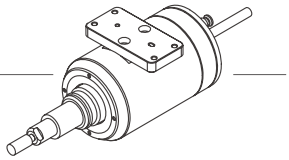
Mindman **TLG30 series**

# SERVICE MANUAL

## Pneumatic Spindle -

## Linear Compliant Deburring Tool



## ⚠ Cautions

① This product is exclusively designed for robot deburring work, DO NOT use for other purpose.

② For your safety, DO NOT approach the robot when it is in automatic operation mode.

③ Grinding tools and burrs could cause injuries, be aware when you are working with them.

④ Collisions may cause damage to the compliant module. Be sure to thoroughly check before running in fully automated mode.

⑤ Severe bouncing of the tool on the workpiece may damage the compliant tool. Be sure to perform a check before running in full automatic mode.

⑥ The air supplied to the precision regulator and the compliant force should NOT be lubricated, otherwise the compliant module will be damaged.

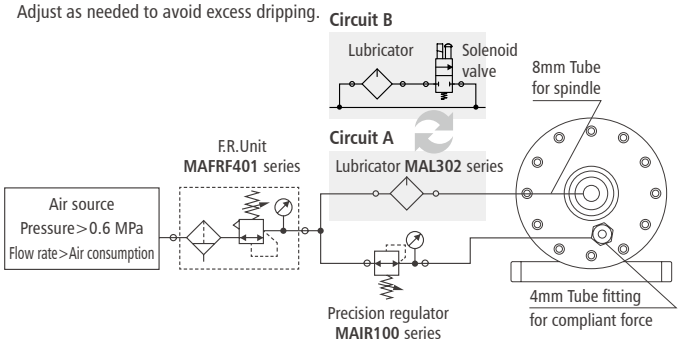
⑦ The noise from grind could damage your hearing, be sure to always wear earplugs at work.

⑧ Never allow contact with the workpiece from a direction that is not aligned with the compliant module's direction.

## Before Use

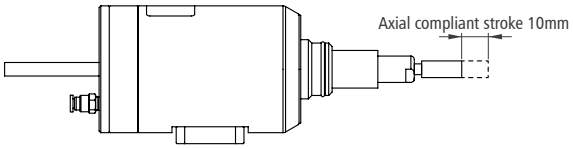
① Prepare a suitable air source as shown as the illustration below. The maximum flow rate of the thick lines should exceed the air consumption of the spindle.

* If excessive oil injection occurs, it is recommended to reduce the lubricant amount in **circuit A** or refer to **circuit B** to add an oil circuit switch to set the oil injection interval. Adjust as needed to avoid excess dripping.




② Check the CENTER POINT of the spindle first. Giving 0.2 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 (*1), please contact us.

Supplying air pressure to the 4mm fitting will extend the TLG30, as shown in the diagram below.




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 operate smoothly, please contact us.

④ Install the compliant tool on the robot or a fixed position by screw holes and pin holes. (*1)

⑤ Setup TCP(Tool Center Point) of the compliant tool in robot controller by using either designed dimensions or the four-point calibration method. (*2)

⑥ You have finished the pre-use preparation, now you can start teaching-in robot paths.

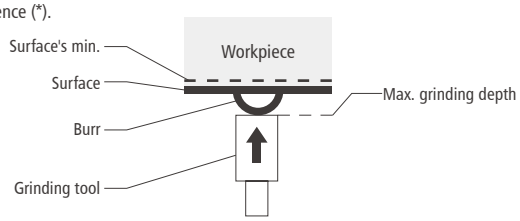
*1. The CENTER POINT may not align exactly with the position shown in the illustration. A tolerance or gap of less than 0.5 mm is considered normal.

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

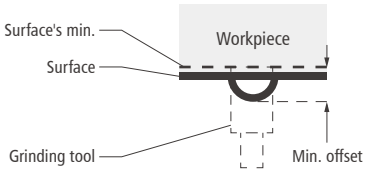
*3. It is recommended to start by using designed dimensions in the first place and then using four-point calibration method to improve the accuracy of TCP. When you implement the four-point calibration method, you need to indicate the point of TCP that you want with a sharp dummy tip.

## Teach-in Robot Path

① Keep the compliant tool fully extended, then teach-in the robot path so that the grinding tool just makes contact with the area to be ground on the workpiece, without causing any interference (*).




② Add an offset (virtual cutting depth) to the previously taught-in point. The purpose of setting this offset is to prevent the grinding tool from losing contact with the workpiece and to provide a stable contact force. This offset should be able to absorb all dimensional errors and the grinding depth, but it should not be set too large, to avoid hitting the stroke limit.




③ The compliant tool's axial direction must be aligned with the surface normal of the workpiece to achieve the best grinding results.

④ When the TLG30 contacts the workpiece, it should only move axially (forward and backward). Lateral movement is not allowed, as lateral forces can damage the spindle and floating mechanism.

* Both workpiece or tool on robot are possible, depends on the aspect of system integration requirement.

## Operation

① Set the compliant force to a small value, such as 0.2MPa, then start operating the deburring process.

② Increase the compliant force or the robot dwelling time, if the burrs were not completely removed.

③ If the spindle is blocked during operation, it may be caused by the high material removal rate. Reduce the compliant force will solve this program.

## Maintenance

① **Daily** Check whether the deburring tip is damaged or wore, replace it immediately when it has been invalid. Drain the water cup if it is full. Check the lubricating oil drip rate is normal.

② **Weekly** Check that the spindle operates smoothly and without abnormal noise. Verify that the compliant stroke moves smoothly and can return to the CENTER POINT. When at the CENTER POINT, the mechanical play of the spindle should be less than 0.5 mm when lightly shaken by hand, and it should be able to reach both forward and backward LIMIT POSITIONS. If any defect is found, please contact us.

## Specification

| | | |
|---|---|---|
| Compliant stroke | (mm) | 10 (one-sided) |
| Compliant force | (N) | 5～20 |
| Operating pressure | (MPa) | Compliant force: 0.2～0.5<br>Spindle: 0.6 |
| Air source requirement | | > 0.6 MPa, clean, dry, filtered ≤ 5μm |
| Air consumption | (LPM) | Complian force: Ignorable |
| | | Spindle: 350 |
| Recomm. lubricating oil (*) | | Turbine oil ISO-VG32 |
| Spindle type speed | (rpm) | 35000 |
| Collet size | (mm) | Ø3 or Ø6 Abrasive with shank |
| Ambient temperature | (°C) | +5～+35 |
| Ambient hummidity | (%) | <95 |
| Weight | (kg) | 1.7 |

* Only for the pneumatic spindle. Adjust oil quantity as needed.