End Profile Grinding Machine

Operation Manual

Machine Serial No. 202403-06

Rush Machinery, Inc.
4761 Route 364
Rushville, NY 14544 USA

Tel: 800-929-3070 (Toll Free - USA & Canada)
or +1 585-554-3070
Fax: +1 585-554-4077

Email: mail@rushmachinery.com
Website: www.rushmachinery.com

Contents

1 MACHINE DIMENSIONAL.....5

2. INSTALLATION.....6

2.1 BASE.....6
2.2 ENVIRONMENTAL.....6
2.3 SPECIFICATION.....6
2.4 MOVEMENT / STORAGE.....6

3. SAFETY.....7

3.1 DANGEROUS AREA.....7
3.2 OPERATING SAFETY.....7
3.3 SAFETY EQUIPMENT.....7
3.4 NOISE.....7
3.5 WORKING AREA.....7
3.6 QUALIFIED OPERATOR.....8
3.7 PERSONAL PROTECTED EQUIPMENT.....8
3.8 INSTALLED PLACE OF SAFETY MEASURE.....8
3.9 SAFETY DEVICE.....8
3.10 SAFETY MARK.....8
3.11 NAME PLATE.....9
3.12 EMERGENCY.....9

4. MAIN COMPONENTS.....10

4.1 HMI CONTROL PANEL AND BUTTON.....10
4.2 MAIN INSTRUCTION.....11
4.3 CYLINDER LAYOUT.....12
4.4 AIR PRESSURE UNIT.....13
4.5 WHEEL LAYOUT.....14
4.6 ELECTRIC LUBRICATOR AND OIL CYCLE.....15

5. PROCESSING.....16

5.1 EXCHANGE PRODUCTION LINE.....17
5.1-1 Adjust the “Bar Explosed Length.....17
5.1-2 Set the “Positioning Position”.....19
5.2 WHEEL SETTING.....21

6. PROGRAM PAGES.....22

6.1 MAIN PAGE.....22
6.2 POSITION PARAMETER.....23

6.3 PROCESSING PARAMETER 24
6.3-1 Pre-Point 25
6.3-2 Chamfer Angle / R Angle 27
6.3-3 Endface Dressing 29
6.3-4 Profile 30
6.3-5 R Angle 31
6.4 PROCESS MODE 32
6.5 PROCESSING 32
6.6 MACHINE PARAMETER 33
6.7 POSITION DISTANCE 34
6.8 I0 PAGE 35

7. ALARM / WARN /EXTEND PARAMETER 37

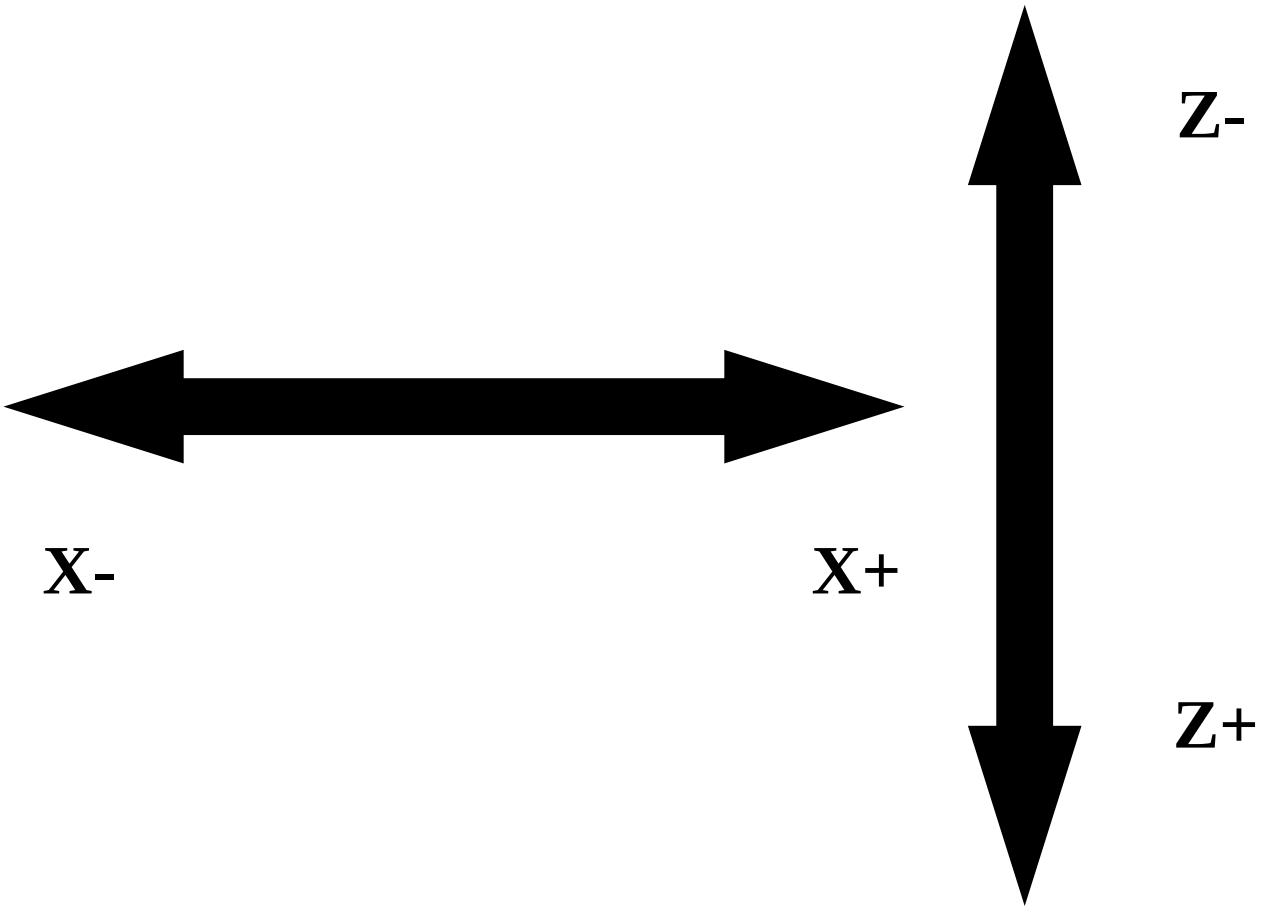
7.1 ALARM 37
7.2 WARN 39
7.3 EXTEND PARAMETER 39

8. ELECTRICAL BOX 40

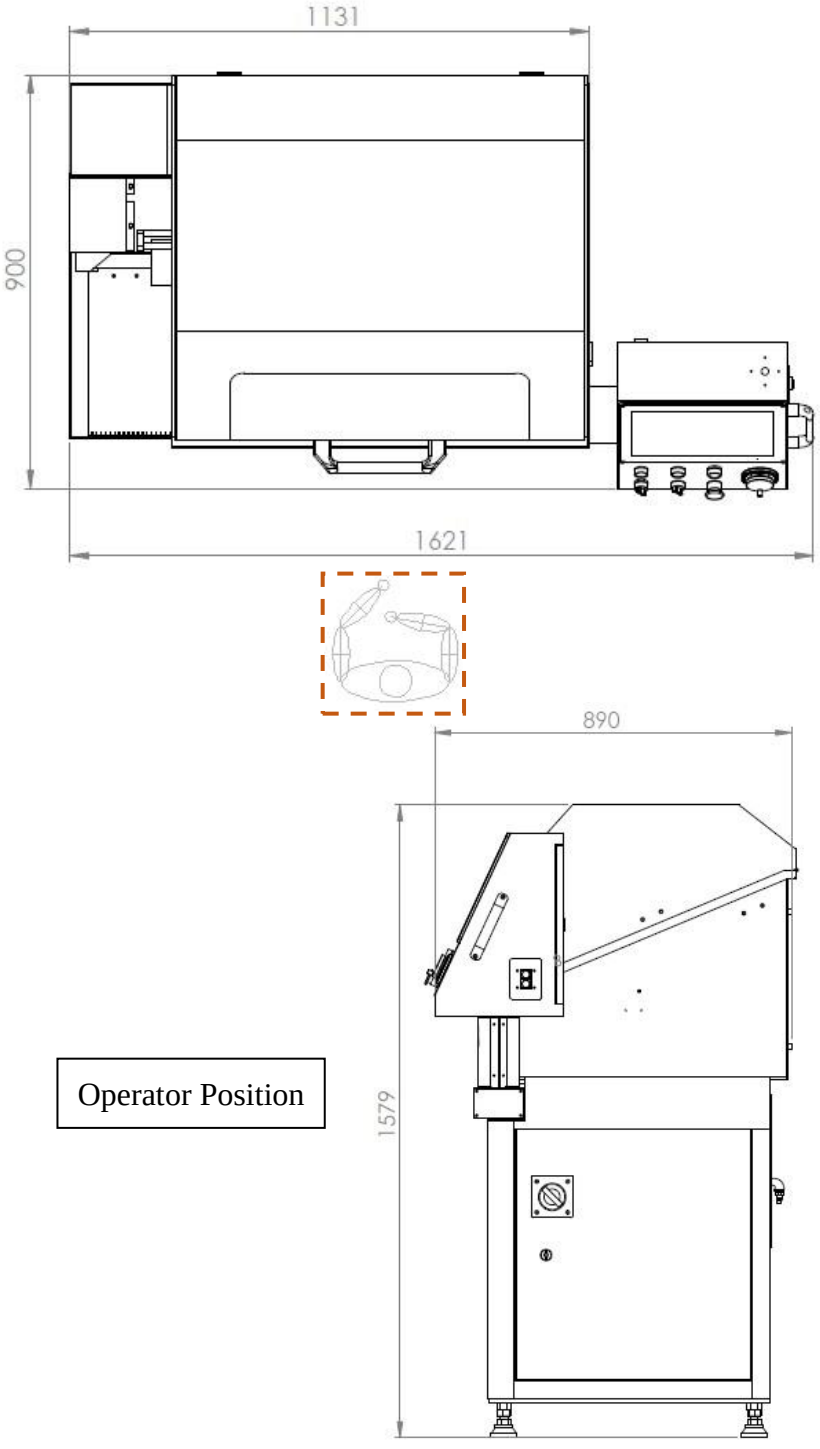
9. ELECTRICAL DRAWING 41

Product Descriptions

Definition of Axis



1 Machine Dimensional



Note：Dimensional excluded extra items of coolant tank and dust collector.

2. Installation

2.1 Base

PP-001 must be stable installed on flat ground and fixed.

2.2 Environmental

Table 3.1 Environmental Situations

Highest humidity	70%
Room Temperature	18~22°C
Dust	Environment must be kept with cleanness equivalent to a clean room
Vibration	Shocks from strong vibrations may impact machine function and life
Electromagnetic field	Strong electromagnetic field (EMF) may interfere machine instructions

2.3 Specification

Table 3.2 Specification

Aera	Europe	China	Taiwan
Input voltage	3Ø 400V AC	3Ø 380V AC	3Ø 220V AC
Frequency	50 Hz	50 Hz	60 Hz
Power consumption	3.5KW	3.5KW	3.5KW
Current	17A	17A	17A
Breaker capacity	20A	20A	20A
Wire size	2mm²	2mm²	2mm²
Pneumatic requirement			
Rated pressure	6.0 bar		
Humidity	Compressed air must be dried		
Compressed air cleanness	Compressed air must be filtered		
Compressed air consumption	50 L/min		
Other information			
Machine Dimensions	(L)1620mm*(W)900mm*(H)1580mm		
Machine weight	600 Kg		

2.4 Movement / Storage

*When machine is being moved, do not fall down or shake the machine and be aware of the center of gravity position.

*Use crane to move the machine.

*The minimum loading for crane is 1000kg.

*Observe the space while moving the machine.

*Center of the machine is on center of left side

3. Safety

3.1 Dangerous Area

PP-001 provides safety device in order to protect operator.
Error and abused operate the machine would cause below risk:
Operator would be affected life and body got hurt.
Damage the machine or other property.
Effected the machine efficiency.
****The operator does every operation and maintaining must have:
Qualification
Read every operated instruct

3.2 Operating Safety

Any machine changed without permission is forbidden. It would affect the machine and human safety.
Every operation、service and maintaining are mentioned on this manual must be strictly observed.

3.3 Safety Equipment

Safety device operation on CMPG can't be affected by extra installation.
Emergency button must be touchable.

3.4 Noise

The noise of PP-001 on operating is under 70dB(A)。(Excluded option exhaust equipment.)
Noise value is based on ISO 7960

Value determination is according to ISO 3746 inspected regulations.
This reference graph is emission grade, which is not the requirement of safety working grade. When specifying the grade and exposed grade and have the relationship, do not use this table to judge it, it should be in addition another safety measure.
The real effective of exposure level factor is included continue noise period. (The quantity of machine in working area.)
The exposure grade is according each country's rule; this information would make a better dangerous evaluation to the operator.

3.5 Working Area

Working area is in front of machine and able to see HMI interface

 **When machine is running, do not stand or lean against the machine or electric box.**

3.6 Qualified Operator

*Only qualified operator can operate the PP-001.

*The operated responsibility must be specified and restricted clearly. It would cause risk if it's not clearly understood the operation to PP-001.

*User responsibility:

Assigned a person in charge of PP-001.

Make sure the operator, who is in charge, read operated manual carefully and understand how to use PP-001.

3.7 Personal Protected Equipment

When machine is running or open the safety door, please do wear safety goggles to prevent from practical or small parts shooting out and harm the eyes.

3.8 Installed Place of Safety Measure

PP-001 must be stably placed on flat ground.

**Note:

It must be always clear and opened space at working area.

3.9 Safety Device

SRCC stop operated by below switches.

- Emergency Stop
- Main Power

Check Internal Machine

- Restart to turn on the machine. (Interrupt the operation)
- After each maintaining or repairing.

3.10 Safety Mark

*All the safety warning signs indicate correct and safety operation.

*All the safety sign on the machine is to indicate that might have high risk operation or position.

*Do not remove the safety sign on the machine.

*All the safety warning sign is stocked in proper place on the machine.

*Make sure all signs clearly, if any lose or broken, it must be made up immediately



Danger



Electric Shock

3.11 Name Plate



3.12 Emergency

Emergency Switch: Press “Emergency Stop” when any emergency condition happening.

All the functions and operations will be stopped immediately when press the emergency switch or safety function started.



