

Common Mechanical-System Faults and Corrective Actions

Item	Details
Document No.	AUREK-RC-ME-001-V1.0
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Applicable Stage	Pre-use inspection / Routine maintenance / Preliminary after-sales troubleshooting / On-site fault reporting
Intended Users	On-site operators, equipment maintenance personnel, sales and after-sales service personnel

Document Purpose For routine inspection and preliminary fault diagnosis of mechanical structures, joints, bases, columns, lifting points, tooling, and fasteners.	Intended Users On-site operators, team leaders, equipment maintenance personnel, and after-sales service personnel.
Troubleshooting Principle Shut down and unload first, then inspect. Check the structure and connections before assessing wear, deformation, looseness, or interference.	Important Notice This guide provides general maintenance reference information. For equipment-specific requirements, refer to the product nameplate, contract configuration, and dedicated operation manual.

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How to Use This Guide

01 Safety Instructions Shut down, unload the workpiece, and confirm that no unexpected movement can occur	02 Troubleshooting Process Inspect the load, structure, joints, and tooling in sequence	03 Quick Fault Reference Use the symptom to identify likely causes quickly	04 Maintenance Intervals Inspect daily, weekly, monthly, and every six months
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1. Safety Prerequisites

Non-Negotiable Safety Rules

If a mechanical abnormality occurs, stop operation first, unload or stabilize the workpiece, and lower the tooling to a safe position.
Before servicing, dismantling, or adjusting load-bearing components, joints, tooling, lifting points, or end stops, shut off the air supply or electrical power. Only trained personnel may perform this work.
It is strictly prohibited to remove tooling, pins, bolts, brakes, or load-bearing connections while a load is suspended.

- If a structural component is cracked, a weld is abnormal, obvious deformation is present, a load-bearing bolt is loose, a lifting point is worn, or a brake has failed, remove the equipment from service immediately.
- After an impact, overload, uncontrolled drop, or abnormal binding, further trial operation is not recommended. Conduct a complete inspection first.
- Personnel must not stand beneath the workpiece, main arm, secondary arm, tooling, or lifting points during testing, troubleshooting, or maintenance.

2. Mechanical Troubleshooting Process

Troubleshoot mechanical systems in the following order; do not begin by dismantling load-bearing components. If any abnormality is found in a load-bearing structure, stop operation and contact the manufacturer for assessment.

Step	Inspection Focus	Description
1	Verify Load and Operating Conditions	Check for overload, eccentric loading, impact, forced pulling, or a change in workpiece dimensions.
2	Check Mounting and Supports	Check anchors, the baseplate, column, mobile base, and rail suspension components for looseness, cracking, or deformation.
3	Inspect Arms and Joints	Check the main arm, secondary arm, pins, retaining rings, bearings, bushings, and end stops for wear or interference.
4	Inspect Brakes and End Stops	Confirm that brakes hold reliably and that end stops, buffers, and stop blocks have not shifted or been damaged.
5	Inspect Tooling and Lifting Points	Check the tooling flange, quick-change mechanism, hook, sling, locating pin, and anti-drop features for secure and reliable operation.
6	Cross-Check the Pneumatic System	If no obvious mechanical abnormality is found, inspect the pushbuttons, valves, cylinders, and brake pneumatic circuit.

3. Quick Reference for Common Mechanical Faults

The following is a general public-edition checklist for preliminary on-site assessment. Customers should not attempt repairs involving load-bearing structures, welds, lifting points, brakes, or joint wear.

A. Arms, Joints, and Brakes

Symptom	Possible Causes	On-Site Checks and Corrective Action	Action Level
Main/Secondary Arm Is Difficult to Rotate or Binds	Joint bearing or bushing wear; deformed pin; debris in the joint; end-stop interference; air-tubing or cable tension.	After shutdown and unloading, inspect around the joint for debris, impact damage, or interference. Check pins, retaining rings, and bearing housings for looseness or deformation. If necessary, contact the manufacturer to replace bearings, bushings, or pins.	Correct within the specified period / Remove from service if severe
Vertical Motion Is Rough or Binds	Eccentric loading of the main-arm mechanism; increased joint friction; misaligned cylinder support or connection; tooling is too heavy or has an offset center of gravity.	Confirm that workpiece and tooling weights are within the design limits. Test vertical motion without a load. Inspect the cylinder support, force-arm support, and joint connections for misalignment or looseness.	Correct within the specified period

