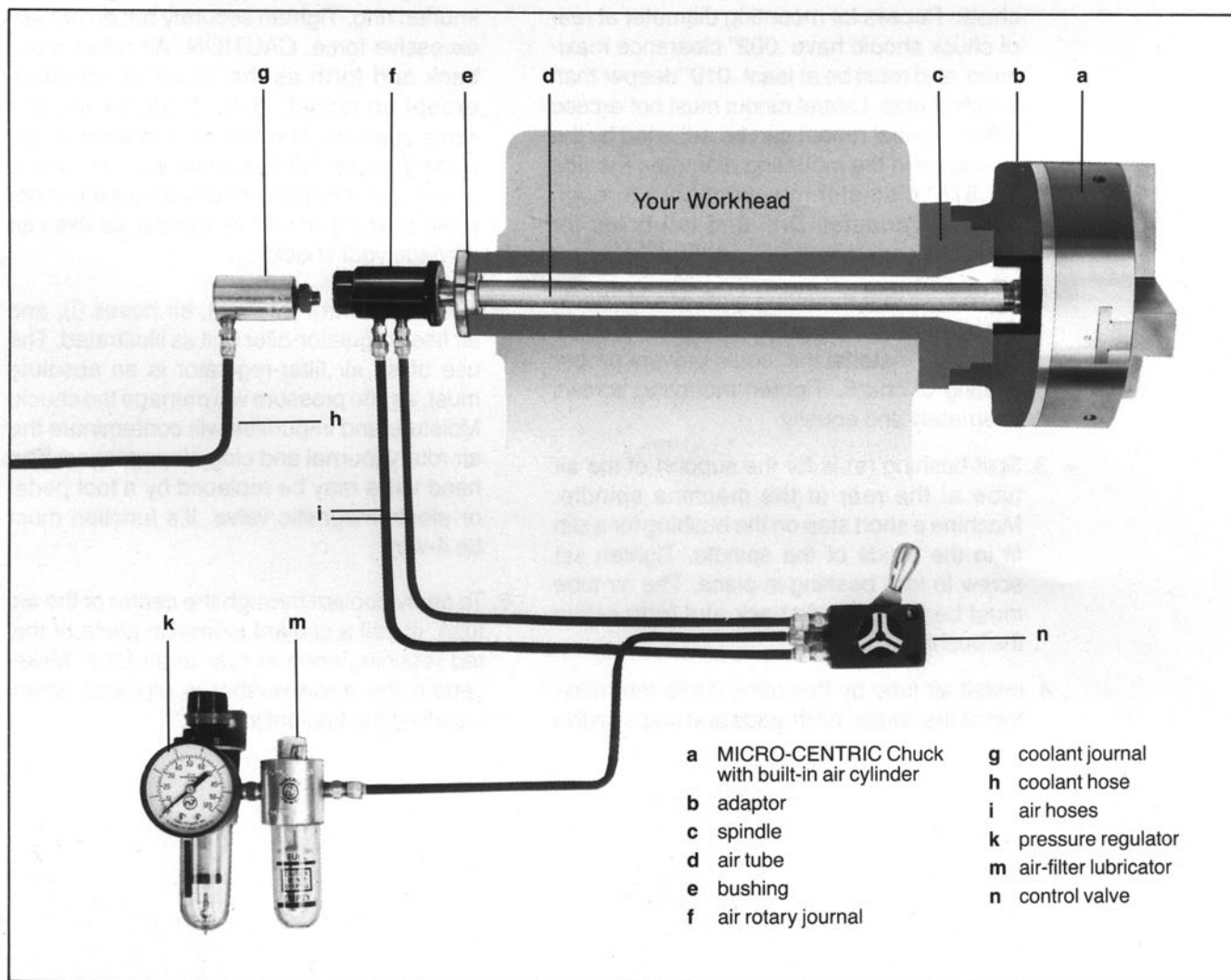




Precision Air Chuck Installation & Service Manual

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Installation

Micro-Centric chucks can be installed on most machine tools within minutes. All that is required is an adapter which fits your machine spindle.

