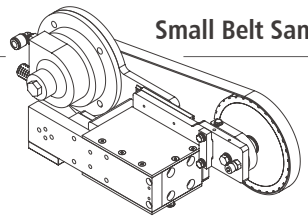
Mindman **TSB80 series**

SERVICE MANUAL

Small Belt Sander

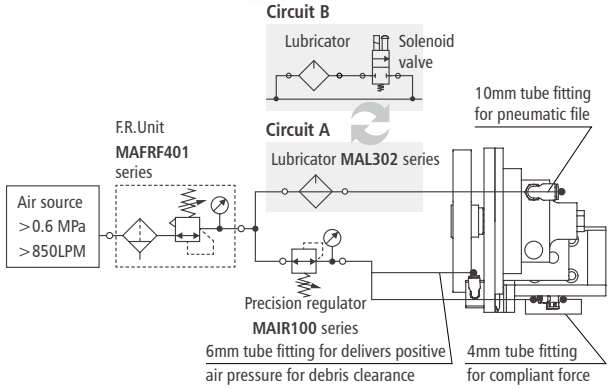


⚠ Cautions

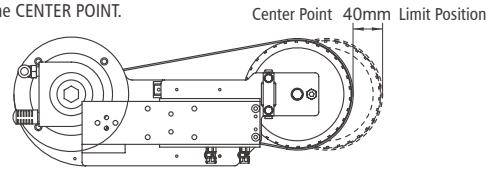
① This product is exclusively designed for robot deburring work, DO NOT use it for other purposes.
② For your safety, DO NOT approach the robot when it is in automatic operation mode.
③ Tips and burrs could cause injuries, be cautious when working with them.
④ Tips and compliant tools could be damaged 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 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.
⑧ Noise from the file and deburring operation are harmful to your hearing, always wear earplugs while operating.

Before Use

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

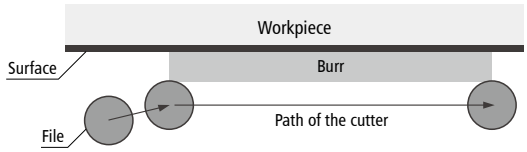


③ Turn the spindle on when it is on the CENTER POINT, and listen to its highfrequency sounds. If there are any other low-frequency sounds or noises, or if the spindle doesn' t rotate or is not smooth, please contact your supplier.
④ Install the compliant tool on the robot or a fixed position by screw 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 preparation, now you can start teaching-in paths of the robot.

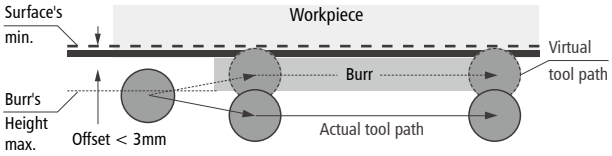
*1. The CENTER POINT may not align exactly with the designed position. A tolerance or gap smaller than 0.5mm is normal.
*2. Dimensions of tools are in the Appendix. If you need 3D model or 2D drawing, please contact your supplier or download from our website. www.mindman.com.tw
*3. It is recommended 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.

Teach-in Robot Path

① Move the spindle back to the CENTER POINT, then guide the spindle to move over the workpiece (*1), and teach a path where the abrasive belt remains in consistent contact with the burrs or areas to be removed.



② Apply a virtual offset to the taught path from the previous step. The purpose of this offset is to prevent the tool from losing contact with the workpiece and to ensure stable contact force (compliance force). The key to setting the proper interference amount lies in imagining a virtual path traced by the tool starting from the CENTER POINT. This path should exceed the total tolerance stack-up to be absorbed, but must remain under 3 mm to avoid reaching the limit of the compliant stroke and causing potential collision.



③ If the burr height is too high to maintain an offset of less than 3mm, it may be necessary to repeat the process along the corresponding path multiple times, each time gradually reducing the virtual cutting depth towards the final target.
④ If the robotic arm path is curved, more path points are required compared to a straight path. When the burr height is significant, reduce the robotic arm speed; conversely, increase the speed when the burr height is smaller. Before performing the final deburring operation, ensure that the robotic arm path is smooth and optimized.

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

Operation

① Set the compliance force to a lower value, such as 0.2 MPa, turn on the spindle's air pressure source, and execute the robot path.
② If the burrs are not fully removed, increase the compliance force. If some burrs remain, reduce the robot speed along the areas where burrs are not completely removed. If the cut depth is too great, decrease the compliance force or increase the robot speed.
③ If the tool bounces on the workpiece, it indicates that the compliance force is too low. Increasing the compliance force or reducing the robot speed will resolve this issue.
④ If the spindle's rotational speed drops significantly or stops during the deburring operation, it indicates an excessive material removal rate. Lowering the compliance force or reducing the robot speed will address this issue.

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.

Specification

Spindle pressure	(MPa)	0.6 (6bar)
Air consumption	(LPM)	Pneumatic Spindle 850
Recomm. Lubricating oil (*)		Turbine oil ISO-VG32
Oscillating speed	(RPM)	3000
Collet size	(mm)	Belt width 20
Ambient temperature	(℃)	+5~35
Ambient humidity	(%)	<95
Weight	(kg)	8.6

*1. Adjust oil quantity as needed.
*2. Do not disassemble this product yourself. For repairs or replacement of consumables, please contact our sales.