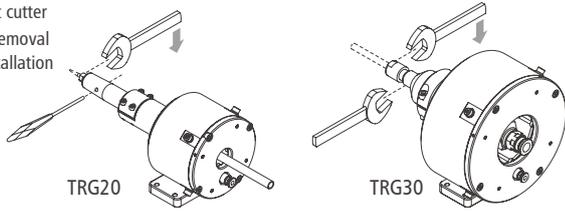




SERVICE MANUAL

Radial Compliant Deburring Tool For Robot

- ① Without cutter
- ② Cutter removal and installation

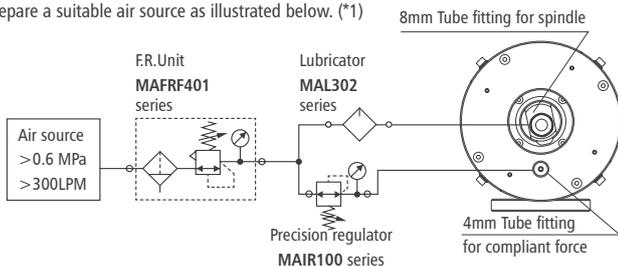


⚠ Cautions

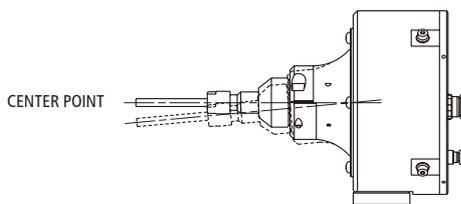
- ① This product is designed exclusively for deburring workpieces with a robot, any other use is not intended.
- ② Do not close to the robot when it operates in automatic mode.
- ③ Cutters and burrs can hurt, beware when you are working with them.
- ④ Cutters and compliant tools can be damaged by collision, check robot paths before automatic operation.
- ⑤ Severe bouncing of the cutter on the workpiece can damage compliant tools, check it before automatic operation.
- ⑥ Do not lubricate the precision regulator and the air for the compliant force, lubricant may cause malfunction of them.
- ⑦ Noise from the spindle and deburring operation are harmful to your hearing, always wear earplugs while operating.

Before Use

- ① Prepare a suitable air source as illustrated below. (*1)



- ② Check the CENTER POINT of the spindle first. Giving 0.1 MPa to the compliant force while the spindle is turned off. Check the spindle is able to return to the CENTER POINT. If it doesn't return or is not on the CENTER POINT (*2), please contact us.



- ③ While the spindle is on the CENTER POINT, turn it on and listen to the high frequency sound. If there is any other lower frequency or noise that makes the sound not pure and clear or the spindle doesn't rotate at all, please contact us.
- ④ Install the compliant tool on the robot or a fixed point through the screw holes and pin holes (*3).
- ⑤ Setup TCP (Tool Center Point) of the compliant tool in the robot controller. You can use either designed dimensions or the four point calibration method (*4).
- ⑥ You have finished the preparation, now you can start teaching-in paths of the robot.

*1. TRG30: 8mm tube fitting for spindle, 4mm tube fitting for compliant force.
TRG20: 6mm tube for spindle, 4mm tube fitting for compliant force.

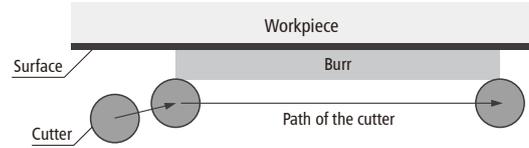
*2. The CENTER POINT may not be exactly on the designed position. It's normal if there is a tolerance or gap smaller than 0.5mm.

*3. Dimensions of tools are in the Appendix. If you need 3D model or 2D drawing, please contact your supplier or download from our website. www.mindman.com.tw

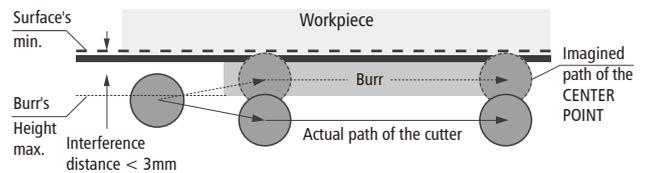
*4. We suggest using designed dimensions at the beginning and four point calibration method to improve TCP accuracy. When you implement the four point calibration method, you will need a dummy sharp tip to indicate the point that you are interested in.

Teach-in Robot Path

- ① Let the spindle be on the CENTER POINT and move the workpiece or the cutter along each other *1. Teach-in a path that makes the acting point on the cutter always contacts with burrs to be removed.



- ② Set an interference distance along the path you just taught-in in the previous step. This interference distance is to prevent non-contact between the cutter and the workpiece, and also offers a stable contact force (compliant force). The key of setting interference distance is to imagine the path of the CENTER POINT while you could only see the actual path of the cutter. Interference distance should be set smaller than 3mm to prevent the compliant tool from collision.



- ③ If it's impossible to set an interference distance smaller than 3mm due to a large burr, several paths over the same segment are required. To do so, the imaged paths of the CENTER POINT are closer to the final position each time.
- ④ If the robot path curves, use more points than in a straight path. Speed down the robot when the burr is large and up when it's small. Before actual deburring operation, make sure the path is smooth.

*1. Both workpiece or tool on hand are possible, it depends on the aspect of system integration.

Operation

- ① Set the pressure of the compliant force small, for example 0.2 MPa, and operate the deburring process.
- ② If the burrs are not completely removed, tune up the compliant force. If some are removed but others not, speed down the robot in the corresponding segment. If the cutter cuts too deep, tune down the compliant force or speed up the robot.
- ③ If the cutter bounces on the workpiece, this is because the traction of the spindle is bigger than the compliant force. Either tune up the compliant force or speed down the robot can solve this problem.
- ④ If the spindle is blocked during operation, this is because the material removal rate is too high. Either tune down the compliant force or speed down the robot can solve this problem.

Maintenance

- ① **Daily** Check the cutter for damage or wear, replace it if necessary. Check air conditions and keep it dry, clean and lubricated.
- ② **Weekly** Check the spindle rotates smoothly with no weird noise. Check the compliant movement smooth and be able to return to the CENTER POINT. If any defect is found, contact us.

Specification

Model	TRG20	TRG30
Compliant angle (°)	3.5 (radial)	
Compliant force (N)	4-10	10-30
Nominal operating pressure (MPa)	Compliant force: 0.1-0.5, Spindle: 0.6	
Air source requirement	> 0.6 MPa, clean, dry, filtered ≤ 5μm	
Air consumption (LPM)	Compliant force: neglectable	
	Spindle: 150	Spindle: 350
Oil consumption (drops/min)	1-2 (for the spindle only, do not lubricate the compliant part)	
Spindle type	Vane motor	
Spindle idle speed (RPM)	65000	25000
Cutter shank diameter (mm)	3	6
Ambient temperature (°C)	+5~+35	
Ambient moisture (%)	<95	
Weight (kg)	1.2	2.9