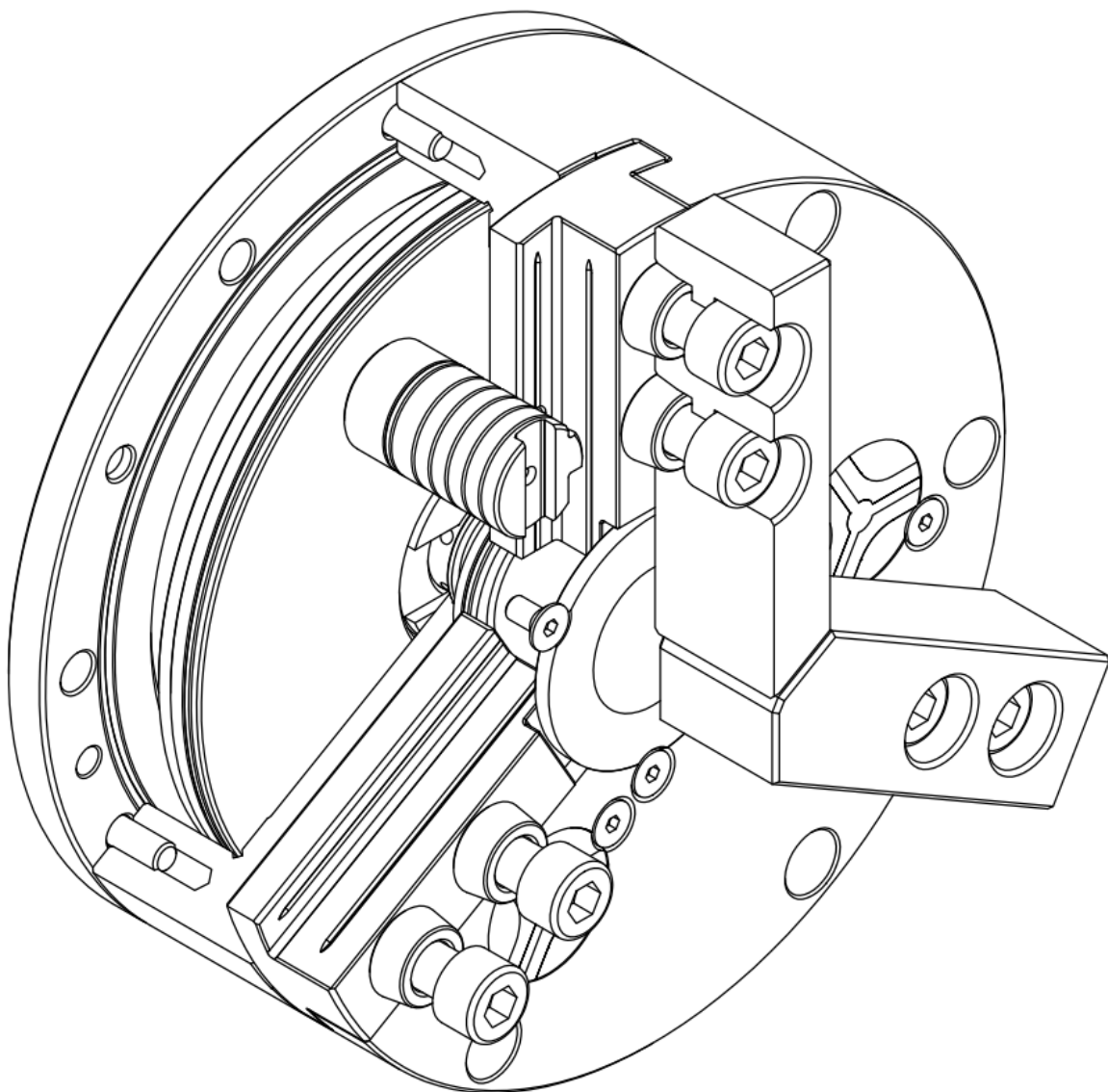




*Technical Documentation  
for Precision Air Chucks*



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## 1.0 CONTACT AND SERVICE INFORMATION

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## 2.0 INTRODUCTION

The ultimate high precision air chuck, MicroCentric air chucks offer unmatched accuracy and long term performance. Their advanced design, high quality hardened alloy steels, and MicroCentric's renowned precision manufacturing capability result in a chuck of unmatched quality.

The information contained in this manual will enable you to obtain the best possible accuracy and long term performance from your MicroCentric air chuck. This manual is also available for download at [microcentric.com](http://microcentric.com).



### SAFETY ALERT SYMBOL

This symbol is used to call attention to items that could be dangerous to you or persons using this equipment. Please read these messages and follow these instructions and safety regulations before use.



### DANGER

Indicates an imminent hazardous condition which, if not avoided, could result in serious injury or death.



### WARNING

Indicates a potentially hazardous condition which, if not avoided, could result in serious injury or death.



### CAUTION

Indicates a potentially hazardous condition which, if not avoided, could result in injury.

### IMPORTANT

Instructions for optimum performance and avoiding errors or misuse of chuck.

### 3.0 PRECAUTIONS FOR SAFE OPERATION



#### **DANGER**



**Switch off power to the machine before installing or changing the chuck.**

- The machine spindle may inadvertently be switched on, and the turret indexed or jogged, potentially causing serious injury to the operator.



#### **DANGER**



**Do not operate the control valve (foot pedal) or solenoid valve during spindle rotation.**

- The workpiece will be thrown from the chuck, potentially causing serious injury to the operator.



#### **DANGER**



**Do not exceed maximum recommended speed of the chuck for a given input pressure.**

- The workpiece can be thrown from the chuck due to inadequate gripping force as a result of centrifugal force.



#### **DANGER**



**Never wear gloves, loose clothing, or ties while operating a machine tool. Secure long hair.**

- Gloves, loose clothing, ties, and long hair can become caught in the chuck causing serious injury to the operator as the spindle is rotated.

**DANGER**

**Always lift the chuck by using an eyebolt or lifting belt, and stand clear of suspended loads.**

- The operator can be injured and the chuck can be damaged if the chuck is dropped.

**WARNING**

**Do not start the machine with the door open.**

- The operator could be injured by cutting chips or other flying debris.

**WARNING**

**Do not exceed the maximum recommended air pressure for a specific chuck model.**

- The workpiece can be thrown from the chuck as a result of damage to the chucks actuating mechanism.

**WARNING**

**Make certain the mounting bolts are securely tightened to the recommended torque values.**

- The chuck could become loose during operation causing damage to the chuck and potentially throwing the workpiece from the chuck.

**WARNING**

**Never attempt to operate a machine tool while under the influence of drugs or alcohol.**

- Damage to the machine, tooling, and chuck, or serious injury to the operator could result.

**WARNING**

**Remember to lubricate the chuck at regular intervals as specified in this manual.**

- The workpiece can be thrown from the chuck due to a loss of gripping force caused by insufficient lubrication.

**WARNING**

**Do not attempt to modify the chuck.**

- The workpiece can be thrown from the chuck due to damage which may be caused to the chuck.

**WARNING**

**Long workpieces should be supported by a live center in the tail stock or by a steady rest.**

- The workpiece can be thrown from the chuck if it is too long and not properly supported.

**WARNING****Remove eyebolts after use.**

- Rotating the chuck without removing eye bolts may cause them to be thrown from the chuck, potentially causing serious injury.

**WARNING****Disassemble and clean chuck according to Section 13.0.**

- Failure to properly disassemble and clean the chuck can lead to insufficient clamping force, and the workpiece can be thrown from the chuck.

**CAUTION****Ensure workplace is clean.**

- Danger of slipping and falling from a dirty floor, such as lubricants or oil.

**CAUTION****Always make sure to keep your hands and fingers clear of the top jaws and workpiece as the chuck is clamped.**

- The operator can be seriously injured if a finger or hand is clamped between the top jaw and the workpiece.





## CAUTION



**Do not touch machined workpieces with bare hands.**

- Machined workpieces may be very hot, and may cause burns.



## CAUTION



**Remove workpiece when stopping the machine for an extended period of time.**

Clamping force may be lost unexpectedly, causing the workpiece to drop.



