

Polishing Process



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Polishing Process

This chapter mainly describes the relevant information about the polishing process of this control system. iNexBot pioneered special instructions for edge solder joints polishing without complex programming.

It can realize automatic replacement of grinding wheels for various polishing, and the robot automatically polishes multiple times in different directions.

- Polishing of welding spatter
- Polishing of surface bumps and scratches
- Smoothing of weld reinforcement
- Smoothing of machining allowance
- Polishing of long and large welds
- Removal of edges and burrs

Combined with external axis equipment such as positioner, it can polish large sheet metal parts and ensure smooth and flat polishing effect

Combined with offline programming, it can achieve compliant polishing of complex curved workpieces

Combined with line scan laser tracking technology, it can achieve automatic programming of polishing

- 2-point positioning for straight line
- 3-point/4-point positioning for user coordinate system

> Polishing parameters

Turn on the teach pendant, enter the "Process" interface, select "Polishing process", and enter the "Polishing parameters" interface. At this time, do not click "Modify", only the process number can be modified. After selecting one of the process numbers, click the "Modify" button to perform modifications.

Process/grinding process/grinding parameters

Grinding process:

Process nr:

Parameter	Value	Notes
Tool wear compensate	0.0	Compensation after tool wear(mm)
Start tool X offset	0.0	Tool coordinate offset in the X direction(mm)
Start tool Y offset	0.0	Tool coordinate offset in the Y direction(mm)
Start tool Z offset	0.0	Tool coordinate offset in the Z direction(mm)
End tool X offset	0.0	Tool coordinate offset in the X direction(mm)
End tool Y offset	0.0	Tool coordinate offset in the Y direction(mm)
End tool Z offset	0.0	Tool coordinate offset in the Z direction(mm)
Auto compensate	0.0	Compensate with a certain number of grinding cycles(mm)
Auto comp. cycle	0	Compensation period(times)

Return Modify

Process number: 1-9 process numbers are provided, each of which stores all the parameters below that process number.

Tool wear compensation: The value of polishing tool wear, which will be automatically compensated after filling in

Tool offset at start point in X/Y/Z direction: Before polishing starts, the offset will be automatically performed at the start point

Tool offset at end point in X/Y/Z direction: After the polishing is completed, the offset will be automatically performed at the end point

Auto compensation period/auto compensation value: After every set number of polishing, all parameters will be automatically shifted by a certain distance

> Polishing instructions

POLISH_EDGE (edge polishing) instruction

Project preview/job instructions/Instruction insertion/Parameter

POLISH_EDGE

Parameter name	Parameter source	Notes	Form 0	None	None
Point	New	More	Saved points:0	Joint	Joint
V	10	More	Range (1-1000)	Axis	Current pos
PL	0	More	Range (0-5)	One	0.00
ACC	1	More	Ratio (1-100)	Two	0.00
DEC	1	More	Ratio (1-100)	Three	0.00
TIME	0	More	Natural number (ms)	Four	0.00
TIMES	1	More	Polishing times(1-99)	Five	0.00
ANGLE	0		[-180,+180]	Six	0.00
ID	1		1-99	Move to P pos	Set to P point

Example: POLISH_EDGE P0001 V=500mm/s PL=2 ACC=1 DEC=1 T=1 ID=1 ANGLE=0

Modify: ☐

Confirm Cancel

At present, the polishing process only supports polishing in the straight line direction. Compared with the MOVL instruction, the POLISH_EDGE in the polishing process adds the angle parameter (ANGLE), the polishing times parameter (TIMES), and the process number parameter (ID).

V: linear motion speed, 2-1000 (mm/s)

PL: position level, 0-5

ACC: acceleration adjustment ratio, 1-100

DEC: deceleration adjustment ratio, 1-100

TIME: early execution time, natural number 1-999999

ANGLE: angle parameter, sets the polishing angle of the tool hand when polishing, -180° to $+180^{\circ}$

TIMES: polishing times parameter, i.e. the number of times you need to polish, 1-99

ID: process number parameter, you can select the process number for which the polishing parameters have been set in the polishing process, 1-99

POLISH_CONTINUE (continue polishing) instruction

Project preview/job instructions/Instruction insertion/Parameter

Parameter	Value	Notes
Process number	1	Polishing process No1-99
Frequency	1	1-99
Angle	0	Angle $[-180^{\circ}, +180^{\circ}]$
TIME	0	Early execution, N(ms)
POLTSH_CONTINUE ID 1 1TIMES ANGLE 0 0		

Confirm Cancel

The main purpose of the POLISH_CONTINUE instruction is to facilitate the operator to check for leaks and fill in the gaps. During polishing, some parts may not be able to be polished well in the process, so this function is added to compensate for possible errors in some parts.

Process number: select the process number for which the polishing parameters have been set in the polishing process

Times: polishing times parameter, i.e. the number of times you need to polish, 1-99

Angle: set the polishing angle of the tool hand when polishing, -180° to +180°

TIME: early execution time, natural number 1-999999

POLISH_OFF (end polishing) instruction

Project preview/job instructions/Instruction insertion/Parameter

POLISH_OFF

Parameter	Value	Notes
Process number	1	Polishing process No1-99
POLISH_OFF ID 1		

Confirm Cancel

End polishing instruction, run this instruction to end the polishing process.

