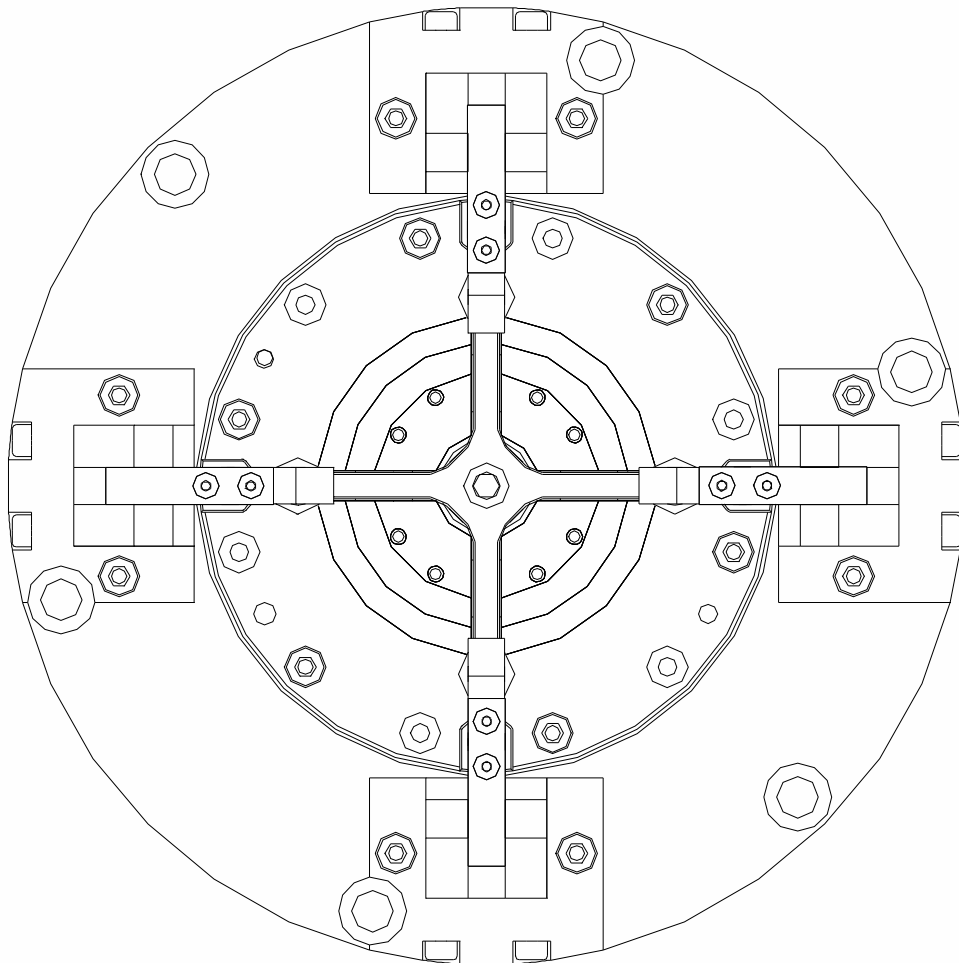


Axial chuck Operating manual



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1. Introduction

Thank you very much for the purchase of an MicroCentric axial chuck. We wish you a good success on your work with it. Please read the operation manual carefully before you start the work with this product. The consideration of this manual will help you to avoid accidents, breakdowns and damages.

Clamping systems are the most important components of tool machines, when you have to produce high precision parts with high accuracy and concentricity. Our products have several advantages and are in usage for different applications, e.g. turning, grinding and milling.

Please call our sales- and service engineers if you would like to get additional information.

2. General

2.1 Features of axial chucks

MicroCentric axial chucks are designed according to the actual stand of technique and correspond to the requirements of modern clamping systems:

- Stepless adjustable clamping force
- As a rule usage of axial chucks are for fragile and thin-walled work pieces
- High repeatability
- Quick changeover of clamping diameters
- Maintenance and lubrication free
- Long lifetime
- Sealed against pollution
- Clamping force up to 120 daN per clamping hook (depend from the length of the clamping hook)
- Chuck has a through bore as standard to bring coolant through the spindle directly to the work piece.
- Part stops could be mounted very easily.

2.2 Security notices

Please read and pay attention to the following security notices very carefully. If you will get faults or damages through the non-observance of this manual, MicroCentric can not take over the liability.

