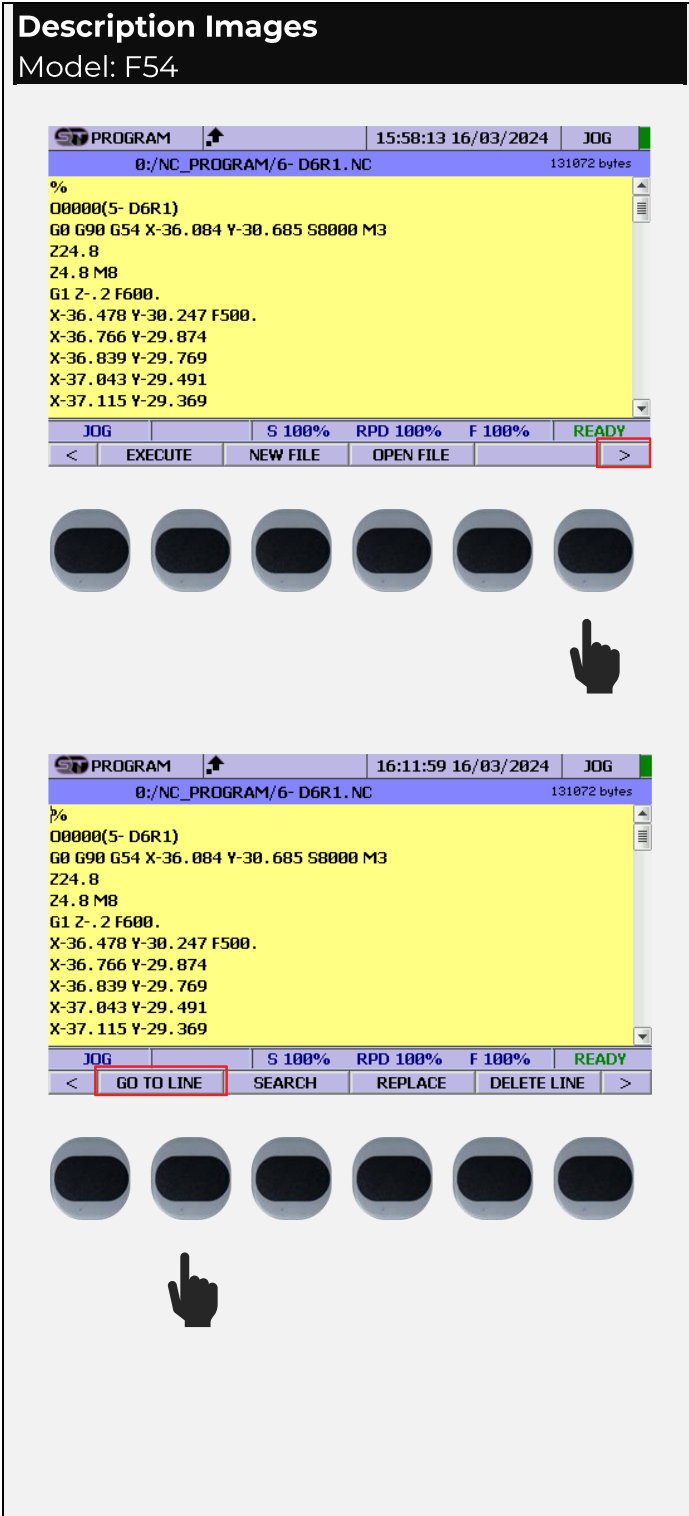
### Step 3:

Press EXECUTE button.

### Step 4:

Check program after executed.

### 3.3.3 GO TO ANY COMMAND LINE



### Memo

Model: F54

#### Step 1:

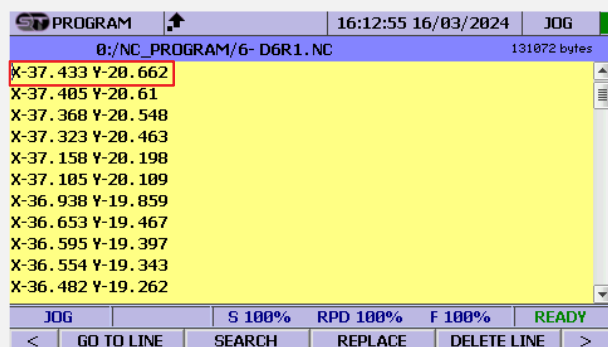
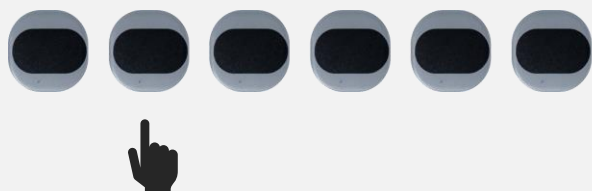
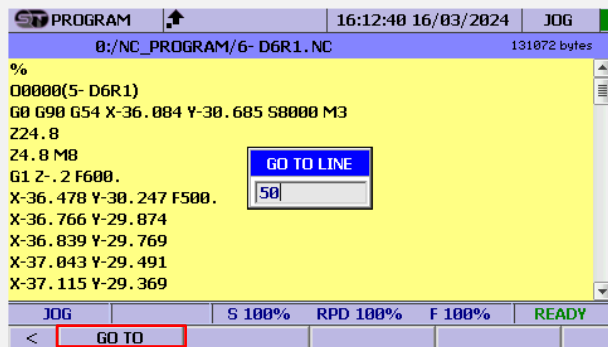
Press the arrow button on the left to change to next page.

#### Step 2:

Press GO TO LINE button.

## Description Images

Model: F54



## Memo

Model: F54

### Step 3:

Enter line number you want to go to and press GO TO button.

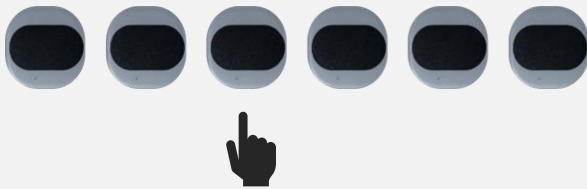
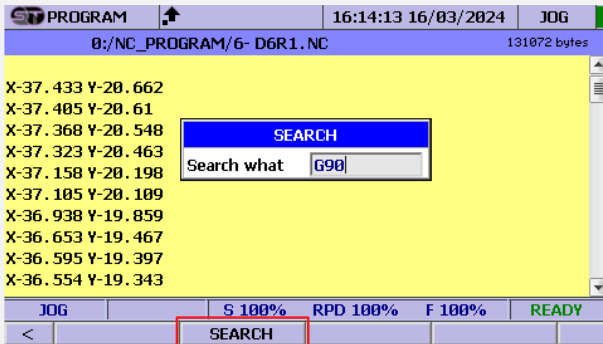
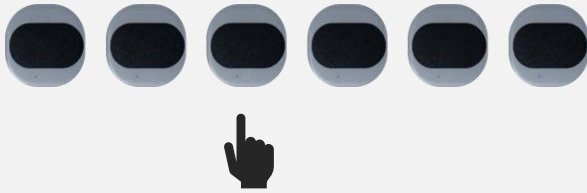
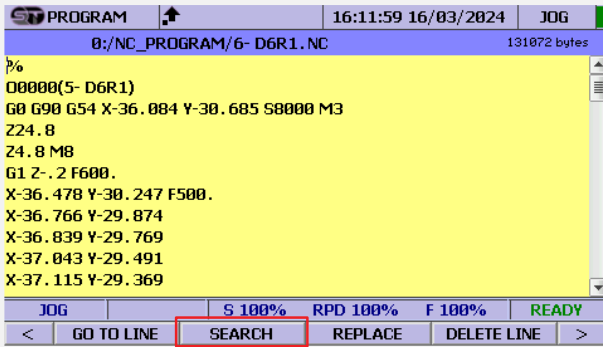
### Step 4:

The controller will automatically jump to that command line.

### 3.3.4 SEARCH FOR AN OBJECT IN PROGRAM AND REPLACE

#### Description Images

Model: F54



#### Memo

Model: F54

##### Step 1:

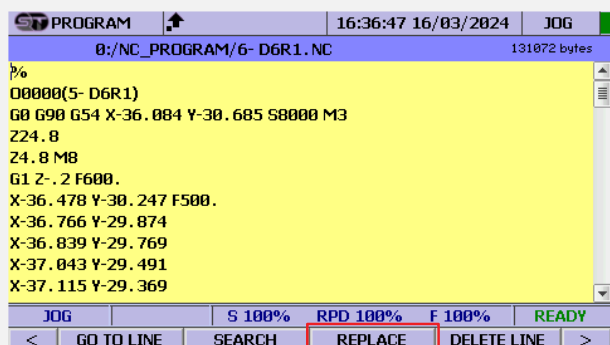
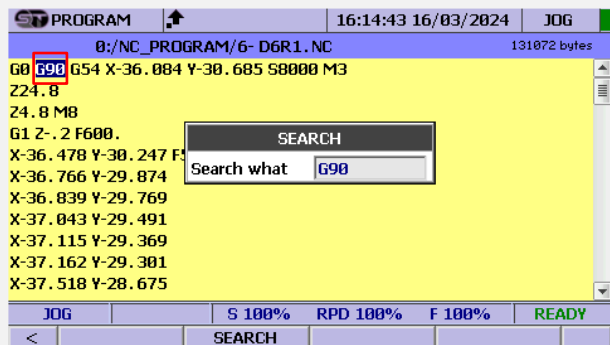
Press SEARCH button.

##### Step 2:

Enter object name and press SEARCH button.

## Description Images

Model: F54



## Memo

Model: F54

### Step 3:

If the object or value is existing in program.  
The controller will find and give the result.

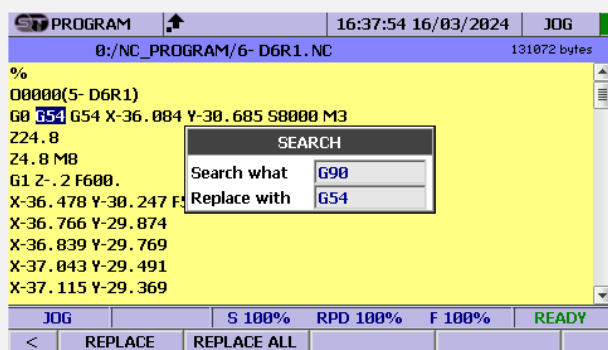
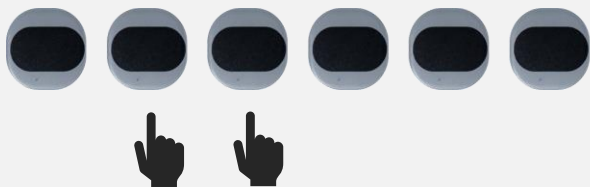
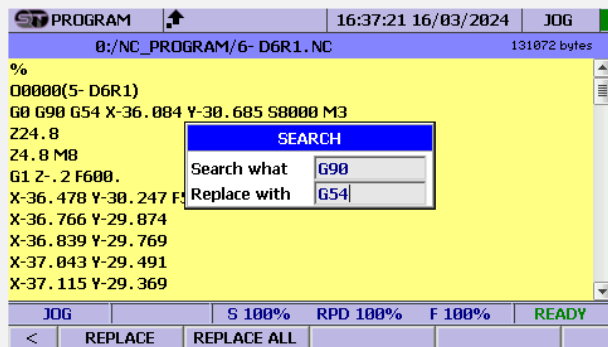
### Step 4 (Find & Replace):

Press REPLACE button.



## Description Images

Model: F54



## Memo

Model: F54

### Step 5:

Enter the object name you want to replace, enter the replacement object and press REPLACE or REPLACE ALL.

### Note:

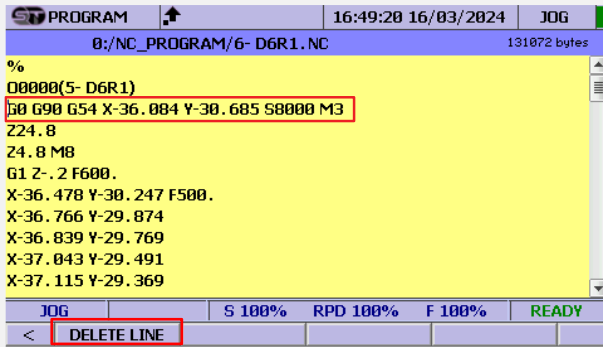
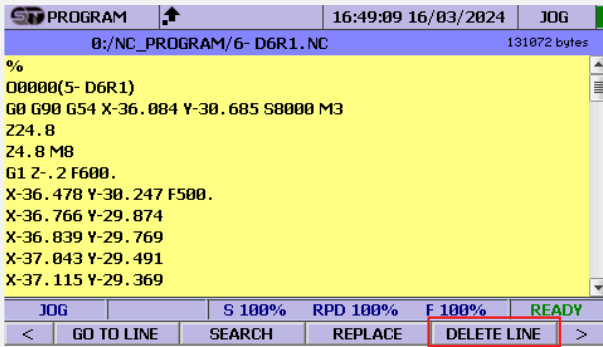
REPLACE: Replace only for one object

REALCE ALL: Replace all object

### 3.3.5 DELETE A COMMAND LINE

#### Description Images

Model: F54



#### Memo

Model: F54

##### Step 1:

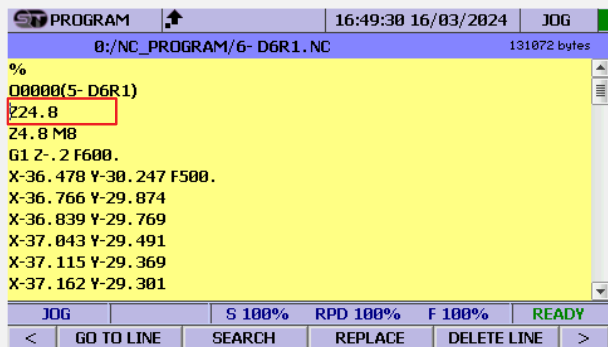
Press DELETED LINE button.

##### Step 2:

Select command line you want to delete and press DELETED LINE button.

## Description Images

Model: F54



## Memo

Model: F54

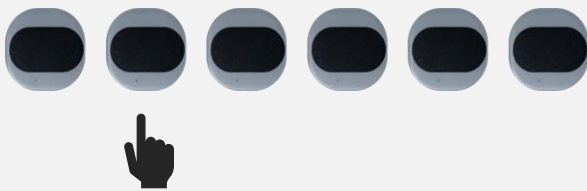
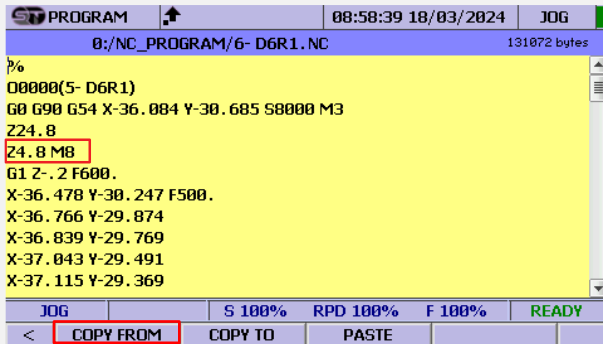
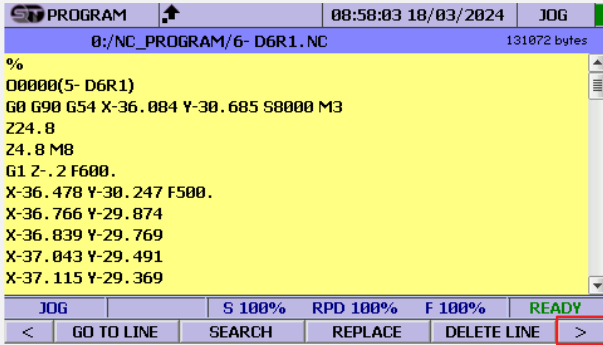
### Step 3:

Check the command line after being deleted.