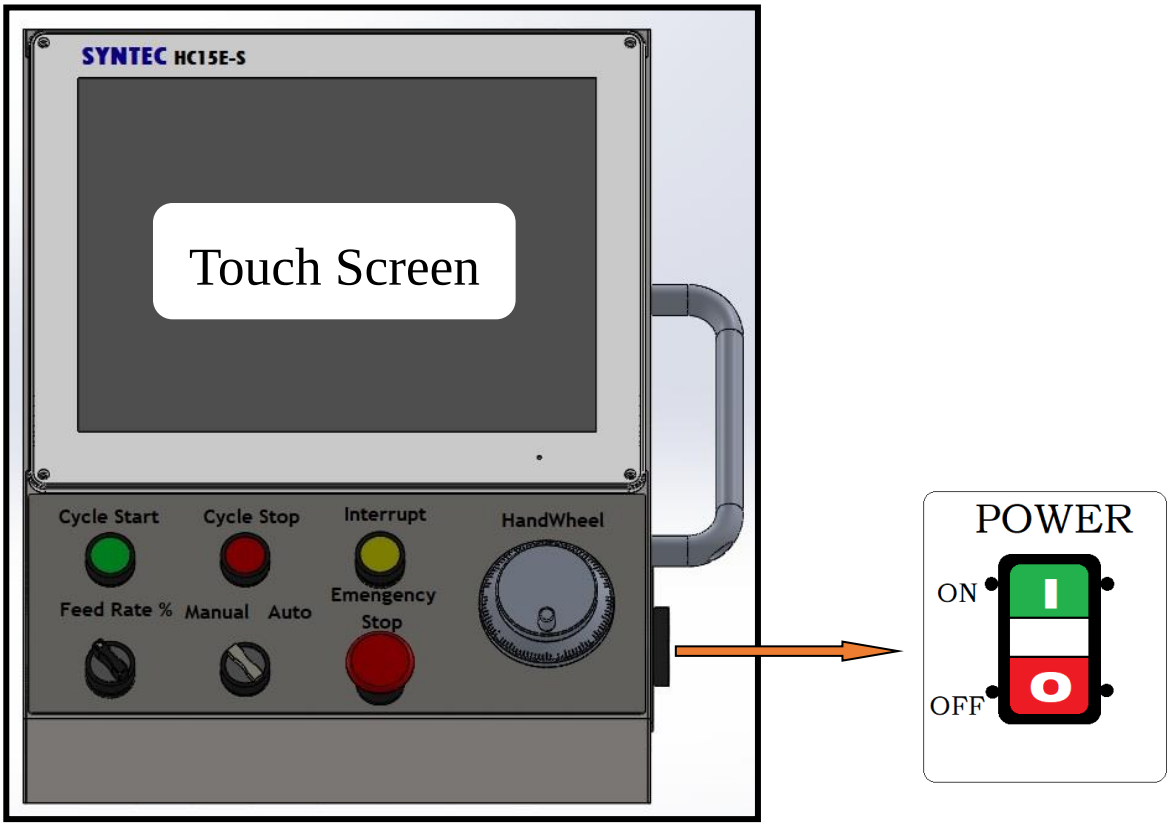
Emengency Stop

4. Main Components

4.1 HMI Control Panel and Button

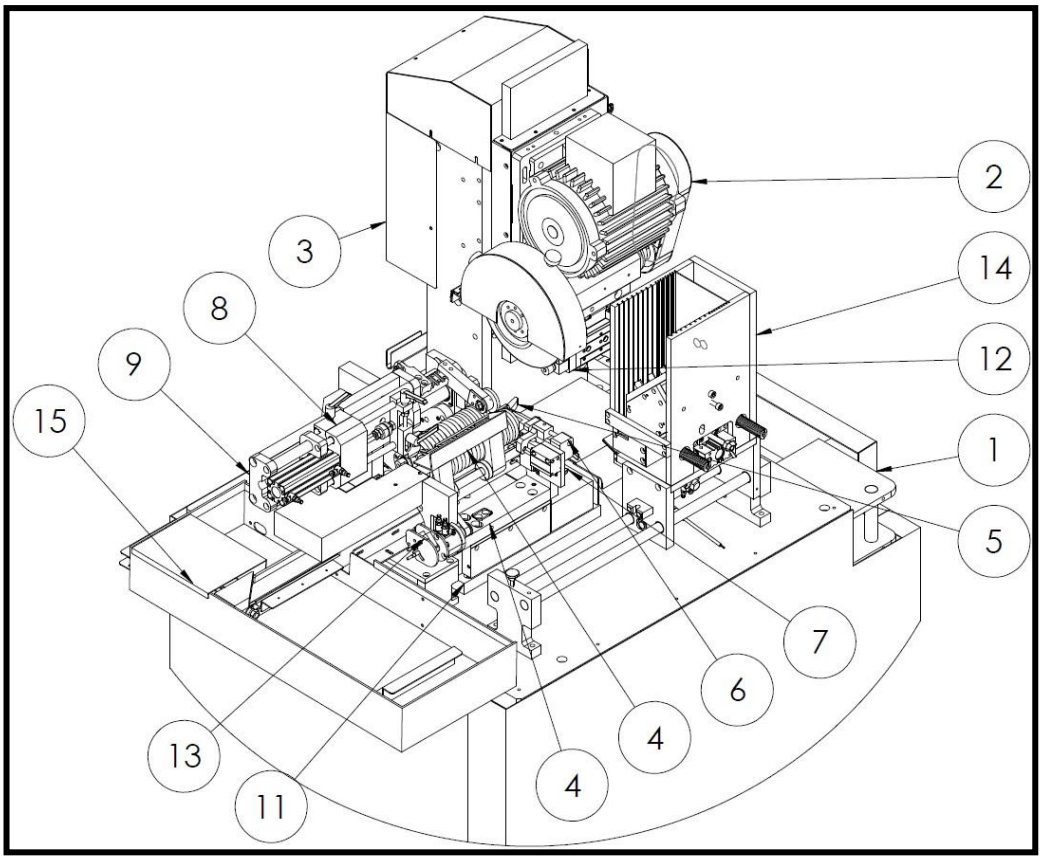
*HMI is touchable of human machine interface, which connected between operator and PP-001. Also, it can be used the finger or blunt plastics item to touch it.

*HMI interface is to process the parameter changing of grinding producer and driving each actuator in single action or auto/single process.



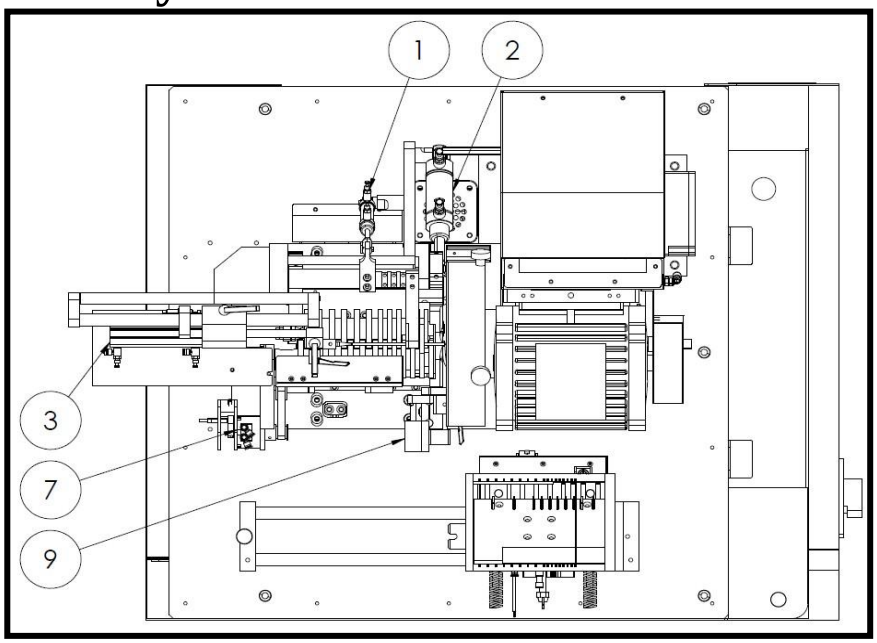
1. Power：Power ON/OFF
2. Cycle Start：Start Processing
3. Cycle Stop：During Processing, press this button, the process will be stopped after currently process is done.
4. Interrupt (Reset)：After turning on the machine, press this button to release the alarm. During the processing, release the alarm message.
5. Feed Rate %：Process speed. (0~150%)
6. Manual / Auto：Change to manual or auto mode.
7. Emengency Stop：Emengency stop
8. HandWheel：To move X axis or Z axis by handwheel.

4.2 Main Instruction

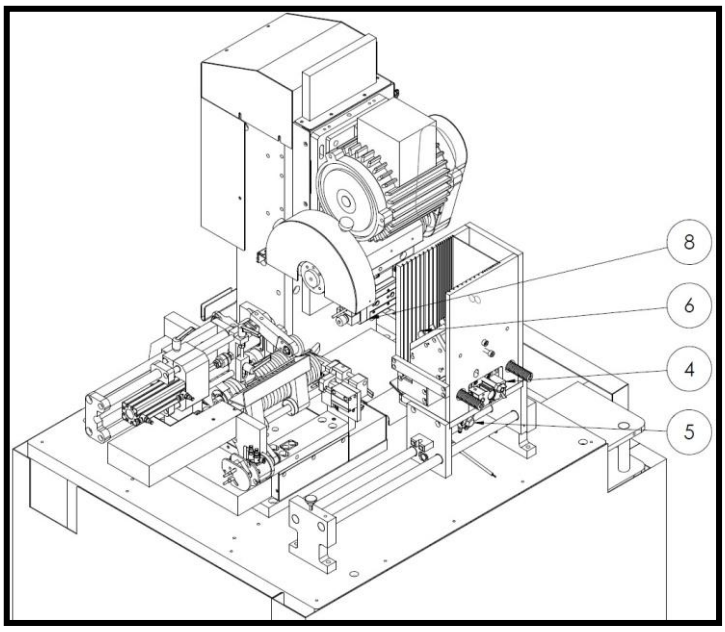


No.	Item	No.	Item
1	Based	9	Pusher components. (Fixed)
2	Wheel belt components	10	X axis components. (Slide Board)
3	Wheel fixed components	11	X axis components.
4	Roller components	12	Front probe components.
5	Front stop components	13	Loading arm components.
6	Supporter components (Movable)	14	Loading Box components.
7	Supporter components (Fixed)	15	Unloading components.
8	Pusher components. (Movable)		

4.3 Cylinder Layout



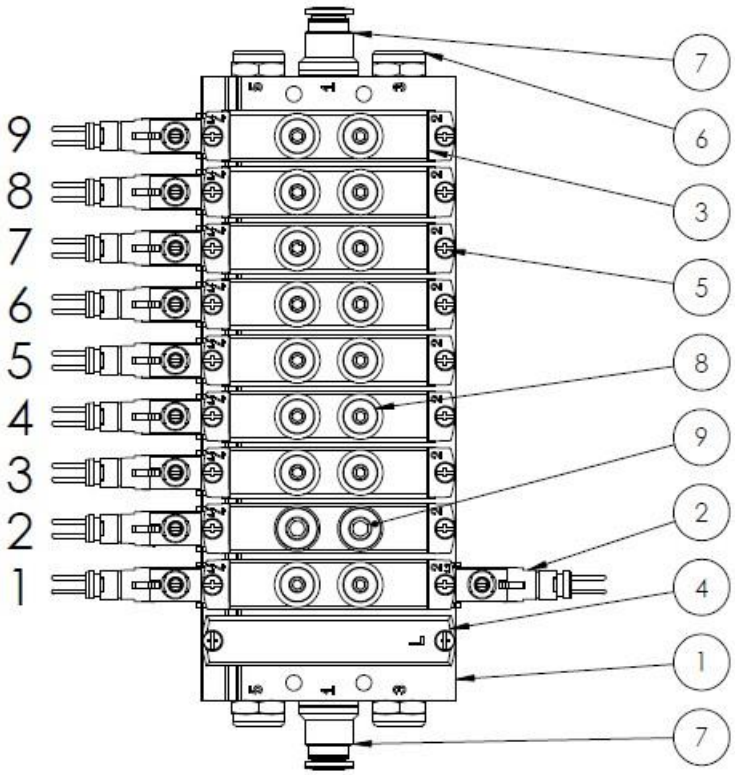




No.	Item	No.	Item
1.	Pressed Cylinder - MCMB-11-20-25-E	2.	Roller Cylinder - YS-MCMA-11-32-25
3.	Pusher Cylinder - MCJQ-11-20-75M	4.	Feeding Cylinder - MCGB-03-16-25
5.	Loading Cylinder - MCJQ-11-16-15M	6.	Stir Cylinder - MCJQ-12-25-10
7.	Rotating Cylinder - CRB2BW20-270S	8.	Positioning Cylinder - MXS12-50BS-M9BL
9.	Supporter Cylinder - MCFB-12-16-20M		

4.4 Air Pressure Unit

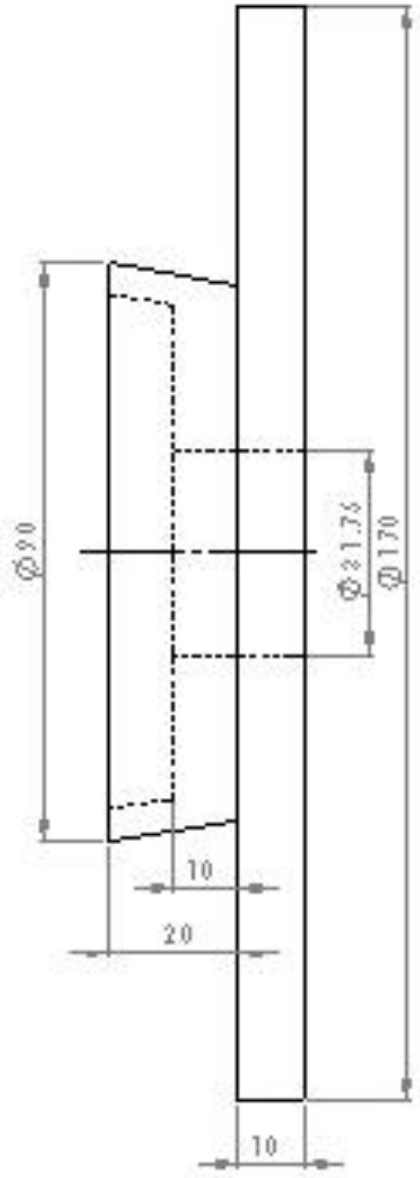
Outer air pressure supply should over 6 bars, PP-001 of air regulator pressure set is 5 bars.
Air pressure detected is set 4.5 bars.