## CAUTION



**Never hit the outside of the chuck, top jaws, or workpiece with a hammer.**

- The workpiece can be thrown from the chuck if the chuck is damaged.

## 4.0 RECOMMENDED TIGHTENING TORQUE FOR MOUNTING SCREWS

| SOCKET HEAD CAP SCREW SIZE<br>(CLASS 12.9) | M5  | M6  | M8 | M10 | M12 | M14 | M16 | M20 |
|--|-----|-----|----|-----|-----|-----|-----|-----|
| TIGHTENING TORQUE [N*m]                    | 7.5 | 13  | 33 | 73  | 107 | 171 | 250 | 402 |
| TIGHTENING TORQUE [lb*ft]                  | 5.5 | 9.6 | 24 | 54  | 79  | 126 | 184 | 297 |

## 5.0 AIR CHUCK SPECIFICATIONS

| Chuck Size       | Chuck Model | No. of Jaws | Chuck Accuracy | Jaw Stroke | Maximum Clamp Force | Maximum Air Pressure | Maximum rpm | Chuck Weight |
|------------------|-------------|-------------|----------------|------------|---------------------|----------------------|-------------|--------------|
| 3 inch<br>80mm   | 3-50-3      | 3           | .00005"        | .050"      | 920 lb              | 100 psi              | 6,000       | 3.0 lb       |
|                  |             |             | 0.0012mm       | 1.3mm      | 4.1 kN              | 0.7 Mpa              |             | 1.4 kg       |
|                  | 3-50C-3     | 3           | .00005"        | .050"      | 920 lb              | 100 psi              | 6,000       | 3.0 lb       |
|                  |             |             | 0.0012mm       | 1.3mm      | 4.1 kN              | 0.7 Mpa              |             | 1.4 kg       |
| 4 inch<br>100mm  | 4-40-3      | 3           | .00005"        | .040"      | 1,520 lb            | 100 psi              | 6,000       | 6.1 lb       |
|                  |             |             | 0.0012mm       | 1.0mm      | 6.8 kN              | 0.7 Mpa              |             | 2.8 kg       |
|                  | 4-120-3     | 3           | .00005"        | .120"      | 1,520 lb            | 100 psi              | 6,000       | 6.9 lb       |
|                  |             |             | 0.0012mm       | 3.0mm      | 6.8 kN              | 0.7 Mpa              |             | 3.1kg        |
|                  | 4-360-3     | 3           | .00005"        | .360"      | 1,300 lb            | 100 psi              | 4,000       | 7.9 lb       |
|                  |             |             | 0.0012mm       | 9.1mm      | 5.8 kN              | 0.7 Mpa              |             | 3.6 kg       |
| 6 inch<br>150mm  | 6-40-3      | 3           | .00005"        | .040"      | 3,820 lb            | 100 psi              | 4,000       | 14.1 lb      |
|                  |             |             | 0.0012mm       | 1.0mm      | 17.0 kN             | 0.7 Mpa              |             | 6.4 kg       |
|                  | 6-120-3     | 3           | .00005"        | .120"      | 3,820 lb            | 100 psi              | 4,000       | 15.9 lb      |
|                  |             |             | 0.0012mm       | 3.0mm      | 17.0 kN             | 0.7 Mpa              |             | 7.2 kg       |
|                  | 6-360-3     | 3           | .00005"        | .360"      | 3,275 lb            | 100 psi              | 3,000       | 18.3 lb      |
|                  |             |             | 0.0012mm       | 9.1mm      | 14.6 kN             | 0.7 Mpa              |             | 8.3 kg       |
| 8 inch<br>200mm  | 8-120-3     | 3           | .00005"        | .120"      | 6,570 lb            | 100 psi              | 3,500       | 42.2 lb      |
|                  |             |             | 0.0012mm       | 3.0mm      | 29.2 kN             | 0.7 Mpa              |             | 19.1 kg      |
|                  | 8-360-3     | 3           | .00005"        | .360"      | 5,630 lb            | 100 psi              | 2,500       | 45.2 lb      |
|                  |             |             | 0.0012mm       | 9.1mm      | 25.1 kN             | 0.7 Mpa              |             | 20.5 kg      |
| 10 inch<br>250mm | 10-220-3    | 3           | .00005"        | .220"      | 10,330 lb           | 100 psi              | 3,000       | 75.2 lb      |
|                  |             |             | 0.0012mm       | 5.6mm      | 46.0 kN             | 0.7 Mpa              |             | 34.1 kg      |
|                  | 10-400-3    | 3           | .00005"        | .400"      | 8,850 lb            | 100 psi              | 2,000       | 75.2 lb      |
|                  |             |             | 0.0012mm       | 10.2mm     | 39.4 kN             | 0.7 Mpa              |             | 34.1 kg      |
| 12 inch<br>300mm | 12-220-3    | 3           | .0002"         | .220"      | 13,125 lb           | 100 psi              | 2,250       | 110 lb       |
|                  |             |             | 0.005mm        | 5.6mm      | 58.4 kN             | 0.7 Mpa              |             | 49.9 kg      |
|                  | 12-400-3    | 3           | .0002"         | .400"      | 11,250 lb           | 100 psi              | 1,850       | 110 lb       |
|                  |             |             | 0.005mm        | 10.2mm     | 50.1 kN             | 0.7 Mpa              |             | 49.9 kg      |
| 14 inch<br>350mm | 14-220-3    | 3           | .0002"         | .220"      | 20,640 Lb           | 100 psi              | 2,250       | 156 lb       |
|                  |             |             | 0.005mm        | 5.6mm      | 91.9 kN             | 0.7 Mpa              |             | 70.8 kg      |
|                  | 14-400-3    | 3           | .0002"         | .400"      | 17,690 Lb           | 100 psi              | 1,850       | 156 lb       |
|                  |             |             | 0.005mm        | 10.2mm     | 78.7 kN             | 0.7 Mpa              |             | 70.8 kg      |
| 16 inch<br>400mm | 16-220-3    | 3           | .0002"         | .220"      | 23,520 lb           | 100 psi              | 2,000       | 257 lb       |
|                  |             |             | 0.005mm        | 5.6mm      | 104.7 kN            | 0.7 Mpa              |             | 116.6 kg     |
|                  | 16-400-3    | 3           | .0002"         | .400"      | 20,160 lb           | 100 psi              | 1,500       | 257 lb       |
|                  |             |             | 0.005mm        | 10.2mm     | 89.7 kN             | 0.7 Mpa              |             | 116.6 kg     |

## 6.0 MAXIMUM CLAMPING FORCE AND SPINDLE SPEED

### 6.1 MAX. STATIC CLAMPING FORCE

The static clamping force developed by air chucks will vary depending on several variables including the state of lubrication of the chuck, the type of grease used, the height of the top jaws, among other factors. MicroCentric's standard specifications for air chucks are based on the following conditions:

1. A standard height top jaw is used.
2. Jaw force is measured at the mid point (in height) of a standard jaw blank, at mid stroke with a jaw force gage.
3. MicroCentric's recommended grease is used to obtain maximum efficiency of the chuck.
4. The mounting bolts on the top jaws are tightened to the specified torque.
5. The recommended air pressure is applied to the chuck.

### 6.2 MAX. RECOMMENDED SPEED

The maximum recommended speed for air chucks is defined as the speed at which the measured clamping force during rotation is reduced by 2/3 of the static value. Dynamic clamping force is measured under the following conditions:

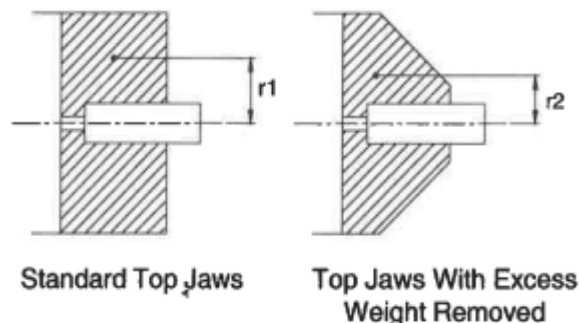
1. A standard jaw height is used.
2. Jaw force is measured at the mid point (in height) of a standard jaw blank, at mid stroke with a dynamic jaw force gage.
3. The chuck is sufficiently lubricated with MicroCentric's recommended grease to obtain maximum efficiency of the chuck.
4. The mounting bolts on the top jaws are tightened to the specified torque.
5. The maximum recommended air pressure is applied to the chuck.