### 3.3.6 COPY AND PASTE

#### Description Images

Model: F54



#### Memo

Model: F54

##### Step 1:

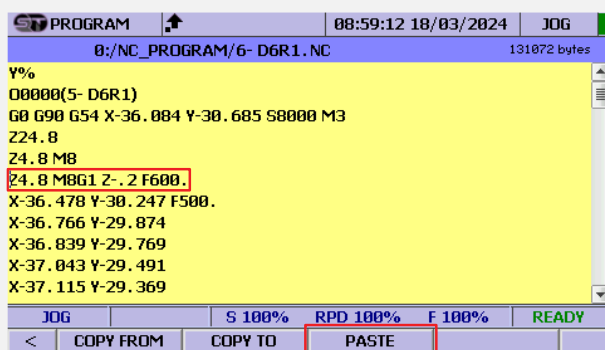
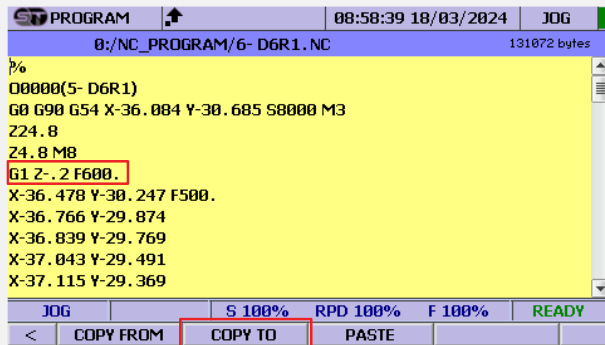
Press the arrow button on the left to change to next page.

##### Step 2:

Select command line you want to copy and press COPY FROM button.

## Description Images

Model: F54



## Memo

Model: F54

### Step 3:

Select where you want to paste and press COPY TO button.

### Step 4:

Press PASTE button.

### 3.4 OFFSET PAGE

Here is the place for the users establish working values of workpiece as well as the height and diameter of cutting tool.

QS Controllers provide users with 6 coordinate system, including: G54, G55, G57, G58, G59 and 18 extended workpiece coordinate system from G59.1 (G54P7) to G59.12 (G54P18).

#### Offset features:

- **Work set:** Establish workpiece values
- **Tool set:** Establish the height, diameter of cutting tool
- **Tool NO:** Display table of the current tool in tool magazine
- **Apply AUX:** Assign the coordinate was being calculated in middle function to specified coordinate system
- **Apply MACH:** Assign the machine coordinates to specified coordinate system
- **Middle function:** Calculate the coordinate of the center point by 4 points of rectangle workpiece and 3 points of circle workpiece.

#### Model: F54 controller

COORD		00000-NO		JOG	
MACHINE POS			ABS POS		
X		0.000	X	0.000	
Y		0.000	Y	0.000	
Z		0.000	Z	0.000	
A		0.000	A	0.000	
Feedrate 0.0		Spindle 2000		CMD T 0	
Act. Feed 0.0		Act. Spin 0		Spi. 0	
JOG		S 50%		RPD 50%	
<		COORD		PROGRAM	
		PROGRAM		OFFSET	
		PROGRAM		MONITOR	
>		PROGRAM		MONITOR	

OFFSET		11:09:15 18/03/2024		JOG	
EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	0.000	X	279.030
Y	0.000	Y	0.000	Y	235.003
Z	0.000	Z	0.000	Z	102.322
A	0.000	A	0.000	A	-154.497
MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	0.000
Y	0.000	Y	0.000	Y	0.000
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000
JOG		S 100%		RPD 100%	
<		WORK SET		TOOL SET	
		WORK SET		TOOL SET	
		WORK SET		TOOL SET	
>		WORK SET		TOOL SET	

Figure 3-4. Offset page

## Offset page instruction parts:

- Manual data input **(3.4.1)**
- Assign machine, auxiliary coordinates to specified coordinate system **(3.4.2)**
- Quickly get the center points of 4 points workpiece and 3 points workpiece **(3.4.3)**
- Tool set **(3.4.4)**

### 3.4.1 MANUAL DATA INPUT

#### Description Images

Model: F54

EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	0.000	X	133.130
Y	0.000	Y	0.000	Y	31.503
Z	0.000	Z	0.000	Z	62.722
A	0.000	A	0.000	A	-154.497

MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	0.000
Y	0.000	Y	0.000	Y	0.000
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000

JOG S 100% RPD 100% F 100% READY

< WORK SET TOOL SET

EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	20.456	X	133.130
Y	0.000	Y	0.000	Y	31.503
Z	0.000	Z	0.000	Z	62.722
A	0.000	A	0.000	A	-154.497

MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	0.000
Y	0.000	Y	0.000	Y	0.000
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000

20.456 -999999.999 ~ 999999.999

< WORK SET TOOL SET

#### Memo

Model: F54

#### Step 1:

Select the coordinate system(G54) by press the arrow buttons on control panel.

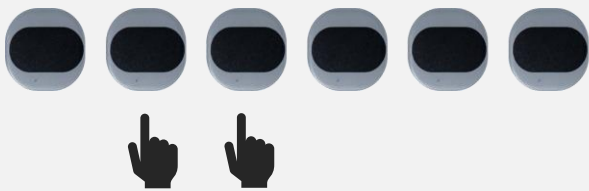
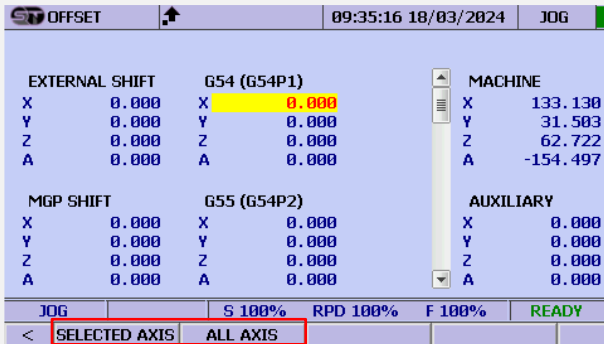
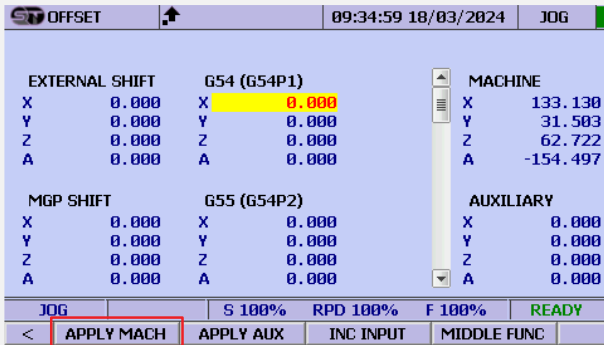
#### Step 2:

Enter values to the axis and press ENTER button to confirm.

### 3.4.2 ASSIGN MACHINE, AUXILIARY COORDINATES TO SPECIFIED COORDINATE SYSTEM

#### Description Images

Model: F54



#### Memo

Model: F54

##### Step 1:

Select the axis and press APPLY MACH button.

##### Step 2:

SELECTED AXIS: Assign the coordinate of the corresponding axis to specified axis.

ALL AXIS: Assign all the machine coordinates to the specified coordinate system.



## Description Images

Model: F54

EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	133.130	X	133.130
Y	0.000	Y	0.000	Y	31.503
Z	0.000	Z	0.000	Z	62.722
A	0.000	A	0.000	A	-154.497

MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	0.000
Y	0.000	Y	0.000	Y	0.000
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000

JOG S 100% RPD 100% F 100% READY

< APPLY MACH APPLY AUX INC INPUT MIDDLE FUNC

EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	0.000	X	-118.770
Y	0.000	Y	0.000	Y	-169.297
Z	0.000	Z	0.000	Z	62.722
A	0.000	A	0.000	A	-154.497

MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	11.180
Y	0.000	Y	0.000	Y	-41.597
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000

JOG S 100% RPD 100% F 100% READY

< APPLY MACH **APPLY AUX** INC INPUT MIDDLE FUNC

EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	0.000	X	-118.770
Y	0.000	Y	0.000	Y	-169.297
Z	0.000	Z	0.000	Z	62.722
A	0.000	A	0.000	A	-154.497

MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	11.180
Y	0.000	Y	0.000	Y	-41.597
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000

JOG S 100% RPD 100% F 100% READY

< **SELECTED AXIS** ALL AXIS

EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	11.180	X	-118.770
Y	0.000	Y	0.000	Y	-169.297
Z	0.000	Z	0.000	Z	62.722
A	0.000	A	0.000	A	-154.497

MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	11.180
Y	0.000	Y	0.000	Y	-41.597
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000

JOG S 100% RPD 100% F 100% READY

< APPLY MACH APPLY AUX INC INPUT MIDDLE FUNC

## Memo

Model: F54

### Step 3:

Check the coordinate after being assigned.

### Note:

Make the same steps above when assigning auxiliary coordinate (APPLY AUX). Select APPLY AUX instead APPLY MACH

AUX coordinate will be calculated in MIDDLE FUNCTION, refer at **(3.4.3)** below

### 3.4.3 CALCULATE THE CENTER POINT OF WORKPIECE

#### Description Images

Model: F54

EXTERNAL SHIFT		G54 (G54P1)		MACHINE	
X	0.000	X	0.000	X	-110.770
Y	0.000	Y	0.000	Y	-169.297
Z	0.000	Z	0.000	Z	62.722
A	0.000	A	0.000	A	-154.497

MGP SHIFT		G55 (G54P2)		AUXILIARY	
X	0.000	X	0.000	X	0.000
Y	0.000	Y	0.000	Y	0.000
Z	0.000	Z	0.000	Z	0.000
A	0.000	A	0.000	A	0.000

JOG	S 100%	RPD 100%	F 100%	READY
<	APPLY MACH	APPLY AUX	INC INPUT	MIDDLE FUNC



Machine Coord		MACHINE	
Px1	-59.270	X	-59.270
Px2	-59.270	Y	58.503
Pxm	-59.270	Z	62.722
Py1	-169.797	A	-154.497
Py2	58.503	X	-59.270
Pym	-55.647	Y	-55.647
		Z	0.000
		A	0.000

JOG	S 100%	RPD 100%	F 100%	READY
<	PX1 SET	PX2 SET	PY1 SET	PY2 SET



#### Memo

Model: F54

#### Four-point workpiece

##### Step 1:

Press MIDDLE FUNCTION button.

##### Step 2:

Move to reach 4 edges (Px1,Px2,Py1,Py2). Then establish the position values of the workpiece base on the description image. When you complete the coordinate of the center point will be calculated and displayed at PXM, PYM and Auxiliary coordinate

## Description Images

Model: F54

Machine Coord		MACHINE	
Px1	-59.270	X	-59.270
Px2	-59.270	Y	58.503
Pxm	-59.270	Z	62.722
Py1	-169.797	A	-154.497
Py2	58.503		
Pym	-55.647		

AUXILIARY	
X	-59.270
Y	-55.647
Z	0.000
A	0.000

JOG S 100% RPD 100% F 100% READY

< PX1 SET PX2 SET PY1 SET PY2 SET <>



Machine Coord		MACHINE	
Px1	0.000	X	279.030
Py1	0.000	Y	235.003
Px2	0.000	Z	102.322
Py2	0.000	A	-154.497
Px3	0.000		
Py3	0.000		
Pxm	0.000	X	0.000
Pym	0.000	Y	0.000
R	0.000	Z	0.000
		A	0.000

AUXILIARY	
X	0.000
Y	0.000
Z	0.000
A	0.000

JOG S 100% RPD 100% F 100% READY

< P1 SET P2 SET P3 SET CALCULATE <>



## Memo

Model: F54

### Three-point workpiece

#### Step 1:

Press the arrow button on the left to move to next page.

#### Step 2:

Move to reach 3 points of circle workpiece (P1,P2,P3). Then establish the position values base on the description image. When you complete. Press CALCULATE button. The coordinate of the center point will be displayed at (PXM,PYM,R), R is the radius of workpiece.

### 3.5 MONITOR PAGE

At the monitor screen, the users can easy get the information, coordinate systems of machine such as: Program name, Operation mode, federate, spindle speed percent...

#### Monitor features:

- **Program:** quick access to system disk
- **Simulator:** simulate the working program
- **MDI:** manual data input
- **Auto Option:** safety feature
  - o Allow to run form any command line in program
  - o Continue the working process from the last command line if the machine was suddenly stopped before
  - o Automatically create a secondary program to activate all necessary G-code before jumping to the last command that was stopped

#### Model: F54 controller

ST COORD		10:48:11 18/03/2024		JOG	
MACHINE POS			ABS POS		
X	0.000		X	0.000	
Y	0.000		Y	0.000	
Z	0.000		Z	0.000	
A	0.000		A	0.000	
DIS TO GO					
X	0.000		X	0.000	
Y	0.000		Y	0.000	
Z	0.000		Z	0.000	
A	0.000		A	0.000	
Feedrate	0.0	Spindle	2000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG	S 50%	RPD 50%	F 50%	ALARM	
<	COORD	PROGRAM	OFFSET	MONITOR	>

ST MONITOR		11:12:20 18/03/2024		JOG	
MACHINE		ABSOLUTE		DIS TO GO	
X	279.030	X	279.030	X	0.000
Y	235.003	Y	235.003	Y	0.000
Z	102.322	Z	102.322	Z	0.000
A	-154.497	A	-154.497	A	0.000
RELATIVE					
X	249.600	Y	164.600	Z	39.600
A	0.000				
0:/NC_PROGRAM/C3_D1S_3D_0.005.NC		Fa 0.0 Fp 3000.0			
%		Sa 0 Sp 10000			
00000(C3_D1S_3D_0.005)		D 0 H 0			
(DATE=DD-MM-YY - 17-07-22 TIME=HH:MM -		T 0 L 36984			
(MCX FILE - D:\ONEDRIVE\DESKTOP\A KHOI\G		CYC 0 Prg 0%			
(NC FILE - D:\ONEDRIVE\DESKTOP\A KHOI\G		P.N 0:00:00			
(MATERIAL - ALUMINUM MM - 2024)		G00 G93 G20 G90 G17 G49			
(T2   H2)		G54 G60 G99			
(T3   2 FLAT ENDMILL   H3)					
JOG	S 100%	RPD 100%	F 100%	READY	
<	PROGRAM	SIMULATOR	MDI	AUTO OPTION	>

Figure 3-5. Monitor page

## Monitor instruction parts:

- Toolpath simulation **(3.5.1)**
- MDI mode **(3.5.2)**
- Auto features **(3.5.3)**
  - o Start program from any command line **(3.5.3.1)**
  - o Continue the working process from the last stopped command **(3.5.3.2)**
- Working history **(3.5.4)**

### 3.5.1 TOOLPATH SIMULATION

**Description Images**  
 Model: F54

**Memo**  
 Model: F54

**Step 1:**

After executed the program, at the monitor screen. Press SIMULATOR button.

**Step 2:**

Waiting for the simulation process.

AUTO SCALE: scale the shape fit to screen

TOOL MODE: simulate the program by many view mode such as: Milling, Engraving 2D – Milling, Engraving 3D.

INFORMATION: The maximum and minimum travel of workpiece

**Memo**  
 Model: F54

**Step 1:**

After executed the program, at the monitor screen. Press SIMULATOR button.

**Step 2:**

Waiting for the simulation process.



AUTO SCALE: scale the shape fit to screen

TOOL MODE: simulate the program by many view mode such as: Milling, Engraving 2D – Milling, Engraving 3D.



INFORMATION: The maximum and minimum travel of workpiece

### 3.5.2 MDI MODE



**Description Images**  
 Model: F54

MONITOR		11:50:02 18/03/2024		MDI	
MACHINE	ABSOLUTE	DIS TO GO	RELATIVE		
X 279.030	X 279.030	X 0.000	X 249.600		
Y 235.003	Y 235.003	Y 0.000	Y 164.600		
Z 102.322	Z 102.322	Z 0.000	Z 39.600		
A -154.497	A -154.497	A 0.000	A 0.000		
0:/NC_PROGRAM/C3_DIS_3D_0.005.NC		Fa 0.0	Fp 3000.0		
		Sa 0	Sp 10000		
		D 0	H 0		
		T 0	L 36984		
		CYC 0	Prg 0%		
		P.N	0:00:00		
		G00 G93 G20 G90 G17 G49			
		G54 G60 G99			
MDI	S 100%	RPD 100%	F 100%	READY	
<	PROGRAM	SIMULATOR	MDI	AUTO OPTION	>

MONITOR		11:52:35 18/03/2024		MDI	
MACHINE	ABSOLUTE	DIS TO GO	RELATIVE		
X 279.030	X 279.030	X 0.000	X 249.600		
Y 235.			Y 164.600		
Z 102.			Z 39.600		
A -154.			A 0.000		
0:/NC_PROGR		Fp 3000.0			
		Sp 10000			
		H 0			
		L 36984			
		Prg 0%			
		0:00:00			
		G90 G17 G49			
MDI	S 100%	RPD 100%	F 100%	READY	
<	OK	CLEAR			

**Memo**  
 Model: F54

#### Step 1:

At first press the AUTO button to switch to MDI mode. Then at monitor screen, press MDI button.

#### Step 2:

Enter a command for the controller. Press OK to confirm and CLEAR to start again.