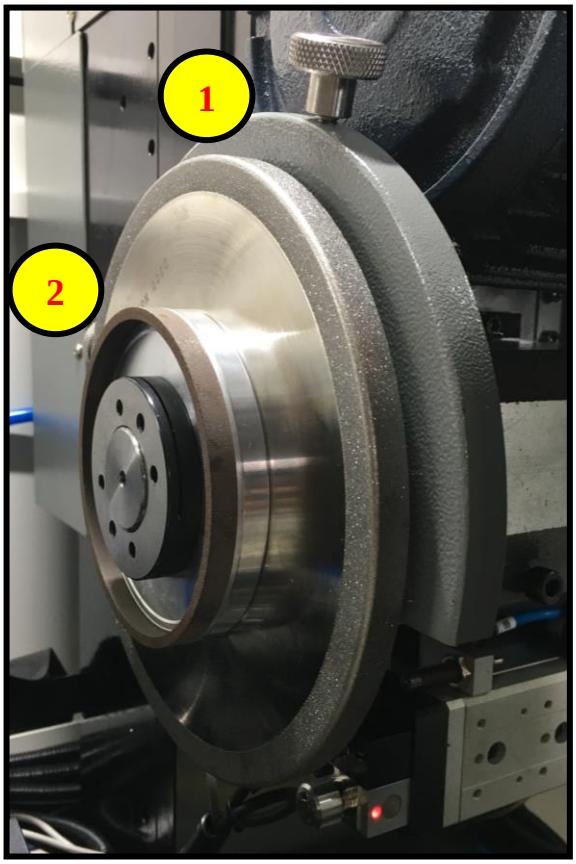


No	Definition	Connection	Mode Number	Q'ty
1	Pressure Cylinder (Up)(1B)	Y10	566626_VABM-L1-14S-G14-10	1
1	Pressure Cylinder (Down)(1A)	Y11	577962_VUVG-L14-P53E-T-G18-1H2L-W1	1
2	Roller Cylinder (UP)(2B)	Y12	576256 VUVG-L14-M52	8
3	Pusher Cylinder (Back)(3B)	Y13	569989_VABB-L1-14	1
4	Feeding Cylinder (Back)(4B)	Y14	566675_VABD-L1-14X-S-G18	10
5	Loading Cylinder (UP)(5B)	Y15	1206623_AMTE-M-H-G14	4
6	Stir Cylinder (OFF)(6B)	Y16	186110_QS-G1_4-8-I	2
7	Rotating Cylinder (UP)(7B)	Y17	186106_QS-G1_8-4-I	16
8	Positioning Cylinder (Back)(8B)	Y18	186107_QS-G1_8-6-I	2
9	Supporter Cylinder (Back)(9B)	Y19	566626_VABM-L1-14S-G14-10	1

Tube Diameter：Ø4

4.5 Wheel Layout





Wheel- 1：Max. Diameter 205mm
Min. Diameter 170mm
Wheel Width 5~15mm

Wheel- 2：Max. Diameter 125mm
Min. Diameter 90mm
Wheel Width 15~20mm

※The minimin difference between those 2 wheels of diameter should be **80mm** as a safety distance.

※When using those 2 wheels to grind, the grinding length isn't allowed to over the **wheel total width**.

4.6 Electric Lubricator and Oil Cycle

Electric lubricator

Electric lubricator is on when machine is on (power on)

When lubricating oil is under lower limited, machine will alarm the warning.

Oil box capacity: 4 L

Oil pressure: MAX 7 bar

Lubricating time: Min 4 SEC(up LED value，unit: Sec)

Break time: Max. 50 min (down LED value，unit: Min)

Oil Type：R68

Operating instruction:

Oil pressure: the rotary screw on front side of lubricating device can adjust oil pressure (collocate oil button), oil pressure is working when doing lubricating. The pressure of break time is set 0 to provide the oil, which means when break time button is pressured, then lubricating device will be working.

Set/Start: This is the function of setting lubricating / break time. 1st time pressing this button to change the parameter, 2nd time pressing is to finish the setting and start provide the oil. While setting, the LED value can be adjusted by pressing adjusting button. (0→ 9 cycle), also, changing value, the LED will be blinked. Lubricating time can be set 0~999 sec. Break time can be set 0~999 min.

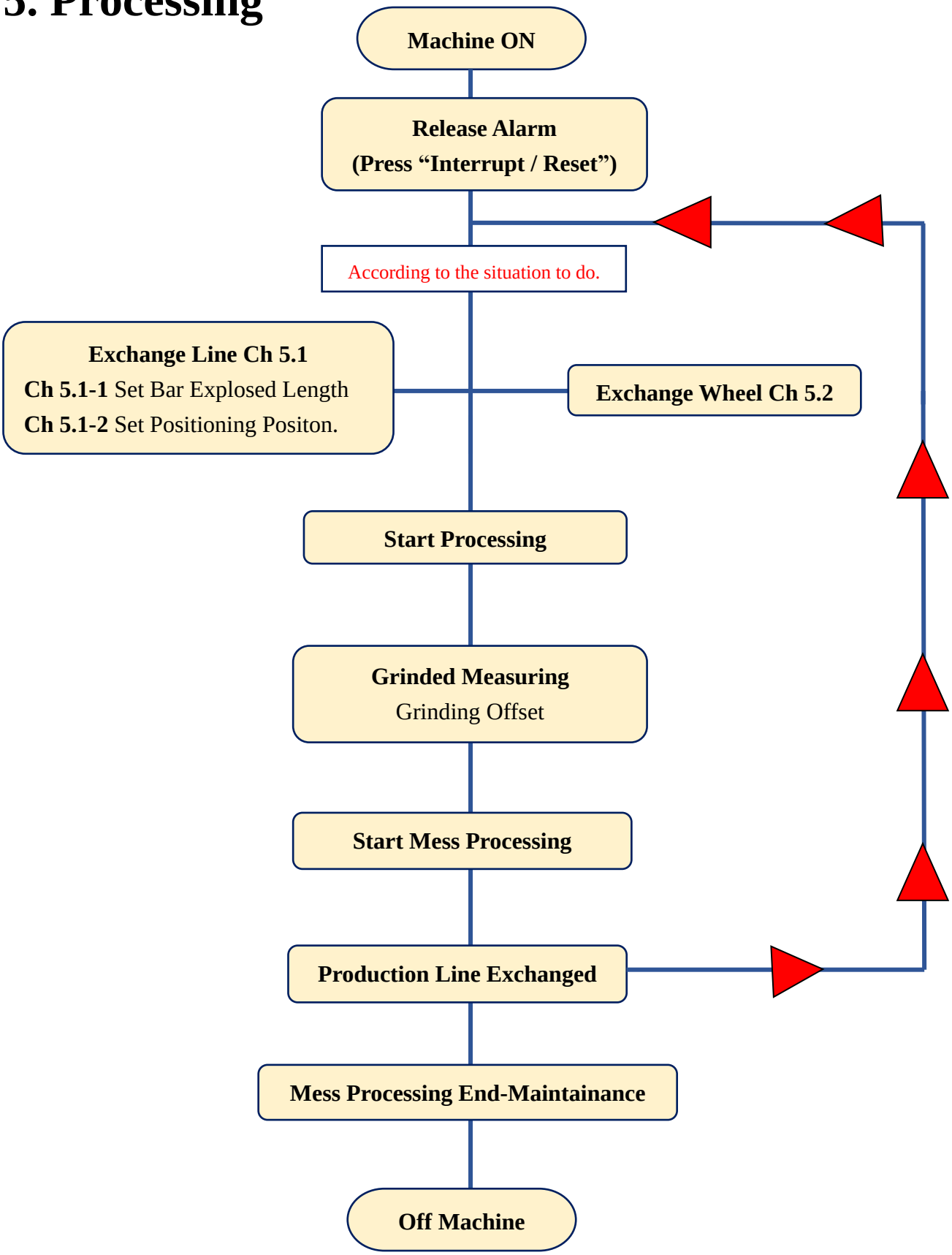
Oil cycle tank

Everyday needs to release the oil on the tank to prevent from oil overflow and contaminate the ground.

To observe oil cycle condition to check the lubricating device and pipes are normal.



5. Processing



5.1 Exchange Production Line

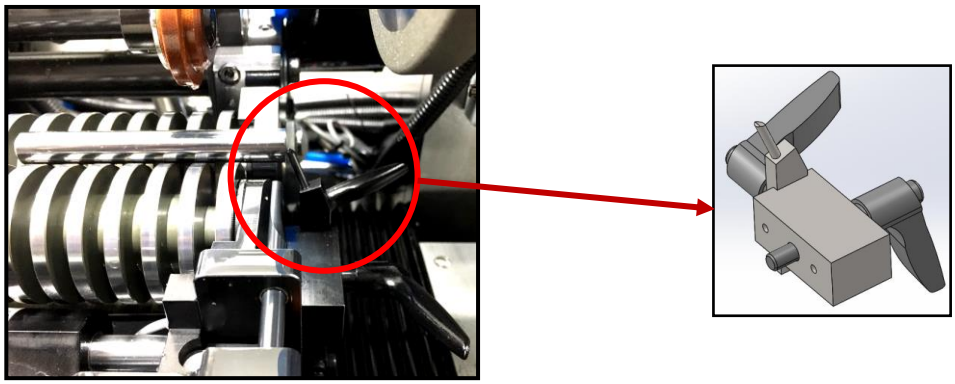
1. Jump to setting page.



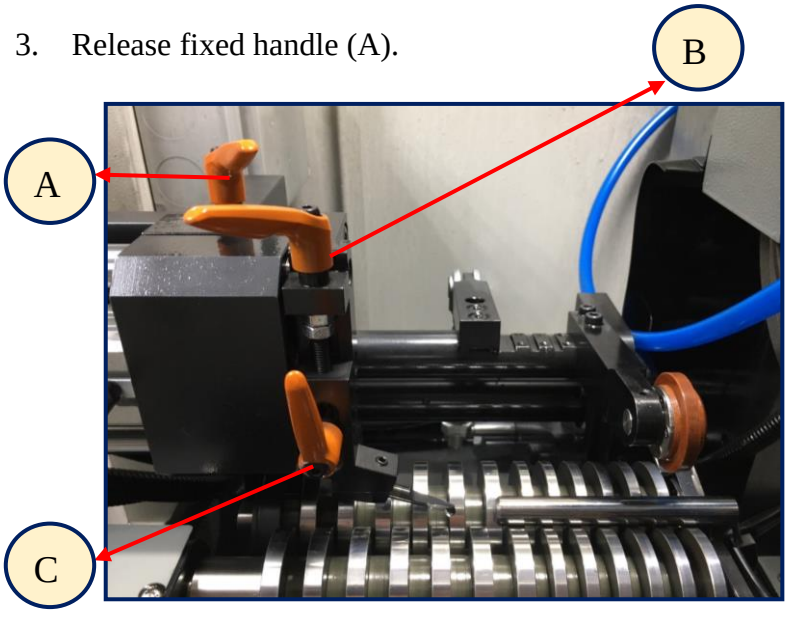
2. Adjust the **“Bar explosed length”. (CH 5.1-1)**
3. Setting bar diameter.
4. Setting the **“Positioning position”. (CH 5.1-2)**
5. Setting processing parameter.
6. Start processing grinding.

5.1-1 Adjust the “Bar Explosed Length

1. Put a bar and enter the bar diameter.
2. Assembled the “Front Stopper”.

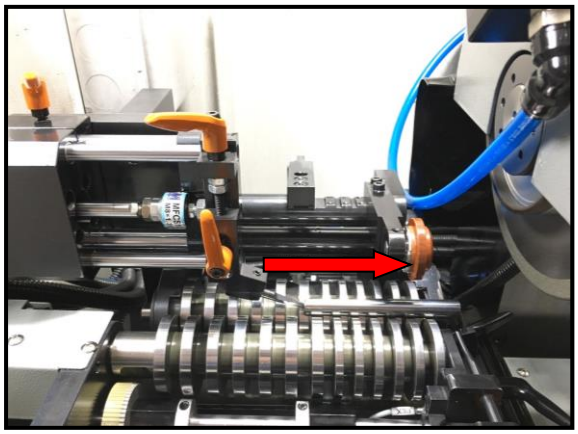


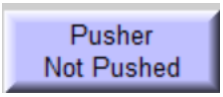
3. Release fixed handle (A).



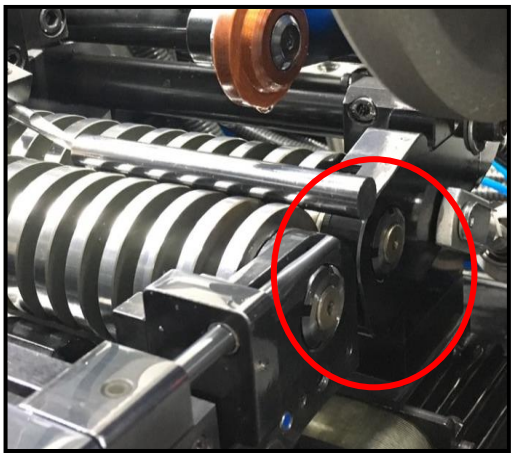
A. Pusher positon fixed handle.
B. Pusher rod level adjusting handle.
C. Pusher rod level adjusting fixed handle.

4. “Position Parameter” page press “Push” to let the pusher go forward and hold the bar forward.

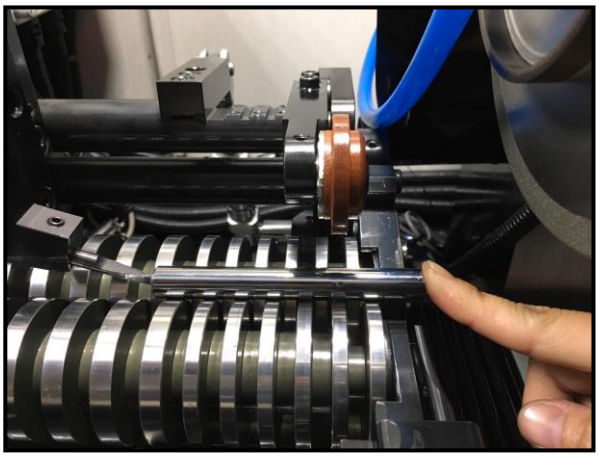


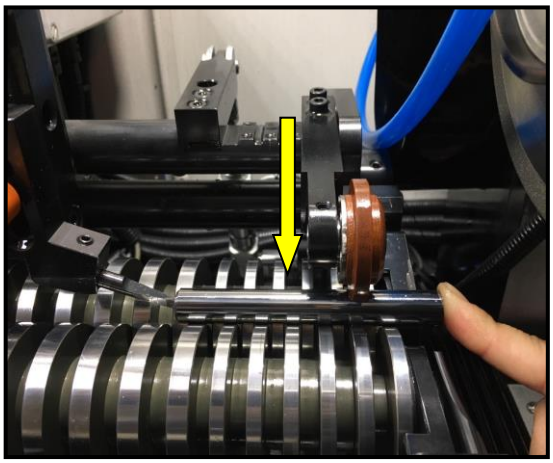


5. Disassembled the “Front Stopper”.



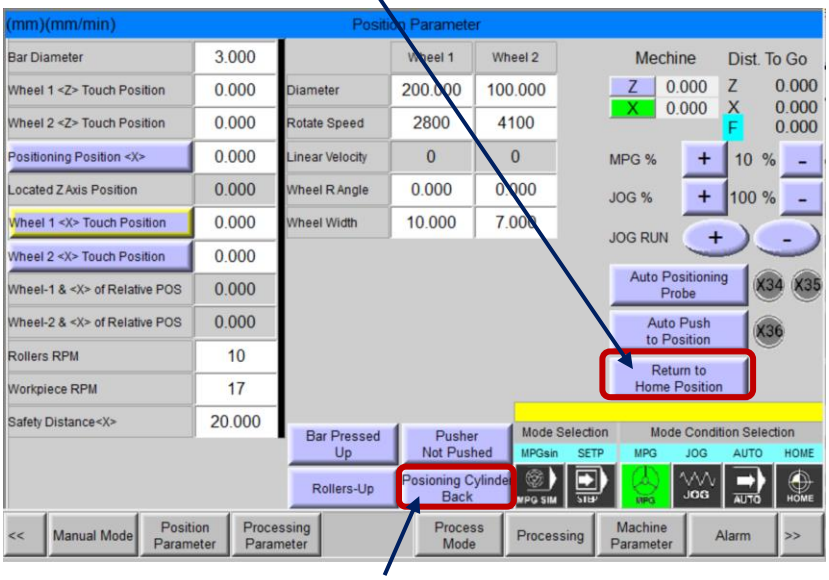
6. Using hand to hold the bar and let the pressed roller down to the bar, off the hand away the bar.