1. Prepare adapter to suit your chuck model. Refer to spec sheet for exact dimensions of chuck. Recess for mounting diameter at rear of chuck should have .002" clearance maximum, and must be at least .010" deeper than length of step. Lateral runout must not exceed .0001". Radial runout can be adjusted by the clearance in the mounting diameter. Provide an .875" diameter minimum bore through center of adapter. Drill and tap holes for mounting screws.
air tube must be clean and free of chips and dirt. Tighten air tube by hand, using the black knurled ring. Tighten securely but do not use excessive force. CAUTION: Air tubes move back and forth as the chuck is actuated, except on models 2-40, 3-50, 34-50, and some specials. The motion is forward on the closing stroke. Make certain your air tube is of sufficient length. Knurled ring must not strike bushing at rear of spindle, as this can damage your chuck.
2. Make sure that mounting surfaces of chuck, adapter, and spindle are free from nicks, burrs, or foreign material that could prevent proper seating of chuck. Tighten mounting screws alternately and equally.
3. Split bushing (e) is for the support of the air tube at the rear of the machine spindle. Machine a short step on the bushing for a slip fit in the inside of the spindle. Tighten set screw to lock bushing in place. The air tube must be free to slide back and forth within the bushing.
4. Install air tube by threading it into the manifold of the chuck. All threads and steps on the
5. Connect control valve (n), air hoses (i), and air filter-regulator-oiler unit as illustrated. The use of an air filter-regulator is an absolute must, as line pressure will damage the chuck. Moisture and impurities will contaminate the air rotary journal and clog air passages. The hand valve may be replaced by a foot pedal or electromagnetic valve. It's function must be 4-way.
6. To apply coolant through the center of the air tube, install a coolant journal in place of the red retaining knob at rear of air tube. Make certain the nylon washer is replaced when installing the coolant journal.

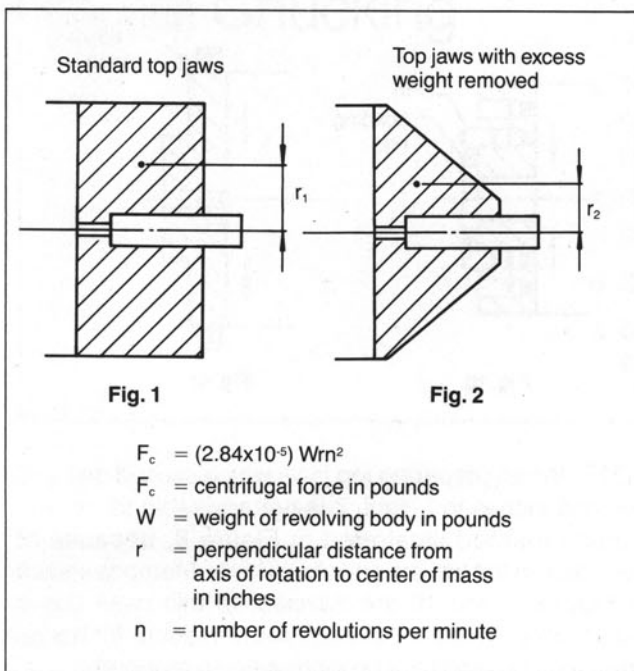
Top jaw design and preparation

Design:

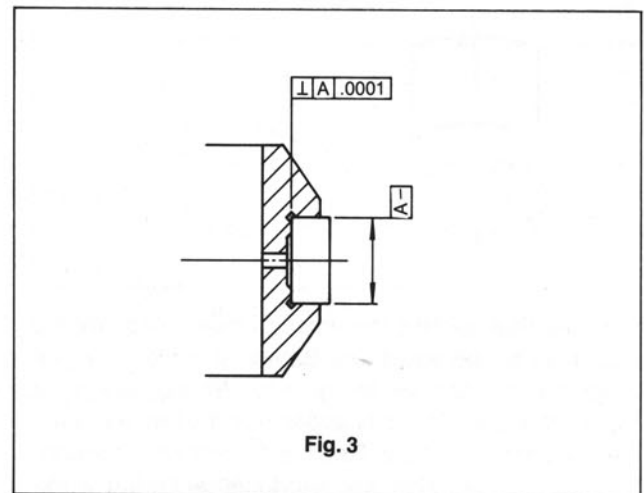
Top jaw design is one of the most important criteria in the overall performance, accuracy, and efficiency of a work-holding system.

To achieve utmost accuracy as well as the best possible holding capability, the following should be considered when designing top jaws.