Ex: we are entering M8 to activate the water coolant system

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### 3.5.3 AUTO OPTION MODE

This function assists the users when unexpected issues occur during to the machining process, leading to production interruptions.

**Description Images**  
 Model: F54

The screenshot shows the CNC monitor interface. At the top, it displays 'MONITOR' and the time '11:12:20 18/03/2024'. Below this is a table of machine coordinates (X, Y, Z, A) in absolute and relative units. The main area shows program details for '0:/NC\_PROGRAM/C3\_D1S\_3D\_0.005.NC'. At the bottom, a row of buttons is visible, with 'AUTO OPTION' highlighted in red. A hand icon points to this button.

The second screenshot shows the 'START F. LINE' menu. The top bar now shows 'AUTO' and the time '11:53:16 18/03/2024'. The main area shows 'Last Line 36984' and 'New Line 1'. Below this is a row of buttons: 'START F. LINE', 'CONTINUE', 'SET NEW LINE', and 'SET Z PLUS'. Hand icons point to the first three buttons.

**Memo**  
 Model: F54

**Step 1:**

At monitor screen, press AUTO OPTION button.

**Step 2:**

**START FROM LINE:** run from any command line in program.

**CONTINUE:** resume the working process that was stopped before.

**SET NEW LINE:** enter the line number then press this button before selecting START FROM LINE button.

**NC CUT:** automatically create secondary program to activate all necessary G-code before jumping to the last command feature

### 3.5.3.1 START PROGRAM FROM ANY COMMAND LINE

#### Description Images

Model: F54

MONITOR		12:55:10 24/05/2016		AUTO	
MACHINE	ABSOLUTE	DIS TO GO	RELATIVE		
X 110.140	X -107.520	X 0.000	X 59.180		
Y 343.531	Y 12.611	Y 0.000	Y 199.211		
Z 0.361	Z 0.361	Z 0.000	Z -5.464		
A 0.000	A 0.000	A 0.000	A -360.000		

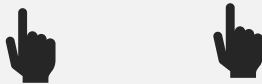
0:/NC_PROGRAM/C3_D1S_3D_0.005.NC		Last Line	2293
% O0000(C3_D1S_3D_0.005) (DATE=DD-MM-YY - 17-07-22 TIME=HH:MM - (MCX FILE - D:\ONEDRIVE\DESKTOP\A KHOI\C (NC FILE - D:\ONEDRIVE\DESKTOP\A KHOI\GI (MATERIAL - ALUMINUM MM - 2024) ( T2     H2 ) ( T3   2 FLAT ENDMILL   H3 )		New Line	1
		Z Plus	3500.000
		<input checked="" type="checkbox"/> NC Cut	
		New line number is less than current line. Start cut from 1. Check G0000 NC file	
AUTO		S 100%	RPD 100%
		F 100%	READY
<	START F. LINE	CONTINUE	SET NEW LINE
			SET Z PLUS >



MONITOR		12:56:04 24/05/2016		AUTO	
MACHINE	ABSOLUTE	DIS TO GO	RELATIVE		
X 110.140	X -107.520	X 0.000	X 59.180		
Y 343.531	Y 12.611	Y 0.000	Y 199.211		
Z 0.361	Z 0.361	Z 0.000	Z -5.464		
A 0.000	A 0.000	A 0.000	A -360.000		

0:/NC_PROGRAM/C3_D1S_3D_0.005.NC		Last Line	2293
% O0000(C3_D1S_3D_0.005) (DATE=DD-MM-YY - 17-07-22 TIME=HH:MM - (MCX FILE - D:\ONEDRIVE\DESKTOP\A KHOI\C (NC FILE - D:\ONEDRIVE\DESKTOP\A KHOI\GI (MATERIAL - ALUMINUM MM - 2024) ( T2     H2 ) ( T3   2 FLAT ENDMILL   H3 )		New Line	1
		Z Plus	3500.000
		<input checked="" type="checkbox"/> NC Cut	
		New line number is less than current line. Start cut from 1. Check G0000 NC file	
100		0 ~ 99999999	
<	START F. LINE	CONTINUE	SET NEW LINE
			SET Z PLUS >



#### Memo

Model: F54

#### Step 1:

Example, we want to go to command line 100.

#### Step 2:

Enter 100 from control panel and press SET NEW LINE button. Then press START FROM LINE button.



## Description Images

Model: F54

MONITOR		13:01:12 24/05/2016		AUTO	
MACHINE	ABSOLUTE	DIS TO GO	RELATIVE		
X 110.140	X -107.520	X 0.000	X 59.180		
Y 343.531	Y 12.611	Y 0.000	Y 199.211		
Z 0.361	Z 0.361	Z 0.000	Z -5.464		
A 0.000	A 0.000	A 0.000	A -360.000		
0:/NC_PROGRAM/C3_D1S_3D_0.005.NC			Last Line	2293	
N284 Y-5.896 Z10.697			New Line	100	
N286 Y-5.667 Z10.815			Z Plus	3500.000	
N288 Y-5.377 Z10.955			<input checked="" type="checkbox"/> NC Cut		
N290 Y-5.143 Z11.062			New line number is less than current line. Start cut from 1. Check		
N292 Y-4.847 Z11.188			G0000 NC file		
N294 Y-4.608 Z11.284					
N296 Y-4.367 Z11.376					
N298 Y-4.063 Z11.483					
AUTO		S 100%	RPD 100%	F 100%	READY
<	START F. LINE	CONTINUE	SET NEW LINE	SET Z PLUS	>



## Memo

Model: F54

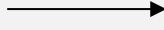
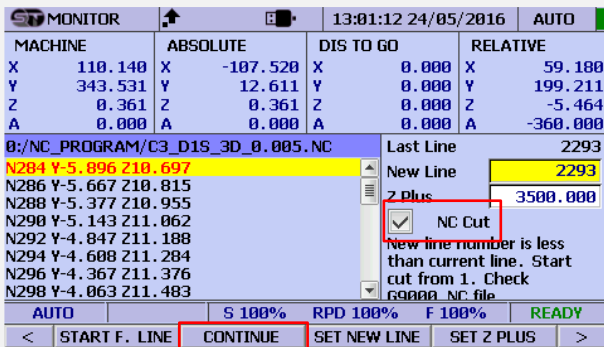
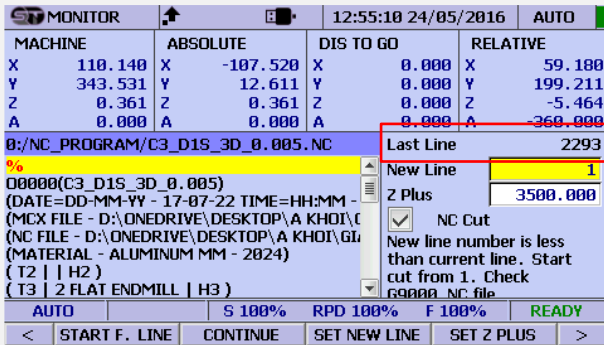
### Step 3:

Controller will go to command line 100.

### 3.5.3.2 CONTINUE THE WORKING PROCESS FROM THE LAST STOPPED COMMAND

#### Description Images

Model: F54



#### Memo

Model: F54

#### Step 1:

Check the last command line on the right.

#### Step 2:

Press CONTINUE button. After that press switch to AUTO mode by pressing AUTO button on control panel. Final is pressing CYCLE START button.

#### Note:

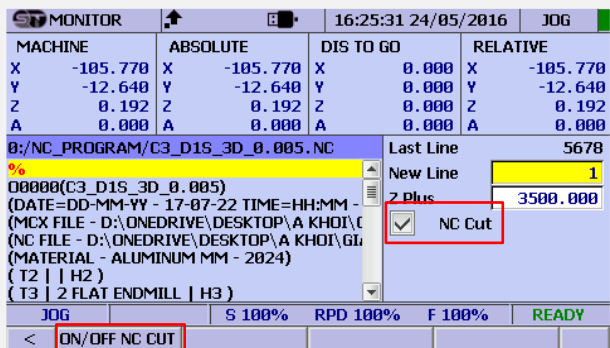
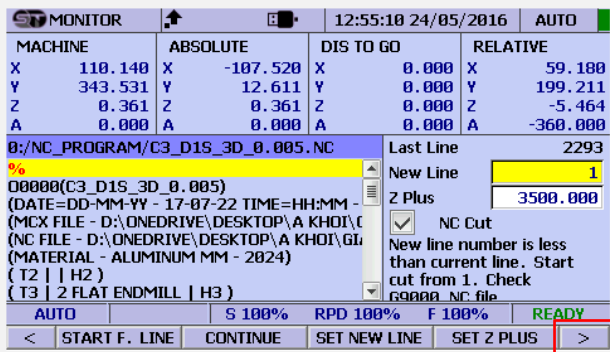
**NC CUT enable:** When user continue the working process, controller will automatically create a secondary to activate all necessary G-Code before run to the last command line

**NC CUT disable:** When user continue the working process, controller will not create a secondary program to activate all necessary G-Code and jump to the last command directly

## Description Images

Model: F54

To enable/disable NC cut feature.



## Memo

Model: F54

### Step 1:

Press the arrow button on the right.

### Step 2:

Press ON/OFF NC CUT button to enable or disable feature.

### 3.5.4 WORKING HISTORY

**Description Images**  
 Model: F54

MONITOR		12:05:27 18/03/2024		JOG	
MACHINE	ABSOLUTE	DIS TO GO	RELATIVE		
X 279.030	X 279.030	X 0.000	X 249.600		
Y 235.003	Y 235.003	Y 0.000	Y 164.600		
Z 102.322	Z 102.322	Z 0.000	Z 39.600		
A -154.497	A -154.497	A 0.000	A 0.000		

0:/NC_PROGRAM/C3_D1S_3D_0.005.NC		Fa	0.0 Fp	3000.0
%		Sa	0 Sp	10000
00000(C3_D1S_3D_0.005)		D	0 H	0
(DATE=DD-MM-YY - 17-07-22 TIME=HH:MM -		T	0 L	36904
(MCX FILE - D:\ONEDRIVE\DESKTOP\A KHOI\G		CYC	0 Prg	0 %
(NC FILE - D:\ONEDRIVE\DESKTOP\A KHOI\G		P.N		0:00:00
(MATERIAL - ALUMINUM MM - 2024)		G00 G93 G20 G90 G17 G49		
( T2   H2 )		G54 G60 G99		
( T3   2 FLAT ENDMILL   H3 )				

JOG	S 100%	RPD 100%	F 100%	READY
-----	--------	----------	--------	-------

PART LOG		12:05:49 18/03/2024		JOG	
No.	Program	Start Time	Total Time (s)		
1	C3_D1S_3D_0.005.NC	13:33:53 15/11/2023	13		
2	6- D6R1.NC	15:58:19 16/03/2024	0		
>3<	C3_D1S_3D_0.005.NC	11:10:37 18/03/2024	0		

JOG	S 100%	RPD 100%	F 100%	READY
-----	--------	----------	--------	-------

PART LOG

**Memo**  
 Model: F54

**Step 1:**

Press the arrow button on the left to switch to next page.

**Step 2:**

Press PART LOG button to open the working history table. At this table you would able to see the working history, name of program and the cycle time.

### 3.6 MAINTENANCE PAGE

Operators can monitor the error log, error notifications, and error alarms of the controller. To access the MESSAGE page, press the MESSAGE button from the main interface. Additionally, operators can save the error history for inspection when needed.

#### Maintenance features:

- **Alarm:** alarm history
- **Warning:** warning history
- **Operation:** operation history
- **Backup:** plug in the usb drive to controller and press this button to save all the error notifications to usb drive.

#### Model: F54 controller

ST COORD		13:31:12 18/03/2024		JOG
MACHINE			ABSOLUTE	
X	279.030		X	279.030
Y	235.003		Y	235.003
Z	102.322		Z	102.322
A	-154.497		A	-154.497
Feedrate 3000.0		Spindle 10000		CMD T 0
Act. Feed 0.0		Act. Spin 0		Spi. 0
JOG	S 100%	RPD 100%	F 100%	READY
<	MAINTEN.	DIAGNOS.	PARAMETER	PLC >

ST OPERATION		13:33:08 18/03/2024		JOG
No.	Group	ID	Time	Content
105	A	0	11:52:35 18/03/2024	System Reset Command
106	A	0	11:53:15 18/03/2024	System Reset Command
107	A	0	12:05:22 18/03/2024	System Reset Command
108	A	0	12:05:27 18/03/2024	System Reset Command
109	A	0	12:05:49 18/03/2024	System Reset Command
110	A	0	13:31:04 18/03/2024	System Reset Command
111	A	0	13:31:12 18/03/2024	System Reset Command
112	A	0	13:32:53 18/03/2024	System Reset Command
113	A	0	13:33:08 18/03/2024	System Reset Command
JOG	S 100%	RPD 100%	F 100%	READY
<	HISTORY A.	HISTORY W.	OPERATION	BACK UP >

Figure 3-6. Maintenance page

### 3.7 DIAGNOSTIC PAGE

QS Controllers support users with diagnostic tale. This table will allow users can monitor the system data bits, data registers and macro variables.

#### Diagnostic features:

- **NC bit:** open data bit page
- **NC register:** open register data page
- **Macro debug:** open macro variable page (local variables & global variables)

#### Model: F54 controller

COORD		13:39:41 18/03/2024		JOG	
MACHINE				ABSOLUTE	
X	279.030		X	279.030	
Y	235.003		Y	235.003	
Z	102.322		Z	102.322	
A	-154.497		A	-154.497	
Feedrate	3000.0	Spindle	10000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG	S 100%		RPD 100%	F 100%	READY
<	MAINTEN.	DIAGNOS.	PARAMETER	PLC	>

NC BIT		13:39:50 18/03/2024		JOG				
Addr	+0	+1	+2	+3	+4	+5	+6	+7
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
JOG	S 100%		RPD 100%	F 100%	READY			
<	NC BIT	NC REG	MACRO DEBUG					

Figure 3-7. Diagnostic page

### 3.8 PARAMETER PAGE

The controller parameter page is a very important page. The operator needs to understand and know the parameters on the controller and absolutely not change them arbitrarily without fully understanding the function of that parameter. Because if the operator arbitrarily changes the parameters without understanding the function, it will lead to the machine malfunctioning, which can be dangerous, reduce the machine's productivity and affect the processing process.

#### Parameter feature:

- **General:** back to main page
- **Axis:** go to axis setting part
- **Spindle:** go to spindle setting part
- **Hardware:** go to hardware setting part

#### Model: F54 controller

ST COORD		14:13:27 18/03/2024		JOG	
MACHINE				ABSOLUTE	
X	279.030		X	279.030	
Y	235.003		Y	235.003	
Z	102.322		Z	102.322	
A	-154.497		A	-154.497	
DIS TO GO					
X	0.000		X	0.000	
Y	0.000		Y	0.000	
Z	0.000		Z	0.000	
A	0.000		A	0.000	
Feedrate	3000.0	Spindle	10000	CMD T	0
Act. Feed	0.0	Act. Spin	0	Spi.	0
JOG	S 100%		RPD 100%	F 100%	READY
<	MAINTEN.	DIAGNOS.	PARAMETER	PLC	>

ST AXIS		10:27:04 21/05/2016		JOG				
Addr	+0	+1	+2	+3	+4	+5	+6	+7
00000	AX1.ENA	AX2.ENA	AX3.ENA	AX4.ENA	AX5.ENA	AX6.ENA	AX7.ENA	AX8.ENA
15	1	1	1	1	0	0	0	0
00008	AX1.DIR	AX2.DIR	AX3.DIR	AX4.DIR	AX5.DIR	AX6.DIR	AX7.DIR	AX8.DIR
0	0	0	0	0	0	0	0	0
00016	AX1.SODI	AX2.SODI	AX3.SODI	AX4.SODI	AX5.SODI	AX6.SODI	AX7.SODI	AX8.SODI
8	0	0	0	1	0	0	0	0
00024	AX1.HDIR	AX2.HDIR	AX3.HDIR	AX4.HDIR	AX5.HDIR	AX6.HDIR	AX7.HDIR	AX8.HDIR
0	0	0	0	0	0	0	0	0
00032	AX1.HDRF	AX2.HDRF	AX3.HDRF	AX4.HDRF	AX5.HDRF	AX6.HDRF	AX7.HDRF	AX8.HDRF
0	0	0	0	0	0	0	0	0
JOG	S 100%		RPD 100%	F 50%	READY			
<	GENERAL	AXIS	SPINDLE	HARDWARE	>			

Figure 3-8. Parameter page

Parameter instruction parts:

- Parameter setting steps **(3.8.1)**

### 3.8.1 PARAMETER SETTING STEPS

**Description Images**  
 Model: F54, F86, Astro 6A, Astro 10i

Addr	+0	+1	+2	+3	+4	+5	+6	+7
00000	AX1.ENA	AX2.ENA	AX3.ENA	AX4.ENA	AX5.ENA	AX6.ENA	AX7.ENA	AX8.ENA
15	1	1	1	1	0	0	0	0
00008	AX1.DIR	AX2.DIR	AX3.DIR	AX4.DIR	AX5.DIR	AX6.DIR	AX7.DIR	AX8.DIR
0	0	0	0	0	0	0	0	0
00016	AX1.SODI	AX2.SODI	AX3.SODI	AX4.SODI	AX5.SODI	AX6.SODI	AX7.SODI	AX8.SODI
8	0	0	0	1	0	0	0	0
00024	AX1.HDIR	AX2.HDIR	AX3.HDIR	AX4.HDIR	AX5.HDIR	AX6.HDIR	AX7.HDIR	AX8.HDIR
0	0	0	0	0	0	0	0	0
00032	AX1.HDRF	AX2.HDRF	AX3.HDRF	AX4.HDRF	AX5.HDRF	AX6.HDRF	AX7.HDRF	AX8.HDRF
0	0	0	0	0	0	0	0	0

JOG | S 100% | RPD 100% | F 50% | READY

< | GENERAL | AXIS | SPINDLE | HARDWARE | >

Addr	Parameter Name	VALUE
04050	Axis 1 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04051	Axis 2 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04052	Axis 3 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04053	Axis 4 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04054	Axis 5 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04055	Axis 6 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04056	Axis 7 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04057	Axis 8 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04058		0
04059		0

JOG | S 100% | RPD 100% | F 50% | READY

< | GENERAL | AXIS | SPINDLE | HARDWARE | >

**Memo**  
Model: F54, F86, Astro 6A, Astro 10i

**Step 1:**

Select parameter type such as: Axis, Spindle, Hardware.