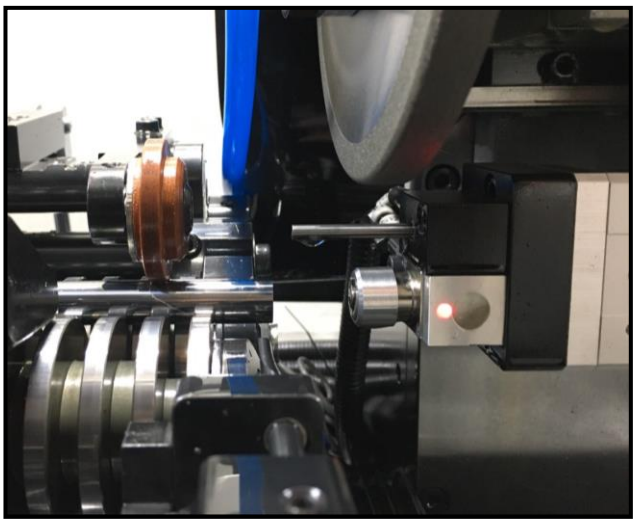


5.1-2 Set the “Positioning Position”

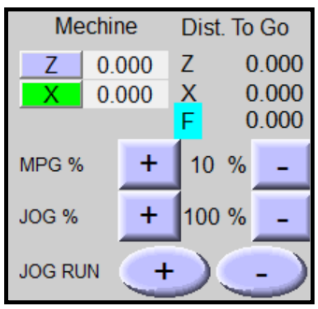
1. Press “Return to Home Position” button on the position parameter page.



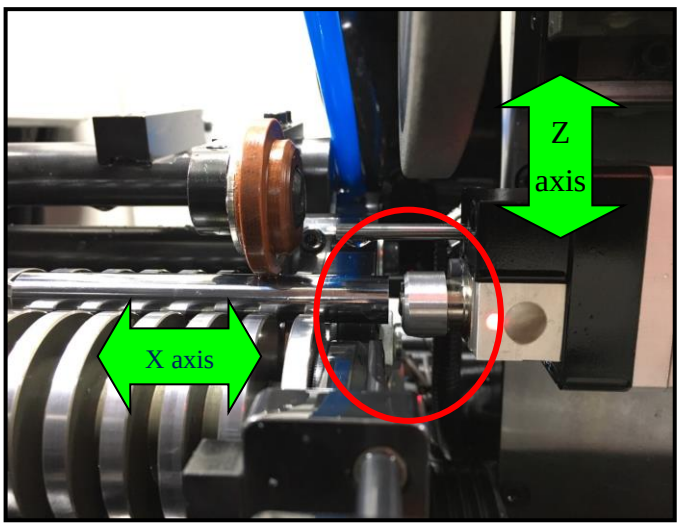
2. Press “Posioning Cylinder Out” the let the cylinder extended.



3. By using handwheel to adjust the position of Z and X axis, let the “Front Probe” to close the bar.

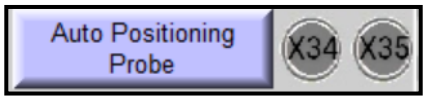


*Green light means moveing direction is selected.

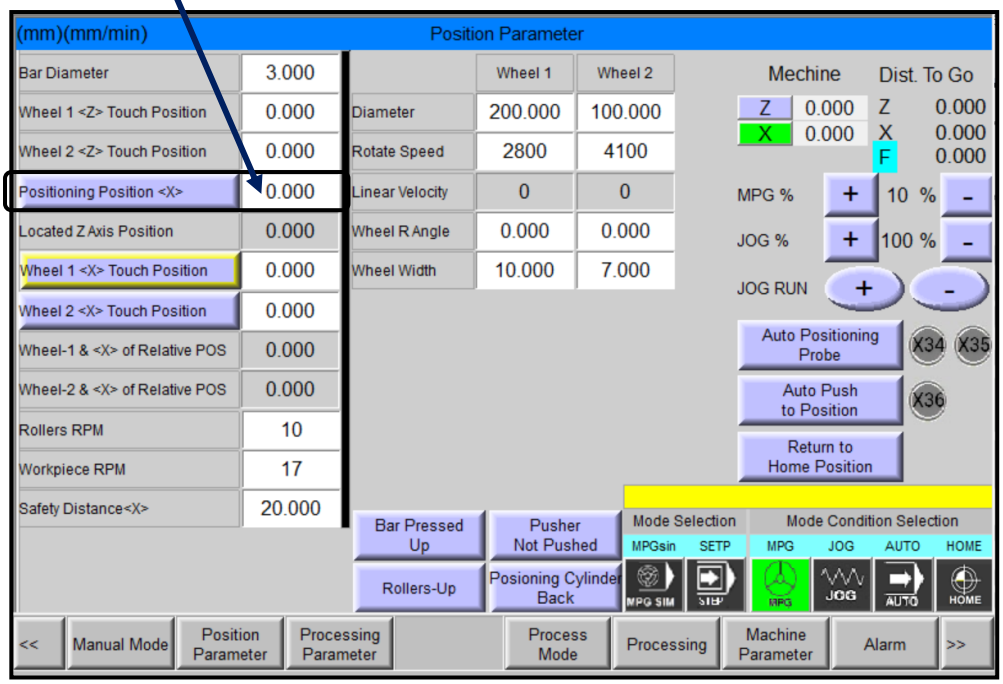


4. Press “Auto Positioning Probe” button to start the cylinder.

(Observe if the sensor has 2 times flashing light during touching the bar.)

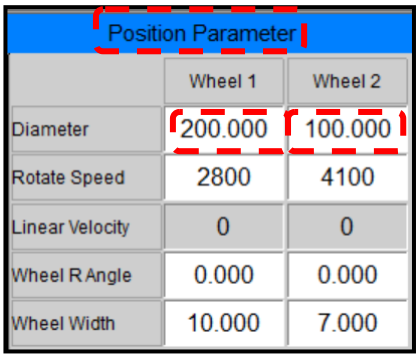


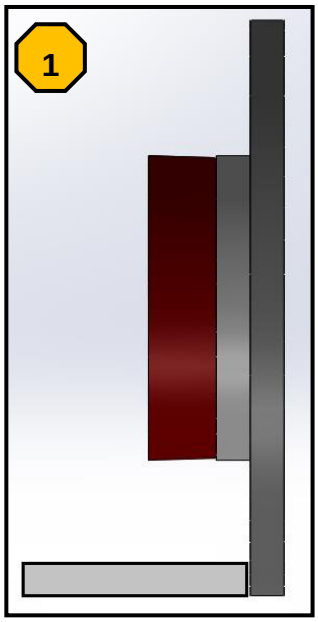
5. After doing probe is done, the positioning postion is entered automatically.



5.2 Wheel Setting.

1. Enter the diameter of wheel 1 and wheel 2. (Page：Position Parameter)



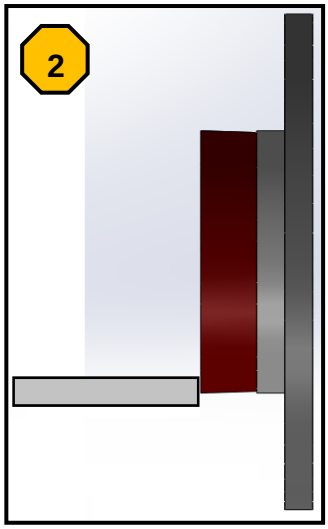


2. Adjust the “Bar Explosed Length” (CH5.1-1)
3. Setting the “Positioning Position” (CH5.1-2)
4. Setting the X touching Position for wheel 1.
   4.1 Let the wheel 1 move close to the bar until the wheel is touched the bar slightly. (Dwg.1)
   4.2 After the bar, press “Wheel 1 <X> Touch Positon” button, the numbers will be entered automatically.



5. Setting the X touching Position for wheel 2.
   5.1 Let the wheel 1 move close to the bar until the wheel is touched the bar slightly. (Dwg.2)
   5.2 After the bar, press “Wheel 1 <X> Touch Positon” button, the numbers will be entered automatically.





6. Set the wheel speed.
7. Set the wheel width.
8. Set the wheel R angle.

6. Program Pages

6.1 Main Page



1 2 3 4 5 6 7 8 9

Page 1

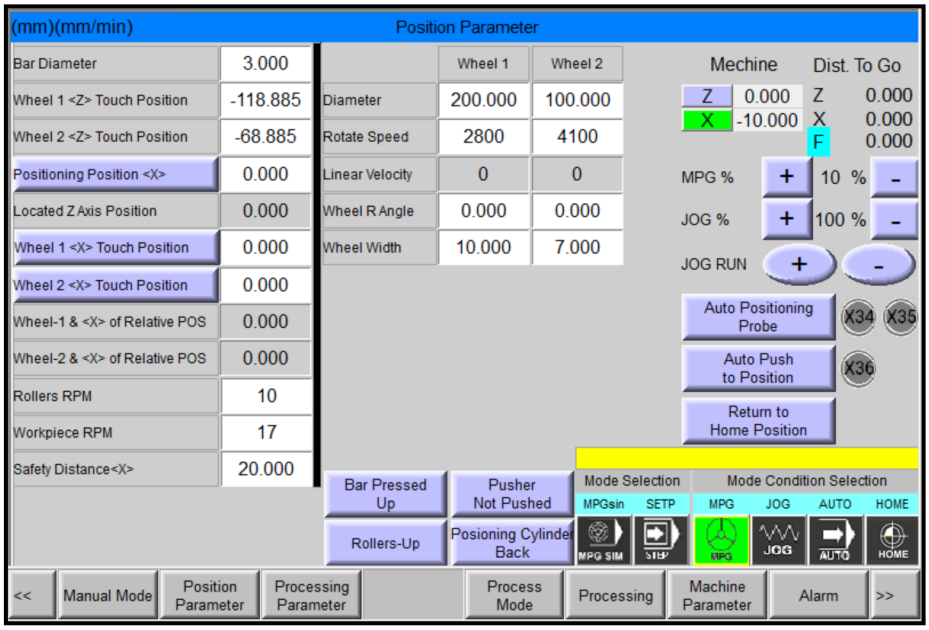


10 11 12 13 14 15

Page 2

No.	Button Name	No.	Button Name
1.	Pervious Page	9.	Next Page
2.	Manual Mode	10.	Pervious Page
3.	Position Parameter	11.	Axis Module (System Page)
4.	Processing Parameter	12.	Electronic Module (System Page)
5.	Process Mode	13.	Position Distance
6.	Processing	14.	IO
7.	Machine Parameter	15.	Set Abs Home (System Page)
8.	Alarm		

6.2 Position Parameter

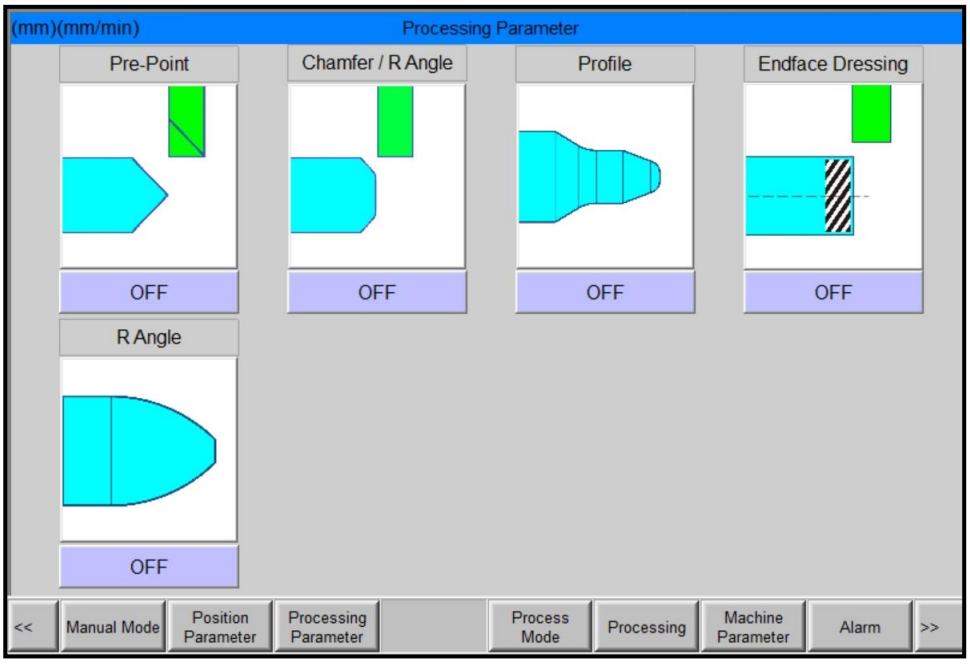


1. **Bar Diameter**：Enter the bar diameter.
2. **Wheel 1 <Z> Touch Position**：Enter the bar diameter, the touch position of wheel 1 and Z axis direction will be calculated automatically. (Manual offset is available.)
3. **Wheel 2 <Z> Touch Position**：Enter the bar diameter, the touch position of wheel 2 and Z axis direction will be calculated automatically. (Manual offset is available.)
4. **Positioning Position**：To confirm where the touch position is when the probe sensor is touched the bar endface.
   *The button is available to use when probe sensor is off (I34) to touch the bar.
5. **Located Z axis Position**：The positioning postion is entered, the Z axis level will be recorded.
6. **Wheel 1<X> Touch Position**：The touch position of wheel 1 and sideface of bar. (Refer to 5-2)
7. **Wheel 2<X> Touch Position**：The touch position of wheel 2 and sideface of bar. (Refer to 5-2)
8. **Wheel 1<X> of Relative POS**：Display the wheel 1 and located distance. (Program calculated.)
9. **Wheel 2<X> of Relative POS**：Display the wheel 2 and located distance. (Program calculated.)
10. **Rollers RPM**：Enter the rollers' RPM.
11. **Workpiece RPM**：Enter the workpiece's RPM.
12. **Safety Distance**：Enter the distance of bar's endface to interfered position.

※Wheel Parameter <Wheel 1><Wheel 2> (Refer to 5-2)

1. **Diameter**：Enter the wheel diameter.
2. **Rotate Speed**：Enter the wheel processing speed.
3. **Linear Speed**：Display the wheel limited speed.
4. **Wheel R Angle**：Enter the left side of wheel's R angle.
5. **Wheel Width**：Enter the wheel available width.