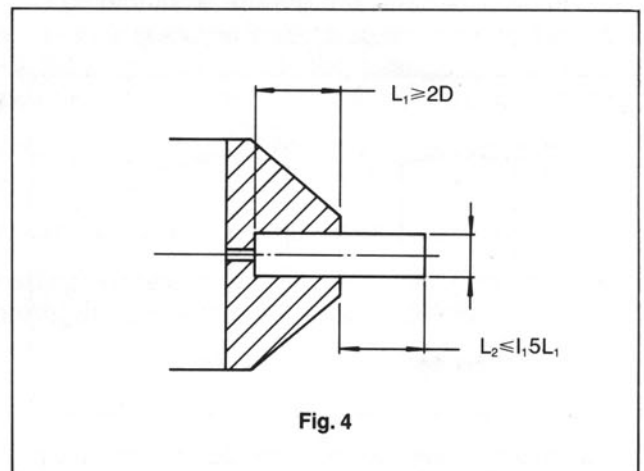
1. Workpieces must have a good finished diameter for precise holding.
2. Grip the workpiece as close to the face of the chuck as possible.
3. Clamping surfaces of top jaws and workpieces must be absolutely clean and free of burrs.
4. For external grip applications lighten the top jaws as much as possible to minimize the effects of centrifugal force. It is important to reduce the weight at the largest radius. Refer to Figures 1 and 2.



5. Short workpieces must have a true face which locates it against a step in the top jaw. Refer to Figure 3.

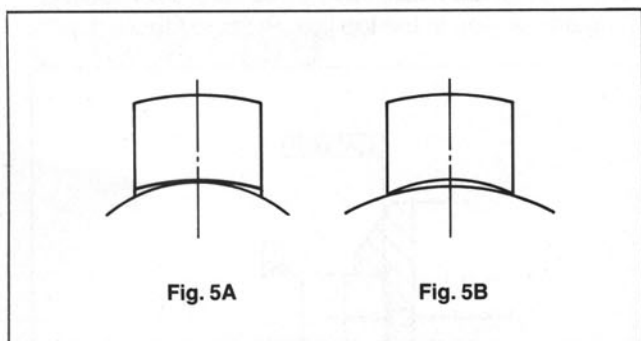


6. Workpieces with no shoulder support must be held on a length twice their diameter. Refer to Figure 4.

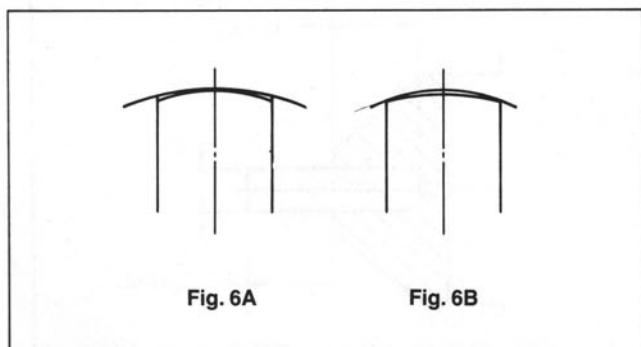


7. Long workpieces should not extend from the top jaws more than one and one half times the length being gripped, unless an end support is used. Refer to Figure 4.

8. For external holding, the finished diameter of the top jaws should be equal to or greater than the largest workpiece diameter in your lot. Where workpiece diameter is significantly smaller than the jaw diameter, a line contact occurs. Refer to Figure 5A. This condition is acceptable and produces accurate workholding. If workpiece diameter is significantly larger than the jaw diameter, a two-line contact at the outer edges of the top jaw occurs. Refer to Figure 5B. This condition is beneficial if greater workholding is desired, but does cause a loss of accuracy.

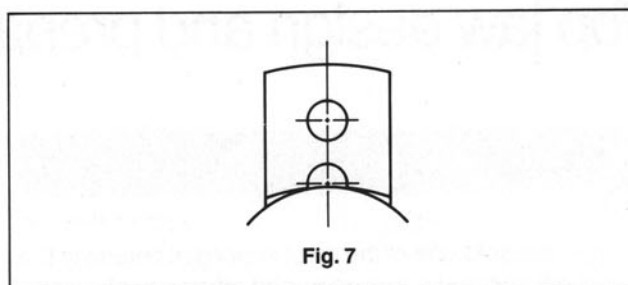


9. For internal holding, the finished diameter of the top jaws should be equal to or smaller than the smallest workpiece diameter in your lot. Where workpiece diameter is significantly larger than the jaw diameter, a line contact occurs. Refer to Figure 6A. This condition is acceptable and produces accurate workholding. If workpiece diameter is significantly smaller than the jaw diameter, a two-line contact at the outer edges of the top jaw occurs. Refer to Figure 6B. This condition is beneficial if greater workholding is desired, but does cause a loss of accuracy.