1. All applications of the axial chuck must be according to this operation manual.
2. Do not touch the chuck while it is rotating.
3. While closing the top jaws and the axial clamps please pay attention, that there are no objects between the top jaws resp. the clamping paws and the workpiece.
4. The spindle adapter must be manufactured in the right way. During mounting the chuck onto the machine, spindle nose, spindle adapter and the chuck must be clean. Further all mounting bolts have to tighten strong enough.
5. Periodically you should verify, that all mounting bolts on the chuck resp. the spindle adapter are still fixed and if the air supply hoses are fixed without an air pressure lost.
6. The supplied air must be without humidity or pollution. Please never exceed the maximum air pressure of the chuck of 600 kPa (6 bar). The minimum air pressure is 100 kPa (1 bar).
7. On automatically loaded machines there should be a control, if the chuck will get into the right position while clamping the workpiece.
8. Please let us know first and immediately in every cases, when the chuck works abnormal or it has no function. Our well educated service engineers will support you well and solve your problems soon.
9. On the usage of our clamping systems the valid instructions and laws to avoid accidents must be observed.

3. System description

3.1 Chuck assembly

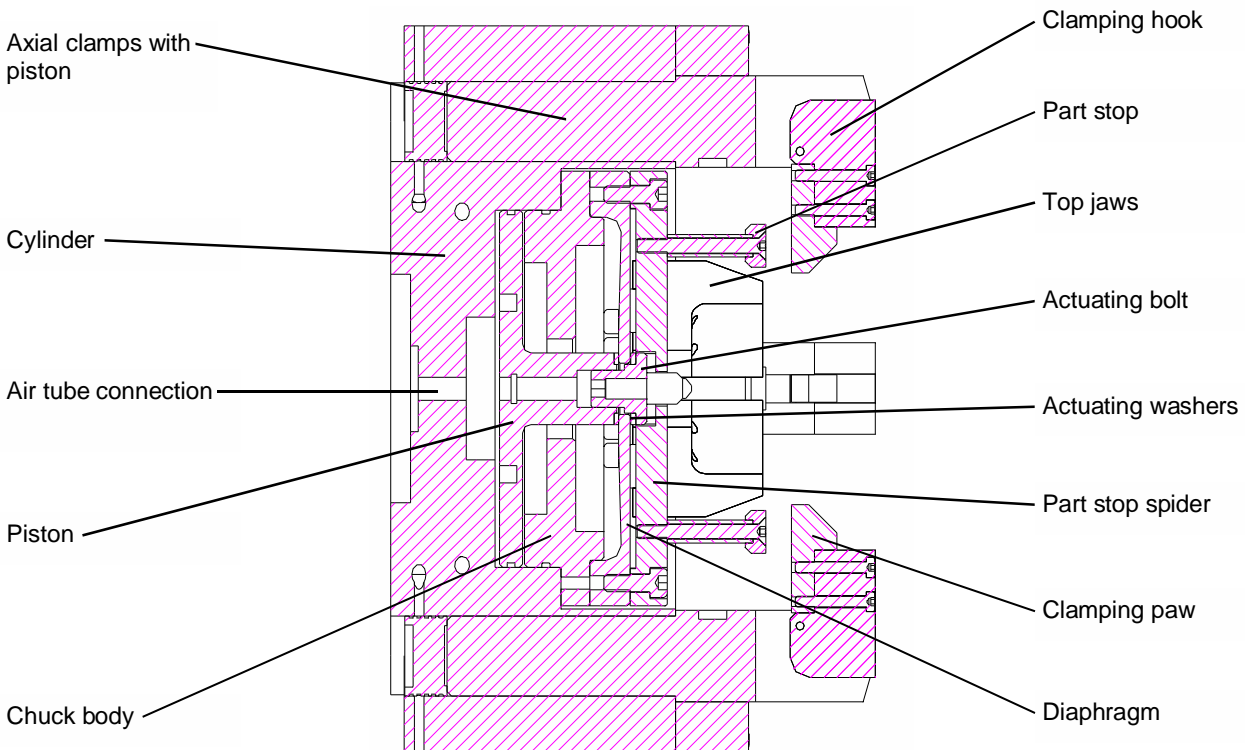


Fig. 1.1

3.2 Function principle

- The workpiece will be loaded while the chuck is fully opened. The built in diaphragm chuck and the axial clamps must be opened. The axial clamps will be opened through a built in piston with air pressure. The diaphragm chuck will be pneumatic actuated and the piston makes a movement forwards. With this movement the diaphragm is vaulted outside and on the diaphragm mounted top jaws will be opened.
- The top jaws of the diaphragm chuck are responsible for centering the workpiece in radial direction. The piston and with it the diaphragm moves backwards by air pressure.
- The top jaws are closing and the workpiece will be centered radially.
- After centering the axial clamps will be closed. Through the built in piston the clamping hooks move downwards and clamp the workpiece with the clamping paws axial against the part stops.
- The machining of the workpiece can be done.
- After successful machining the axial chuck opens reverse. First the axial clamps will be opened, second the top jaws of the diaphragm chuck. The workpiece can be removed out of the axial chuck.