Symptom	Possible Causes	On-Site Checks and Corrective Action	Action Level
Noticeable Vibration or Oscillation at the Manipulator End	Loose anchor bolts; insecure column or baseplate; increased joint play; loose arm connection bolts; eccentric load.	Inspect anchor bolts, the baseplate, column, and arm connections. Check joint play and pin wear. If structural looseness or cracking is found, remove the equipment from service and contact the manufacturer.	Remove from service / Manufacturer assessment required
Inaccurate Positioning or Rotary Stop-Position Deviation	Loose or worn end stop; increased joint play; unstable brake locking; shifted rail or mobile-base position.	Reconfirm the pickup and placement positions. Check end stops, locating pins, and stop blocks for looseness, and verify brake holding performance.	Correct within the specified period
Joint Brake Binds or Fails to Hold	Worn brake pad/friction block; contaminated brake mechanism; binding brake linkage or pin; incorrect brake-position adjustment.	Determine whether the problem is mechanical binding or a pneumatic actuation failure. Remove oil contamination and dust; inspect connectors, pins, and springs. If the brake will not hold, remove the equipment from service immediately.	Remove from service / Manufacturer assessment required
End Stop or Stop Block Has Failed or Is Being Struck	Loose end stop; worn buffer; overtravel impact; limit position not recalibrated after installation.	Check whether end stops have shifted, deformed, or detached. Replace worn buffers, reconfirm limit positions, and prevent end stops from sustaining repeated impact.	Correct within the specified period

B. Base, Fasteners, and Rails

Symptom	Possible Causes	On-Site Checks and Corrective Action	Action Level
Column, Base, or Mobile Base Moves	Inadequate foundation; loose expansion anchors; deformed baseplate; insufficient mobile-base counterweight; caster lock failure.	Check the floor for voids or cracking; retighten anchor bolts; inspect the baseplate and welds. For mobile equipment, verify casters, leveling feet, and counterweights.	Remove from service / Manufacturer assessment required
Connection Bolts Loosen Frequently	Loss of preload due to vibration or impact; settlement of contact surfaces; thread damage; incorrect tightening torque; inadequate locking method.	After shutdown, inspect threads, washers, and contact surfaces. Retighten to the manufacturer's requirements. If necessary, use suitable lock washers, threadlocker, or a mechanical locking feature.	Correct within the specified period
Cracked Weld or Deformed Structural Component	Overload, eccentric loading, impact, or fatigue damage; repeated impact loading; on-site welding or cutting that compromises structural strength.	Stop immediately and unload the equipment. Do not field-weld a load-bearing structure. Photograph the crack location and extent of deformation, and contact the manufacturer for repair-or-replacement assessment.	Remove from service immediately
Bearing/Bushing Wear or Excessive Joint Play	Poor lubrication; ingress of dust or metal chips; prolonged eccentric loading; incorrect bearing installation; mismatch between actual load and selected capacity.	Check for looseness, abnormal noise, heat, or metallic debris at the joint. Verify dust protection and lubrication. Replace bearings, bushings, or pins if wear is severe.	Correct within the specified period / Manufacturer support
Abnormal Pin, Shaft, or Retaining Ring	Worn pin; retaining ring not fully seated or detached; enlarged bore; prolonged impact or eccentric loading; incorrect reassembly after service.	Shut down and inspect pin ends, retaining-ring grooves, retaining rings, and cotter pins. If a retaining ring has detached, a pin has migrated, or a bore is worn, remove the equipment from service.	Remove from service / Manufacturer assessment required
Overhead-/Rail-Mounted Unit Travels Roughly or Binds	Rails are not parallel; rollers are worn; rail joints have a step; suspension fittings are loose; debris has entered the rail.	Check rail level and alignment, joints, rollers, and suspension fittings. Remove debris from the rail. If a suspension connection is loose or the rail is deformed, remove the equipment from service.	Correct within the specified period / Remove from service

C. Tooling, Lifting Points, and Moving Mechanisms

Symptom	Possible Causes	On-Site Checks and Corrective Action	Action Level
Tooling Opening/Closing Binds or Encounters Mechanical Interference	Contaminated gripper-jaw guide; deformed gripper jaws; displaced locating pin; change in workpiece dimensions; tooling collides with equipment or a rack.	Clean tooling guides and contact surfaces. Check whether gripper jaws are parallel or deformed. Confirm workpiece dimensions and placement. Do not force deformed tooling to operate.	Correct within the specified period
Workpiece Is Skewed After Gripping or at Risk of Falling	Incorrect gripping-point selection; worn gripper-jaw pads; oil on the locating surface; offset workpiece center of gravity; anti-drop feature has failed.	Reconfirm the gripping point and center of gravity. Replace worn pads, remove oil contamination, and inspect the anti-drop pin, secondary restraint, and mechanical lock.	Remove from service immediately

