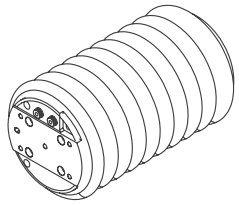
Mindman **TLZ20 series**

SERVICE MANUAL

Large Z-Axis Compliant Module - Linear Compliant Tool

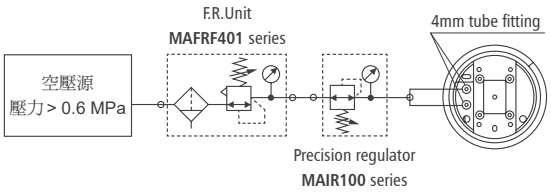


⚠ Cautions

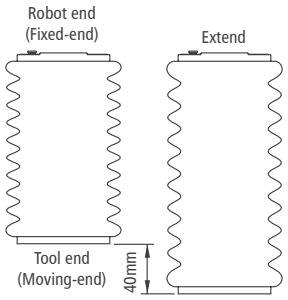
① This product is exclusively designed for robot deburring work, DO NOT use for other purpose.
② For your safety, DO NOT approach the robot when it is in automatic operation mode.
③ Grinding tools and burrs could cause injuries, be aware when you are working with them.
④ Collisions may cause damage to the compliant module. Be sure to thoroughly check before running in fully automated mode.
⑤ The air supplied to the precision regulator and the compliant force should NOT be lubricated, otherwise the compliant module will be damaged.
⑥ The noise from grind could damage your hearing, be sure to always wear earplugs at work.
⑦ 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 illustrated below.



② Verify the relationship between the air supply fittings and the movement direction. One fitting will extend the TLZ20, while the other will retract it. Please confirm the direction before use.



③ Use the screw holes and pin holes on the fixed-end flange to install the compliant module onto a robotic or a fixed position. (*)

④ If the compliant module is installed horizontally, use the air fitting in the extension direction to provide compliant force. For vertical downward installation (with the grinding tool below), using the air fitting in the extension direction will result in a combined force equal to the weight of the grinding tool plus the compliant force. Using the air fitting in the retraction direction will result in a combined force equal to the weight of the grinding tool minus the compliant force. You can use both air fittings together to achieve a wider range of combined forces. For vertical upward installation (with the grinding tool above), the situation is exactly the opposite of the downward installation.

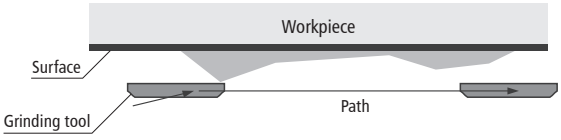
⑤ Use the screw holes on the moving-end flange to install your grinding tool. You will need to design an appropriate fixture based on the shape of the grinding tool.

⑥ The direction of contact between the grinding tool and the workpiece must be parallel to the movement direction of the compliant module.

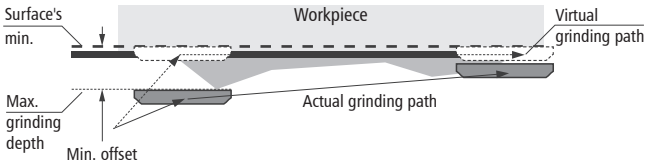
* Please contact your supplier for 3D and 2D drawings of the compliant module, or download them from our website: www.mindman.com.tw

Teach-in Robot Path

① Keep the compliant module fully extended, then teach-in the robot path so that the grinding tool moves over the workpiece (*), ensuring it makes contact without interference.



② Add an offset (virtual cutting depth) to the previously taught-in path. 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. The key to setting the offset is to envision a virtual path that the grinding tool follows when the compliant module is fully extended. This path should be able to absorb all dimensional errors and the grinding depth, but it should not be set too large, to avoid over-grinding at the initial contact point or hitting the stroke limit.



③ If the material to be ground is too much for a single pass, you can repeat the same path multiple times.

④ If the robot path is a curve, more waypoints will be needed compared to a straight path. Additionally, adjust the compliant module's direction to align with the surface normal of the workpiece to achieve the best grinding results.

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

Maintenance

① **Daily** Check the air conditions and keep it dry and clean. Drain the water cup if it is full.

② **Weekly** Check if the compliant module moves smoothly and can reach both the retraction and the extension limit positions. If you notice any mechanical issues, please contact your supplier.

Specification

Model		**TLZ20**
Compliant stroke	(mm)	40 (one-sided)
Compliant force	(N)	40～100
Operating pressure	(MPa)	Compliant force: 0.2～0.5
Air source requirement		> 0.6 MPa, clean, dry, filtered ≤ 5μm
Ambient temperature	(°C)	+5～+35
Ambient hummidity	(%)	<95
Weight	(kg)	2.4