### 6.3 CENTRIFUGAL FORCE

Centrifugal force acts on the chuck jaws during rotation. It is important to always reduce the weight of the top jaw as much as possible for each application to minimize the effects of centrifugal force, and consequently, the loss of clamping force during rotation.

#### IMPORTANT

**Always reduce the weight of the top jaw as much as possible to minimize the clamping force loss as the chuck rotates.**



#### CAUTION

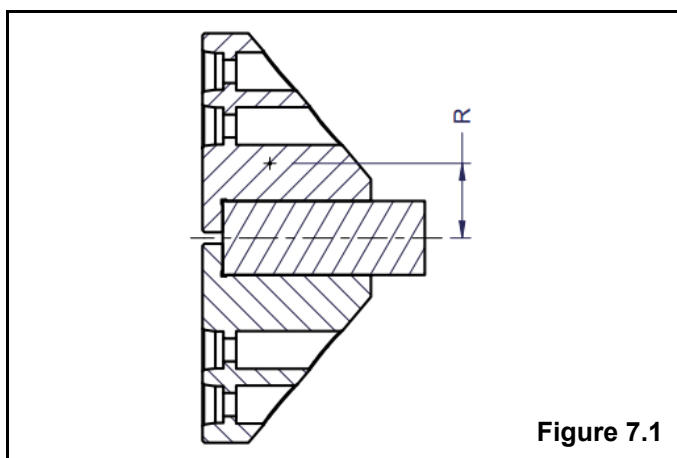
**When using top jaws which are taller and more massive than the standard jaw, a greater amount of clamping force will be lost due to centrifugal force which acts on the top jaw. The maximum recommended speed under these conditions will be less than the value for the standard top jaws.**

## 7.0 DESIGN AND MACHINING OF TOP JAWS

### 7.1 TOP JAW DESIGN

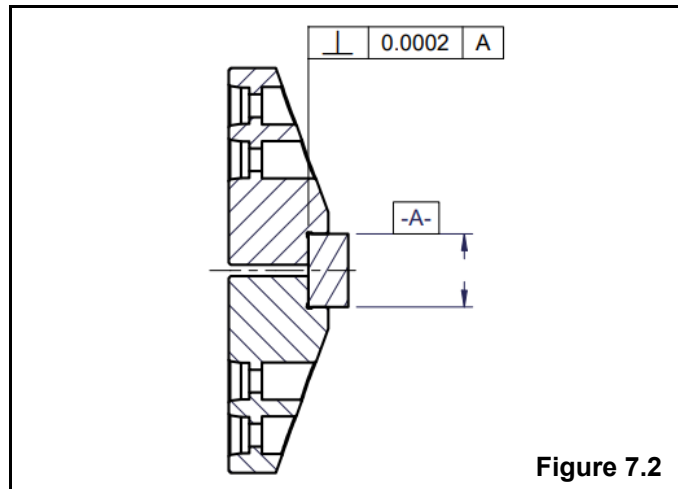
Top jaw design is one of the most important elements in the overall performance, accuracy, and efficiency of a workholding system. To achieve the maximum possible accuracy, as well as optimize the chuck's clamping capability, the following points should be considered in the design and machining of top jaws.

1. A workpiece must have an accurately machined holding diameter, in terms of size tolerance, roundness, and perpendicularity to the locating surface, for precise chucking.
2. When chucking thin walled workpieces, the size and roundness tolerances of the holding diameter will determine the degree to which the workpiece is distorted during chucking, and how accurately the workpiece can be machined.
3. The workpiece should be clamped as close to the face of the chuck as possible.
4. The clamping surfaces of the workpiece and top jaws must have smooth surface finishes, and must be absolutely clean and free of burrs.
5. For external clamping applications, the mass of the top jaws should be reduced as much as possible to minimize the effects of centrifugal force. It is especially important to reduce weight at the largest radius. Refer to Figure 7.1.



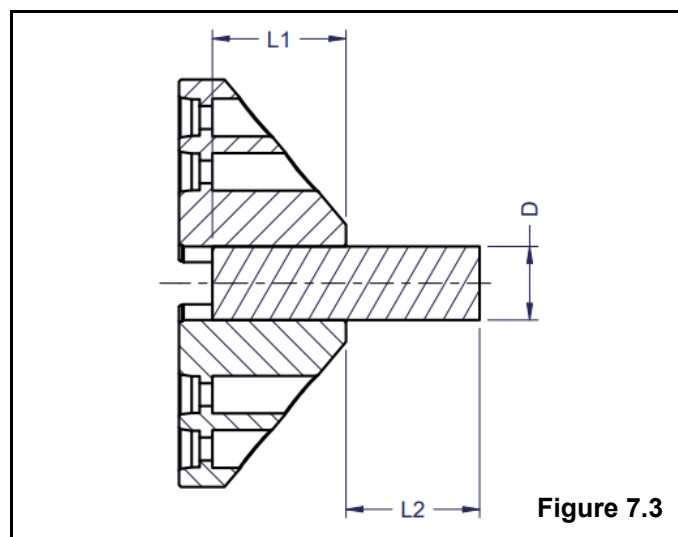
**Figure 7.1**

6. Short workpieces must have a square locating face on which they are banked, in order to ensure the part is clamped accurately. Refer to Figure 7.2.



**Figure 7.2**

7. Workpieces with no shoulder support must be clamped on a length twice their diameter. Refer to Figure 7.3.



**Figure 7.3**

8. Long workpieces should not extend beyond the face of the top jaws more than one and one half times the length being clamped, unless an end support is used. Refer to Figure 7.3.

9. In situations where the top jaws' counter bored mounting bolt holes interfere with the clamping diameter, it is very important that the top jaw's clamping diameter is machined to the exact diameter of the workpiece diameter. Otherwise two-line contact occurs during clamping as shown in Figure 7.4, which will result in a loss of chucking accuracy.

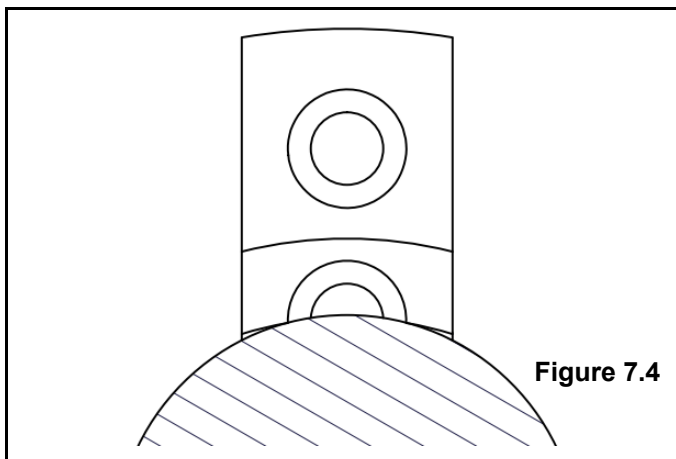


Figure 7.4

## 7.2 EXTERNAL CHUCKING TOP JAWS

1. For external chucking applications, the clamping diameter of the top jaws should be equal to or slightly larger than the upper tolerance limit of the workpiece's clamping diameter.
2. When the workpiece's clamping diameter is smaller than the top jaws' clamping diameter, line contact occurs during clamping as illustrated in Figure 7.5. This condition is acceptable and will produce accurate and concentric workholding.
3. If the workpiece's clamping diameter is larger than the top jaw's clamping diameter, a two-line contact occurs during clamping as shown in Figure 7.6. This condition is beneficial for high clamping force applications, but usually results in a loss of chucking accuracy.