3.3 System construction

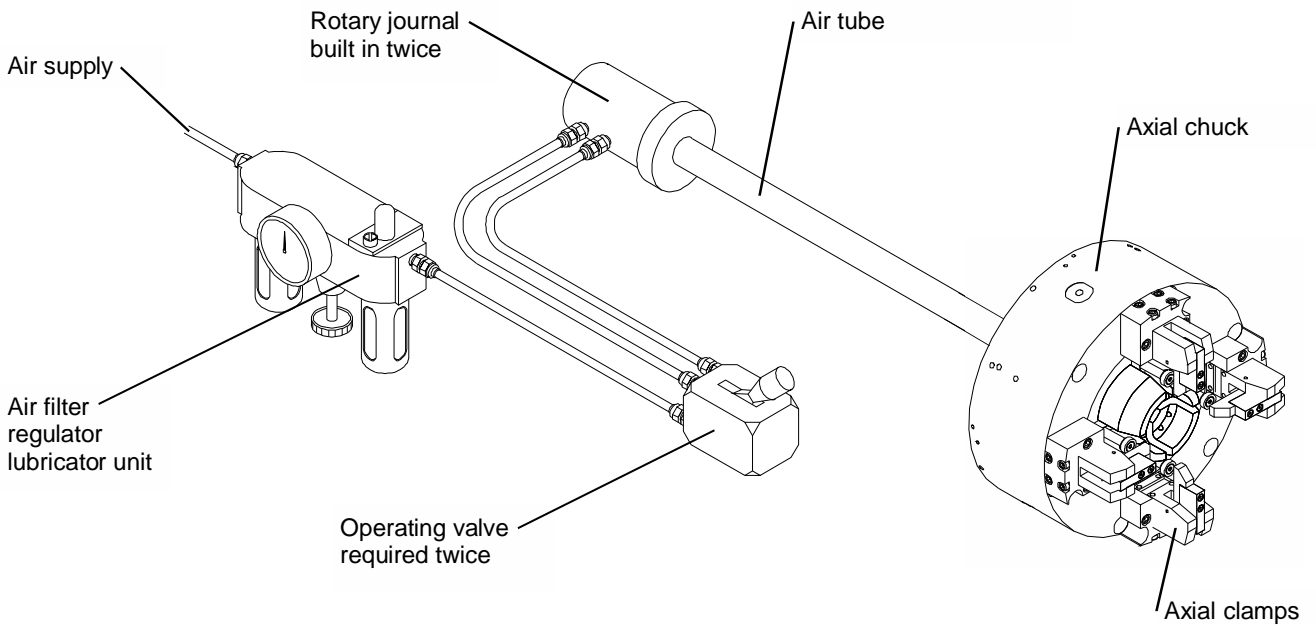


Fig. 1.2

3.4 Detail view air tube assembly

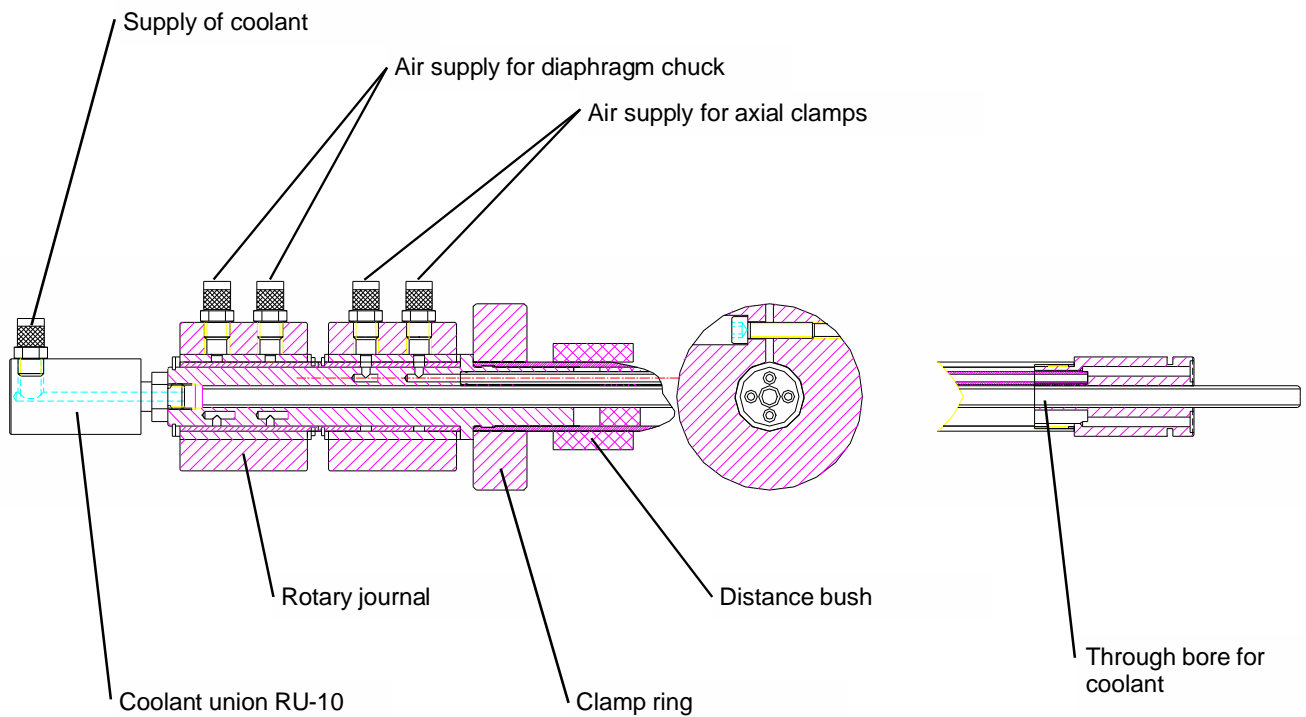


Fig. 1.3

3.5 Mounting of chucks

Attention:

All bolts must be fixed with the in appendix A listed torque.

A. General

1. For the installation of MicroCentric chucks a suitable spindle adapter is required. When you manufacture the spindle adapter by yourself, please take the necessary dimensions out of the DIN-ISO-norms resp. our data sheets. The spindle adapter should get a suitable recess with enough clearance to the pilot diameter of the chuck. The lateral runout may not exceed 2,5 µm. Through the clearance between the recess and the pilot diameter it is possible to adjust a radial runout. The spindle a runout. The spindle adapter must have a through bore for the air tube assembly. Please bring in 6 holes and taps into the spindle adapter for mounting the chuck onto the adapter plate.
2. Make sure that mounting surfaces of chuck, adapter plate and spindle nose are free from nicks or pollution. Please tighten all mounting bolts alternately and equally. It is recommended to use bolts with solidity class 12.9.

B. Adapter-, air tube- and chuck mounting

1. First fix the spindle adapter onto the machine spindle with hand-force. Adjust the adapter by taking out a radial runout. Tighten the mounting screws equally.
2. Push the air tube through the machine spindle and mount it with the security washers into the spindle adapter. At this please pay attention to the mark on the air tube.