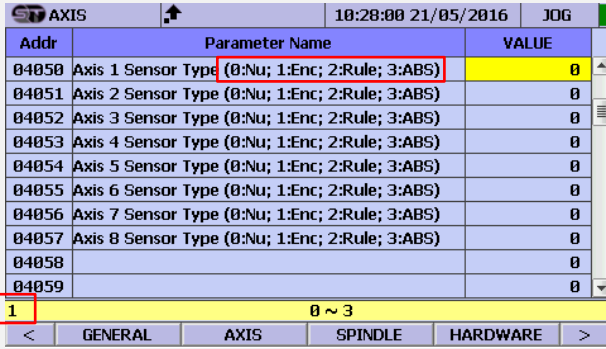
**Step 2:**

Press PAGE DOWN button to scroll the page down and find the parameter you are looking for.



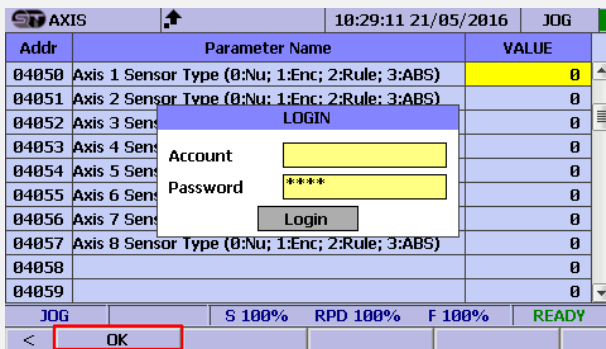
## Description Images

Model: F54, F86, Astro 6A, Astro 10i



Addr	Parameter Name	VALUE
04050	Axis 1 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04051	Axis 2 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04052	Axis 3 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04053	Axis 4 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04054	Axis 5 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04055	Axis 6 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04056	Axis 7 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04057	Axis 8 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04058		0
04059		0

1 0 ~ 3



Addr	Parameter Name	VALUE
04050	Axis 1 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04051	Axis 2 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04052	Axis 3 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04053	Axis 4 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04054	Axis 5 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04055	Axis 6 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04056	Axis 7 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04057	Axis 8 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04058		0
04059		0

JOG S 100% RPD 100% F 100% READY

OK



## Memo

Model: F54, F86, Astro 6A, Astro 10i

### Step 3:

Refer the information on the right of parameter. Then enter the suitable value.

### Step 4:

At this time the system will request you to enter the user password. Enter "1415" and press OK button.

## Description Images

Model: F54, F86, Astro 6A, Astro 10i

Addr	Parameter Name	VALUE
04050	Axis 1 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04051	Axis 2 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04052	Axis 3 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04053	Axis 4 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04054	Axis 5 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04055	Axis 6 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04056	Axis 7 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04057	Axis 8 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04058		0
04059		0

1 0 ~ 3

< GENERAL AXIS SPINDLE HARDWARE >



Addr	Parameter Name	VALUE
04050	Axis 1 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	1
04051	Axis 2 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04052	Axis 3 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04053	Axis 4 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04054	Axis 5 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04055	Axis 6 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04056	Axis 7 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04057	Axis 8 Sensor Type (0:Nu; 1:Enc; 2:Rule; 3:ABS)	0
04058		0
04059		0

JOG S 100% RPD 100% F 100% READY

< GENERAL AXIS SPINDLE HARDWARE >



## Memo

Model: F54, F86, Astro 6A, Astro 10i

### Step 5:

Enter the value again. When you completed enter value, press RESET button on control panel to save data.

### Step 6:

Reboot device to activate the new modified value.

### 3.9 PLC PAGE

QS controllers come with a PLC processor module, allows the users can monitor the operation status of machine. The user can prepare the PLC ladder program then import it to controller to suitable with your applications.

#### PLC features:

- **SYS BIT:** open system bit page
- **SYS REG:** open system register data page
- **FIND REV:** find previous object in ladder program
- **FIND NEXT:** find next object in ladder program

#### Model: F54 controller

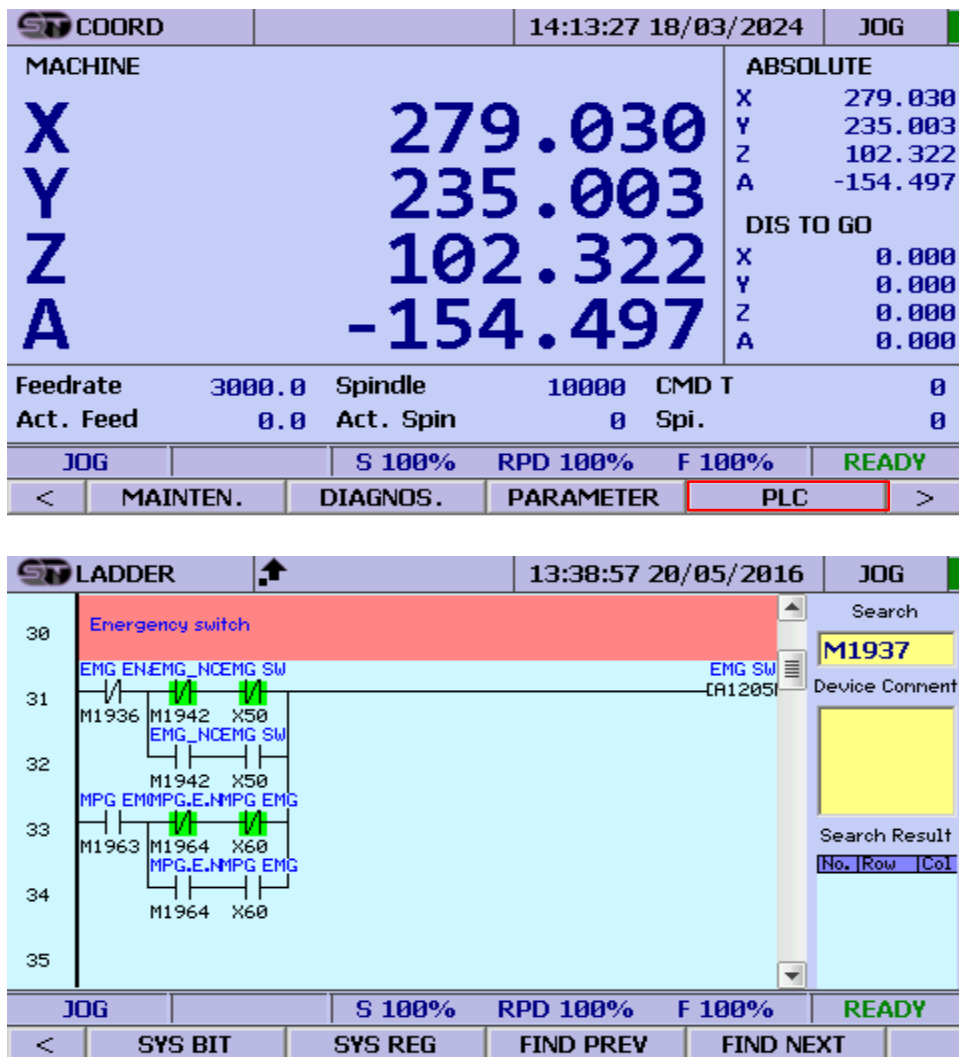


Figure 3-9 PLC page

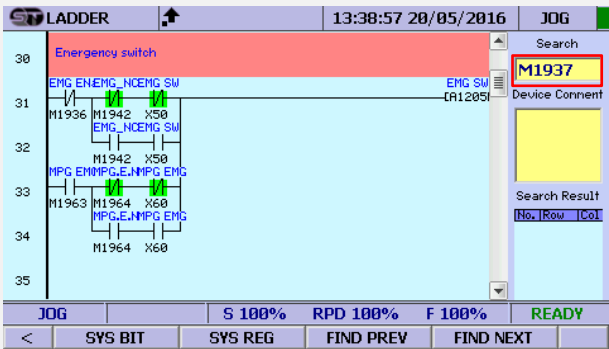
## PLC instruction parts:

- Find an object in ladder program **(3.9.1)**
- Import PLC data **(3.9.2)**

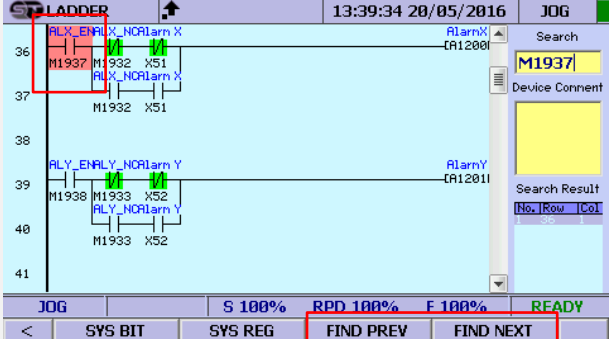
### 3.9.1 FIND AN OBJECT IN LADDER PROGRAM

#### Description Images

Model: F54, F86, Astro 6A, Astro 10i

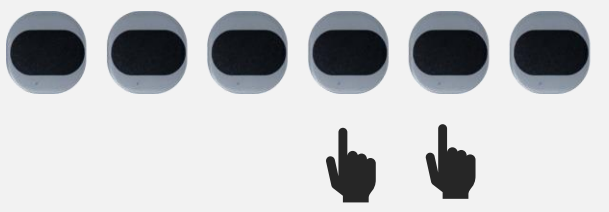


Enter



No.	Row	Col
M1937		

FIND PREV FIND NEXT



#### Memo

Model: F54, F86, Astro 6A, Astro 10i

##### Step 1:

Fill the object name and press ENTER button on control panel.

##### Step 2:

Controller will find the object if it is existing in program. If you want to check is there any object have the same name, press FIND NEXT and FIND REV button.

### 3.9.2 IMPORT PLC DATA

To successfully load data into the controller, operators must understand the directory formats. If the directory names or formats are incorrect, the data will not be loaded.

- Directory Formats on the F54 Controller

Number	Data Type	Standard Name	Standard Format	Final Format
1	PLC	ALM_PLC_USER PLC	.HPL	ALM_PLC_USER.HPL PLC.HPL

**Description Images**  
 Model: F54, F86, Astro 6A, Astro 10i

The screenshot shows the COORD screen with the following data:

COORD		14:14:46 18/03/2024	JOG
MACHINE		ABSOLUTE	
X	279.030	X	279.030
Y	235.003	Y	235.003
Z	102.322	Z	102.322
A	-154.497	A	-154.497
		DIS TO GO	
		X	0.000
		Y	0.000
		Z	0.000
		A	0.000
Feedrate	3000.0	Spindle	10000
Act. Feed	0.0	Act. Spin	0
		CMD T	0
			0
JOG	S 100%	RPD 100%	F 100%
<	SYSTEM		READY

A hand icon points to the SYSTEM button, which is highlighted with a red box.

The screenshot shows the SYSTEM screen with the following data:

SYSTEM		14:42:39 18/03/2024	JOG
INFORMATION		HARDWARE	
NC SOFTWARE		+ NC Version: 2.0.00	
+ NC Version: 1.3.69		+ HMI Version: Integrate	
+ PLC Version: 1.2.05		905980479	
+ Macro Version: 1.0.00		Mbytes	
HMI SOFTWARE			
+ HMI Version: 1.1.00			
+ HMI Ladder Version: 1.0.00			
MOTION SOFTWARE			
+ MOT Version: 1.0.26			
JOG	S 100%	RPD 100%	F 100%
<	OK	CANCEL	READY

A login dialog box is displayed with the following fields:

LOGIN	
Account	<input type="text"/>
Password	<input type="password"/>
Login	

**Memo**  
 Model: F54, F86, Astro 6A, Astro 10i

**Step 1:**

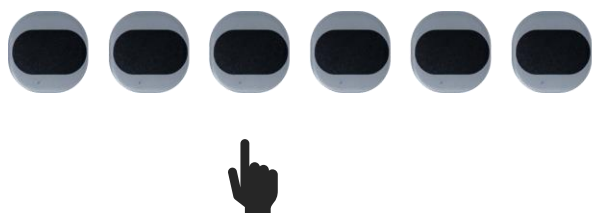
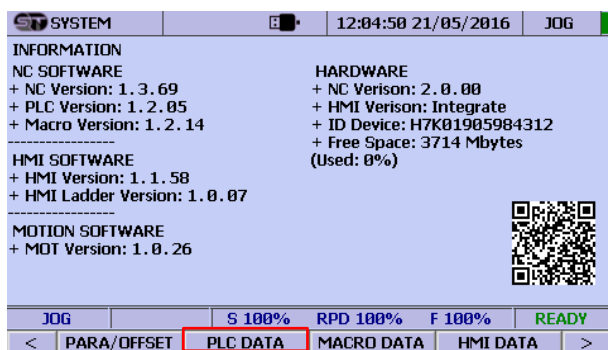
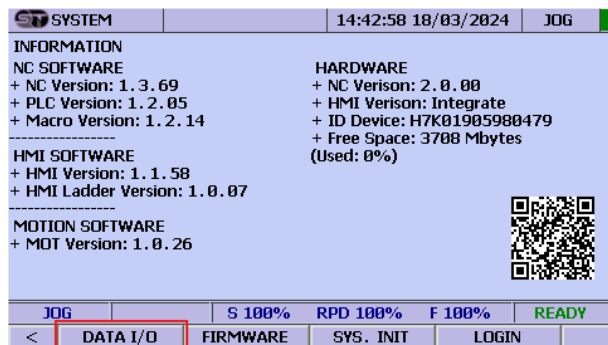
Press SYSTEM button.

**Step 2:**

Enter user password "1415".

## Description Images

Model: F54



## Memo

Model: F54

### Step 3:

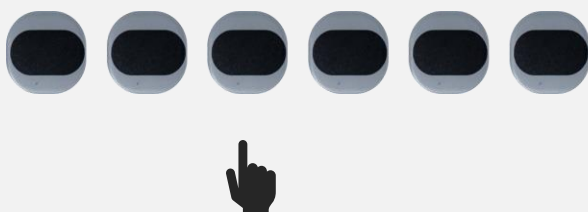
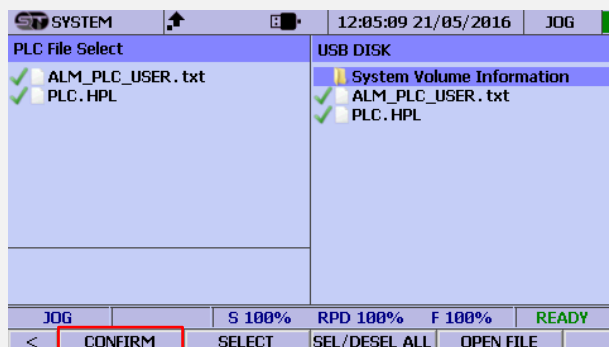
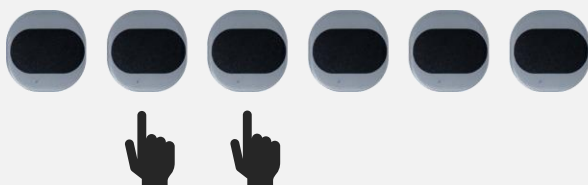
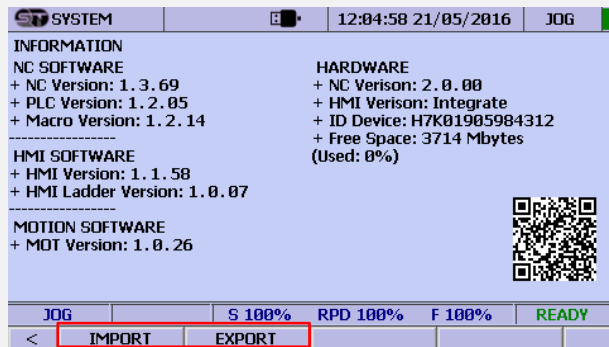
Press DATA I/O button. You can select to load (Macro/PLC/Parameter/Offset, HMI)

### Step 4:

Press PLC DATA button.