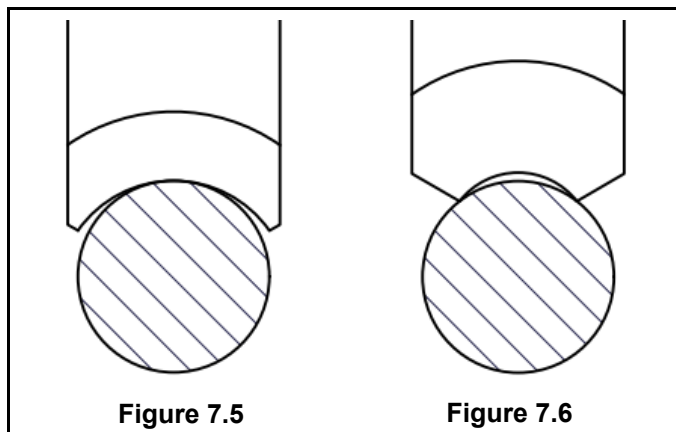


Figure 7.5

Figure 7.6

## 7.3 INTERNAL CHUCKING TOP JAWS

1. For internal clamping applications, the clamping diameter of the top jaws should be equal to or smaller than the lower tolerance limit of the workpiece's clamping diameter.
2. When the workpiece's clamping diameter is larger than the top jaws' clamping diameter, a line contact occurs during clamping as shown in Figure 7.7. This condition is acceptable and will produce accurate and concentric workholding.
3. If the workpiece's clamping diameter is smaller than the top jaws' clamping diameter, two line contact occurs during clamping as shown in Figure 7.8. This condition is beneficial for high clamping force applications, but results in a loss of chucking accuracy.

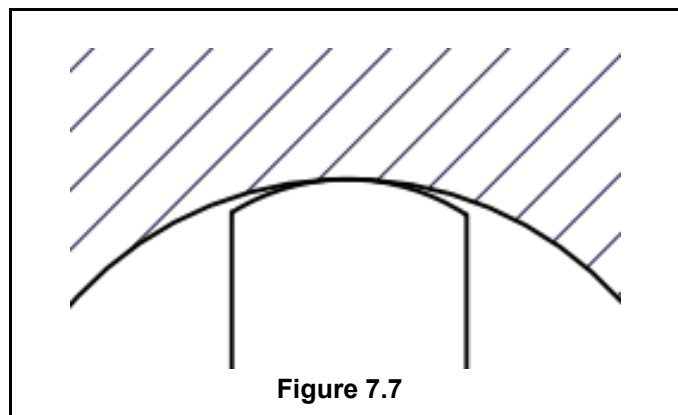


Figure 7.7

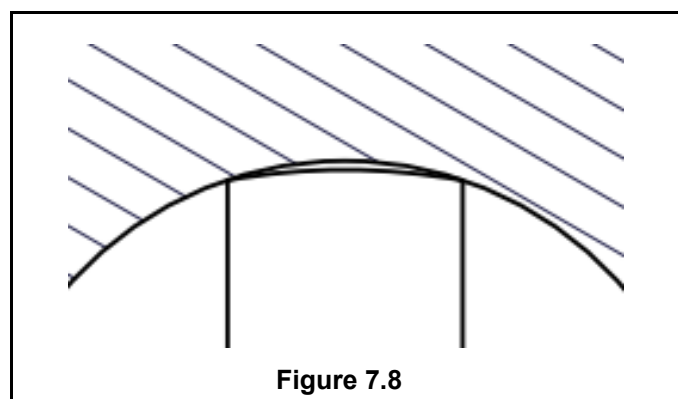
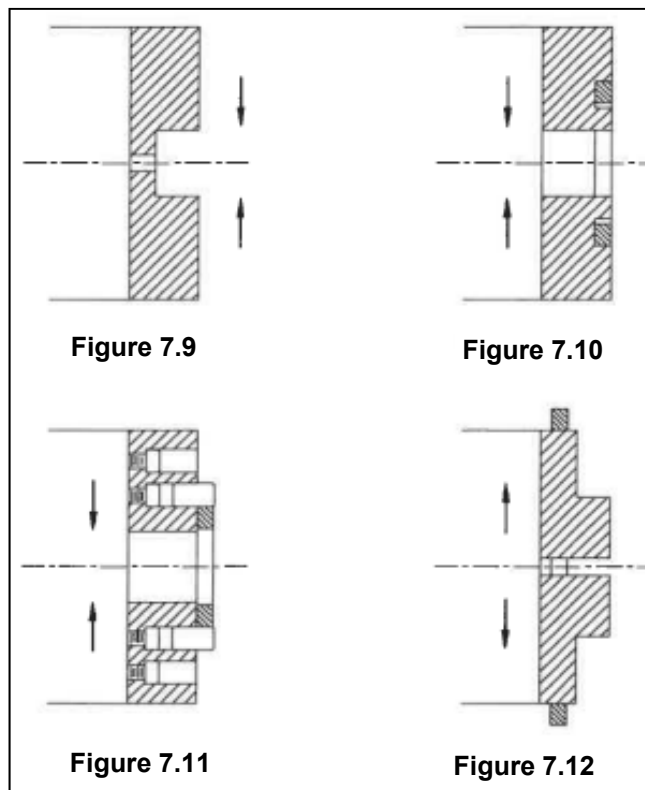


Figure 7.8

## 7.4 MACHINING OF TOP JAWS

To achieve the best possible chucking accuracy, it is necessary to finish machine the clamping diameter and locating face of the top jaws on the chuck, under load. The method by which the jaws are loaded, together with the surface finish of the clamping and locating surfaces, as well as the size of the clamping diameter, will determine the overall accuracy and clamping capability of the chuck. Consider the following when machining top jaws:

1. Always load the chuck in the same direction the chuck is clamping. For OD holding applications the chuck must be closed on a loading pin or ring. For ID applications the chuck must open on a loading ring.
2. The position at which the chuck is loaded during machining of the top jaws, determines the position within the total stroke of the chuck that the workpiece will be clamped. Top jaws should be machined at the upper end of the chuck's stroke (closer to full open) to permit re-boring of the jaws. Re-boring of the jaws can be accomplished by loading the chuck further down in the stroke with a smaller diameter pin or ring.
3. Loading the top jaws further down in the chuck's stroke (near fully closed) allows greater clearance for applications where the workpiece is automatically loaded. An opening of .040" (1mm) on diameter is recommended for automatic loading.
4. Top jaws should be machined at the same air pressure which will be used to clamp the workpiece during production. In instances where either the loading ring or the top jaws are subject to deflection during loading, it is recommended that the top jaws be machined at an air pressure lower than that to be used during production.
5. Several recommended loading configurations are illustrated in Figures 7.9, 7.10, and 7.11 for OD clamping applications and 7.12 for ID clamping. The loading configuration shown in 7.10 should not be used with top jaws exceeding 2.00" (50mm) in height.
6. Carefully clean the mounting surfaces of the master jaws and top jaws before mounting the top jaws to the chuck. The top jaws should fit snugly on the locating pins or QC buttons. On dowel pin located jaws, first tighten the jaw mounting screws lightly, then clamp the loading pin or ring several times with light air pressure to assure that the top jaws are