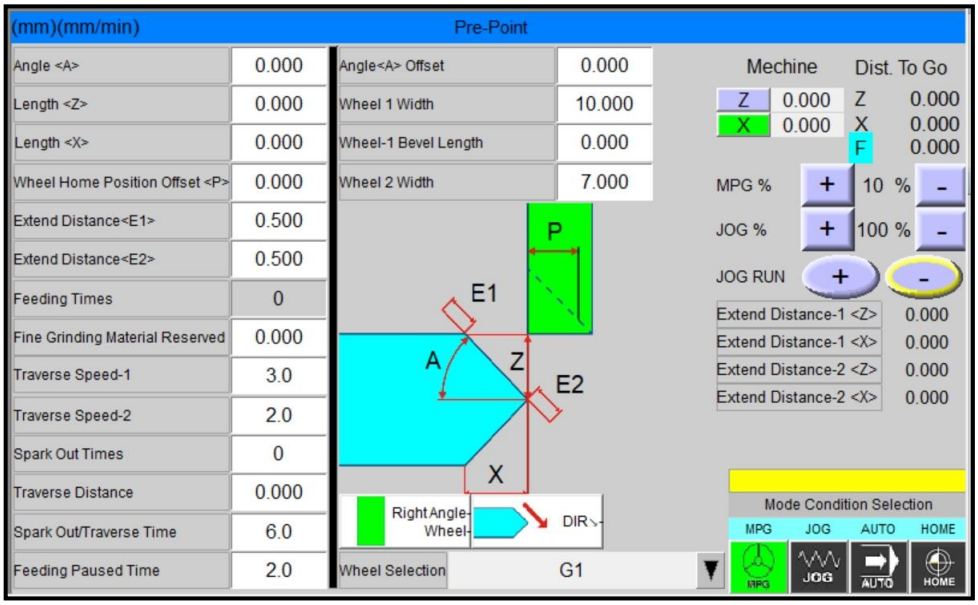
6.3 Processing Parameter



*To set each parameter by enter each function.

*After setting each function’s parameter, press “ON” or “OFF” to select the function.

6.3-1 Pre-Point



*If select endface, the grinding position is “Positioning position”, and auto move to set length as a start grinding position.

1. **Angle <A>**：Set requested angle. (single side of angle) (Range：1°~89°)

2. **Length <Z>**：Set Z axis length, when set the angle, length will be entered helf diameter automatically；When set X length, Z length will be automatically entered. (Range：0~20)

3. **Length <X>**：Set X axis length, when set angle or Z length, X length will be entered automatically. (Range：0~30)

4. **Extend Distance <E1>**：Set extended start grinding position. (Range：0~5)

5. **Extend Distance <E2>**：Set extended finished grinding position. (Range：0~5)

6. **Wheel Home Position Offset <P>**：When using shape wheel, to set the wheel start grinding positon.
   (This parameter is not available for right angle wheel.)
   (Max. value can’t over bevel length of wheel 1. / Range：0.1~ Wheel 1 bevel length.)

7. **Feeding Times**：Total feeding times, set pre-poing grinding cycle times. (Average the feeding amount.)
   *Set Angle、Z Length、X Length、Wheel Width, the program will set cycle times accordingly,operator is’t necessary to change it.
   *When using shape wheel, if the wheel width is over grinding total X length, the feeding times only can be set “1”, the range is different according to processing condition. Max. value is 100.

8. **Fine Grinding Material Reserved**：Feeding time is over 2, to preserved the material is from the second to last.
(If the feeing times is 1, this parameter is't available.) (Range：0~2)

9. **Traverse Speed-1**：Feeding times is over 2, the speed is from start to second times to the last. (Range：0.1~1000)

10. **Traverse Speed-2**：Last grinding time's speed. (Range：0.1~1000)

11. **Spark Out Times**：After finishing grinding, spark out times. (Range：0~10)

12. **Traverse Distance**：The last traverse of feeding when using shape wheel.
*If use shape wheel, the max. distance is 30mm.
*When select shape wheel or set the processing parameter, the "Traverse distance" will be automatically set "Wheel Home Position Offset <P>", it's able to reset, the max. value is 30mm. (Range：0~30)

13. **Spark out/Traverse Speed**：After grinding finished, spark time speed.
*Shape wheel：after grinding, the traverse speed.
*If use 2 wheels to grind, it means traverse speed for Fine wheel. (Range：0.1~1000)

14. **Pause Time**：Available for shape wheel. (Right angle wheel is not available. (Range：0~10)

15. **Wheel 1 Width**：Righg Angle Wheel-set available total width.
Shape Wheel- Set wheel bevel of X width.
(Range：1~30)

16. **Wheel 1 Bevel Length**：Enter wheel 1 <X> length, if the value is over "Wheel Home Position Offset <P>, the program will change the value same as "Wheel Home Position Offset". (Range：0.01~Wheel 1 Width)

17. **Wheel 2 Width**：Set the wheel available total width. (Range：0.1~30)

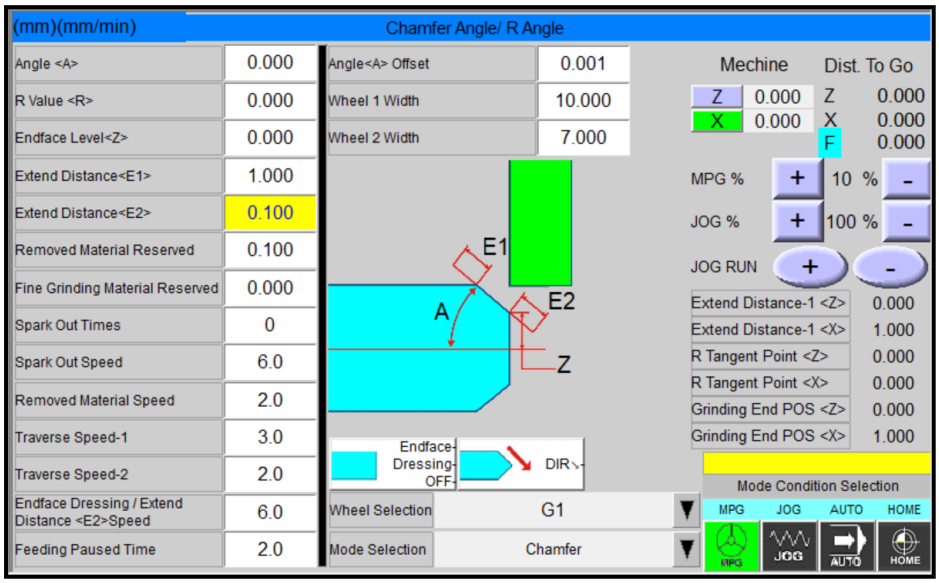
18. **Wheel Shape Selection**：Right angle wheel and shape wheel are available.

19. **Route Direction Select**：It can be selected from up to down or down to up.
*Shape wheel only available from up to down.

20. **Wheel Selection**：Select which wheel to use.



6.3-2 Chamfer Angle / R Angle



1. **Angle <A>**：Enter the angle.
   *If angle is zero, the program only process R angle processing.
   *If both angle and R angle are zero, this function will be off automatically.

2. **R Angle <R>**：Enter R angle.
   *If Rangle is zero, the program only process angle processing.
   *If both angle and R angle are zero, this function will be off automatically.

3. **Endface Level <Z>**：Enter the helf level after endface length deduct the angle or R angle.
   *If set zero, the process will only for pre-point or full R angle.
   *If set zero, the endface dressing function will be off too.

4. **Extend Distance <E1>**：Enter the extend position of start grinding position.
   *This value can't be over wheel width.

5. **Extend Distance <E2>**：Enter the extend position of finishing grinding position.
   *Grinding direction from down to up, when grinding to endface, X axis will be backward to Extend distance <2>.

6. **Removed Material Reserved**：Apply for when the grinding length is over wheel width.
   *If the grinding length is less the wheel width, this value isn't available.
   *Actual reserved amount=Removed Material Reserved + Fine GrindingMaterial Reserved.
   * Removed Material Reserved + Fine GrindingMaterial Reserved can't over buffer distance.

7. **Fine Grinding Material Reserved**：When using 2 wheels to grind, the rest grinding amount for Fine wheel.
   *Removed Material Reserved + Fine GrindingMaterial Reserved can't over buffer distance.
   *Fine Grinding Material reserved is Z length.
   *If X length needs to be reverved, go to offset the wheel of X position.

8. **Spark Out Times**：Fine grinding finished, no feeding repeat times.。
   *Spark out only for angle and R angle, endface is not available.

9. **Spark Out Speed**：The spark out speed.

10. **Removed Material Speed**：Speed.

11. **Traverse Speed-1**：The last traverse speeds. (If fine grinding is available.)
    *2 wheels-for rough grinding wheel's traverse speed.

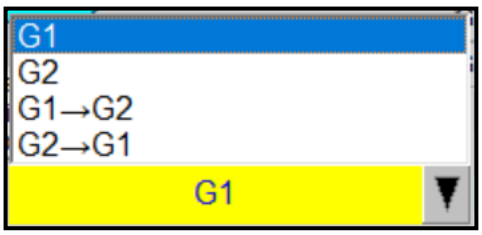
12. **Traverse Speed -2**：After removed material grinding, traverse speed.
    (If fine grinding isn't available.)
    *2 wheels-for fine grinding wheel's traverse speed.

13. **Endface / Extend Distance <E2> Speed**：The speeds of vertical face、endface and extend distance <E2>.

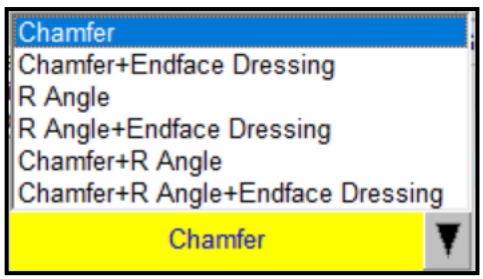
14. **Feeding Pause Time**：Each feeding of pause time.

15. **Endface**：If endface function is selected, process the endface after traverse movement.
    *Endface Level <Z> =0 Not available.
    *Single wheel to reserve the fine grinding amount, rough grinding is not available to do endface process.
    *2 wheels-both fine and rough grinding do endface dressing.
    *Spark out isn't available processed the endface dressing.

16. **Wheel Selection**：Select which wheel to use.

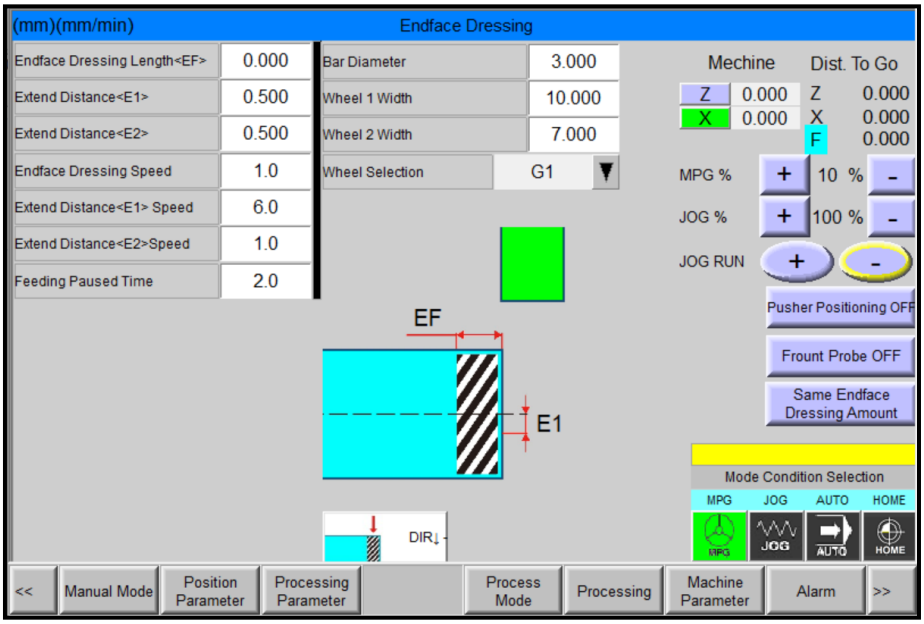


17. **Process selection**：Select which process mode.



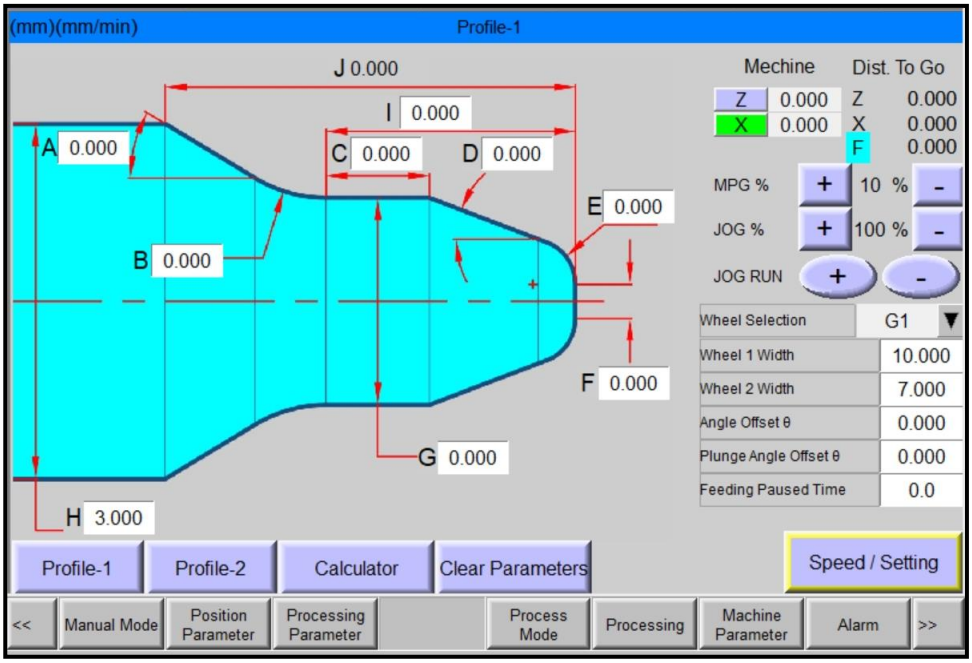
*The cells of parameter are available according to mode selection, the cells which is not available will be zero automatically.

6.3-3 Endface Dressing

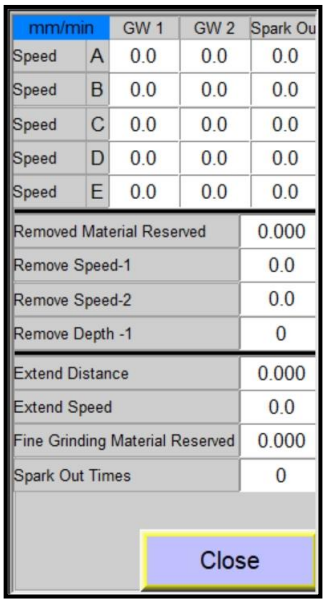


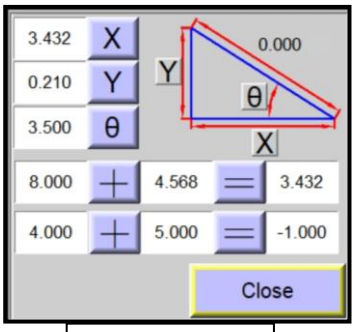
1. **Endface Dressing Length <EF>**：Set endface dressing length.
2. **Extend Distance <E1>**：Set the wheel over bar center distance.
3. **Extend Distance <E2>**：Set extend distance with slow speed.
4. **Endface Dressing Speed**：Set the speed.
5. **Extend Distance <E1> Speed**：From up to down, over dressing speed.
6. **Extend Distance <E2> Speed**：Set E2 speed.
7. **Feeding Pause Time**：After endface dressing, the pause time before the wheel go backward.
8. **Pusher Positioning ON/OFF**：ON/OFF the pusher positioning function.
9. **Frount Probe ON/OFF**：ON/OFF the frount probe function.
   *Frount Probe function is ON, Pusher Positoning must be ON.
10. **Same Endface Dressing Amount**：The dressing length is the same everytime.
11. **Same Endface Dressing Position**：Set a bar as a standard position for dressing length, program will change the E2 extend distance to let every bar's length all the same after dressing.
    * Frount Probe function must be ON.
    *If the bar is shorter than standard bar, the program will jump alarm.
    (The length is shorter than buffer distance.)