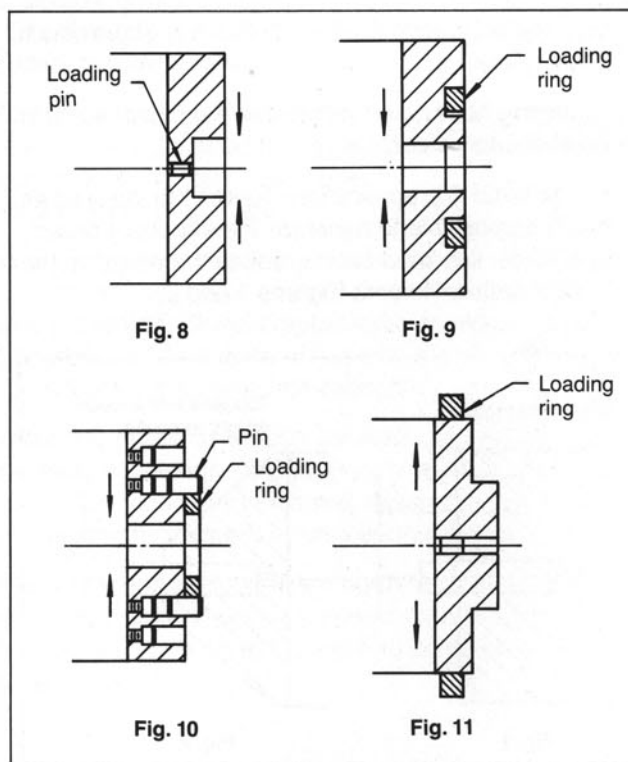


10. In a situation where the counterbored holes in the top jaws interfere with the holding diameter, it is extremely important that the holding diameter is exactly equal to the workpiece diameter. Otherwise a condition of a two-line contact exists as in Figure 7, resulting in a loss of accuracy.

In some instances it may be advantageous to produce special top jaws where the interfering screw hole is eliminated.



11. Top jaws must be machined under load during their preparation and at actual air pressure to be used in production. Figures 8, 9 and 10 illustrate common loading methods for external grip applications. Figure 11 illustrates a loading method for internal grip applications.



NOTE: When preparing top jaws which exceed one and one half inches in height, it is not advisable to use the loading method illustrated in Figure 8, because of deflection in the top jaw and chuck body. Methods shown in Figures 9 and 10 are advised. In this case use a maximum of 30 psi for boring jaws. Pressure for actual workpiece holding may be increased as required.

Preparation

Clean mounting surfaces of jaws. Top jaws should fit snugly on locating pins. Fasten screws tightly and evenly. The chuck should operate freely at an air pressure of 10 psi.

AIR PRESSURE GUIDE: Most finishing operations require 10-30 psi, Medium cutting 30-50 psi, heavier cutting 50 to maximum rated psi.

NOTE: When preparing top jaws on a machine other than the one used for actual production, it is necessary to establish a true diameter and face to be referenced when remounting the chuck on the production machine. With a test indicator make sure the radial runout of the outside diameter of the chuck, and the lateral runout of the face of the chuck are both within .0001". Repeat this procedure when remounting the chuck.

External Chucking

1. Set air pressure to 60 PSI. With jaws in the open position insert largest diameter loading pin. Close jaws on pin several times to assure proper seating. Rough machine jaws to within .010" under required holding diameter.
2. Select air pressure you will actually use during production.
3. Finish holding diameter to an exact fit of your largest lot size. Face banking step, undercut and deburr carefully.

Internal Chucking

1. Set air pressure to 60 PSI. With jaws in the open position insert the smallest diameter loading pin. Close jaws on pin.
2. Turn outside of top jaws until loading ring fits with less than .005" clearance. Remove loading pin. Place loading ring on jaws under load. Open jaws on ring several times to assure proper seating.
3. Rough machine jaws to within .010" larger than required holding diameter.
4. Select air pressure you will actually use during production.
5. Finish holding diameter to an exact fit of your smallest lot size. Face banking step, undercut and deburr carefully.

Chuck care

1. Lubricate the chuck at regular intervals as determined by actual operating conditions. The interval may be each shift or as long as once a week.

A 2 oz. squeeze bottle of E-6 oil is furnished with the chuck.

To lubricate, remove 3 set screws located on the outside diameter of the chuck body. Insert tip of squeeze bottle in oil hole and squeeze several times, opening and closing chuck simultaneously. Oil will appear at the T-slot area of the chuck body. Repeat this procedure for the other two oil holes. Replace set screws.

NOTE: Some models, especially those used for stationary applications may be equipped with grease fittings. Use a suitable grease gun to force lubricant into chuck.

CAUTION: Do not over lubricate.