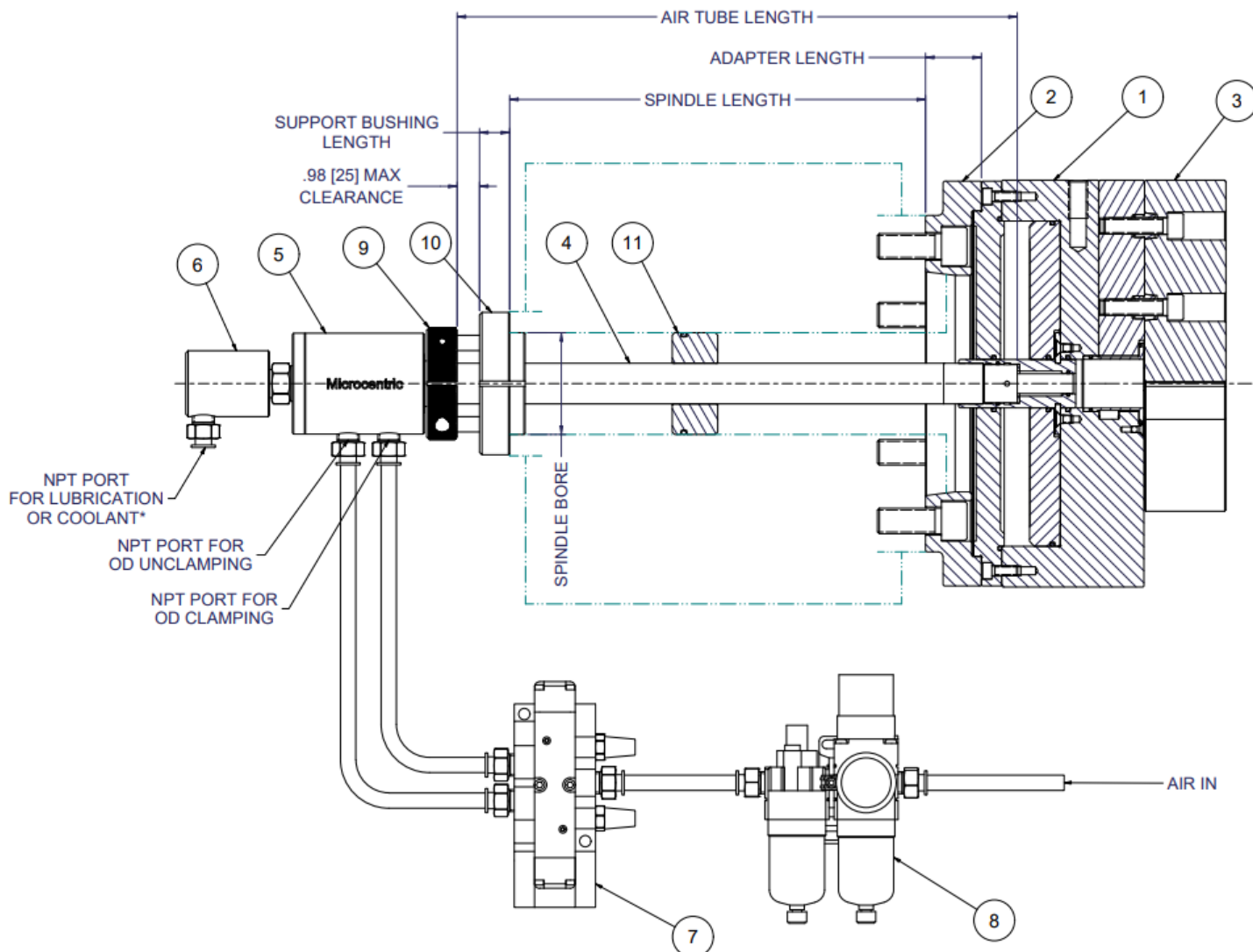


properly seated. With the chuck clamped on the loading pin, tighten the mounting bolts to the torque specifications given in Section 4.0. On QC located jaws just tighten the mounting bolts after they are installed on the chuck.

7. Top jaws can be rough machined on a turning fixture, but should be finish machined under load on the chuck to achieve best chucking accuracy.
8. Dowel pin located top jaws must be re-machined when they are reinstalled on the chuck to achieve best chucking accuracy.
9. When top jaws are finished on a machine other than the one used in production, it is necessary to establish a true reference diameter and face which is to be indicated when mounting the chuck.



## 8.0 AIR CHUCK SYSTEM ASSEMBLY



| ITEM NO. | TITLE              |
|----------|--------------------|
| 1        | AIR CHUCK          |
| 2        | ADAPTER            |
| 3        | TOP JAW            |
| 4        | AIR TUBE           |
| 5        | AIR ROTARY JOURNAL |
| 6        | ROTARY UNION*      |

| ITEM NO. | TITLE  |
|----------|--|
| 7        | VALVE (MANUAL/ELECTRONIC)                      |
| 8        | FILTER REGULATOR<br>LUBRICATOR (FRL) WITH GAGE |
| 9        | KNURLED RING                                   |
| 10       | SUPPORT BUSHING                                |
| 11       | CENTER SUPPORT BUSHING**                       |

\* OPTIONAL. FOR COOLANT, LUBRICANTION, AIR SENSING, OR AIR BLAST.

\*\* RECOMMENDED FOR SPINDLE LENGTHS > 750mm

## 9.0 MOUNTING OF CHUCK

Air chucks are typically mounted to a machine spindle with an adapter plate. Refer to the chuck assembly drawing to familiarize yourself with the chuck's components before mounting the chuck.

### 9.1 MOUNTING ADAPTER PLATE

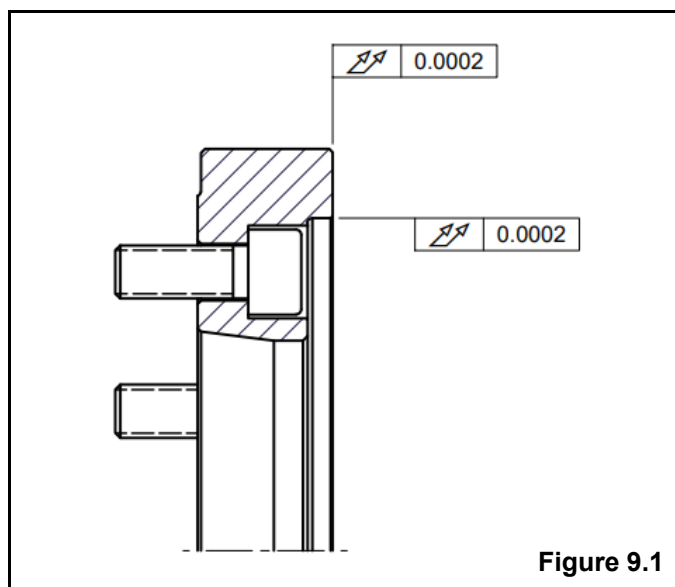
1. Make certain that the spindle and mounting plate are clean and free of nick, burrs, and foreign materials which would prevent the proper seating of the adapter plate.
2. Mount the adapter plate to the machine spindle. Do not fully tighten the mounting bolts at this time. First indicate the radial runout of the pilot diameter, and lateral runout of the mounting face as described in step 3.
3. Use a dial indicator to measure the radial and lateral runout of the mounting surfaces of the adapter plate. Both radial and face runout should not exceed .0002" (0.005mm). Adjust the radial runout to within .0002" (0.005mm) before fully tightening the mounting bolts. If the face runout exceeds .0002" (0.005mm), remove the adapter from the spindle nose and verify that the adapter plate is seating properly and is clean and free of nicks and burrs. A skim cut can be taken on the mounting face of the adapter once it is mounted to the spindle to assure the face is running true.
4. Tighten the mounting bolts alternately to the torque specifications given in Section 4.0.

### 9.2 MOUNTING CHUCK ASSEMBLY

1. Tighten the mounting bolts alternately but do not fully tighten them at this point.
2. Indicate the OD of the chuck body and adjust the runout to within .0002" (0.005mm) TIR.
3. After the runout of the chuck's OD has been adjusted, tighten the mounting bolts to the torque specifications given in Section 4.0.

### 9.3 MOUNTING TOP JAWS

1. Make certain that the mating faces are clean and free of nick, burrs, and foreign materials which would prevent the proper seating of jaws.
2. Be sure to assemble the correct numbered top jaw to each corresponding master jaw.
3. Tighten the mounting bolts alternately, to the torque specifications given in Section 4.0.
4. Ensure that the bottom surface of each top jaw is flush to the top surface of each master jaw.



### IMPORTANT

**The runout of the mounting plate should not exceed .0002" (.005mm) radially, and .0002" (.005mm) laterally.**

### IMPORTANT

**The runout of the OD of the chuck body should not exceed .0002" (.005mm).**



## 10.0 MOUNTING OF AIR TUBE

### 10.1 AIR TUBE PRECAUTIONS

1. An air filter-regulator-lubricator unit must be installed to assure proper operation.
2. The air tube must be of proper length with a minimum of 15mm to a maximum of 25mm clearance at the rear of the machine spindle.
3. The air journal bearing requires continuous lubrication. Lubricated air is supplied by the air filter-regulator-lubricator unit.
4. Recommended lubricant is light spindle oil: (Mobil Velocite no. 6 or equivalent).