6.3-4 Profile

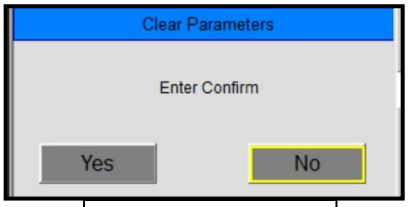


1. **Wheel Selection**：Select grinding wheel.
2. **Wheel 1 Width**：Setting the width for wheel 1.
3. **Wheel 2 Width**：Setting the width for wheel 2.
4. **Angle Offset**：Setting the angle offset.
5. **Plunge Angle Offset**：Offset the plung angle.
6. **Feeding Paused Time**：Setting the paused time after feeding.
7. **Profile-2**：Display the parameter setting.
8. **Calculator**：To calculate the parameter.
9. **Clear Parameter**：To clear all the parameters setting.
10. **Speed/Setting**：Setting each parameter according to each step.



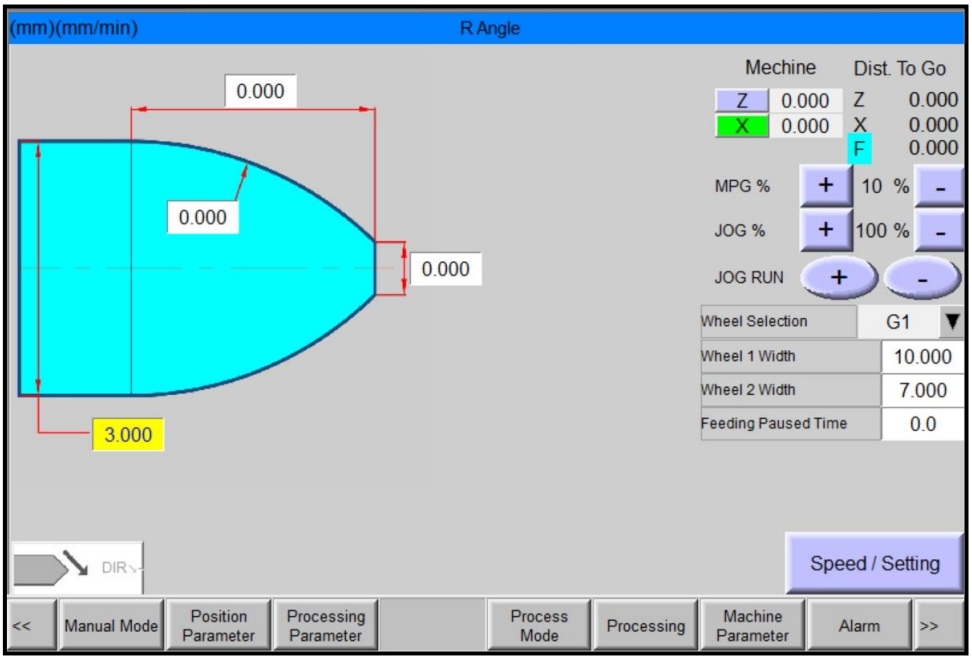


Calculator

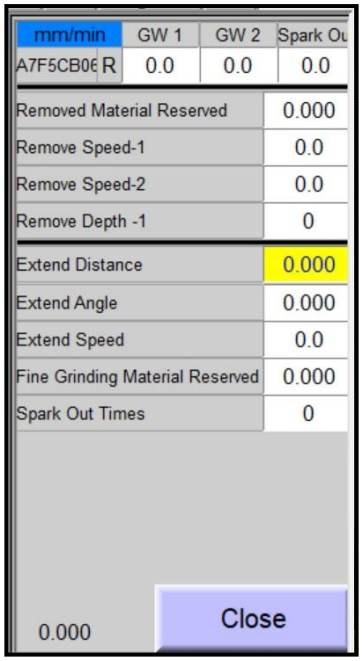


Clear Parameter

6.3-5 R Angle



1. **Wheel Selection**：Select grinding wheel.
2. **Wheel 1 Width**：Setting the width for wheel 1.
3. **Wheel 2 Width**：Setting the width for wheel 2.
4. **Feeding Paused Time**：Setting the paused time after feeding.
5. **Speed/Setting**：Setting each parameter according to each step.



6.4 Process Mode



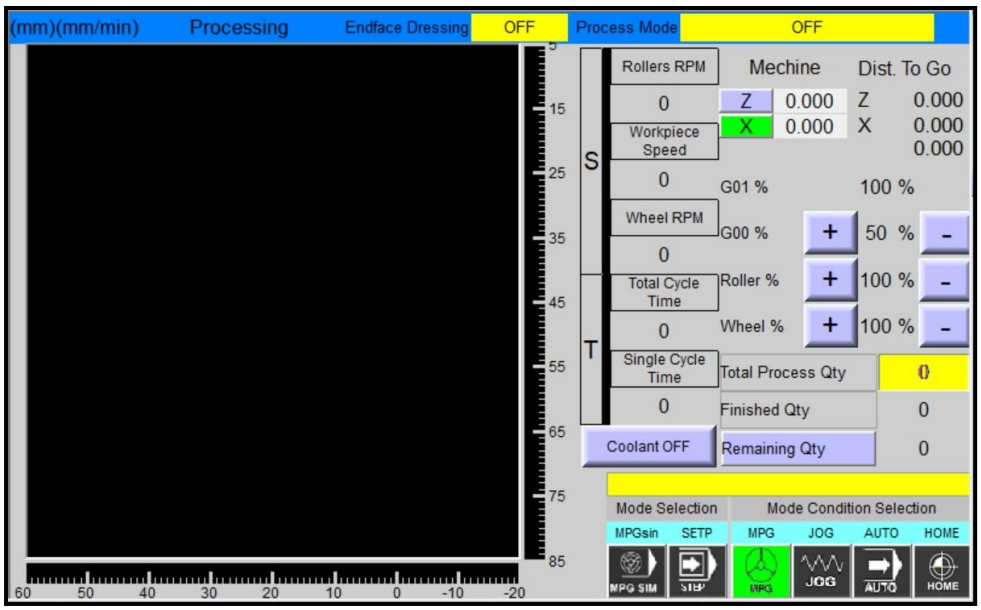
*Wheel Offset：According to measureing result to do wheel offset.

	Z	X	R
Wheel-1 Offsec	0.000	0.000	0.000
Wheel- 2 Offsec	0.000	0.000	0.000

*This page is for displaying each position, which calculated by program.

*Each function and function selection.

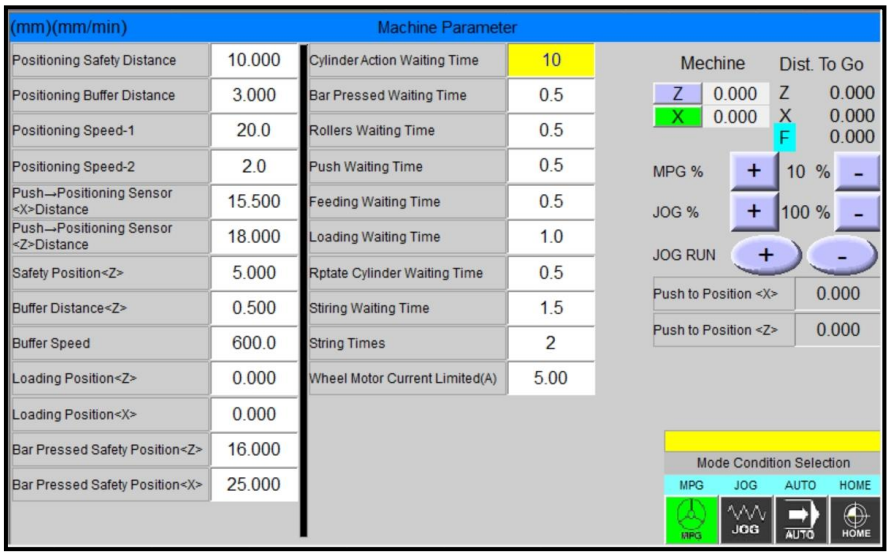
6.5 Processing



*This page is for auto processing.

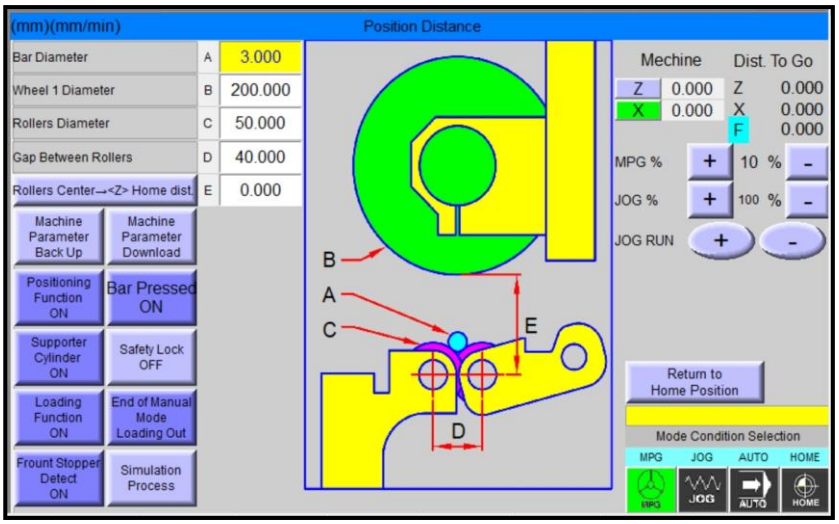
*Right is wheel simulation route.

6.6 Machine Parameter

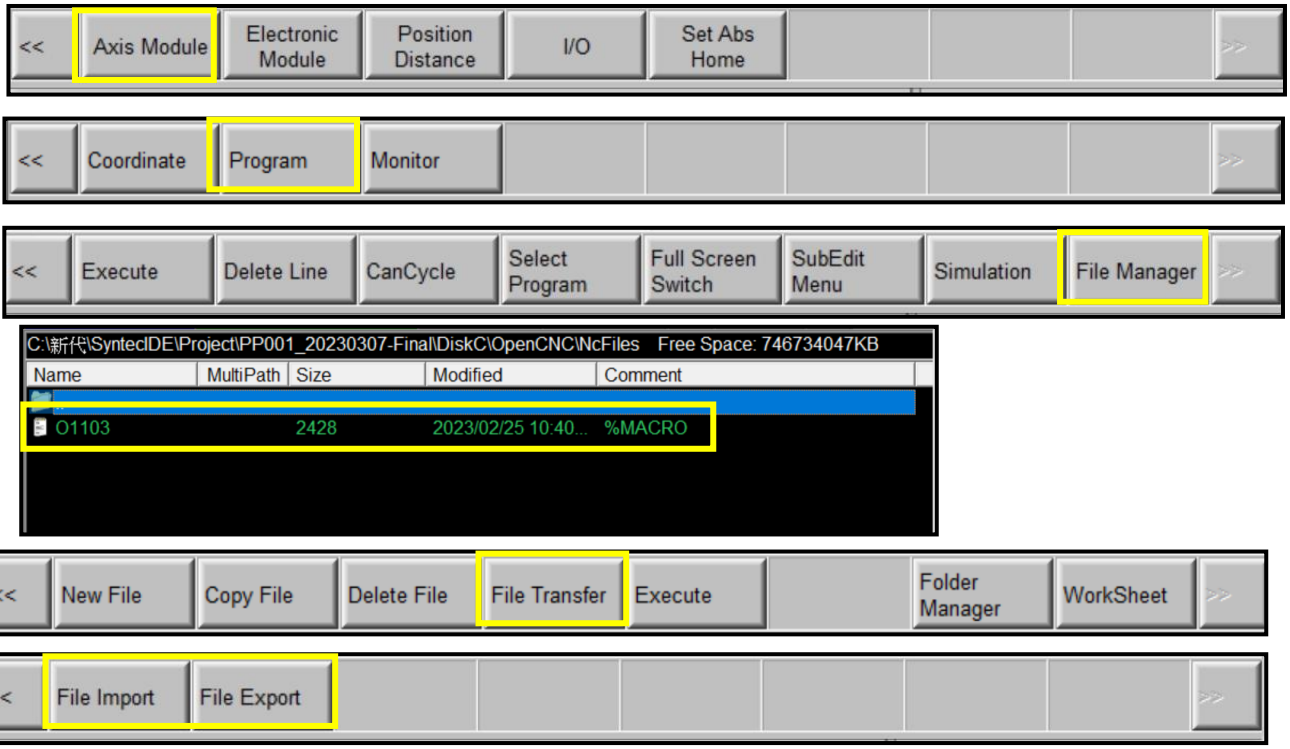


1. **Positionng Safety Distance**：Frount probe is ON, X axis backward distance.
2. **Positioning Buffer Distance**：Frount probe is ON, positioning move distance.
   *If the probe position is over “positioning buffer distance, jump up the alarm.
3. **Positioning Speed-1**：Auto probe goes 2 times, probe first time probe speed.
4. **Positioning Speed-2**：Sencod time probe speed.
5. **Push→Positioning Sensor <X> Distance**：Positioning pusher to sensor -X distance.
6. **Push→Positioning Sensor <Z> Distance**：Positioning pusher to sensor -Z distance.
7. **Safety Position <Z>**：<Z> axis of wheel safety position, for the position of end of program.
8. **Buffer Distance <Z>**：Z axis of buffer distance before grinding.
9. **Buffer Speed**：Buffer speed before grinding.
10. **Loading Position <Z>**：<Z> axis of loading position.
11. **Loading Position <X>**：<X> axis of loading position.
12. **Bar Pressed Safety Position <Z> / Bar Pressed Safety Position<X>**：
    Z/X axis are over those 2 positions, the pressed roller will go down.
13. **Cylinder Action Waiting Time**：After actioning the cylinder, over the time will jump up alarm.
14. **Bar Pressed Waiting Time**：The waiting time after pressed roller action.
15. **Rollers Waiting Time**：The waiting time after rollers action.
16. **Push Waiting Time**：The waiting time after pusher action.
17. **Feeding Waiting Time**：The waiting time after feeding action.
18. **Loading Witing Time**：The waiting time after loading action.
19. **Rotate Cylidner Waiting Time**：The waiting time after rotating action.
20. **Stiring Waiting Time**：The waiting time after stiring action.
21. **Stiring Times**：The times for each stiring action.。
22. **Wheel Motor Current Limited (A)**：The limited current when rotating the wheel. (Pre-set：5)