3. Mount the chuck onto the spindle adapter, adjust it at the outside diameter radially and tighten the screws over cross equally.
4. Connect control valves, air tube hoses and the air filter-regulator-lubrication unit according Fig. 1.2 and 1.3 carefully.

The Usage of an air filter-regulator-lubrication unit is necessary. Otherwise the chuck can be destroyed. For the actuating of the chuck each control valve can be used, which fulfil the valid instructions and laws to avoid accidents. MicroCentric offers corresponding hand valves, foot valves and pneumatic control units. The chuck should work with low air pressure now.

5. Check the radial runout, in the best case with a master workpiece and if there is a need adjust the chuck again.
6. Actuate chuck and axial clamps several times and verify the chuck system.

4. Air pressure adjustment and clamping set changeover

4.1 Air pressure adjustment

The correct adjustment of the clamping systems should be checked before you start to manufacture a new lot. Different lots could have dimension differences. Please check as follow:

1. Load the workpiece into the opened axial clamps and the opened top jaws of the diaphragm chuck.
2. Pull down the air pressure of the radial clamping (diaphragm chuck) so far, that you can move the workpiece just by hand-force.
3. Increase the air pressure appr. 50 kPa (0,5 bar) for a secure centering of workpiece.
4. Close the Clamping hooks and verify the fixed clamp of the workpiece.