## Description Images

Model: F54



## Memo

Model: F54

### Step 5:

Select IMPORT or EXPORT

### Step 6:

Plug in the USB drive with the PLC data to the controller. At this point, the controller will automatically detect the PLC file. You only need to check it and press the CONFIRM button.

### 3.10 SYSTEM SETTING

Operators access the SYSTEM page to configure system changes, load, and export controller data.

To successfully load data into the controller, operators must understand the directory formats. If the directory names or formats are incorrect, the data will not be loaded.

- Directory Formats on the F54 Controller

Number	Data Type	Standard Name	Standard Format	Final Format
1	Macro alarm	ALM_MACRO_USER	.txt	ALM_MACRO_USER.txt
2	Parameter	PARAM_NC PARAM_USER	.txt	PARAM_NC.txt PARAM_USER.txt
3	Offset	OFFSET	.txt	OFFSET.txt
4	PLC	ALM_PLC_USER PLC	.HPL	ALM_PLC_USER.HPL PLC.HPL

#### Notes:

Macro programs are typically created using a text editor such as Notepad and saved with a .txt file extension. Before loading the macro program into the controller, the programmer must remove the .txt file extension.

Example:

A macro program created using Notepad is named "M0100.txt". The operator must remove the .txt file extension before loading the file into the controller.

M0100.txt → M0100

To load data into the controller, the operator must follow these steps:

#### SYSTEM Page Features:

- **DATA I/O:** Import and export data such as parameters, offsets, PLC, and HMI.
- **FIRMWARE:** Update and save device firmware versions.
- **SYS.INIT:** Configure other features such as time settings.



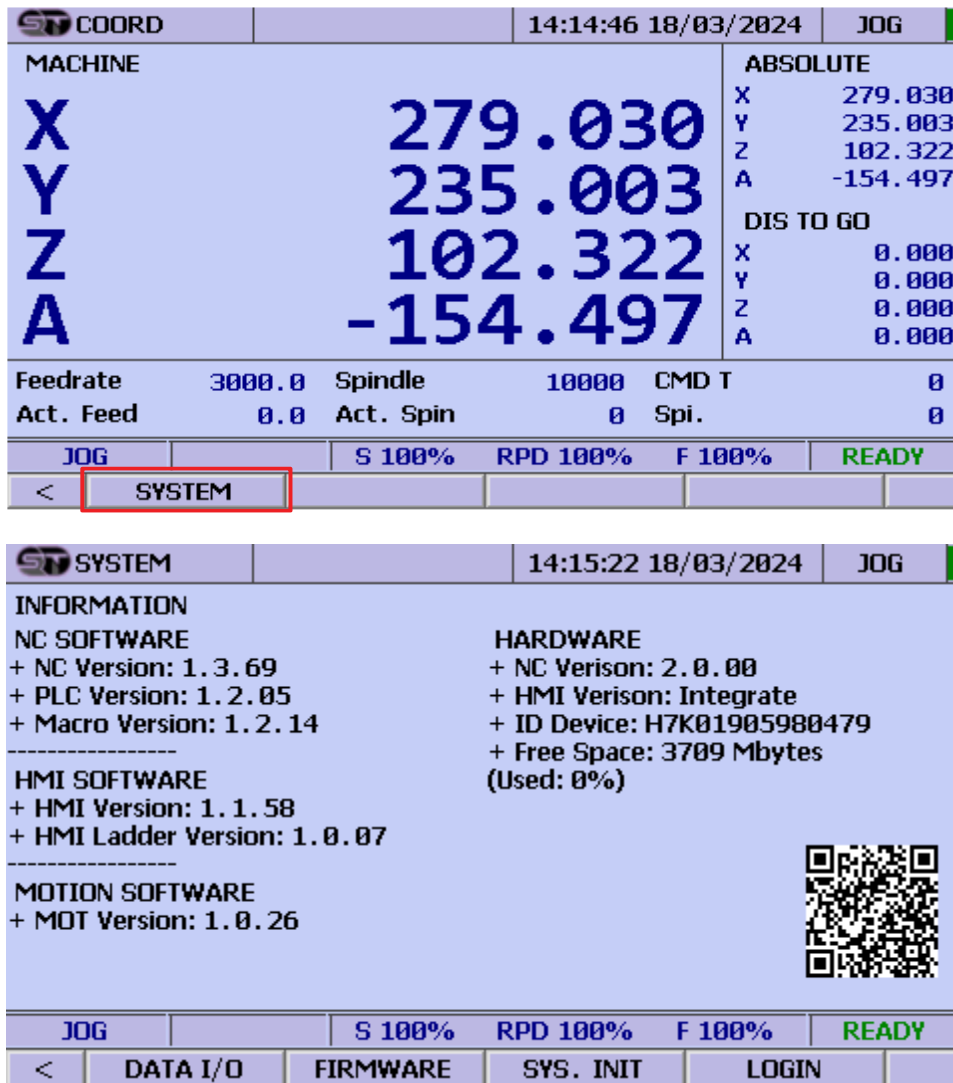


Figure 3-10. System page

**System instruction parts:**

- Firmware update **(3.10.1)**
- Date & Time setting **(3.10.2)**
- Access permission **(3.10.3)**

### 3.10.1 FIRMWARE UPDATE

#### Description Images

Model: F54

COORD		14:14:46 18/03/2024		JOG	
MACHINE				ABSOLUTE	
X	279.030	X	279.030	Y	235.003
Y	235.003	Z	102.322	A	-154.497
Z	102.322	DIS TO GO			
A	-154.497	X	0.000	Y	0.000
Feedrate 3000.0		Spindle 10000		CMD T 0	
Act. Feed 0.0		Act. Spin 0		Spi. 0	
JOG		S 100%	RPD 100%	F 100%	READY
<	SYSTEM				



SYSTEM		14:42:39 18/03/2024		JOG	
INFORMATION				HARDWARE	
NC SOFTWARE				+ NC Version: 2.0.00	
+ NC Version: 1.3.69				+ HMI Version: Integrate	
+ PLC Version: 1.2.05				905900479	
+ Macro Version: 1.0.00				Mbytes	
HMI SOFTWARE				Account	
+ HMI Version: 1.1.00				Password	
+ HMI Ladder Version: 1.0.00				Login	
MOTION SOFTWARE				MOTION SOFTWARE	
+ MOT Version: 1.0.26				MOTION SOFTWARE	
JOG		S 100%	RPD 100%	F 100%	READY
<	OK	CANCEL			



#### Memo

Model: F54

##### Step 1:

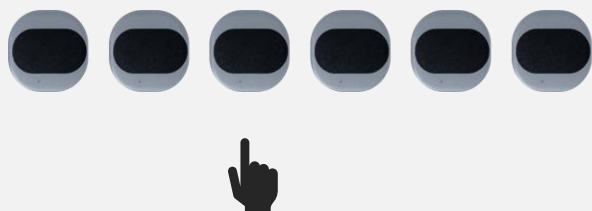
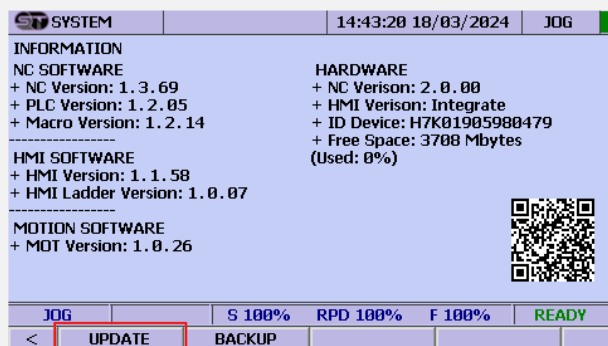
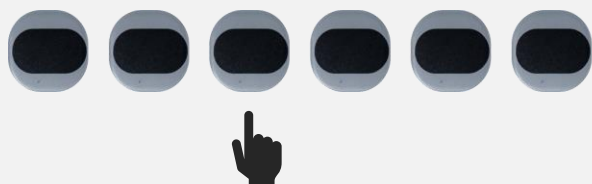
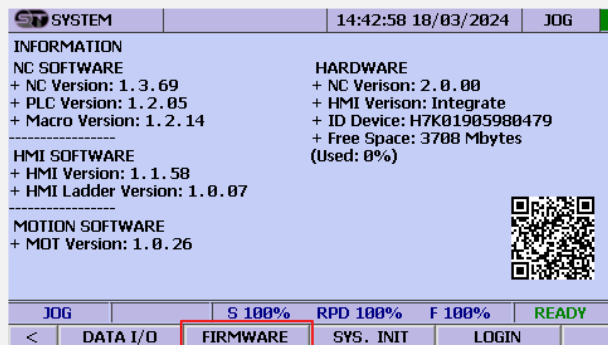
Press SYSTEM button.

##### Step 2:

Enter user password "1415".

## Description Images

Model: F54



## Memo

Model: F54

### Step 1:

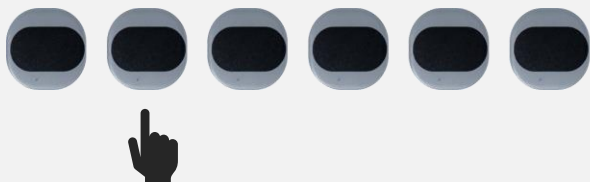
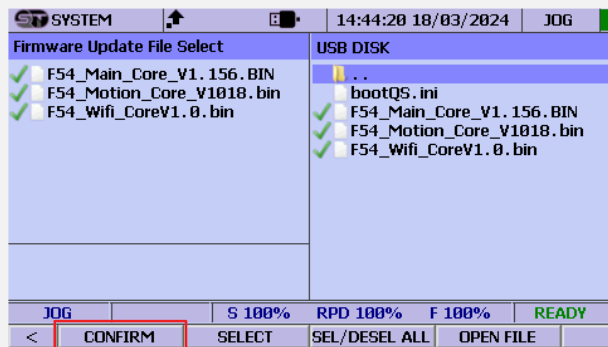
Login to system and select FIRMWARE button.

### Step 2:

Press UPDATE button.

## Description Images

Model: F54



## Memo

Model: F54

### Step 3:

Plug in the USB drive with the firmware data to the controller. At this point, the controller will automatically detect the firmware file. You only need to check it and press the CONFIRM button.

### Note:

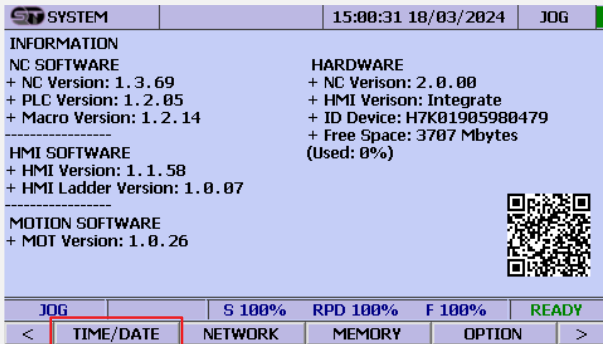
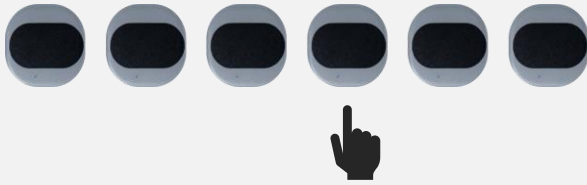
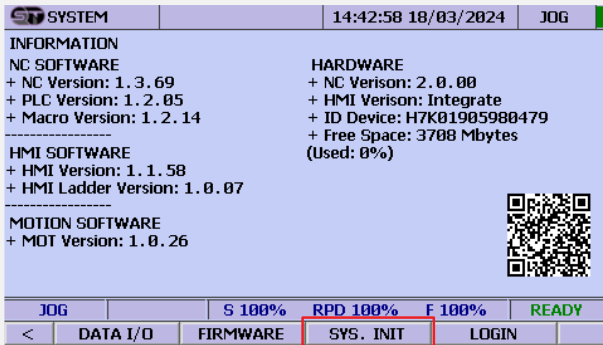
The firmware for the controller is named as follows:

- F54\_Main\_Core\_V1.00.Bin
- F54\_Motion\_Core\_V1061.Bin

### 3.10.2 DATE & TIME SETTING

#### Description Images

Model: F54



#### Memo

Model: F54

##### Step 1:

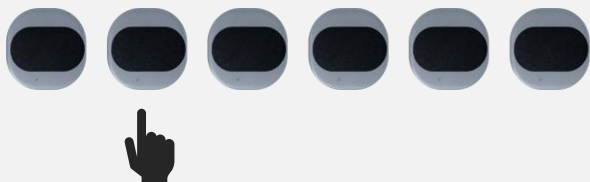
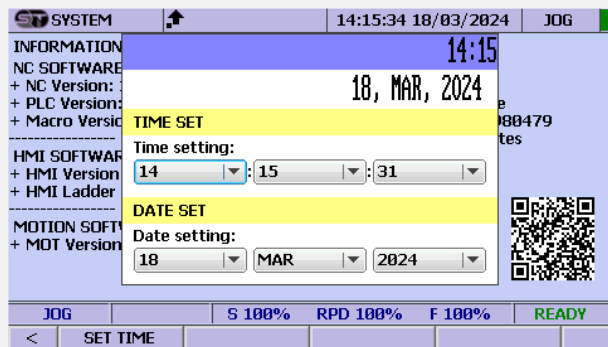
Login to system and select SYS.INT button.

##### Step 2:

Press TIME/DATE button.

## Description Images

Model: F54, F86, Astro 6A, Astro 10i



## Memo

Model: F54, F86, Astro 6A, Astro 10i

### Step 3:

Establish date, time value. And press SET TIME button.

### 3.11 TRANSMIT DATA VIA WI-FI NETWORK

F54 Controller allows the users to transmit the working data from personal computer, laptop to the controller via Wi-Fi network by using the software “QS Explorer”.

User can go to [www.gstcnc.com](http://www.gstcnc.com) or download the software or scan the QR below to download the software.



Scan this QR code to download “QS Explorer” software.



Scan this QR code to download “QS Editor” software.