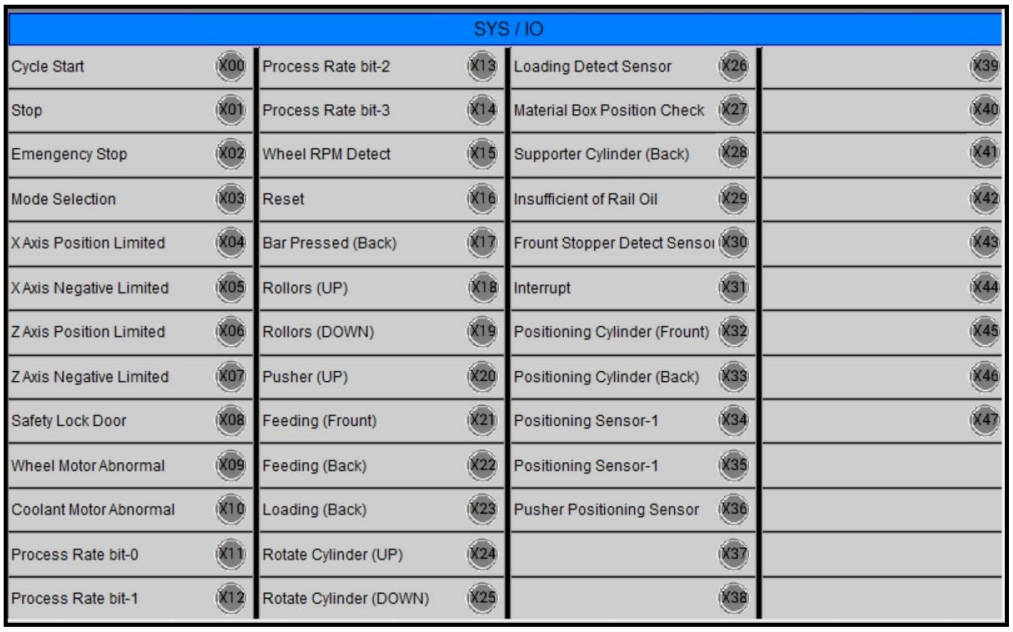
6.7 Position Distance



1. **Bar Diameter**：Enter the bar diameter.
2. **Wheel 1 Diameter**：Enter the wheel 1 diameter.
3. **Wheel 2 Diameter**：Enter the wheel 2 diameter.
4. **Rollers Diameter**：Enter the average of rollers' diameter. (Add up the rollers' diameter/2)
5. **Gap Between Rollers**：Enter the center distance between 2 rollers.
6. **Roller Center→<Z> Home dist.**：The wheel 1 touched the bar, press button to calculate the position automatically.
7. **Machine Parameter Back Up**：Save all the parameter. (File's name can't be changed.)
   *Save File Route: Next Page/Axis Module/Program/File Manager/O1103.
8. **Machine Parameter Download**：Download all the parameter. (File's name can't be changed.)
   *Save File Route: Next Page/Axis Module/Program/File Manager/O1103.



6.8 I0 Page



Input				Output	
Input	Definiton	NO.	Output	Definiton	NO.
0	Cycle Start (Panel)	X0	0	Lamp	Y00
1	Stop (Panel)	X1	1		Y01
2	Emengency Stop (Panel)	X2	2		Y02
3	Mode Selection (Panel-Key)	X3	3	Wheel Motor Run	Y03
4	Z Axis Position Limited	X4	4	Coolant Motor Run	Y04
5	Z Axis Negative Limited	X5	5	Convey Motor Run	Y05
6	X Axis Position Limited	X6	6	Safety Moudle	Y06
7	X Axis Negative Limited	X7	7		Y07
8	Safety Lock Door	X8	8	Power OFF	Y08
9	Wheel Motor Abnormal	X9	9	Safety Lock Door	Y09
10	Coolant Motor Abnormal	X10	10	Panel Start Button-Green	Y10
11	Process Rate bit-0(Panel)	X11	11	Panel Stop Button-Red	Y11
12	Process Rate bit-1(Panel)	X12	12	Tricolored Light-Red	Y12
13	Process Rate bit-2(Panel)	X13	13	Tricolored Light-Yellow	Y13
14	Process Rate bit-3(Panel)	X14	14	Tricolored Light-Green	Y14
15	Wheel RPM Detector	X15	15		Y15

Input	Definiton	NO.	Output	Definiton	NO.
16	Reset (Panel)	X16	16	Pressed Cylinder (UP)(1B) _1	Y16
17	Pressed Roller (UP)	X17	17	Pressed Cylinder (Down)(1A)	Y17
18	Rollers (UP)	X18	18	Rollers Cylinder_2	Y18
19	Rollers (Down)	X19	19	Pusher Cylinder_3	Y19
20	Pusher (Not Pushed)	X20	20	Feeding Cylinder_4	Y20
21	Feeding (Frount)	X21	21	Loading Cylinder_5	Y21
22	Feeding (Back)	X22	22	Stirring Cylinder_6	Y22
23	Loading (Down)	X23	23	Rotating Cylinder_7	Y23
24	Rotating Cylinder (UP)	X24	24	Positioning Cylinder_8	Y24
25	Rotating (Down)	X25	25	Supporter Cylinder_9	Y25
26	LoadingSensor (Detected)	X26	26		Y26
27	Loading Sensor (Box Position)	X27	27		Y27
28	Supporter (Back)	X28	28		Y28
29	Rail Oil Unsuffience	X29	29		Y29
30	Front Stopper Detected	X30	30		Y30
31	Interrupt	X31	31		Y31

Input	Definiton	Input		Panel	
32	Positioning Cylinder (Front)	X32	1	Start (Light)	
33	Positioning Cylinder (Back)	X33	2	Stop (Light)	
34	Positoning Sensor-1	X34	3	Feed Rate %	
35	Positoning Sensor -2	X35	4	Mode (ON=AUTO)	
36	Puser Positioning Sensor	X36	5	Emengency Stop	
37	Air Pressure Detected	X37	6	Reset	
38	Coolant Flow Detected	X38	7	Handwheel	
39		X39	8	Power Switch	
40		X40			
41		X41		Wheel Axis 2HP Motor+Inverter	
42		X42		Conveyer Motor 5W	
43		X43		Servo Motor	
44		`		3 Axis Servo Motor	
45		X45	1 Axis	Z Axis (Wheel UP/Down) 400W+Braker	
46		X46	2 Axis	X Axis (Rollers Left/Right) 400W	
47		X47	3 Axis	A Axis (Roller Rotated) 100W	

7. Alarm / Warn /Extend Parameter

7.1 Alarm

Alarm	Factor	Trouble Shooting
Emengency Stop (R44.0)	After turning on, not pressed reset button.	1. Press “Reset” button.
	“EMC” button is pressed.	1. Release “EMC” button 2. Presse “Reset” button.
Check Safety Door (R44.1)	The door is not close properly.	1. Close the door
Switch to AUTO Mode (R44.2)	After pressing “Cycle Start” button, mode didn’t switch to auto.	1. Swith to “AUTO” mode.
Wheel Motor Abnormal (R44.3)	Wheel motor overload	1. Check if the wheel axis or belt is stuck. 2. After checking, press “reset” or re-turn on the machine.
Coolant Motor Abnormal (R44.4)	Coolant motor overload.	1. Check the coolant motor. 2. After checking, press “reset” or re-turn on the machine.
Pressed Down Abnormal (R44.5)	Press down, the sensor(X17) on	1. Adjust the sensor(X17) position. 2. Page "Position Distance” to off the sensor(X17) 3. Presse “Reset” button
Pressed Up Abnormal (R44.6)	Press down, the sensor(X17) off	1. Adjust the sensor(X17) position. 2. Page "Position Distance” to off the sensor(X17) 3. Presse “Reset” button
Roller Down Abnormal (R44.7)	Roller down, sensor(X18) on or sensor(X19) off	1. Adjust sensor(X19) position 2. Check if the sensor(X18) (X19) is broken. 3. Presse “Reset” button
Roller Up Abnormal (R44.8)	Roller UP, sensor(X19) on or sensor(X18) off	1. Adjust sensor(X19) position 2. Check if the sensor(X18) (X19) is broken. 3. Presse “Reset” button
Pusher-Frount Abnormal (R44.9)	Push forward, sensor(X20) on	1. Adjust sensor(X20) position 2. Check if the sensor(X18) (X19) is broken. 3. Presse “Reset” button
Pusher-Back Abnormal (R44.10)	Push backward, sensor(X20) off	1. Adjust sensor(X20) position 2. Check if the sensor (X20) is broken. 3. Presse “Reset” button

Alarm	Factor	Trouble Shooting
Feeding-Frount Abnormal (R44.11)	Feeding forward, sensor(X22) on or sensor(X21) off	1. Adjust sensor(X21) position 2. Check if the sensor(X21) (X22) is broken. 3. Presse “Reset” button
Feeding-Back Abnormal (R44.12)	Feeding backward, sensor(X21) on or sensor(X22) off	1. Adjust sensor(X22) position 2. Check if the sensor(X21) (X22) is broken. 3. Presse “Reset” button
Loading-Frount Abnormal (R44.13)	Loading down, sensor(X23) off	1. Adjust sensor(X23) position 2. Check if the sensor (X23) is broken. 3. Presse “Reset” button
Loading-Back Abnormal (R44.14)	Loading up, sensor(X23) on	1. Adjust sensor(X23) position 2. Check if the sensor (X23) is broken. 3. Presse “Reset” button
Rotate Cylider-Down Abnormal (R44.15)	Rotating UP, sensor(X25) on or sensor(X24) off	1. Adjust sensor(X24) position 2. Check if the sensor(X24) (X25) is broken. 3. Presse “Reset” button
Loading Box Wrong Position (R45.2)	If use auto loading, the loading box at the wrong positon, sensor(X27) off	1. Adjust loading box position. 2. Adjust sensor(X27) position 3. Presse “Reset” button
Supporter-Frount Abnromal (R45.3)	Supporter is out, sensor(X28) on	1. Adjust sensor(X28) position 2. Check if the sensor (X28) is broken. 3. Presse “Reset” button
Supporter-Back Abnormal (R45.4)	Support is back, sensor(X28) off	1. Adjust sensor(X28) position 2. Check if the sensor (X28) is broken. 3. Presse “Reset” button
Positioning Cylinder-Frount Abnormal (R45.5)	Positioning Cylinder is out, sensor(X33) on or sensor(X32) off	1. Adjust sensor(X32) position 2. Check if the sensor(X32) (X33) is broken. 3. Presse “Reset” button
Positioning Cylinder-Back Abnormal (R45.6)	Positioning Cylinder is back, sensor(X32) on or sensor(X33) off	1. Adjust sensor(X32) position 2. Check if the sensor(X32) (X33) is broken. 3. Presse “Reset” button
Positioning Cylinder NOT Extending (R45.7)	Position parameter, turn on the function of positioning probe, but the positioning cylinder is not at the out position.	1. Press “Return to Home Position” button, and try again. 2. Presse “Reset” button
Positioning at Wrong Position (R45.8)	Bar length is over “buffer distance”. (Over length)	1. Re-do the “bar explosed length” and “auto positioning probe. 2. Presse “Reset” button

Alarm	Factor	Trouble Shooting
Pusher Positioning Abnormal (R45.9)	Pusher go forward, sensor(X36) off	1. bar length is too short or no material. 2. Presse “Reset” button
Frount Stopper Detect Sensor Abnormal (R45.10)	Start processing, but “front stopper” isn’t disassembled.	1. Disassembl the front stopper. 2. Check if the sensor (X30) is broken. 3. Presse “Reset” button
Wheel Motor Overload (R45.11)	When wheel is running, over current limited (A)"	1. Check if the wheel axis or belt is stuck. 2. Check if the wheel is being hit by the mechanism or bar. 3. Check the grinding speed. 4. Presse “Reset” button
Bar Length too Short (R45.12)	Endface is ON, “same endface dressing positon” is ON, the bar is too short.	1. Check the bar length.
Insufficient of Rail Oil (R44.16)	Rail oil is unsufficient.	1. Add the rail oil (R68)

7.2 Warn

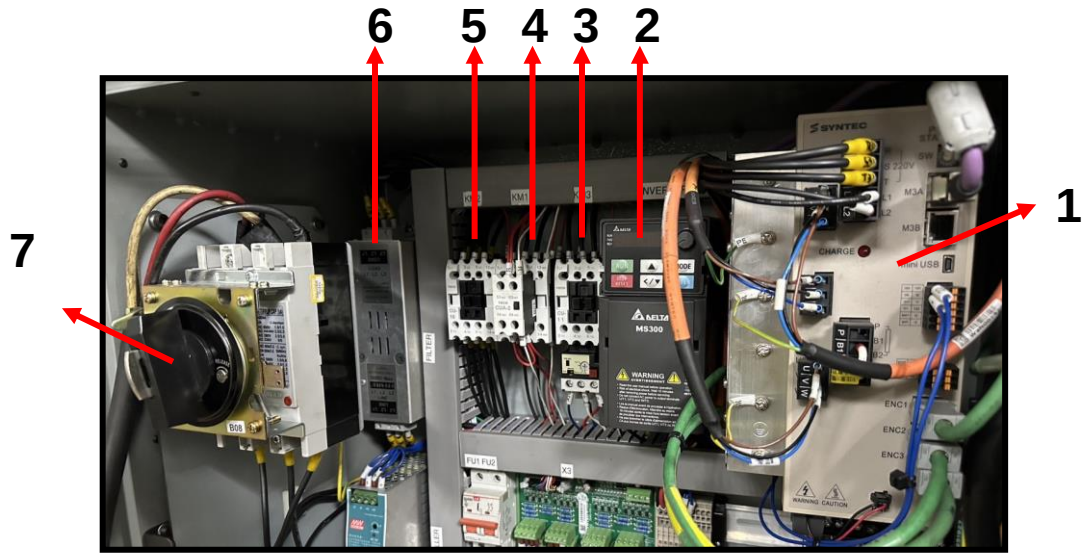
Warm	Factor	Trouble Shooting
Processing Quantity Completed (R590.1)	The set quantity is finished processing.	
No Material at Loading Position (R590.2)	When auto loading, loading out without detecting the material. sensor(X26)	1. Check if the bar is stuck or no material. 2. Check if the sensor (X26) is broken.
Grinding Length Over Safety Distance (R590.3)	1. Grinding length is over safety distance. 2. When using 2 wheels to do the process, grinding length is over the distance between 2 wheels.	