2. Do not exceed recommended air pressure values. Few devices will perform at their best over a long period if consistently operated at their maximum. Closest repeatability is attained at low to medium air pressure. As a general rule operate the chuck at the lowest air pressure compatible with each job.
3. Disassemble the chuck at regular intervals, as determined by actual operating conditions—at least once a year but possibly as often as every few months—for cleaning, replacement of O-Rings, and to determine effectiveness of lubrication schedule.
4. Protect the chuck and air tube when not on machine. The pilot diameter, threads, and mounting surfaces should be protected from nicks, and any open access to working parts should be covered to keep dirt and chips out.

Recommended Lubricants

Use a petroleum base oil with a tacky additive for good adhesion. One such compound is Mobil E-6, supplied with the chuck.

Use No. 1 Spindle oil or equivalent in air lubricator unit.

CAUTION: Do not use E-6 oil on air rotary journal.

1. Place the chuck face down and remove back cover. Make note of the letter stamped on the face of the piston. It must align with jaw slot no. 1 when reassembling.
2. Remove manifold-piston assembly. If the chuck is in good working order this can be easily done by threading the air tube into the manifold and pulling upward. However, if the slides are binding and the chuck does not operate freely, it will be necessary to remove the 3 actuator covers on the face of the chuck and with a nylon plug, alternately tap each actuator until the assembly is free.

NOTE: Do not disassemble actuators from piston, as they are positioned and pinned in place.

3. Remove master jaws.
4. Clean all parts with mineral spirits or a stoddard solvent and blow dry with light air pressure.
5. Inspect all parts for wear or damage, replace O-Rings if necessary.

NOTE: This chuck is a precision tool. All parts are matched and mated, and they must be assembled in the same location from which they were removed.

1. All sliding surfaces should be liberally coated with lubricating oil.
2. Slide master jaws into their respective T-slots, note numbers engraved on jaws and T-slots.
3. Insert manifold-piston assembly, aligning the letter stamped on face of piston with jaw slot no. 1. Slide piston forward.
4. Engage actuators into slot in master jaw. Slide piston completely forward.
5. Replace back cover.
6. Chuck should operate freely at an air pressure of 10 PSI.

NOTE: Chucks in need of repair should be returned to the factory for skilled fitting to restore original performance and accuracy.

Chuck Disassembly

Chuck Assembly

Trouble shooting guide

Problems

1. Not enough jaw pressure
2. Jaws move too slowly
3. Does not hold at high speeds
4. Excessive vibration
5. Excessive body runout
6. Chuck does not repeat
7. Chuck jaws do not have full travel
8. Air leaks from chuck or through operating valve

Possible causes

- A, B, C, D, E
A, B, C, D, E
A, B, D, F, I
H
J
B, D, E, F, G
B, D, E, K
L, M

Possible causes and solutions

- | | |
|---|---|
| <p>A. Air pressure too low. Check setting on air regulator. Consult jaw force charts on spec sheet.</p> <p>B. Poor lubrication. It may be necessary to disassemble the chuck for a thorough cleaning and lubrication, particularly if the chuck has not been lubricated at frequent regular intervals.</p> <p>C. Restricted air flow. Check air lines. Make sure valve and pressure regulator are correctly installed. Old piping and hoses sometimes have restricted air flow.</p> <p>D. Improper assembly. If the chuck has been repaired recently make sure that all parts have been installed correctly.</p> <p>E. Master jaw binding in chuck body. Remove top jaws. If binding action is no longer present examine for foreign material trapped between master jaw and top jaw. If binding action is still present after removing top jaw, disassemble chuck and examine for galled sliding surfaces. Consult factory for repair information.</p> <p>F. Poor top jaw design and/or preparation. Top jaws must be machined under load and at actual pressure to be used during operation. Reduce top jaw</p> | <p>weight as much as possible to minimize the effects of centrifugal force. Refer to top jaw design section in this manual.</p> <p>G. Top jaws not tight. Tighten equally.</p> <p>H. Unequal weight distribution. Counterbalance as required.</p> <p>I. Loss of grip due to centrifugal force. When operating at speeds above 2500 RPM, centrifugal forces must be considered. Use light top jaws, increase air pressure (within limits), reduce speed. Consider using our Counter-Centrifugal chuck.</p> <p>J. Usually due to poor installation practice. Check for chips, nicks or burrs on spindle mount and adapter. Make sure mounting screws are of proper length. Tighten mounting screws alternately and equally.</p> <p>K. Air tube is too short. Check for interference at rear of spindle.</p> <p>L. Check all O-Rings. Replace as needed.</p> <p>M. Air tube not screwed in completely or not properly seated against teflon washer. Replace washer if damaged.</p> |
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