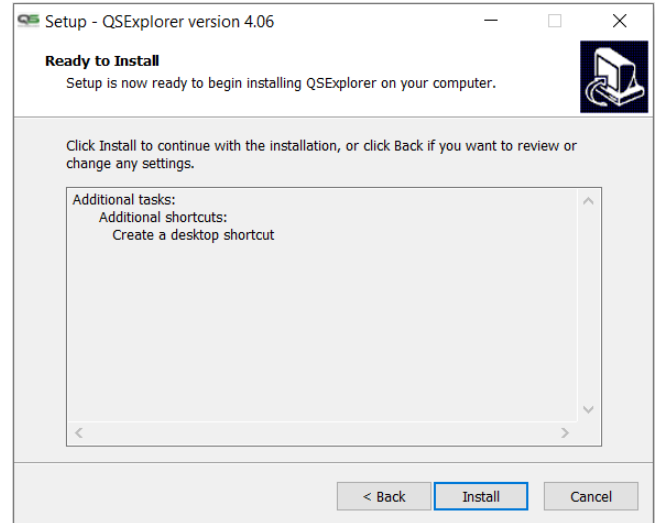
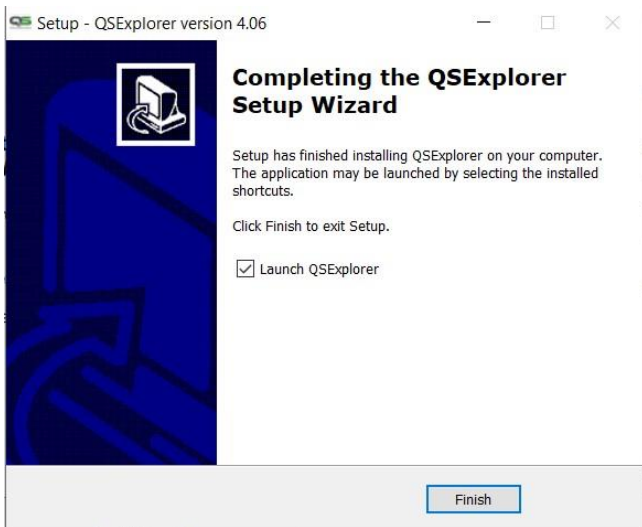
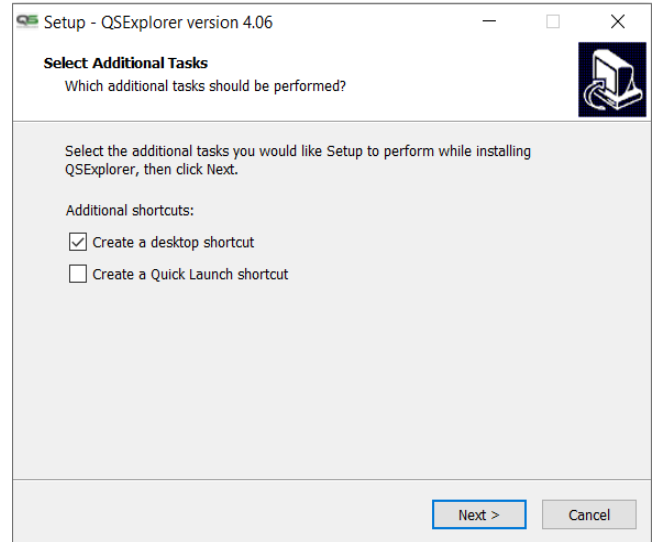
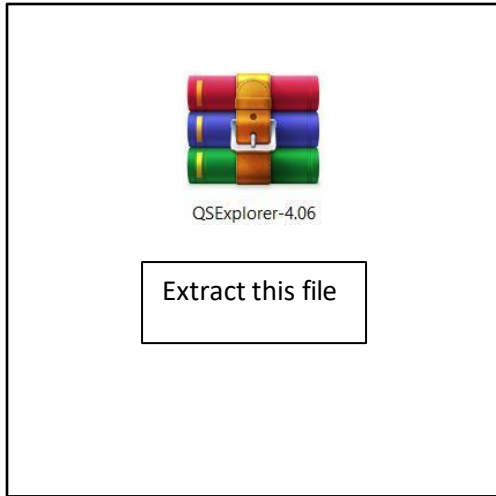
(This software is use for editing PLC ladder)

#### instruction parts:

- Software installation **(3.11.1)**
- Connect device to Wi-Fi network **(3.11.2)**
- Transmit working data from computer to controller via wi-fi network **(3.11.3)**
- Controller status monitoring **(3.11.4)**

### 3.11.1 SOFTWARE INSTALLATION

After you downloaded the software from the website [www.qstcnc.com](http://www.qstcnc.com). Do the steps below to install the software.

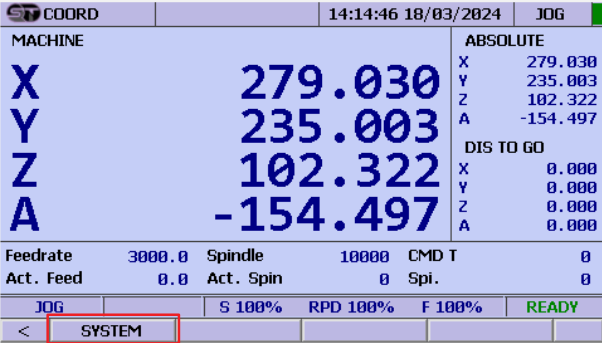




### 3.11.2 CONNECT DEVICE TO WI-FI NETWORK

At first the users need to assemble the antenna to the controller

**Description Images**  
Model: F54



The screenshot shows the 'COORD' screen with the following data:

MACHINE	ABSOLUTE
X 279.030	X 279.030
Y 235.003	Y 235.003
Z 102.322	Z 102.322
A -154.497	A -154.497


DIS TO GO:

X 0.000
Y 0.000
Z 0.000
A 0.000

Feedrate 3000.0 Spindle 10000 CMD T 0  
Act. Feed 0.0 Act. Spin 0 Spi. 0

JOG S 100% RPD 100% F 100% READY

< SYSTEM



The screenshot shows the 'SYSTEM' screen with a login dialog box overlaid. The dialog box has fields for 'Account' and 'Password' (masked with asterisks) and a 'Login' button. A QR code is visible on the right side of the screen.

SYSTEM 14:42:39 18/03/2024 JOG

INFORMATION

NC SOFTWARE + NC Version: 1.3.69  
+ PLC Version: 1.2.05  
+ Macro Version: 1.0.0


HARDWARE + NC Version: 2.0.00  
+ UML Version: Integrate  
905980479 Mbytes

HMI SOFTWARE + HMI Version: 1.1.1  
+ HMI Ladder Version: 1.0.0

MOTION SOFTWARE + MOT Version: 1.0.26

JOG S 100% RPD 100% F 100% READY

< OK CANCEL



**Memo**  
Model: F54

**Step 1:**

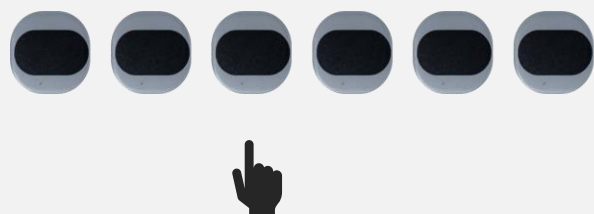
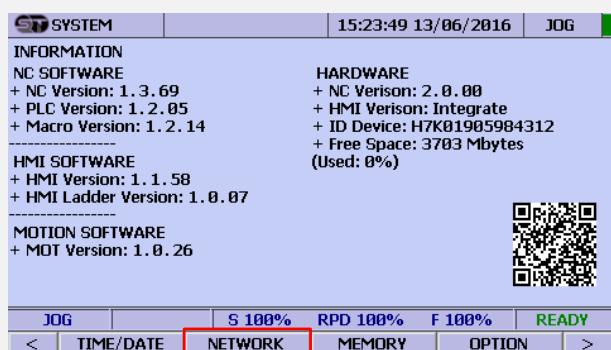
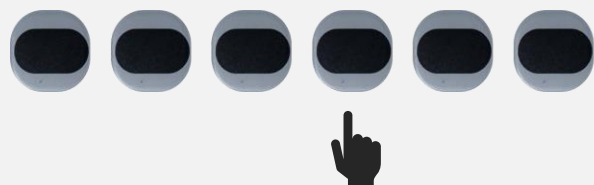
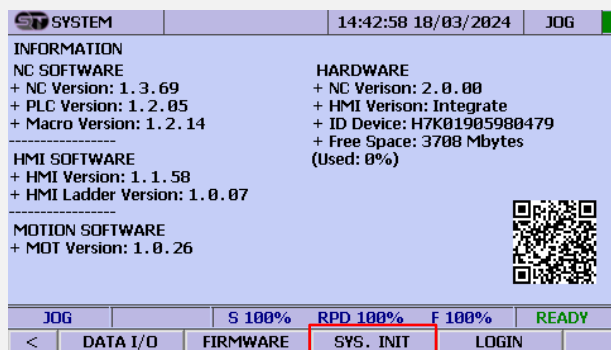
Press SYSTEM button.

**Step 2:**

Enter user password "1415".

## Description Images

Model: F54



## Memo

Model: F54

### Step 3:

Select SYS.INIT button.

### Step 4:

Select NETWORK button.

## Description Images

Model: F54

NETWORK 15:26:24 13/06/2016 JOG

SELECT WIFI

SSID: Input Your SSI

PW:

IP 192 168 1 225

NetMask 255 255 255 0

GateWay 192 168 1 100

JOG S 100% RPD 100% F 100% READY

< SET NETWORK



NETWORK 17:26:03 13/06/2016 JOG

SELECT WIFI

SSID: Cong Ty QS

PW:

IP 192 168 1 225

NetMask 255 255 255 0

GateWay 192 168 1 1

JOG S 100% RPD 100% F 100% READY

< SET NETWORK



## Memo

Model: F54

### Step 5:

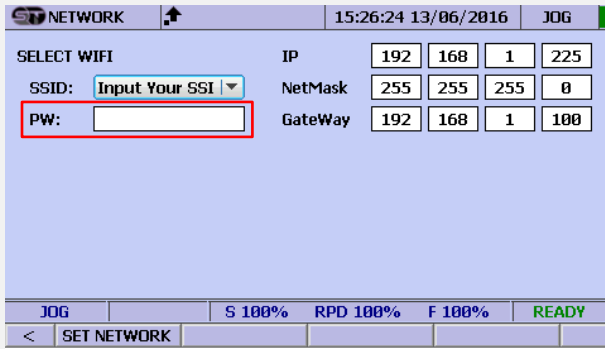
Select SSID by pressing the arrow buttons then press ENTER button.

### Step 6:

Select the Wi-fi network that you want to connect.

## Description Images

Model: F54



NETWORK 15:26:24 13/06/2016 JOG

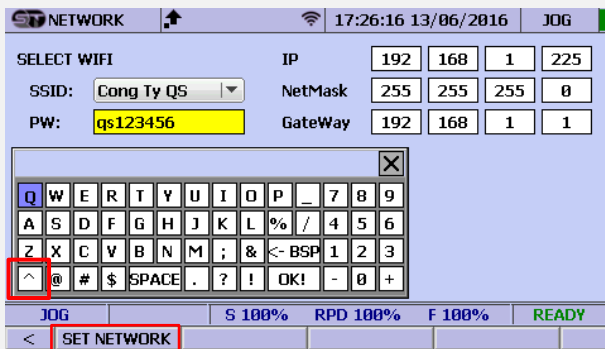
SELECT WIFI IP 192 168 1 225

SSID: Input Your SSI NetMask 255 255 255 0

PW: GateWay 192 168 1 100

JOG S 100% RPD 100% F 100% READY

< SET NETWORK



NETWORK 17:26:16 13/06/2016 JOG

SELECT WIFI IP 192 168 1 225

SSID: Cong Ty QS NetMask 255 255 255 0

PW: qs123456 GateWay 192 168 1 1

Q	W	E	R	T	Y	U	I	O	P	_	7	8	9
A	S	D	F	G	H	J	K	L	%	/	4	5	6
Z	X	C	V	B	N	M	;	&	<	BSP	1	2	3
^	@	#	\$	SPACE	.	?	!	OK!	-	0	+		

JOG S 100% RPD 100% F 100% READY

< SET NETWORK



## Memo

Model: F54

### Step 7:

Select PW to enter the Wi-Fi password.

### Step 8:

Press the arrow buttons on control panel to interact with the virtual keyboard and enter the Wi-Fi password. After complete press SET NETWORK button and reboot the device

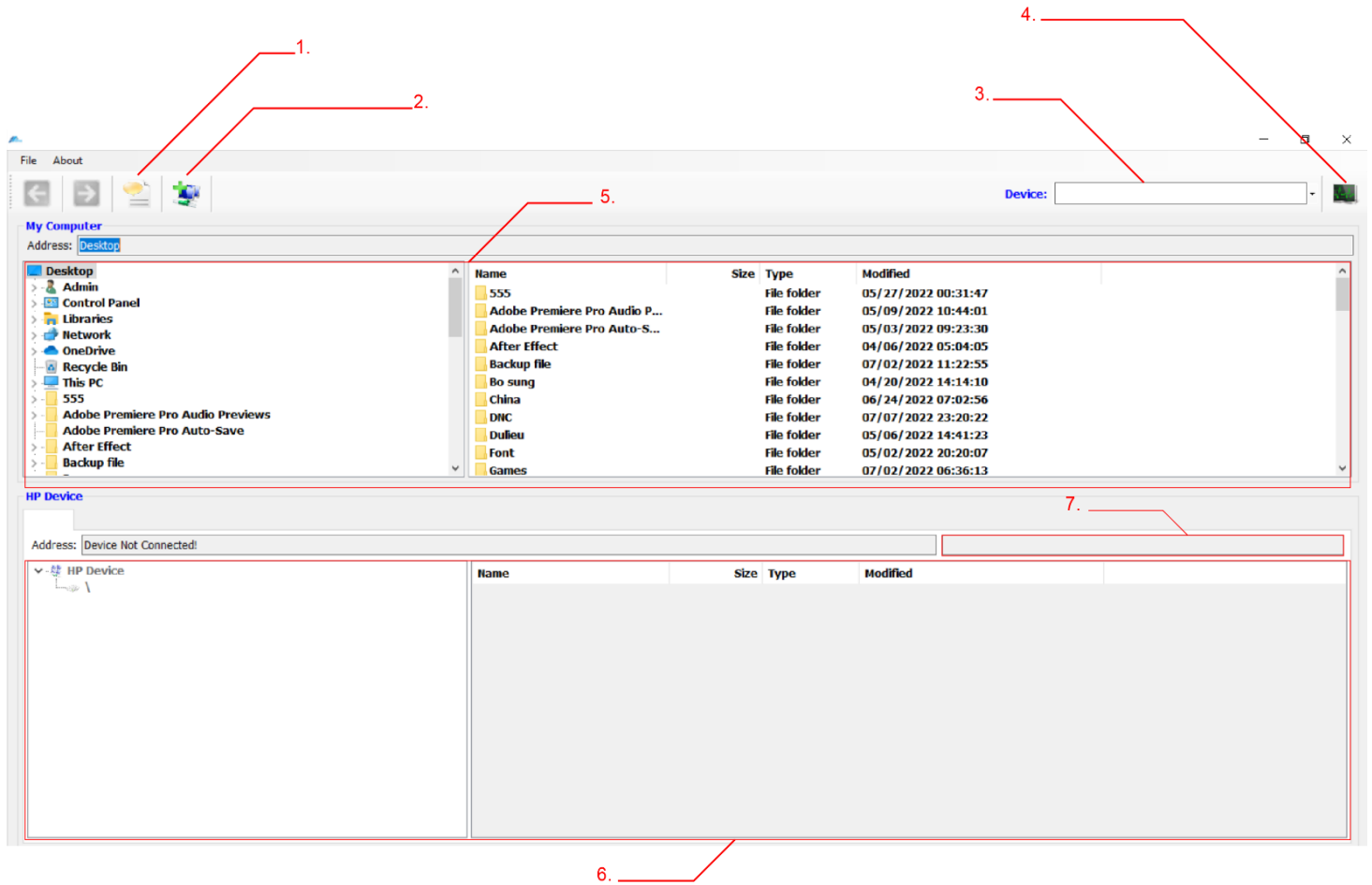
### Note:

Select the symbol in the red box to enter capital characters.

### 3.11.3 DATA TRANSMIT FROM COMPUTER TO CONTROLLER VIA WI-FI NETWORK



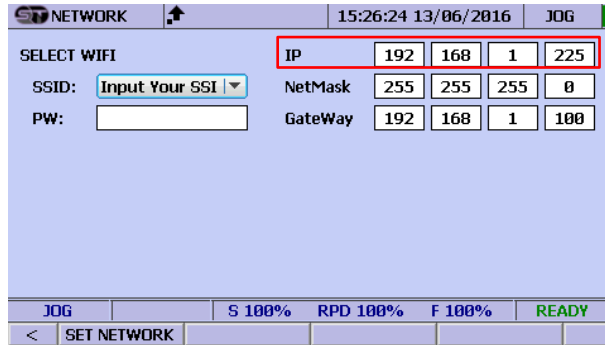
Software interface explanation:



NO.	Name	Description
1	Send MSG	Send message to controller
2	Add Device	Add new controller to transfer data.
3	Device List	Display the device list.
4	Get Device Status	Check the working status of controller
5	Computer	Computer work area.
6	CONTROLLER device	Controller work area.
7	Connection status	Display the device is connected or not.