7.3 Extend Parameter

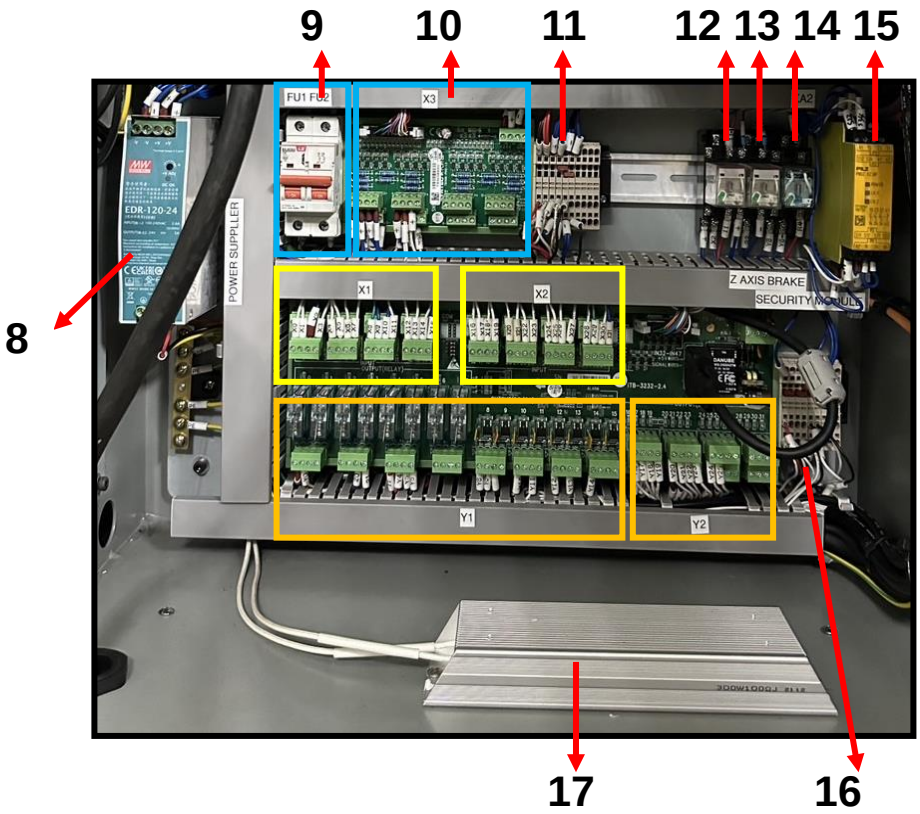
Route: Next Page /Electronic Module/Parameter/Goto Param. /Enter”3401”

1. Parameter "Pr3401" =1：Select Panel Mode-Not Auto Jump Page；=0：Auto Jump Page
2. Parameter "Pr3402" Set the time of power off (sec)
3. Parameter "Pr3403"=1：PLC verification test ；=0：PLC Normal operation

8. Electrical Box



1. 3 in 1 Servo (X/Y/Z)：Syntec-SMD-30/30/30-XS
2. Inverter：Delta-MS300
3. KM3：Coolant Motor
4. KM1：Power Electric
5. KM2：Control Loop Power
6. Filter：Filter-FPM-3320G
7. Main Power：NFB-20A

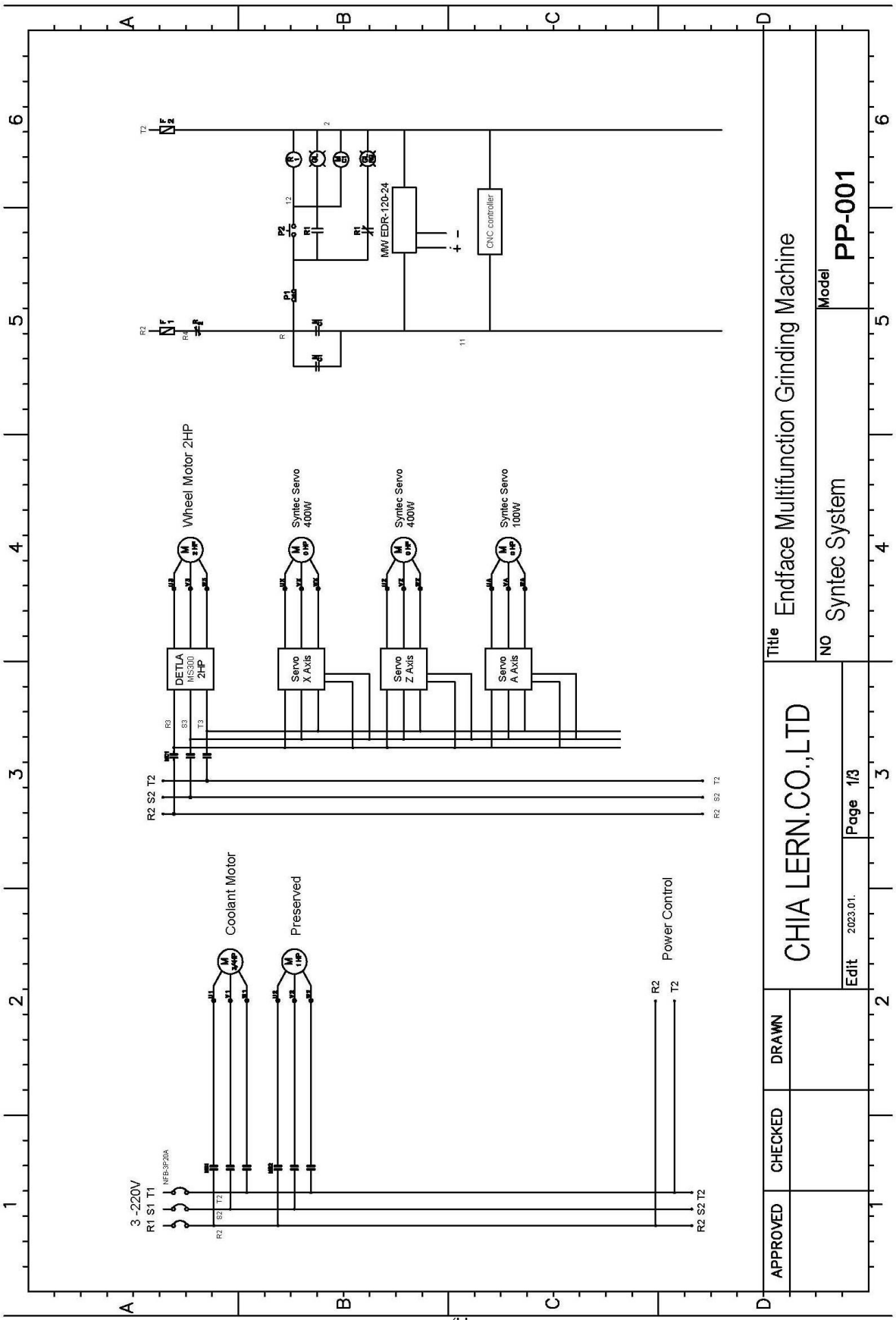


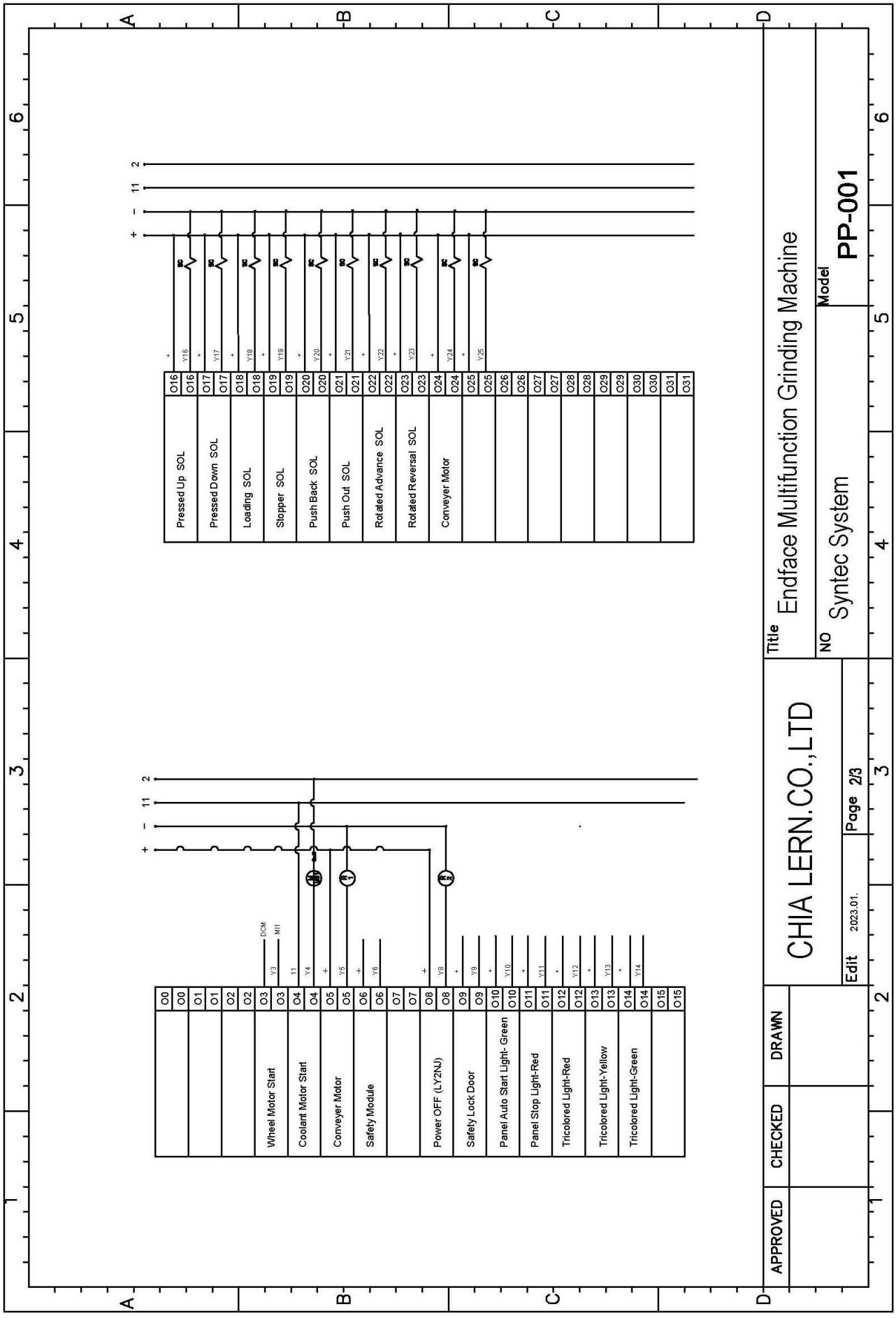
8. Power Supplier
9. Loop Protector
10. X3 Extention Board：232-247
11. Terminal Block
12. Spare (Connected KM2)
13. Z Axis Braker
14. Auto Power Off
15. Security Module
16. Terminal Block
17. Braker Resistor

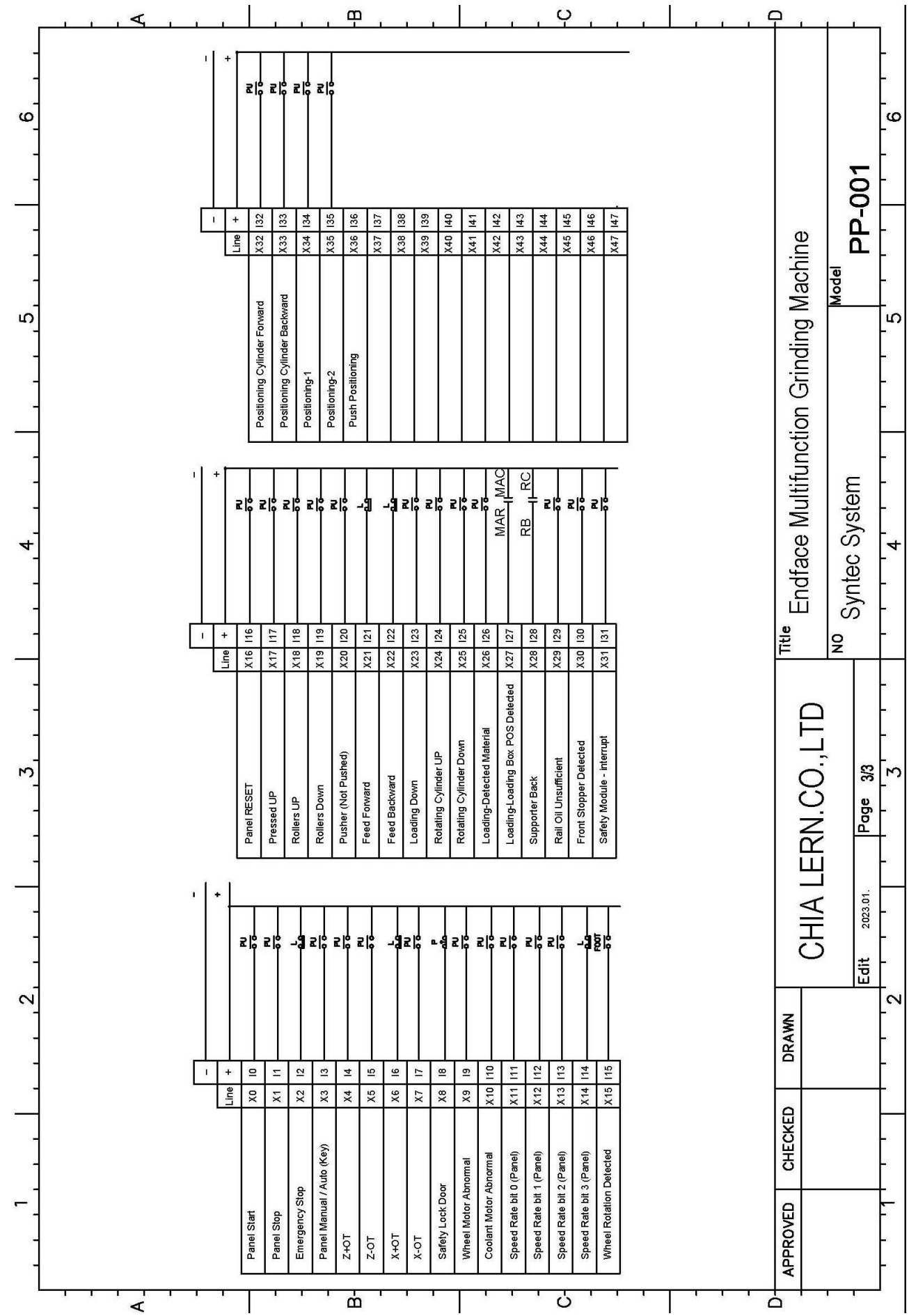
X1 / X2 (Yelow)：Output

Y1 / Y2 (Orange)：Input

9. Electrical Drawing




Pressed Up SOL
Pressed Down SOL
Loading SOL
Stopper SOL
Push Back SOL
Push Out SOL
Rotated Advance SOL
Rotated Reversal SOL
Conveyer Motor
Wheel Motor Start
Coolant Motor Start
Conveyer Motor
Safety Module
Power OFF (LY2NJ)
Safety Lock Door
Panel Auto Start Light- Green
Panel Stop Light-Red
Tricolored Light-Red
Tricolored Light-Yellow
Tricolored Light-Green
APPROVED
CHECKED
DRAWN
CHIA LERN.CO.,LTD
Edit 2023.01.
Page 2/3
Title Endface Multifunction Grinding Machine
NO Syntec System
Model PP-001


Panel Start
Panel Stop
Emergency Stop
Panel Manual / Auto (Key)
Z+OT
Z-OT
X+OT
X-OT
Safety Lock Door
Wheel Motor Abnormal
Coolant Motor Abnormal
Speed Rate bit 0 (Panel)
Speed Rate bit 1 (Panel)
Speed Rate bit 2 (Panel)
Speed Rate bit 3 (Panel)
Wheel Rotation Detected
Panel RESET
Pressed UP
Rollers UP
Rollers Down
Pusher (Not Pushed)
Feed Forward
Feed Backward
Loading Down
Rotating Cylinder UP
Rotating Cylinder Down
Loading-Detected Material
Loading-Loading Box POS Deteded
Supporter Back
Rail Oil Unsufficient
Front Stopper Detected
Safety Module - interrupt
Positioning Cylinder Forward
Positioning Cylinder Backward
Positioning-1
Positioning-2
Push Positioning
APPROVED
CHECKED
DRAWN
CHIA LERN.CO.,LTD
Edit 2023.01.
Page 3/3
Title Endface Multifunction Grinding Machine
NO Syntec System
Model PP-001