### 10.2 AIR TUBE INSTALLATION

1. The air tube must be supported by the split bushing provided. Machine a short step on the bushing for a slip fit into the spindle as shown above. Tighten the set screw on the bushing to secure it in place. The air tube must be free to rotate. When the moving manifold option is ordered, the air tube must be free to slide back and forth within the bushing.
2. Install the tube by threading it into the manifold of the chuck. All threads and steps on the air tube must be free of chips and dirt. Tighten the tube by hand using the black knurled ring. Tighten securely, but do not use excessive force. Make certain your air tube is of sufficient length to allow a minimum of 15mm to a maximum of 25mm clearance at the rear of the machine spindle. When the moving manifold option is ordered, knurled ring must not strike the bushing at rear of spindle, as this can damage your chuck.
3. The air tube assembly supplied with a high speed chuck includes a drive pin to prevent the air tube from unthreading during operation. Make certain the drive pin is engaged into the machined slot in the knurled ring.
4. Connect control valve, air hoses, and air filter regulator lubricator unit as illustrated. The use of an air filter-regulator is essential, as line pressure will damage the chuck. Moisture and impurities will contaminate the air rotary journal and clog air passages. The valve may be a hand valve, a foot pedal, or an electromagnetic valve. It's function must be 4-way.

5. If the chuck does not operate, or if it does not generate appropriate holding force, verify that the air tube is threaded firmly into the chuck.
6. Actuate the chuck to verify that it is functioning properly by measuring the stroke of each jaw. If the jaws do not make their full stroke, check that the air flow is not being restricted, the spindle data that was specified when the chuck was ordered is correct, or that the air tube was correctly manufactured.

### 10.3 ROTARY UNION INSTALLATION

1. To apply coolant or lubrication through the center of the air tube, install a rotary union in place of the red retaining knob at rear of air tube.
2. To install, clean the end of the air tube thoroughly.
3. Chuck rotary union only at its housing, and attach flexible hose with sealant or PTFE tape. Be sure not to damage housing.
4. Attach rotary union onto the air tube with sealant or PTFE tape.
5. Check union for leaks, and ensure there are no strains, torsional stresses, or sharp bends in the hose.

#### IMPORTANT

**Make sure that the air pressure is set within the specified limits of the chuck model.**

#### IMPORTANT

**Minimum rate of lubrication within filter regulator lubricator is 1 drop per minute.**

#### IMPORTANT

**Do not move the knurled ring. Aside from convenient grip during tightening, the ring functions as a clamp, securing the outer tube to the journal.**

## 11.0 QC JAW LOCATING SYSTEM

### 11.1 QC SYSTEM OVERVIEW

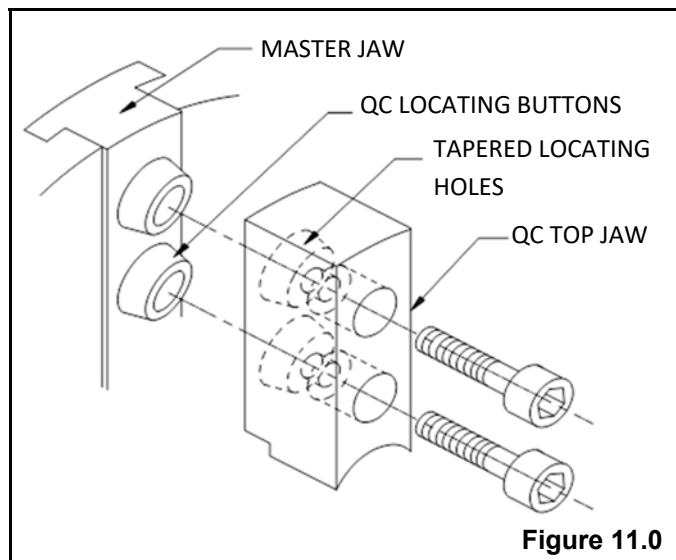
The QC system locates each top jaw on two tapered buttons mounted in each master jaw. The top jaw is located on both the taper and the face of the master jaw to effectively eliminate any clearances between the master jaw and the top jaw. This feature assures accurate relocation of the top jaw when repositioned on the chuck.

### 11.2 QC JAW INSTALLATION

1. First make sure that the locating surfaces of the top jaws, master jaws, and QC buttons are completely clean and free from nicks, burrs, or any foreign matter which would prevent proper seating of the top jaws.
2. It is advised that each top jaw be stamped or marked 1, 2, and 3 so that they can be mounted to the correspondingly marked master jaw for later reference.
3. Mount the top jaw no. 1 onto master jaw no. 1.
4. Insert the mounting screws into the top jaw and tighten each screw to the torque specifications given in Section 4.0.

### 11.3 QC JAW REMOVAL

1. First loosen the mounting screws from jaw no. 1 and then remove the screws completely from the top jaw.
2. The top jaw may remain locked onto the tapered buttons on the master jaw. To break the top jaw free, tap the end of the top jaw lightly with a soft hammer. Tap the jaw toward the center of the chuck while holding the sides of the top jaw.
3. Repeat this procedure for the other top jaws.



## IMPORTANT

**The mounting surfaces of the top jaws, master jaws, and QC buttons must be clean and be free of nicks or any foreign matter, otherwise the top jaws will not seat properly which will result in excessive runout.**

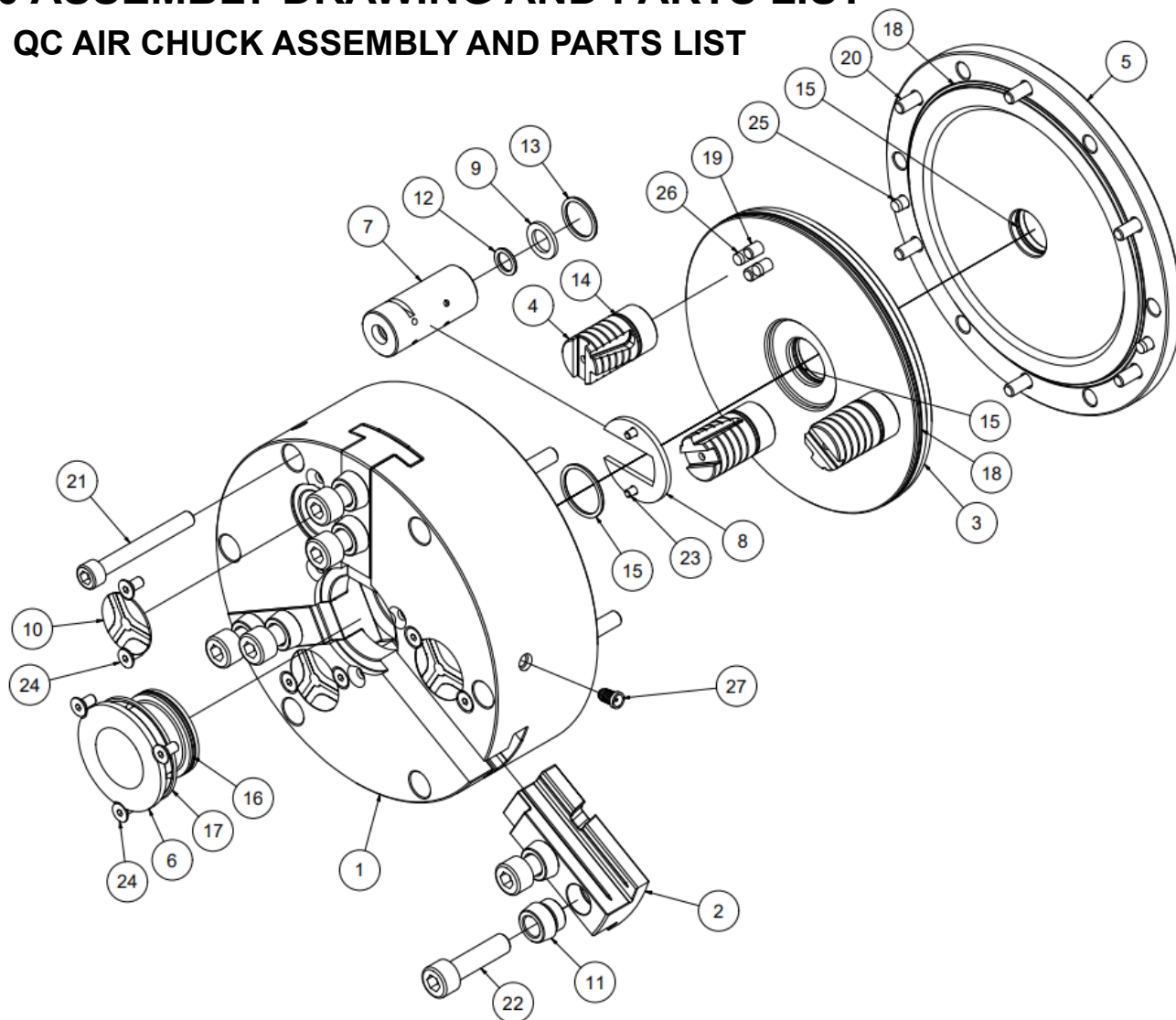


## CAUTION

**In order to minimize jaw runout, it is critical that the mounting screws of the top jaws are tightened to the torque specifications given in Section 4.0**