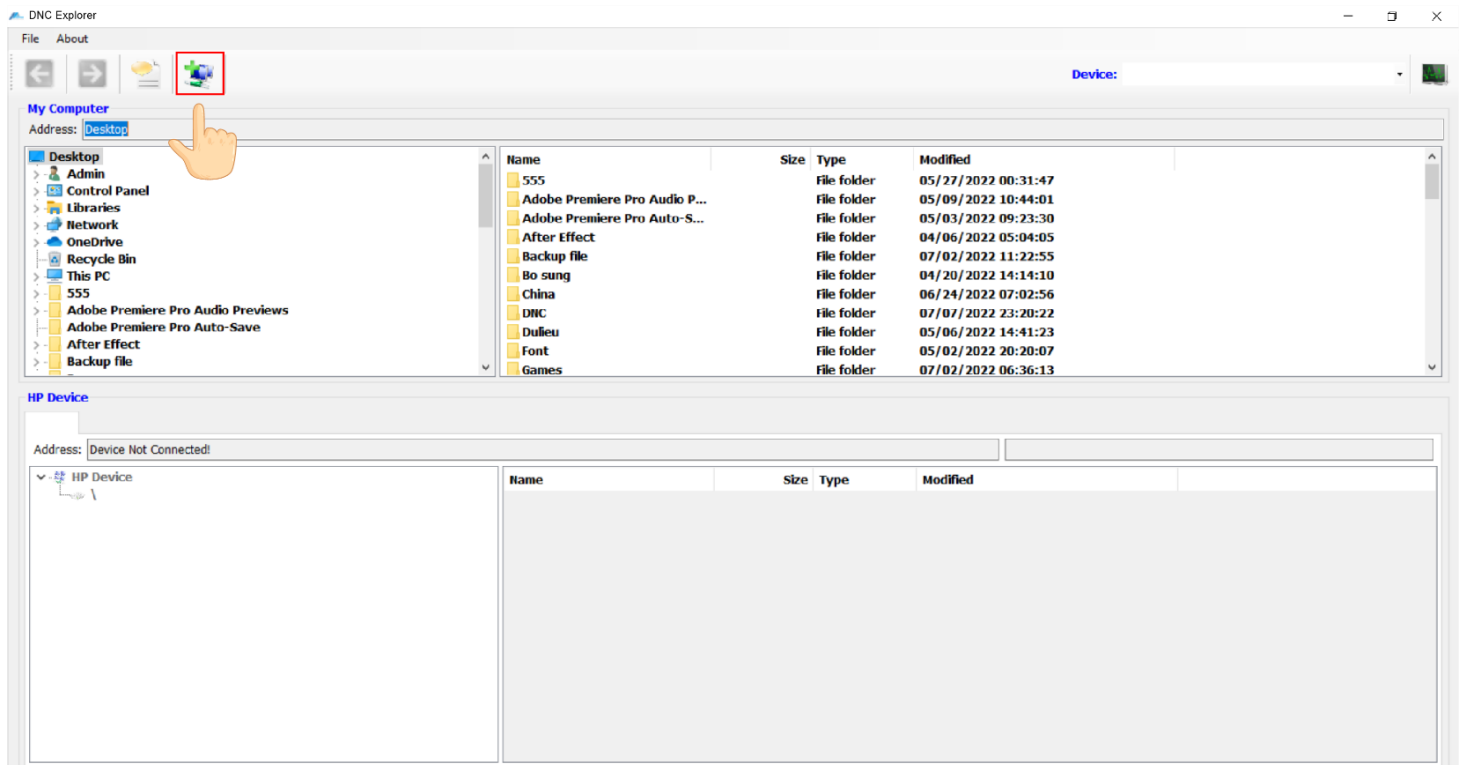
To transmit the working data from computer to the controller, at first the users need to check the IP address of the controller by access to NETWORK page

For examples as you can see in the image below, the IP address of controller is: 192.168.1.225



### Step 1:

Open the software then select "ADD DEVICE"



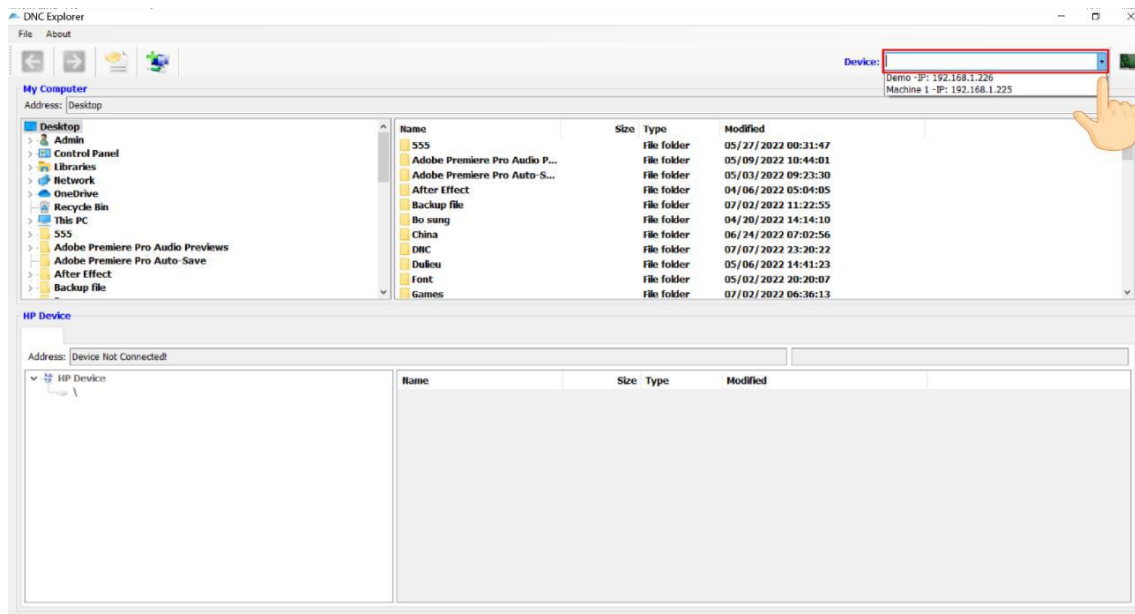
## Step 2:

Enter the name and the IP address of controller that you want to connect. Then press ADD NEW button to save device



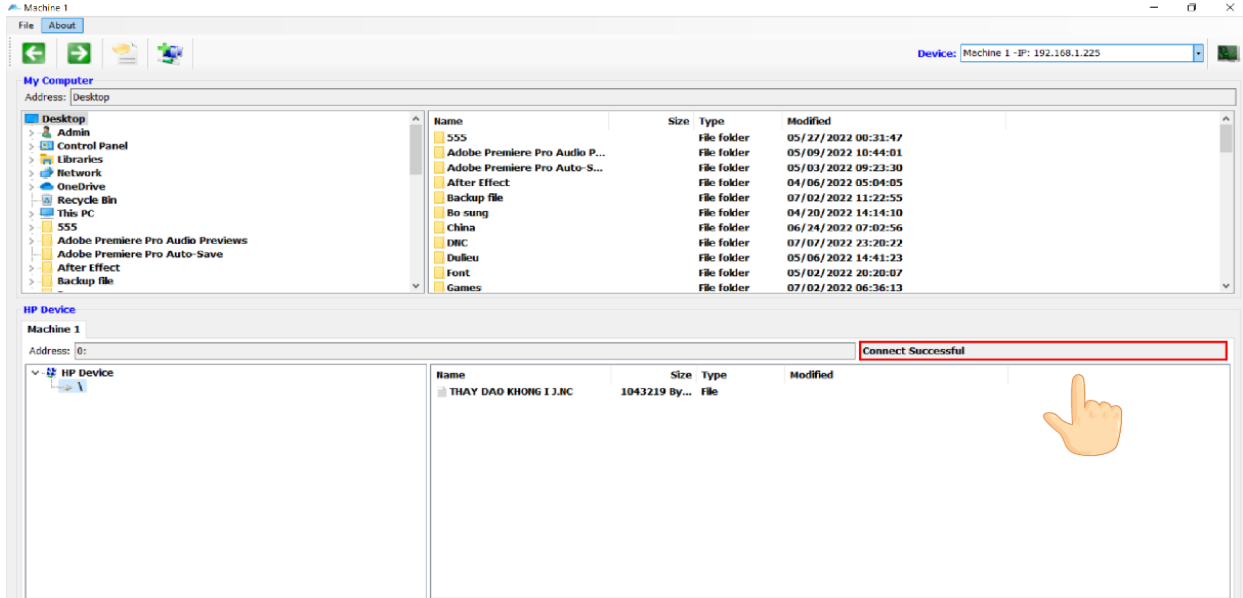
## Step 3:

Select DEVICE LIST box to select device



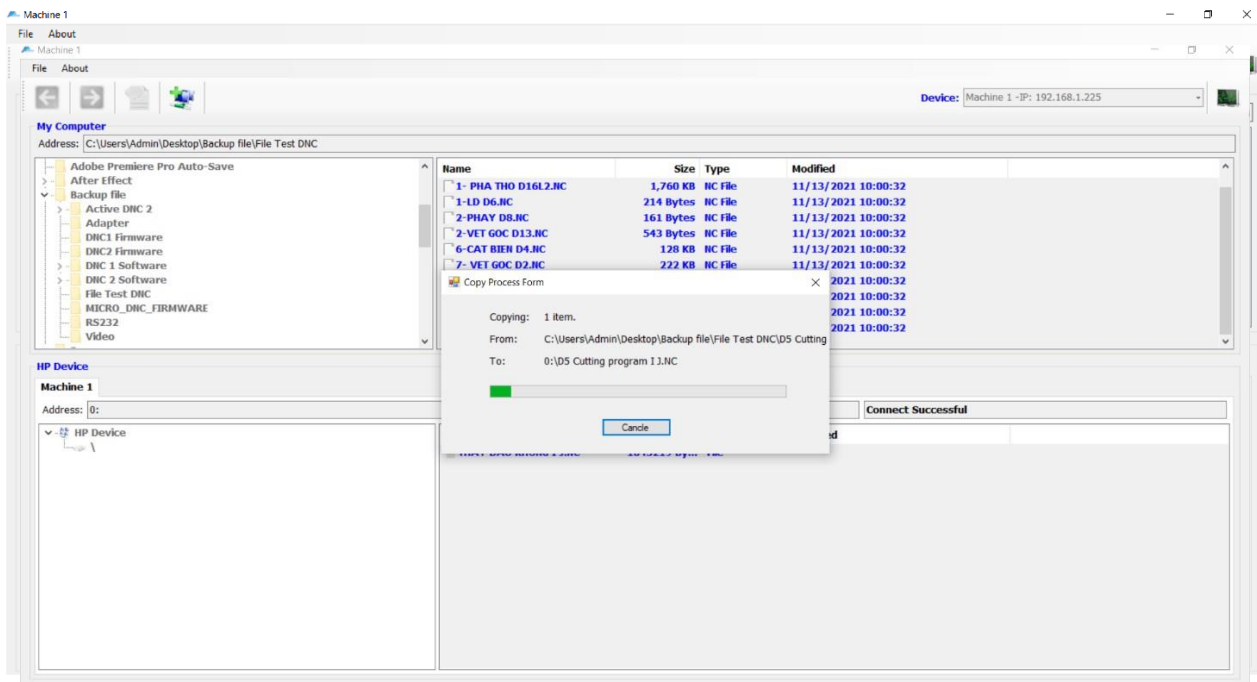
## Step 4:

After controller has connected to computer, on the software will display “ Connection Successful ”



## Step 5:

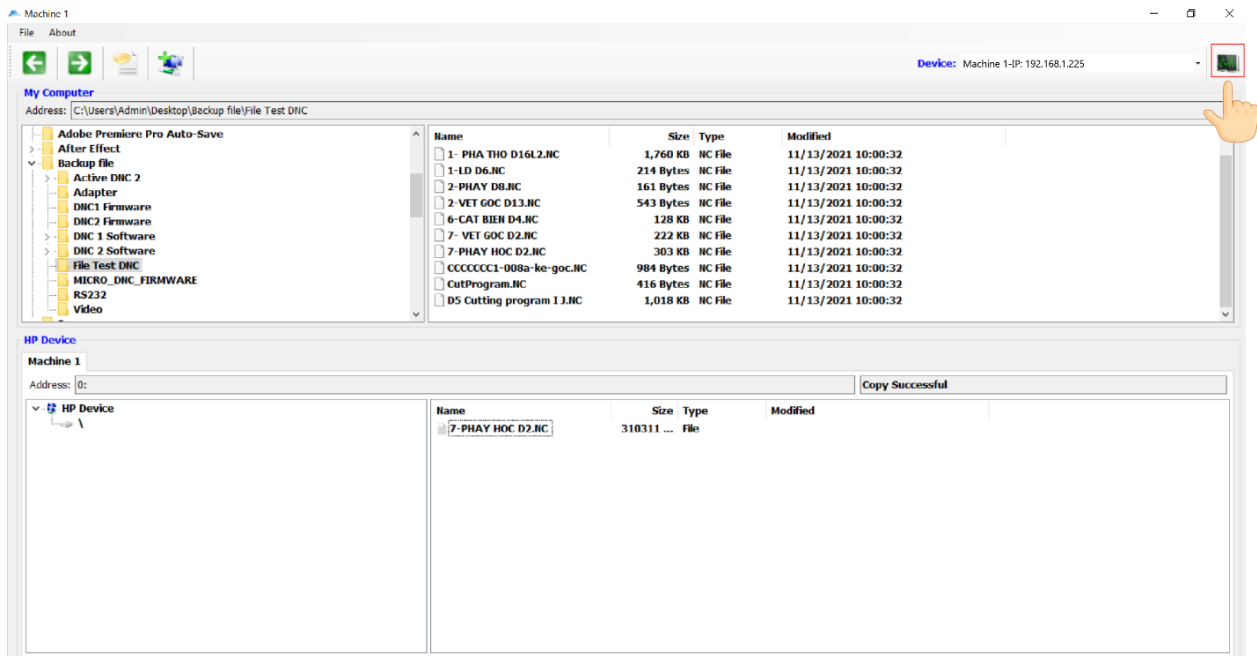
Choose the program from computer then hold left mouse and drag down to controller. Reverse these steps to get the program from controller back to computer





### 3.11.4 CONTROLLER STATUS MONITORING

User can monitor the working process of the controller, Click to the icon on the upper right corner to open monitoring window.



Machine 1

File About

### Device Status

Device Name	Device IP	Device Status	Percent Load	Process Status	Cycle Time	File Path
Demo	192.168.1.226		0%			
Machine 1	192.168.1.225	DNC	29%	Running	3m	\\7-PHAY HOC D2.NC



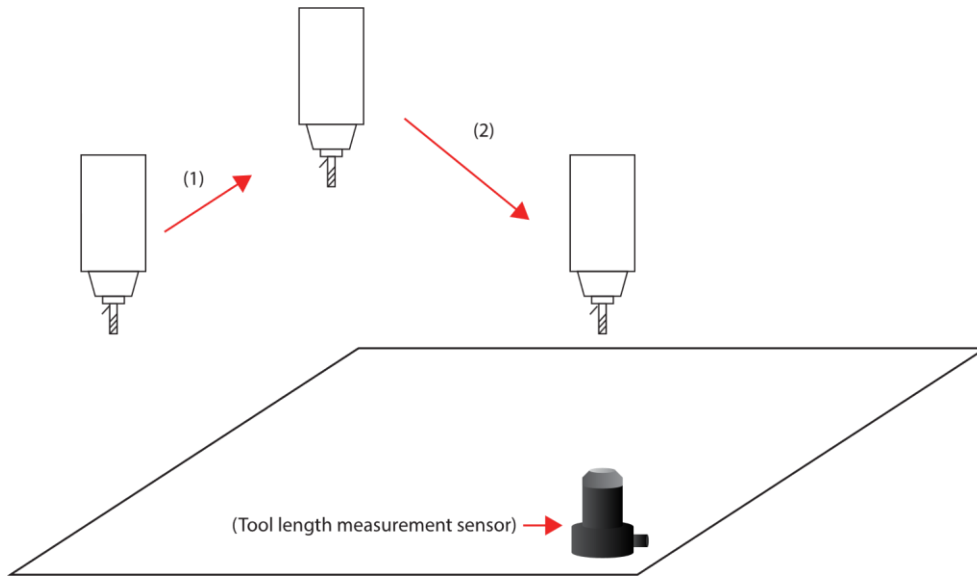
Machine 1

File About

### Device Status

Device Name	Device IP	Device Status	Percent Load	Process Status	Cycle Time	File Path
Demo	192.168.1.226		0%	Stop		
Machine 1	192.168.79.125	DNC	99%		12m	\\7-PHAY HOC D2.NC

### 3.12 TOOL LENGTH MEASUREMENT SENSOR

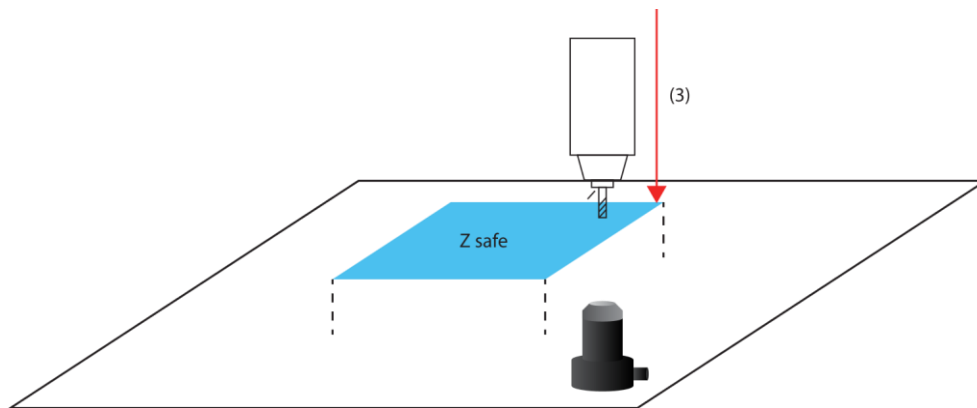


#### Stage 1:

When M100 is called the coolant system will be turned off, at this time, the Z axis, which is at a random position, will start to return to home position.

