2.2 kW Air-Cooled ATC Spindle

User Manual

1. Product Description

The 2.2 kW air-cooled ATC (Automatic Tool Change) spindle is designed for CNC machining, engraving, drilling, and milling applications. It features high-speed operation, pneumatic tool clamping, air cooling, and built-in thermal protection to ensure stable performance, high precision, and long service life.

2. Technical Specifications

Rated Power: 2.2 kW
Rated Voltage: 220 V AC
Rated Current: 7.8 A
Rated Frequency: 300 Hz
Maximum Frequency: 400 Hz
Rated Speed: 18,000 rpm
Maximum Speed: 24,000 rpm
Rated Torque: 1.17 Nm
Cooling Method: Air-cooled
Lubrication Method: Grease
Tool Cone: ISO20
Pull Stud: ISO20-15
Tool Clamping: Pneumatic ATC
Thermal Protection: PTC-110 temperature sensor
Weight: Approx. 8.9 kg

3. Tool Interface

The spindle is equipped with an ISO20 tool cone and uses ISO20-15 pull studs.
Only ISO-standard tool holders and pull studs must be used to ensure proper clamping force, accurate positioning, and safe automatic tool change operation.

Warning:
Using incorrect tool holders or pull studs may result in tool drop, ATC malfunction, or spindle damage.

4. Electrical Connections

The spindle motor must be driven by a Variable Frequency Drive (VFD).

Motor connections:

- U – Motor phase
- V – Motor phase
- W – Motor phase
- PE – Protective ground

The built-in PTC-110 temperature sensor provides thermal protection and should be connected to the VFD or CNC controller.

Important:

- Never connect the spindle directly to mains power
- Proper grounding is mandatory

5. Pneumatic Connections

Clean, dry, and filtered compressed air is required.

Recommended air pressure:

- Tool lock air pressure: 0.6 MPa
- Tool release air pressure: 0.6 MPa
- Air seal: ≥ 0.2 MPa
- Dedusting air: 0.3 – 0.5 MPa

Note:
Moisture or oil in the air supply will damage the pneumatic system and reduce spindle life.

6. Installation Instructions

1. Mount the spindle securely on the machine bracket
2. Ensure alignment with the machine Z-axis
3. Connect:

- VFD motor cables (U, V, W, and PE)
- Thermal protection sensor
- Pneumatic air hoses

4. Check all fasteners and fittings before operation

7. Operation Instructions

7.1 Start-Up

- Verify electrical and pneumatic connections
- Run the spindle at low speed for 5 – 10 minutes before full-speed operation

7.2 Tool Change Procedure

1. Stop spindle rotation completely
2. Apply air pressure to the tool release port
3. Remove the tool holder
4. Insert a new ISO20 tool holder with ISO20-15 pull stud
5. Apply air pressure to the tool lock port
6. Confirm the tool is securely clamped

8. Maintenance

- Regularly inspect air supply and filters
- Check electrical and pneumatic connections monthly
- Keep air inlets and cooling fan clean
- Bearings are grease-lubricated and maintenance-free
- Do not disassemble the spindle without manufacturer authorization

9. Safety Precautions

- Do not exceed the maximum rated speed
- Never change tools while the spindle is rotating
- Always ensure proper grounding
- Stop operation immediately if abnormal noise, vibration, or overheating occurs
- Keep hands and loose clothing away from rotating parts

10. Storage

- Store in a dry, dust-free environment
- Seal all air ports when not in use
- Avoid impact, vibration, and moisture during storage or transport