Symptom	Possible Causes	On-Site Checks and Corrective Action	Action Level
Worn Hook, Lifting Point, Sling, or Rigging	Long-term wear, corrosion, or impact loading; side pulling or diagonal lifting; incorrect loading direction at the lifting point; damaged hook safety latch.	Inspect the hook for deformation, throat opening, cracks, chips, or corrosion. Check the pin and safety latch. If a clear defect is found, remove the component from service and replace it.	Remove from service immediately
Control Handle Is Loose or Pushbutton Enclosure Shakes	Loose control-handle connection bolts; worn mounting holes; repeated push/pull impacts; cable conduit or air tubing under tension.	Inspect the control-handle connection plate, bolts, mounting holes, and support. Improve air-tubing/cable-conduit retention, and do not use the control handle as a load-bearing lever.	Correct within the specified period
Mobile Base Is Difficult to Push or Tracks to One Side	Caster binding; uneven floor; debris in caster bearings; brakes not fully released; offset center of gravity of the base.	Clean the casters and remove floor debris. Inspect caster bearings, brake pedals, and locks. Move slowly on a level surface.	Observe / Correct
Abnormal Noise, Friction, or Metallic Impact	Dry-running joint; damaged bearing; loose bolt; impact at an end stop; cracked or deformed structural component.	Inspect by section to locate the sound source. Run unloaded at low speed to identify the abnormal location. Continued operation is not recommended when a distinct metallic impact is present.	Correct within the specified period / Remove from service
Equipment Operates Abnormally After an Impact	Bent arm; damaged joint; shifted end stop; deformed tooling; impacted leveling feet or base.	Remove the equipment from service immediately and inspect the complete unit. Recheck arm straightness, welds, joint clearances, tooling positioning, end stops, and the base.	Remove from service immediately

4. Critical Inspection Locations

Inspection Location	Critical Inspection Items	Recommended Action
Fixed Baseplate / Anchors	Anchor bolts, baseplate deformation, floor cracking, and contact between the baseplate and floor	If looseness, cracking, or obvious movement is found, remove the equipment from service to prevent overturning or displacement.
Column / Main Support	Column verticality, welds, connection plates, flanges, and supports	Check for tilt, deformation, failed welds, corrosion, or abnormal movement.
Main Arm / Secondary Arm	Arm straightness, connection bolts, welds, end stops, and surface impact marks	The arms carry the principal bending moment. Do not continue operation if deformation or cracking is present.
Rotary Joint / Pin	Smoothness of rotation, play, abnormal noise, retaining rings, bearing housing, and snap rings	Inspect if there is looseness, abnormal noise, binding, or pin migration.
Brake Device	Brake pads/friction blocks, springs, connection pins, brake cylinder, or linkage	An unreliable brake can allow the load to slip; correct this condition as a priority.
Tooling Connection Flange	Flange bolts, locating pins, mating surfaces, and tooling quick-change mechanism	Loose tooling connections directly compromise workpiece safety and require periodic retightening and inspection.
Lifting Points / Hooks / Rigging	Deformed lifting points, hook safety latch, pins, sling wear, and broken wire-rope strands	Do not continue using components with obvious damage, chips, deformation, or corrosion.
Control Handle	Control-handle support, pushbutton enclosure mounting, connection bolts, and air-tubing/cable retention	Prevent a loose control handle from causing unintended operation or line wear.

5. Recommended Maintenance Intervals

Recommended Interval	Maintenance Item
Daily / Every Shift	Check the area around the equipment for obstructions. Inspect the arms, tooling, lifting points, and base for obvious damage. Confirm smooth motion without abnormal noise.
Weekly	Inspect load-bearing bolts, anchor bolts, pins, retaining rings, end stops, and tooling connections. Check the brake mechanism, lifting points, hooks, and control handle.

Recommended Interval	Maintenance Item
Monthly	Inspect rotary-joint play, bearing/bushing wear, arm welds, and base/column connections. Inspect tooling guides, pads, and anti-drop features.
Every 6 Months	Conduct a complete inspection of load-bearing structures, joints, lifting points, mobile bases, and rail suspension components. Replace wear parts as necessary.
After an Impact/Overload	Stop immediately for inspection; do not wait for the next scheduled interval. Recheck arm deformation, welds, joints, tooling, end stops, and the base.

6. Boundary Between Customer Checks and Manufacturer Service

Checks the Customer May Perform

- Check for overload, eccentric loading, or a change in workpiece placement.
- Check the base, column, control handle, and tooling for obvious looseness or interference.
- Check around joints for debris, tension on lines, or impact against end stops.
- Check tooling pads, guides, hook safety latches, casters, and rails for obvious damage.

Contact the Manufacturer for Service When

- A weld is cracked, an arm is deformed, the base moves, or an anchor is loose and cannot be retightened.
- A load-bearing pin, bearing, bushing, lifting point, hook, or quick-change mechanism is visibly worn.
- A brake has failed, a joint slips abnormally, the equipment has sustained an impact, or overload is suspected.
- The tooling cannot grip or release reliably, creating a drop hazard.
- The installation configuration must be changed, an arm lengthened, the tooling replaced, or the load-bearing structure modified.

7. Document Information

This guide covers common mechanical structures and daily inspection items for Pneumatic Industrial Manipulators, rigid-arm manipulators, Pneumatic Balancers, Articulating Jib Cranes, and custom tooling. It is intended for Resource Center downloads, customer training, and after-sales communication.

Inspection priorities may vary with operating conditions, tooling, and installation configuration. The equipment nameplate, contract configuration, site-specific solution, and manufacturer's technical requirements take precedence.

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