## 12.0 ASSEMBLY DRAWING AND PARTS LIST

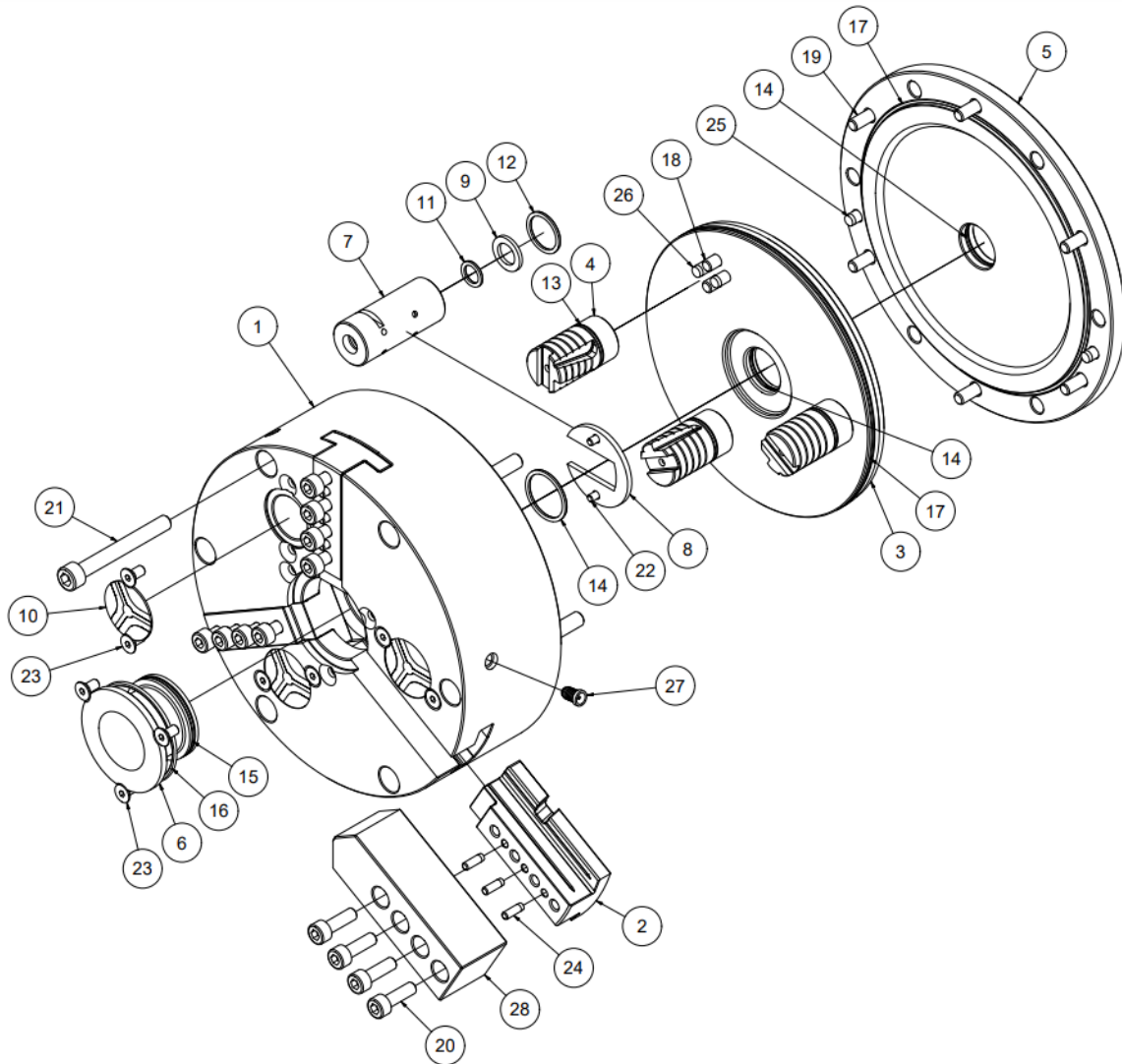
### 12.1 QC AIR CHUCK ASSEMBLY AND PARTS LIST



| ITEM NO. | QTY | TITLE           |
|----------|-----|-----------------|
| 1        | 1   | BODY            |
| 2        | 3   | MASTER JAW      |
| 3        | 1   | PISTON          |
| 4        | 3   | ACTUATOR        |
| 5        | 1   | BACK COVER      |
| 6        | 1   | CENTER SEAL     |
| 7        | 1   | FIXED MANIFOLD  |
| 8        | 1   | C-WASHER        |
| 9        | 1   | MANIFOLD WASHER |
| 10       | 3   | ACTUATOR DISK   |
| 11       | 6   | QC BUTTON       |
| 12       | 1   | O-RING          |
| 13       | 1   | O-RING          |
| 14       | 3   | O-RING          |

| ITEM NO. | QTY | TITLE                 |
|----------|-----|-----------------------|
| 15       | 3   | O-RING                |
| 16       | 1   | O-RING                |
| 17       | 1   | O-RING                |
| 18       | 2   | O-RING                |
| 19       | 6   | SOCKET HEAD CAP SCREW |
| 20       | 6   | SOCKET HEAD CAP SCREW |
| 21       | 6   | SOCKET HEAD CAP SCREW |
| 22       | 6   | SOCKET HEAD CAP SCREW |
| 23       | 2   | FLAT HEAD CAP SCREW   |
| 24       | 9   | FLAT HEAD CAP SCREW   |
| 25       | 2   | DOWEL PIN             |
| 26       | 6   | DOWEL PIN             |
| 27       | 3   | LUBRICATION FITTING   |

## 12.2 DOWEL PIN AIR CHUCK ASSEMBLY AND PARTS LIST



| ITEM NO. | QTY | TITLE           |
|----------|-----|-----------------|
| 1        | 1   | BODY            |
| 2        | 3   | MASTER JAW      |
| 3        | 1   | PISTON          |
| 4        | 3   | ACTUATOR        |
| 5        | 1   | BACK COVER      |
| 6        | 1   | CENTER SEAL     |
| 7        | 1   | FIXED MANIFOLD  |
| 8        | 1   | C-WASHER        |
| 9        | 1   | MANIFOLD WASHER |
| 10       | 3   | ACTUATOR DISK   |
| 11       | 1   | O-RING          |
| 12       | 1   | O-RING          |
| 13       | 3   | O-RING          |
| 14       | 3   | O-RING          |

| ITEM NO. | QTY | TITLE                 |
|----------|-----|-----------------------|
| 15       | 1   | O-RING                |
| 16       | 1   | O-RING                |
| 17       | 2   | O-RING                |
| 18       | 6   | SOCKET HEAD CAP SCREW |
| 19       | 6   | SOCKET HEAD CAP SCREW |
| 20       | 12  | SOCKET HEAD CAP SCREW |
| 21       | 6   | SOCKET HEAD CAP SCREW |
| 22       | 2   | FLAT HEAD CAP SCREW   |
| 23       | 9   | FLAT HEAD CAP SCREW   |
| 24       | 9   | DOWEL PIN             |
| 25       | 2   | DOWEL PIN             |
| 26       | 6   | DOWEL PIN             |
| 27       | 3   | LUBRICATION FITTING   |
| 28       | 3   | TOP JAW               |

## 13.0 AIR CHUCK MAINTENANCE

### 13.1 LUBRICATING AIR CHUCKS

1. Before applying lubrication to the chuck, the chuck should be actuated and set in the unclamped (jaws fully open) position.
2. Recommended lubricant: Kluber Altemp QN B 50
3. Apply lubricant with a grease gun (3 to 5 cc) to each grease fitting on the OD of the chuck body.
4. After applying lubricant to all fittings, cycle the chuck (open and close the chuck) several times to distribute the lubricant to all sliding surfaces.
5. Wipe away any excess grease which has seeped out of the master jaw slots.

