Compliant Deburring Tool for Robot

User's Quick Guide

RC100, RC300(S, M, L)

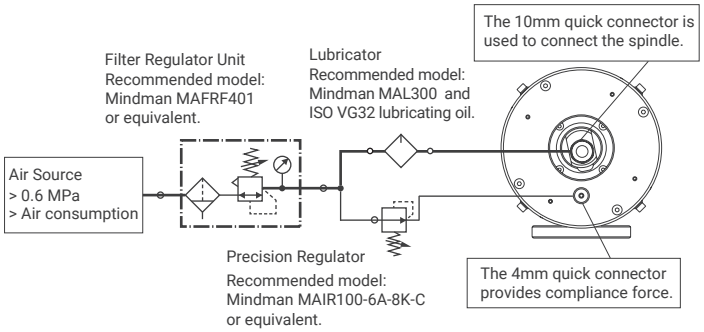
Website Youtube

Maintenance

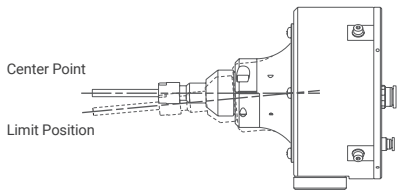
1. **Daily:** Check whether the grinding tool is damaged or wore, replace it immediately when it has invalid. Check air conditions and make sure the filter cup is not full of water, drain it in time. Check the lubricating oil drip rate is normal.
2. **Weekly:** Ensure the spindle operates smoothly without weird noises. Make sure compliant tool movements work smoothly, and the spindle is able to return to the CENTER POINT. Shake the spindle gently by hand at the CENTER POINT, and the mechanical gap should be less than 0.5mm. The spindle should be able to reach both forward and backward LIMIT POSITION. If any defect is discovered, please contact your supplier.

Before Use

1. Prepare a suitable air source as shown in the diagram below. The maximum flow rate of the air supply line must be greater than the air consumption of the tool. For RC100, RC300(S, M, L), please refer to the appearance dimension diagram for details. The spindle air source uses a 10mm outer diameter pneumatic tube, and the compliance air source uses a 4mm quick connector.



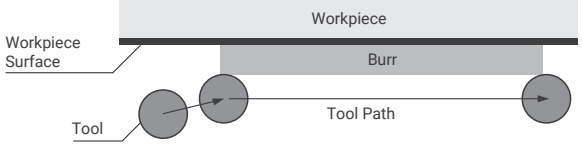
2. Check the CENTER POINT (*1) first; giving 0.2 MPa pressure to the compliant force connector while the spindle is turning off. Make sure the spindle is able to return to the CENTER POINT as shown as the illustration below. Please contact your supplier if it couldn't return to or is not on the CENTER POINT.



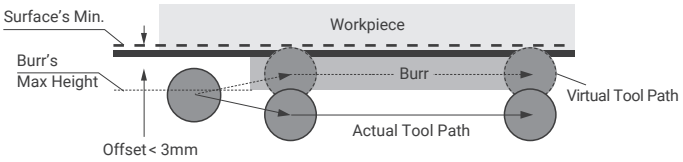
3. Turn the spindle on when it is on the CENTER POINT, and listen to its high-frequency sounds. If there are any other low-frequency sounds or noises, or if the spindle doesn't rotate or is not smooth, please contact your supplier.
4. Install the compliant tool on the robot or a fixed position by screw holes and pin holes on the mounting plate (*2).
5. Set up TCP (Tool Center Point) of the compliant tool in the robot controller by using either the designed dimensions or the four-point calibration method (*3).
6. You have finished the pre-use preparation, now you can start teaching-in robot paths or run auto path generation.

Path Teaching Guidelines

1. Move the spindle back to its center point, then guide it along the workpiece (*4) to teach a path where the deburring tool (carbide end mill) maintains precise contact with the burr (or area to be grinded).



2. Add an offset (virtual cutting depth) to the tool path taught in the previous step. The offset ensures that the grinding tool maintains contact with the workpiece and provides stable compliant force. The offset must be large enough to absorb all tolerances but should be smaller than 3mm to avoid reaching the stroke limit.



3. If the burr is too high and the offset cannot be kept under 3mm, it may be necessary to repeat the process along the corresponding path multiple times, gradually approaching the final target virtual cutting depth each time.
4. If the robot's path is curved, more path points will be needed compared to straight lines. When the burr is large, reduce the robot's speed; conversely, increase the speed when the burr is small. Before performing the deburring operation, ensure the robot's path is smooth.
5. The end mill should only make contact with the workpiece from the side. Any contact that generates axial forces, including using the end face or tapered end mill, will cause damage to the mechanism and will not be covered under warranty.

Cautions

1. This product is exclusively designed for robot deburring work, DO NOT use it for other purposes.
2. For your safety, DO NOT approach the robot when it is in automatic operation mode.
3. Tips and burrs could cause injuries, be cautious when working with them.
4. Tips and compliant tools could be damaged by collision. Always check the robot paths before setting it to automatic operation mode.
5. Compliant tools could be damaged by severe bouncing of the tips on the workpiece. Always perform checks before setting it to automatic operation mode.
6. The air supplied to the precision regulator and compliant force should NOT be lubricated, otherwise, the compliant tools will be damaged.
7. The noise from the deburring operation could damage your hearing, always wear ear protection during work.
8. The file should only contact the workpiece from its side. Any contact in a direction other than the compliant direction, including the tip or the non-compliant side, will result in damage to the mechanism and is not covered under warranty.

Appendix

Model		RC100	RC300S	RC300M	RC300L
Compliant Stroke	(°)	徑向3.5			
Compliant Force	(N)	2~10	13~32	15~38	12~30
Compliant Pressure	(MPa)	0.2~0.5 (2~5bar)			
Air Supply	(MPa)	≥0.6 (6bar)			
Air Consumption	(LPM)	Compliance Force: Negligible			
		150	510		
Lubricant	(drops/min)	1-2 (Only for pneumatic spindle)			
Pneumatic Spindle Speed	(rpm)	65000	16000		
Collet Size	(mm)	Ø3 Rotary file	Ø6 Rotary file		
Ambient Temperature	(°C)	+5~35			
Ambient Humidity	(%)	<95			
Weight	(kg)	1.3	3	3.2	3.5

*1. The CENTER POINT may not align exactly with the designed position. A tolerance or gap smaller than 0.5mm is normal.

*2. Please contact your supplier to obtain the 3D and 2D drawings of the compliant tool, or download them from our website.

*3. It is recommended to begin with the designed dimensions and then use the four-point calibration method to refine the TCP accuracy. When implementing the four-point calibration method, use a sharp dummy tip to indicate the desired TCP point.

*4. The robot can either hold the workpiece or the tool, depending on system integration requirements.