Note: The whole process needs to be used together with the edge polishing. The polishing operator should do a good job of safety protection and examination data handover before the shift, prepare enough auxiliary materials such as abrasive sheets, steel wire wheels, sand paper and atomic ash, and check whether the operation of the abrasives is normal. The polishing operator must use the abrasives correctly when polishing to ensure the safety of use.

> Usage scenarios

Scenario 1

Polish a straight line

Polishing times: 1, polishing angle: 0 degrees (the angle of the current teach point), start polishing

After polishing, wait for the signal to continue polishing

The template is as follows:



NOP	
INT I001 = 0	For the subsequent WHILE loop
MOVJ P001 VJ = 10 % PL = 0 ACC = 10 DEC = 10	Run to safety point
POLISH_EDGE P002 V = 10mm/s PL = 0 ACC = 10 DEC = 10 T = 1 ID = 1 ANGLE = 0	Edge polishing start
WHILE (I001 == 0)	Inner loop
WAIT (DIN2 == 1) T = 10	Wait, judge whether to continue polishing
IF (DIN1 == 1)	Judge, receive signal to continue polishing
POLISH_CONTINUE ID = 1 TIMES = 1 ANGLE = 0	Continue polishing
ELSEIF (DIN1 == 0)	
JUMP *E	Insert label, jump out of loop
ENDIFDIN1==0	Jump out of while loop when jumping out of if loop
ENDWHILEI001≠0	
LABEL *E	Label, jump out of position
POLISH_OFF ID = 1	End polishing
END	

Scenario 2

Polish a straight line: polish 4 times at the teaching position, 2 times at a 15-degree angle in the positive direction, and 2 times at a 15-degree angle in the negative direction.

The template is as follows:

NOP	
MOVJ P001 VJ = 10 % PL = 0 ACC = 10 DEC = 10	Run to safety point
MOVL P001 V = 100mm/s PL = 0 ACC = 10 DEC = 10	Run to the start of the polishing line
POLISH_EDGE P002 V = 10mm/s PL = 0 ACC = 10 DEC = 10 T = 4 ID = 1 ANGLE = 0	Edge polishing start
POLISH_CONTINUE ID = 1 TIMES = 2 ANGLE = 15	Continue polishing
POLISH_CONTINUE ID = 1 TIMES = 2 ANGLE = -30	Continue polishing
POLISH_OFF ID = 1	End polishing
END	

Scenario 3

The polishing head is worn by 1mm, and the parameters need to be adjusted

Setup steps

1. Go to "Process/Polishing process/Polishing parameters", select the corresponding process number and click "Modify"
2. Fill in 1 for "Tool wear compensation" and click "Save"

Process/grinding process/grinding parameters

Grinding process

Process nr

Parameter	Value	Notes
Tool wear compensate	1.0	Compensation after tool wear(mm)
Start tool X offset	0.0	Tool coordinate offset in the X direction(mm)
Start tool Y offset	0.0	Tool coordinate offset in the Y direction(mm)
Start tool Z offset	0.0	Tool coordinate offset in the Z direction(mm)
End tool X offset	0.0	Tool coordinate offset in the X direction(mm)
End tool Y offset	0.0	Tool coordinate offset in the Y direction(mm)
End tool Z offset	0.0	Tool coordinate offset in the Z direction(mm)
Auto compensate	0.0	Compensate with a certain number of grinding cycles(mm)
Auto comp. cycle	0	Compensation period(times)

Return Modify

3. After the setup is complete, run the program

Scenario 4

Polish a straight line: polish 4 times at the teaching position, 2 times at a 15-degree angle in the positive direction by laser searching

The template is as follows:

NOP	
MOVJ P001 VJ = 10 % PL = 0 ACC = 10 DEC = 10	Run to polishing safety point
MOVL G001 V = 100mm/s PL = 0 ACC = 10 DEC = 10	Run to the start of the polishing line
POLISH_EDGE G002 V = 10mm/s PL = 0 ACC = 10 DEC = 10 T = 4 ID = 1 ANGLE = 0	Edge polishing start
MOVJ P004 VJ = 10 % PL = 0 ACC = 10 DEC = 10	Run to searching safety point
SEARCH_START ID = 1 TYPE = 0	Search start
MOVL P002 V = 10 mm/s PL = 0 ACC = 1 DEC = 1	Move to P002
SEARCH_STATIC ID = 1 GP001 0.1	Store the static search results into GP001
MOVL P003 V = 10 mm/s PL = 0 ACC = 1 DEC = 1	Move to P003
SEARCH_STATIC ID = 1 GP002 0.1	Store the static search results into GP002
SEARCH_END ID = 1	Search end
POLISH_CONTINUE ID = 1 TIMES = 2 ANGLE = 15	Continue polishing
POLISH_OFF ID = 1	End polishing
END	