### 13.2 FREQUENCY OF LUBRICATION

1. Air chucks should be lubricated at least once daily.
2. Chucks operated at high speed or are exposed to a high volume of water soluble cutting oil should be lubricated several times each day.
3. Chucks which are installed on machines running around the clock, should be lubricated at the start of each shift .

### 13.3 DISASSEMBLY OF AIR CHUCKS

1. After removing the chuck from the machine, set the chuck face down on blocks (or parallels) 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 soft plug, alternately tap each actuator until the assembly is free. DO NOT disassemble actuators from piston, as they are position pinned in place.
3. Once the piston assembly has been removed from the chuck body, remove each master jaw.
4. If the master jaws are tight, use a soft plug to tap each jaw out of the chuck body.



#### WARNING

**Air chucks must be lubricated on a regular basis to maintain long term accuracy and performance. Inadequate lubrication reduces gripping force and affects the chuck's repeating accuracy. Inadequate lubrication will also cause excessive wear and seizure.**

#### IMPORTANT

**Do not disassemble actuators from the piston, as they are position pinned in place.**

#### IMPORTANT

**Before applying lubrication to the chuck, the chuck should be actuated and set in the unclamped (jaws fully open) position.**



#### CAUTION

**Air chucks should be disassembled, cleaned, lubricated, and reassembled at least once every 6 months or every 100,000 cycles. Chucks that are used to machine cast iron or sintered parts should be disassembled more frequently (at least every 2 to 3 months).**

## 13.4 CLEANING OF AIR CHUCKS

1. After the chuck has been disassembled, remove all sludge and buildup on the sliding surfaces of the chuck body, actuators, and master jaws.
2. Clean off any buildup with fine emery paper.
3. Degrease all components in mineral spirits or other solvent.
4. Remove all residue of the solvent and keep each component clean until reassembly.

## 13.5 REASSEMBLY OF AIR CHUCKS

1. After all the chuck's components have been thoroughly cleaned, set the chuck face up on a bench.
2. Inspect all O-Rings and replace any which exhibit signs of wear. It is recommended to lubricate all O-rings with a lubricant such as Parker Super O-Lube.
3. Apply a liberal amount of grease such as Kluber Altemp QN B 50 to all surfaces of master jaw no.1. Slide master jaw no. 1 into the jaw slot which is marked slot no.1. The jaw should slide freely into the jaw slot with only hand pressure. If the jaw is tight going into the jaw slot remove the jaw, and make sure any buildup has been removed from both the jaw slot and master jaw. After cleaning, degrease the chuck body and master jaw again with a solvent. Apply lubricant to the master jaw and insert the jaw into the chuck body as outlined above.
4. Repeat this procedure for the other master jaws.
5. Turn the chuck face down with jaw slot no. 1 at 12 o'clock.
6. Apply an even coat of grease to the ID of the piston bore.
7. Liberally coat each actuator with grease. Coat the OD and both sides of the key which engages into the master jaw.
8. Turn the piston so that the rear side is facing up. Rotate the piston to align the letter stamped on its rear face with jaw slot no. 1.
9. Insert the piston assembly into the chuck by first inserting the 3 actuators into the bores in the chuck body. Then slide the piston assembly towards the face of the chuck until the actuators contact the master jaws.
10. Turn the chuck body over and support it on the blocks (or parallels) used to disassemble the chuck.

### IMPORTANT

**All components must be thoroughly cleaned and degreased before reassembly. Perform all assembly work on a clean bench in clean surroundings to prevent dirt and other contaminants from getting into the chuck.**



### CAUTION

**When reassembling air chucks make sure each master jaw is mounted into the jaw slot with a corresponding number. Also make sure to align the piston assembly correctly so that the letter stamped on the back face of the piston is in line with jaw slot no. 1.**

11. Looking into the three actuator bores on the face of the chuck, engage the slot of each master jaw into the actuator key.
12. Take the chuck off the blocks and push the piston assembly fully into the chuck body. The piston should slide into the chuck body freely, however, it may be necessary to tap the rear face of the piston assembly with a soft hammer to bring the assembly fully into the chuck body. Tap the rear face of the piston in a circular motion to prevent the piston from cocking.
13. Replace the back cover, and 3 actuator disks on the face of the chuck. Secure each disk with a flat head cap screw. Make sure the top face of the screws are below the face of the chuck.



## 14.0 TROUBLE SHOOTING GUIDE

If your air chuck malfunctions, immediately stop the machine and refer to this trouble shooting guide for possible causes and ways to remedy the problem.

| PROBLEM   | POSSIBLE CAUSE   | SUGGESTED REMEDY   |
|---|--|--|
| The chuck does not operate.                                 | A component inside the chuck (master jaw or actuator) is broken.                             | Disassemble chuck and contact MicroCentric for replacement or repair of the component or chuck.  |
|   | The master jaw slides or actuators are seized.   | Disassemble the chuck to free the seized components by cleaning the chuck and removing buildup that has embedded itself onto the chuck's components and lubricate the chuck. |
| The master jaws do not stroke fully.                        | Swarf or dirt has built up inside the chuck.   | Disassemble, clean, and lubricate the chuck.   |
|   | Improper assembly.   | Ensure all parts have been reassembled correctly.  |
|   | Air tube is too short.   | Check for interference at rear of spindle.   |
| Workpiece slips.  | Insufficient master jaw stroke.  | Rebore top jaws so that the workpiece is clamped in the middle of the chuck's total jaw stroke.  |
|   | Insufficient clamping force.   | Increase the air pressure within recommended limits.   |
|   | Restricted air flow.   | Check air lines. Make sure valve and pressure regulator are correctly installed. Old piping and hoses sometimes have restricted air flow.                                    |
|   | Machined clamping diameter in top jaw does not match workpiece diameter.                     | Rebore top jaws accordingly.   |
|   | Cutting force is too high.   | Reduce cutting force.  |
|   | Insufficient lubrication to the chuck.   | Lubricate the chuck according to the schedule and procedure outlined in Section 13.1 & 13.2.   |
|   | Spindle speed is too high.   | Reduce spindle speed.  |
| Air leaks from the chuck.                                   | Broken O-ring.   | Replace O-Rings as needed.   |
|   | Broken tubing or fittings.   | Replace tubing or fittings as needed.  |
|   | Air tube not screwed in completely, or not properly seated against Teflon washer.            | Hand tighten air tube from knurled ring, replace washer if damaged.  |
| Excessive Vibration   | Unequal weight distribution.   | Counterbalance as required.  |
| Excessive workpiece runout (concentricity) after machining. | OD of chuck is running out, (mounting screws not tight).                                     | Indicate OD of chuck and true chuck to within specifications given in Section 9.0. Also make sure mounting screws are tightened properly.                                    |
|   | Chips, dirt, or other foreign material is embedded in clamping surface of top jaw.           | Remove foreign material and/or rebore top jaws.  |
|   | Mounting screws of top jaws have not been adequately tightened.                              | Tighten mounting screws to torque specifications given in Section 4.0.   |
|   | Top jaws have not been properly machined (loaded).   | Check that the loading ring or plug is not being deformed due to high clamping force. Review procedures outlined in Section 7.4.   |
|   | Top jaw is deformed during clamping due to excessive height and/or excessive clamping force. | Review the design of the top jaw, reducing the height of the jaw and lowering air pressure.  |
|   | Workpiece is deformed during clamping by excessive clamping force.                           | Reduce air pressure. Also evaluate the design of the top jaws to reduce jaw height and jaw mass to reduce effects of centrifugal force.                                      |



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