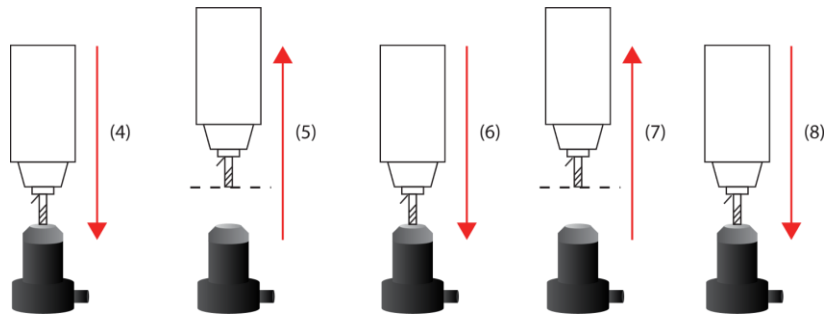
#### Stage2:

The controller will move X,Y axis and tool head to the measurement point were established in parameter (#14003 & #14004)



#### Stage 3:

At this time Z axis will quickly move to the safety position (Z safe) established in (#14005)



**Stage 4, 5:**

Z axis will move and touch to the sensor for the first time by the speed established in **#14007**.

After touch the sensor, Z axis will move up a distance established in **#14008**.

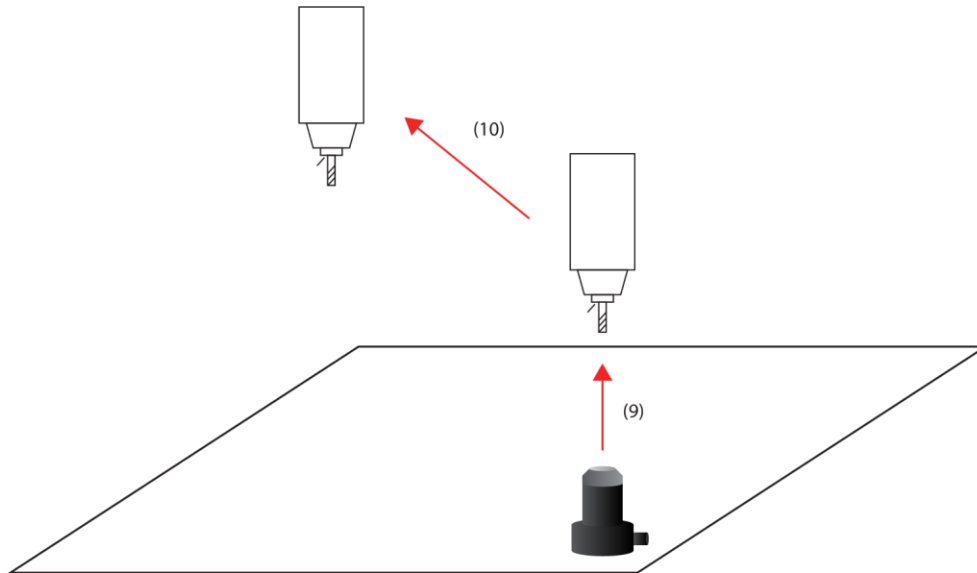
**Stage 6, 7:**

Z axis will move and touch to the sensor for the second time by the speed established in **#14009**.

After touch the sensor, Z axis will move up a distance established in **#14010**.

**Stage 8:**

Z axis will move and touch to the sensor for the third time by the speed established in **#14011**.



**Stage 9:**

After touch the sensor, Z axis will start to return to home position.

## Stage 10:

At this time the Macro will use the measurement values of the second and the third time to compare. If the both touch time have the deviation is higher than established value in **#14012**. The controller will announce an error and the value will not be set to the H Offset.

### Note:

At stage **(4, 5)**. In case Z axis moved the tool head to sensor touch position established in **#14006** but still not touch the sensor. Then the controller will announce an error.

- The issue is the travel limit of #14006 is not correct. The operators need to refer the value established in **#14006**

In case Z axis has raised the tool head by the value established in **#14008** but the probe signal still not disappear. Then the controller will announce an error.

- The issue is the distance to raise the tool head of Z axis is too small or the sensor is having the problem. The operators need to refer the value in **#14008** and the sensor.

At stage **(5, 6)**. In case Z axis moved the tool head to sensor touch position established in **#14006** but still not touch the sensor. Then the controller will announce an error.

- The issue is the travel limit of #14006 is not correct. The operators need to refer the value established in **#14010**

In case Z axis has raised the tool head by the value established in **#14010** but the probe signal still not disappear. Then the controller will announce an error.

- The issue is the distance to raise the tool head of Z axis is too small or the sensor is having the problem. The operators need to refer the value in **#14010** and the sensor.

At stage **(7)**. In case Z axis moved the tool head to sensor touch position established in **#14006** but still not touch the sensor. Then the controller will announce an error.

- The issue is the travel limit of #14006 is not correct. The operators need to refer the value established in **#14006**

At stage **(10)**

- **Case 1:** Call M100 command
  - o The average value will be set to Offset H correspond to the current tool in the spindle
  - o Ex: the current tool in the spindle is T5 then the average value will be set to Offset H5
- **Case 2:** Call M100Hxxx command
  - o The average value will be set to Offset H correspond to H called before
  - o Ex: Call M100H3 then the average value will be set to Offset H3

# CHAPTER 4.

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## PARAMETER INSTRUCTIONS



## 4.1 AXIS PARAMETER

Parameter	Description	Work range	Default
#0000 - #0007	Axis enable(AX.ENA)	0:Disable – 1:Enable	0
#0008 - #0015	Axis direction(AX.DIR)	0:Disable – 1:Enable	0
#0016 - #0023	Axis soft limit disable feature(AX.SODI)	0:Disable – 1:Enable	0
#0024 - #0031	Axis home direction(AX.HDR)	0: Forward – 1: Reverse	0
#0032 - #0039	Axis home offset(AX.HDRF)	0:Disable – 1:Enable	0
#0040 - #0047	Axis home fast(AX.HFAS)	0:Disable – 1:Enable	1
#0056 - #0063	MPG direction(MPG.DIR)	0: Forward – 1: Reverse	0
#0088 - #0095	Axis pulse logic(AX.PLG)	0: Low level – 1: High level	0
#0128 - #0135	Encoder direction(ENC.DIR)	0:Disable – 1:Enable	0
#4000	Motion corner velocity control model	0 – 5	0
#4001	Motion corner smooth max level	1 - 100	1
#4002	Motion corner smooth min level	1 - 100	1
#4003	Motion ARC refill buffer percent(%)	0 - 50	0
#4010 - #4017	Axis zero digit visible	0 - 99999	0
#4020 - #4027	Axis homing type	0: DOG on 1: DOG off 2: INDEX	0
#4030	Axis home search dog times	0 – 5	0
#4040 - #4047	Axis name	65 – 90	0
#4050 - #4057	Axis sensor type	0: NU type 1: ENC type 2: RULE type 3: ABS type	0
#4060 - #4067	Axis pulse out	0: Pul/Dir type 1: CW/CCW type 2: A/B type	0
#4070 - #4077	Axis backlash	0: Disable 1: Lin GW type 2: Box GW type	0
#4080 - #4087	Axis alarm sensor	0: Disable 1: NC type 2: NO type	0
#4140 - #4147	Axis type	0: Linear 1: Rotary 1 2: Rotary 2	0
#4150 - #4157	Axis encoder port	0: Disable 1: port 1 2: port 2 3: port 3 4: port 4 5: port 5 6: port 6	0
#4160 - #4167	Axis encoder multiply	0: X1 1: X2 2: X4	0
#8010	Init rapid override (%)		3
#8011	Init federate override (%)		5
#8013	Feedrate default (mm/min)		3000
#8080 - #8087	Axis position loop gain (1/sec)		0

#8090 - #8097	Axis dir signal delay (0.1us)	200
#8150, #8152 #8154	Radius minimum limit federate (um) (1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> )	1000/5000/10000
#8151, #8153 #8155	Radius maximum limit federate (um) (1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> )	1000/3000/6000
#8170, #8172 #8174	Segment length limit federate (um) (1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> )	500/2000/6000
#8171, #8173 #8175	Auto interpolation limit rate (mm/min)	2000/4000/6000
#8180 - #8187	Axis short segment acceleration (mm/s/s)	1000
#8190 - #8197	Axis G00 backlash time (ms)	50
#8200 - #8207	Axis G01 backlash time (ms)	50
#12000 - #12007	Axis pitch mount (BLU)	10000
#12010 - #12017	Axis pulse/mm (BLU)	1000
#12020 - #12027	Axis rapid travel acceleration (m/s/s) G00	1000
#12030 - #12037	Axis cutting acceleration (m/s/s) G01	500
#12040 - #12047	Axis max jog rapid (mm/min)	12000
#12050 - #12057	Max jog federate (mm/min)	6000
#12060 - #12067	Axis max auto rapid (mm/min)	12000
#12070 - #12077	Axis max auto federate (mm/min)	12000
#12080 - #12087	Axis loss pulse check window (BLU)	0
#12090 - #12097	Axis homing federate 1 <sup>st</sup> (mm/min)	2000
#12100 - #12107	Axis homing federate 2 <sup>nd</sup> (mm/min)	200
#12110 - #12117	Axis homing federate 3 <sup>rd</sup> (mm/min)	100
#12120 - #12127	Axis home offset (BLU)	0
#12130 - #12137	Axis MPG acceleration (mm/s/s)	1000
#12140 - #12147	Axis MPG max speed (mm/min)	8000
#12150 - #12157	Axis backlash G00 (BLU)	0
#12160 - #12167	Axis backlash G01 (BLU)	0
#12200 - #12207	Axis negative coordinate of stroke limit 1 <sup>st</sup> (BLU)	0
#12210 - #12217	Axis positive coordinate of stroke limit 1 <sup>st</sup> (BLU)	0
#12220 - #12227	Axis negative coordinate of stroke limit 2 <sup>nd</sup> (BLU)	0
#12230 - #12237	Axis positive coordinate of stroke 2 <sup>nd</sup> (BLU)	0
#12240 - #12247	Axis negative coordinate of stroke limit 3 <sup>rd</sup> (BLU)	0
#12250 - #12257	Axis positive coordinate of stroke 3 <sup>rd</sup> (BLU)	0
#12260 - #12267	Axis negative coordinate of stroke 4 <sup>th</sup> (BLU)	0
#12270 - #12277	Axis positive coordinate of stroke 4 <sup>th</sup> (BLU)	0
#12280 - #12287	Axis reference point 2 <sup>nd</sup> (BLU)	0
#12290 - #12297	Axis reference point 3 <sup>rd</sup> (BLU)	0
#12300 - #12307	Axis reference point 4 <sup>th</sup> (BLU)	0
#12310 - #12317	Axis reference point 5 <sup>th</sup> (BLU)	0
#12320 - #12327	Axis reference point 6 <sup>th</sup> (BLU)	0
#12330 - #12337	Axis jogging acceleration (mm/s/s)	1000
#12340 - #12347	Axis gear (Motor side)	1
#12350 - #12357	Axis gear (Screw side)	1
#12360 - #12367	Axis encoder pulse/round	0



## 4.2 SPINDLE PARAMETER

Parameter	Description	Work range	Default
#0104	RES.CODE	0: Default S.code 1: Last S.code	0
#0120 - #0123	Spindle direction (SPI.DIR)	0: Forward – 1: Reverse	0
#4090 - #4093	Spindle mode	0: Disable 1: 0→10V 2: 0→±10V	0
#8020	Init spindle override (%)	0 → 10	5 (= 50%)
#8030, #8032 #8034, #8036	Spindle(1) – Gear (1,2,3,4) (Motor side)	0 – 999999	1
#8031, #8033 #8035, #8037	Spindle(1) – Gear (1,2,3,4) (Screw side)	0 – 999999	1
#8040, #8042 #8044, #8046	Spindle(2) – Gear (1,2,3,4) (Motor side)	0 – 999999	1
#8041, #8043 #8045, #8047	Spindle(2) – Gear (1,2,3,4) (Screw side)	0 – 999999	1
#8050, #8052 #8054, #8056	Spindle(3) – Gear (1,2,3,4) (Motor side)	0 – 999999	1
#8051, #8053 #8055, #8057	Spindle(3) – Gear (1,2,3,4) (Screw side)	0 – 999999	1
#8060, #8062 #8064, #8066	Spindle(4) – Gear (1,2,3,4) (Motor side)	0 – 999999	1
#8061, #8063 #8065, #8067	Spindle(4) – Gear (1,2,3,4) (Screw side)	0 – 999999	1
#8070 - #8073	Spindle (1,2,3,4) float gear motor speed (rpm)	0 – 999999	1
#12170 - #12173	Spindle (1,2,3,4) min speed (rpm)	0 – 999999	10
#12175 - #12178	Spindle (1,2,3,4) max speed (rpm)	0 – 999999	24000
#12180 - #12183	Spindle (1,2,3,4) motor gain analog mode (rpm/volt)	0 – 999999	1
#12185 - #12188	Spindle (1,2,3,4) init speed (rpm)	0 – 999999	1
#12190 - #12193	Spindle (1,2,3,4) acceleration (ms)	0 – 999999	5000
#12195 - #12198	Spindle (1,2,3,4) deceleration (ms)	0 – 999999	5000
#12370 - #12373	Spindle (1,2,3,4) max frequency pulse mode	0 – 999999	200

### 4.3 GENERAL PARAMETER

Parameter	Description	Work range	Default
#0064	G54 default (G54.DEF)	0: Disable – 1: Enable	0
#0065	All position clear (POS.CLR)	0: Forward – 1: Reverse	0
#0066	G04 assignment: X(s) – P(ms). (G04.X/P)	0: G04 X 1: G04 P	0
#0072	MTAD.PRO (Available on touch controller)	0: Disable – 1: Enable	0
#0073	MTAD.CRE (Available on touch controller)	0: Disable – 1: Enable	0
#0074	MTAD.MDI (Available on touch controller)	0: Disable – 1: Enable	0
#0080	JOG.ACC	0: Run by cutting speed 1: Run by jog acceleration	1
#0081	CON.FEED		0
#0096	3DP.EAX		0
#0097	NC.CUT	0: Disable – 1: Enable	0
#0098	3DL.FEED		0
#0112	G99/G98	0: Enable G99 & Disable G98 1: Enable G98 & Disable G99	0
#0136	OPK.DISA (Not available on F54 controller)	0: Disable – 1: Enable	0
#4130	Backup battery	0: Disable – 1: Enable	1
#4131	Reset battery alarm	0: Disable – 1: Enable	0
#4132	Touch panel type (Available on touch controller)		
#4133	LCD panel type (Available on touch controller)		
#4134	Touch panel (Available on touch controller)		
#4135	Speaker	0: Disable – 1: Enable	1
#4136	LCD sleep (min)		15
#4137	Wi-Fi function	0: Disable – 1: Enable	0

### 4.4 USER PARAMETER

Parameter	Description	Work range	Default
#2000 - #2079	User defined 16 bit register		0
#10000 - #10049	User defined 16 bit register		0
#14000 - #14049	User defined 32 bit register		0

### 4.5 MACRO PARAMETER

Parameter	Description	Work range	Default
#0048	T.Macro	0: Disable – 1: Enable	0
#0049	Macro.M98	0: Disable – 1: Enable	0
#8110 - #8129	M Macro ID	0 – 999 (0: Disable)	0
#8130 - #8149	G Macro ID	0 – 999 (0: Disable)	0