4.2 Clamping set changeover

Diaphragm dismount

1. Open the axial clamps.
2. Move the piston of the diaphragm chuck backwards. Loose and remove the 6 mounting bolts of the diaphragm.

3. Move the piston with low force frontwards.
4. Mount 2 bolts in the free squeeze off threads of the diaphragm. With them you can remove the diaphragm easily from the chuck body. Simultaneous with the mounting of these 2 bolts loose the actuating bolt.
5. Remove the clamping set (diaphragm, part stop, top jaws) from the chuck body. Please pay attention, that you do not loose the actuating washers.

Diaphragm assembly

1. Move the piston into the front position. Bring an actuating washer with the vault side in direction of the diaphragm onto the piston.
2. Mount the diaphragm with 6 bolts in the chuck body, so that the diaphragm has a distance of 2-3 mm to the chuck body. Consider to the position pin of the diaphragm and the correct size of the actuating washer on the piston. Simultaneously mount the actuating bolt with a second actuating washer (vault side in direction to the diaphragm) and fix it.
3. Move the piston with low force backwards. Fix the diaphragm with the 6 mounting bolts equally in the chuck body.

5. Chuck care and maintenance

The lifetime of your MicroCentric chuck can be increased significant through careful and periodical care. The following notices should help you certainly:

1. You do not have to lubricate the chuck periodically.
2. Do never exceed the maximum air pressure. The chuck could be damaged. As a general rule: The closest repeatability is attained at low to middle air pressures. Please adjust the air pressure in all application so low as possible.

3. Protect the chuck and air tube when the system is not on your machine. Please clean it and protect the system against dust and humidity (corrosion). Think always, that the axial chuck should work in the µm-area.
4. When your machine is working with coolant emulsion or dry, please protect the chuck against corrosion while the chuck stands still for a couple of days (e.g. during holidays).
5. The chuck may not dismantled from uneducated employments. When the chuck is dismantled without our agreement, we can not guarantee further for the function and the security of the chuck system.
6. Please call us in all cases, where the chuck is working abnormally or it has no function. Our service engineers will support you to remove faults from your clamping system.

6. Trouble shooting guide

Problems	Possible causes
1. Not enough jaw force	A,B,C,D,J
2. The jaws move too slowly	A,B,C,D,J
3. Excessive vibration	E,F,G,J
4. Excessive body runout	H
5. Chuck does not repeat	C,D,E,F
6. Chuck jaws do not have full travel	C,D,J
7. Air leaks from chuck or through operating valves	I,J
8. Not enough axial clamping	K

Possible causes and solutions:

- A. Air pressure is too low. Check setting air on the air regulator.
- B. Restricted air flow. First check the air tube hoses if they are sealed. Further verify the right mounting and adjustment of the air filter-regulator-lubrication unit and the air regulator. All air tube hoses could have a restricted air flow.
- C. Improper assembly of chuck. If the chuck has been dismantled recently, make sure that all parts of the axial chuck have been cleaned carefully and installed correctly.

- D. Damage. Please check all moveable components if they are crashed, molten or damaged. When you can not find out the problem, you should contact us for a rework of the axial chuck.
- E. Poor preparation or design of top jaws. Top jaws must be machined under load and actual pressure to be used during operation. Reduce top jaw weight as much as possible to minimize the effects of centrifugal force.
- F. The top jaws are not tight enough. Tighten equally.
- G. Unequal weight distribution. Counterbalance as required.
- H. Improper system mounting. Please check the spindle adapter and the spindle nose for damages and pollution. Verify if the mounting bolts are not too long. Tighten the mounting bolts equally and alternately.
- I. Verify the O-Rings. If necessary renew the seals.
- J. The air tube is not mounted correctly with the seals into the spindle adapter. If the seals are damaged, please replace them.
- K. Please verify the part stop and the axial clamps and contact the supplier if you have existing problems.

Appendix A: Torque for mounting bolts

Bolt size	Torque at bolts 8.8	Torque at bolts 12.9
M 5	6,0 Nm	10,4 Nm
M 6	10,4 Nm	17,9 Nm
M 8	25,3 Nm	43,6 Nm
M 10	51,0 Nm	88,0 Nm
M 12	87,0 Nm	150,0 Nm
M 14	139,0 Nm	239,0 Nm

Notices: