

*Technical Documentation
for HST High Speed Air Chucks*

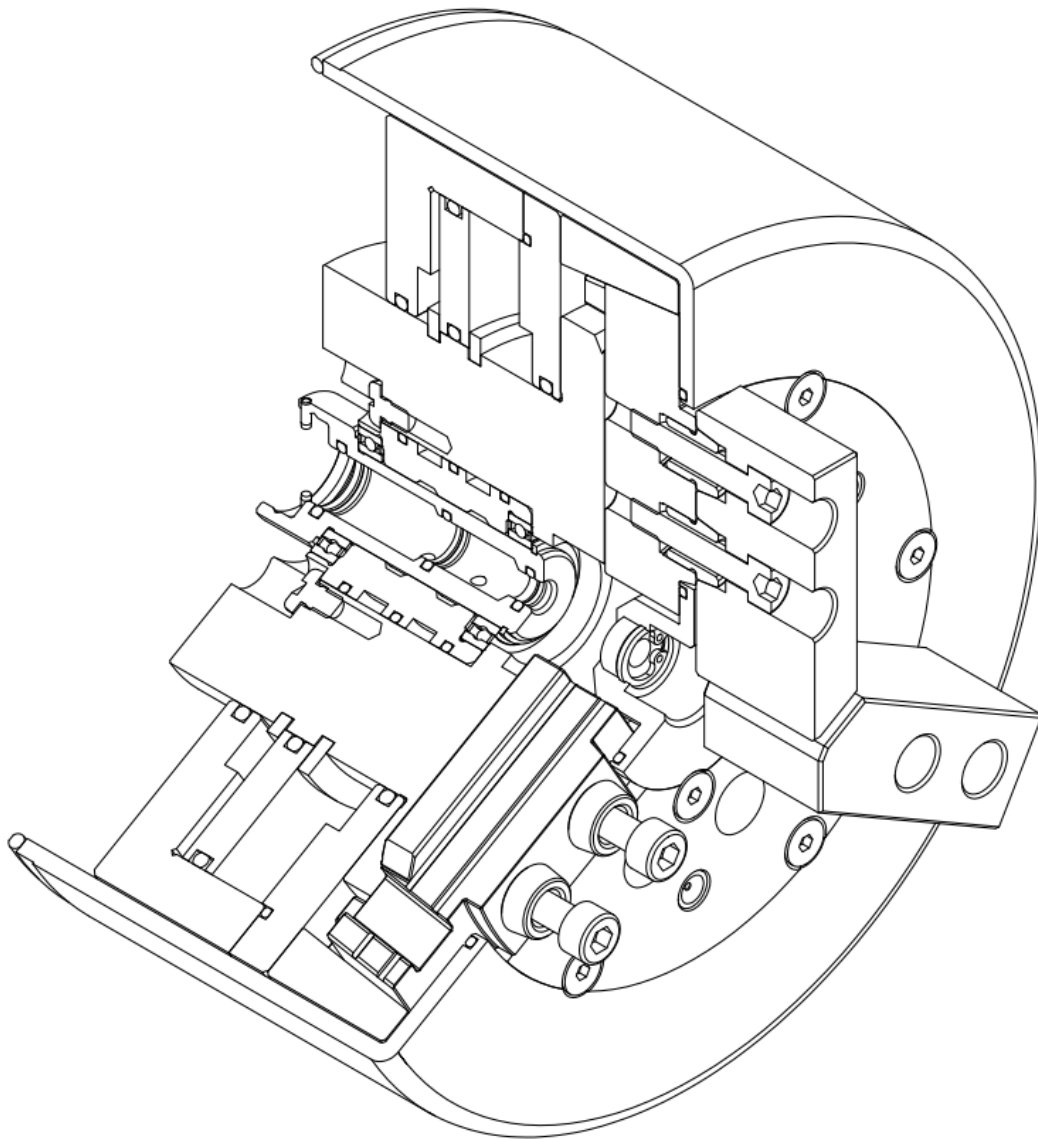


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1.0 CONTACT AND SERVICE INFORMATION

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2.0 INTRODUCTION

The MicroCentric HST series air chucks are the most advanced jaw chuck available for high speed precision turning applications. The HST chuck features a titanium body, and utilizes a patented external wedge design that minimizes the effects of centrifugal force. This design enables the chuck to maintain holding force at high spindle speeds. HST chucks are also available with a patented non-rotating air tube assembly that eliminates the vibration typically associated with rotating air tube designs at very high spindle speeds.

When correctly installed and properly maintained, HST chucks will deliver unsurpassed accuracy and long term performance. It is recommended that you familiarize yourself with the design and operation of the chuck prior to installation and operation. Therefore, please read this manual in its entirety prior to installation. This manual is also available for download at 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,
	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 (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 HIGH SPEED 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 80mm	HST3-3	3	.0001" 0.0025mm	.080" 2.0mm	2,550 lb 11.3 kN	100 psi 0.7 Mpa	6,000	5.9 lb 2.7 kg
	HST3-3/HS	3	.0001" 0.0025mm	.080" 2.0mm	2,550 lb 11.3 kN	100 psi 0.7 Mpa	10,000	5.9 lb 2.7 kg
4 inch 100mm	HST4-3	3	.0001" 0.0025mm	.100" 2.5mm	3,150 lb 14.0 kN	100 psi 0.7 Mpa	6,000	11.8 lb 5.4 kg
	HST4-3/HS	3	.0001" 0.0025mm	.100" 2.5mm	3,150 lb 14.0 kN	100 psi 0.7 Mpa	9,000	11.8 lb 5.4 kg
6 inch 150mm	HST6-3	3	.0001" 0.0025mm	.100" 2.5mm	5,800 lb 25.8 kN	100 psi 0.7 Mpa	6,000	22.5 lb 10.2 kg
	HST6-3/HS	3	.0001" 0.0025mm	.100" 2.5mm	5,800 lb 25.8 kN	100 psi 0.7 Mpa	8,000	22.5 lb 10.2 kg

6.0 MAXIMUM CLAMPING FORCE AND SPINDLE SPEED

6.1 MAX. STATIC CLAMPING FORCE

The static clamping force developed by high speed 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.

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:

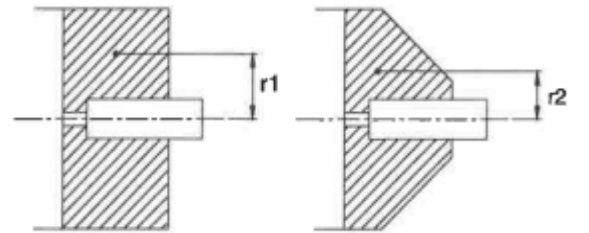
1. A standard jaw height is used.
2. Jaw force is measured at the mid point (in height) of a standard jaw blank, at mid stroke with a dynamic jaw force gage.
3. The chuck is sufficiently lubricated with MicroCentric's recommended grease to obtain maximum efficiency of the chuck.
4. The mounting bolts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



Standard Top Jaws

Top Jaws With Excess Weight Removed



CAUTION

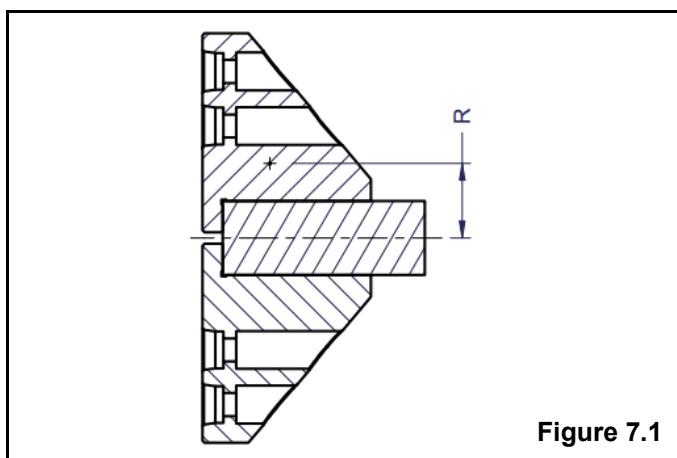
When using top jaws which are taller and more massive than the standard jaw, a greater amount of clamping force will be lost due to centrifugal force which acts on the top jaw. The maximum recommended speed under these conditions will be less than the value for the standard top jaws.

7.0 DESIGN AND MACHINING OF TOP JAWS

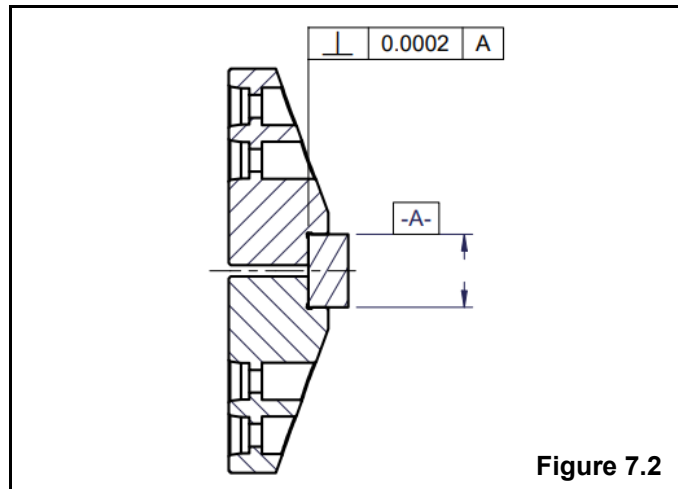
7.1 TOP JAW DESIGN

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.

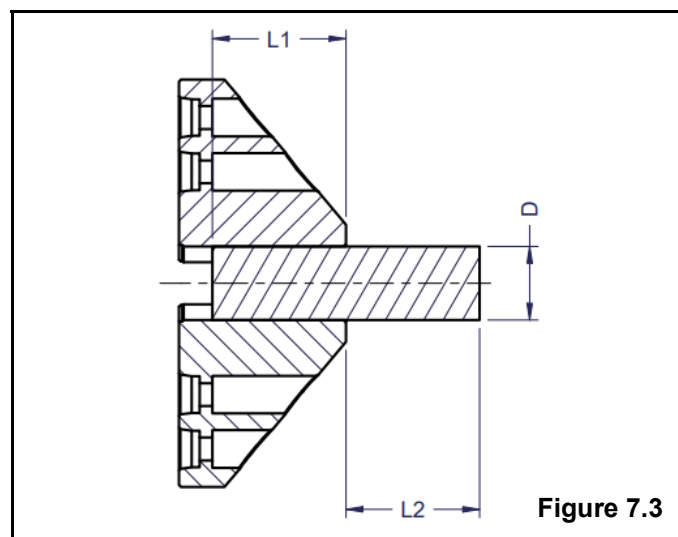
1. A workpiece must have an accurately machined holding diameter, in terms of size tolerance, roundness, and perpendicularity to the locating surface, for precise chucking.
2. When chucking thin walled workpieces, the size and roundness tolerances of the holding diameter will determine the degree to 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.



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



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

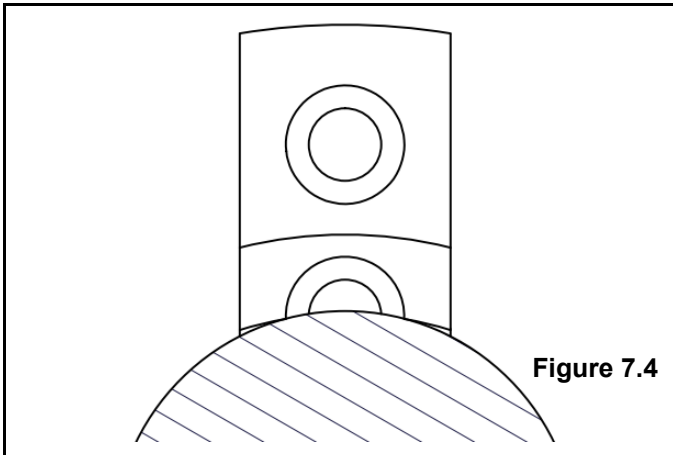


Figure 7.4

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.

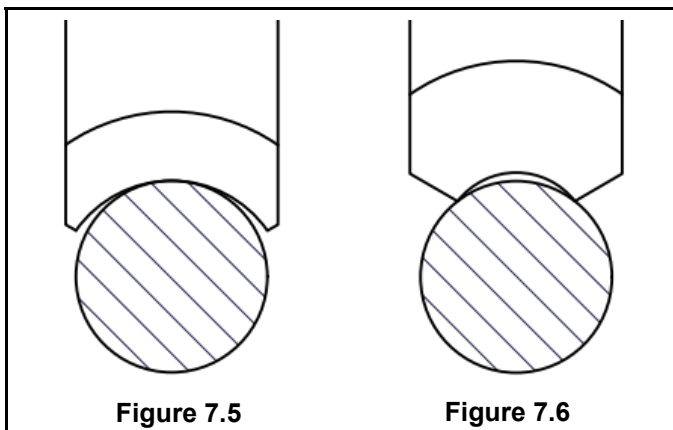


Figure 7.5

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.

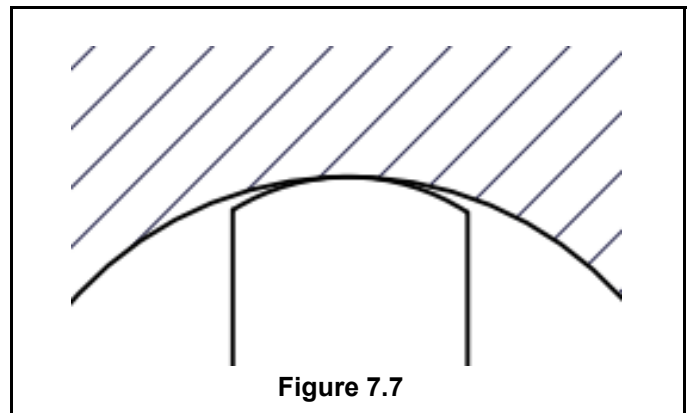


Figure 7.7

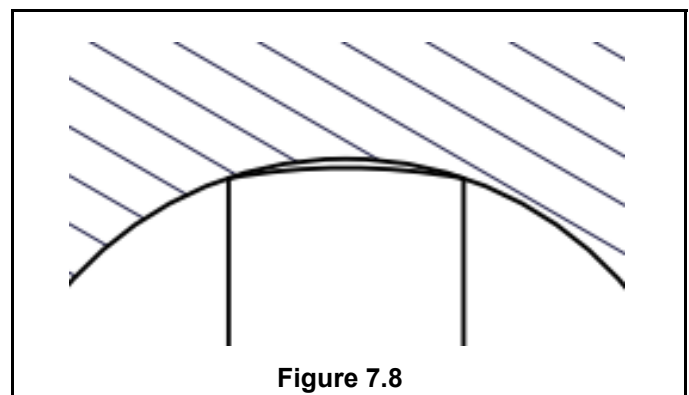
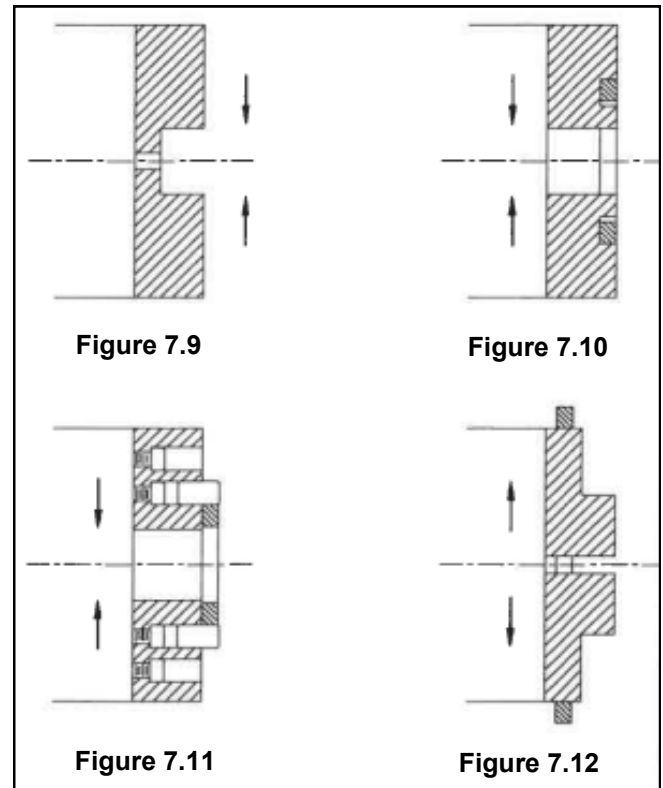


Figure 7.8

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:

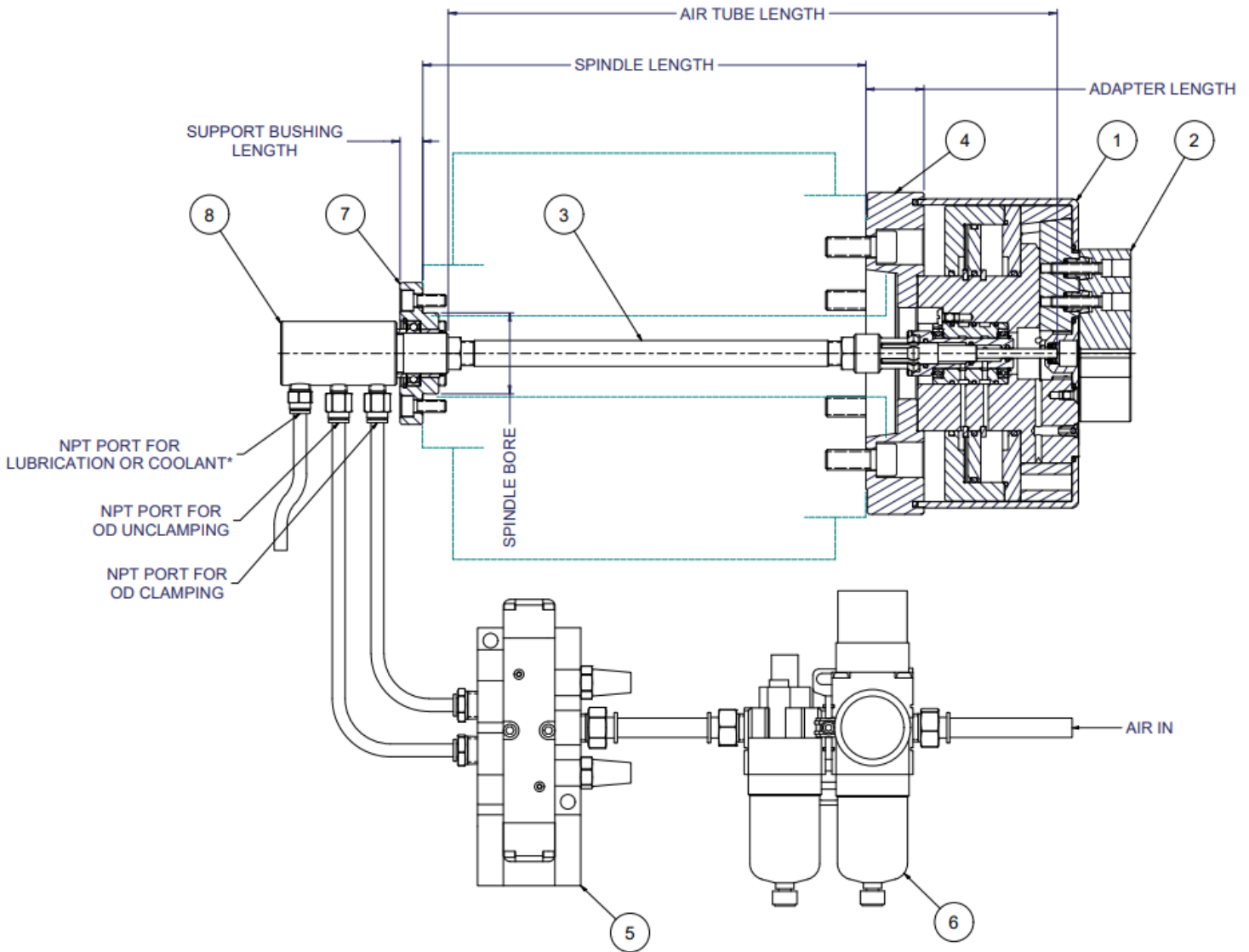
1. Always load the chuck in the same direction the chuck is clamping. For OD holding applications the chuck must be closed on a loading pin or ring. For ID applications the chuck must open on a loading ring.
2. The position at which the chuck is loaded during machining of the top jaws, determines the 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 HIGH SPEED AIR CHUCK SYSTEM ASSEMBLY



ITEM	QTY	TITLE
1	1	AIR CHUCK
2	3	TOP JAWS
3	1	AIR TUBE ASSEMBLY
4	1	ADAPTER

ITEM	QTY	TITLE
5	1	VALVE (MANUAL/ELECTRONIC)
6	1	FILTER REGULATOR LUBRICATOR (FRL)
7	1	SUPPORT BUSHING WITH BEARING
8	1	DISTRIBUTOR

* OPTIONAL. FOR COOLANT, LUBRICATION, AIR SENSING, OR AIR BLAST.

9.0 MOUNTING OF CHUCK

High speed air chucks must be 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

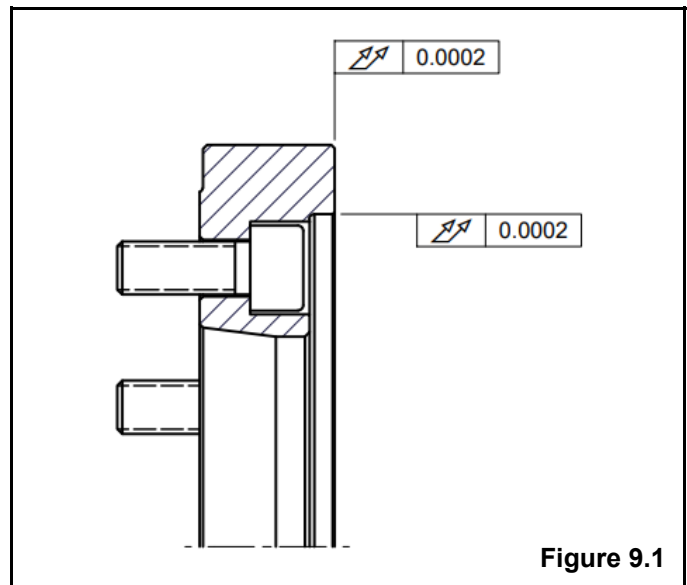
1. Make certain that the spindle and mounting plate are clean and free of nick, burrs, and foreign materials which would prevent the proper seating of the adapter plate.
2. Mount the adapter plate to the machine spindle. Do not fully tighten the mounting bolts at this time. First indicate the radial 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 rotating 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 ROTATING AIR TUBE INSTALLATION

1. The chuck models HST3-3, HST4-3, and HST6-3 operate with a rotating air tube assembly. 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.
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.
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. To apply coolant or lubrication through the center of the air tube, connect to the third port in the distributor.
6. 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.
- 7.

7. 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 NON-ROTATING AIR TUBE INSTALLATION

1. The chuck models HST3-3/HS, HST4-3/HS, and HST6-3/HS operate with the patented model NR50 non-rotating air tube assembly. This air tube is available in coolant through or automatic lubrication configurations.
2. Since the air tube does not rotate with the machine spindle, the tube must be supported either by a bushing assembly which incorporates a ball bearing, or a bracket connected to the machine frame.
3. Slide the air tube through the rear of the machine spindle, coupling the tube into the rotating air bearing inside the chuck.
4. On installations using a bracket to support the air tube, mount the bracket to the machine prior to installing the air tube. Insert the air tube through the bracket then into the machine spindle, and couple the tube into the rotating air bearing. Secure the rear of the tube to the bracket, and adjust the bracket to be positioned in line with the spindle bore.

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 also secures the outer tube to the journal.

11.0 QC JAW LOCATING SYSTEM

11.1 QC SYSTEM OVERVIEW

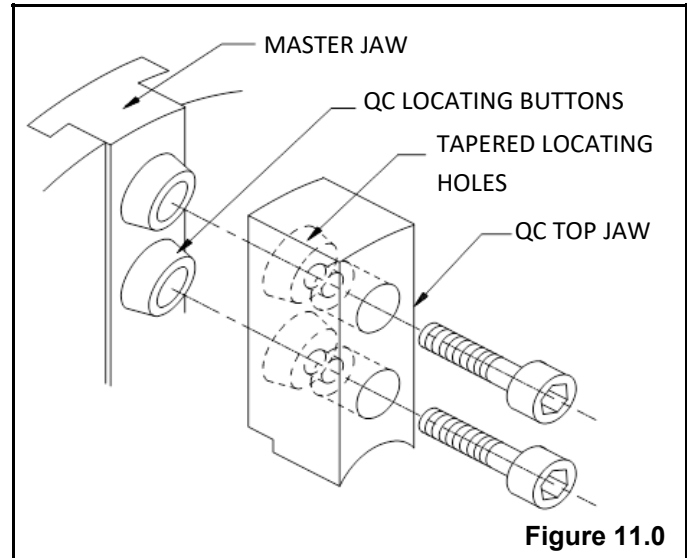
The QC system locates each top jaw on two tapered buttons mounted in each master jaw. The top jaw is located on both the taper and the face of the master jaw to effectively eliminate any clearances between the master jaw and the top jaw. This feature assures accurate relocation of the top jaw when repositioned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

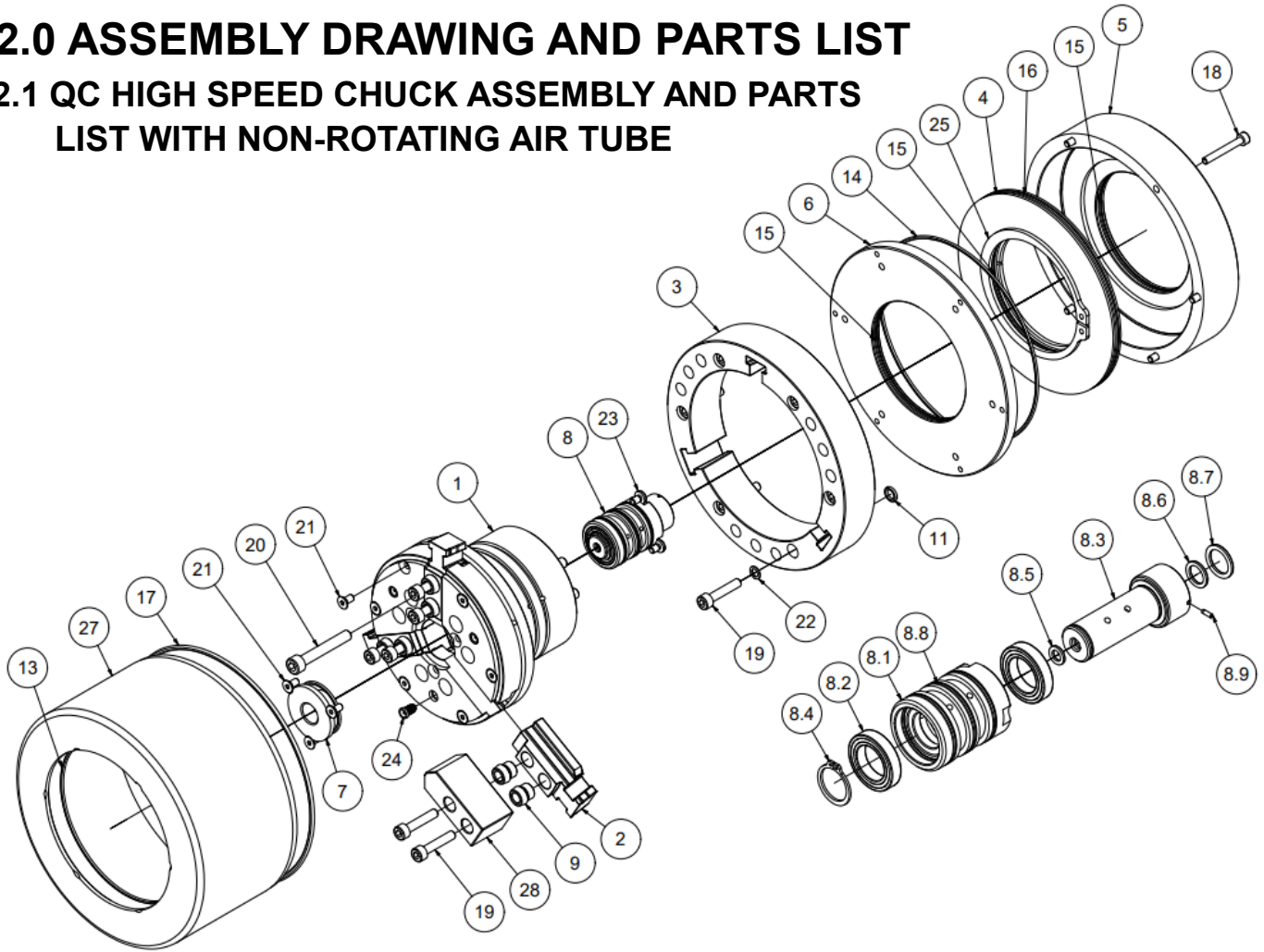


CAUTION

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

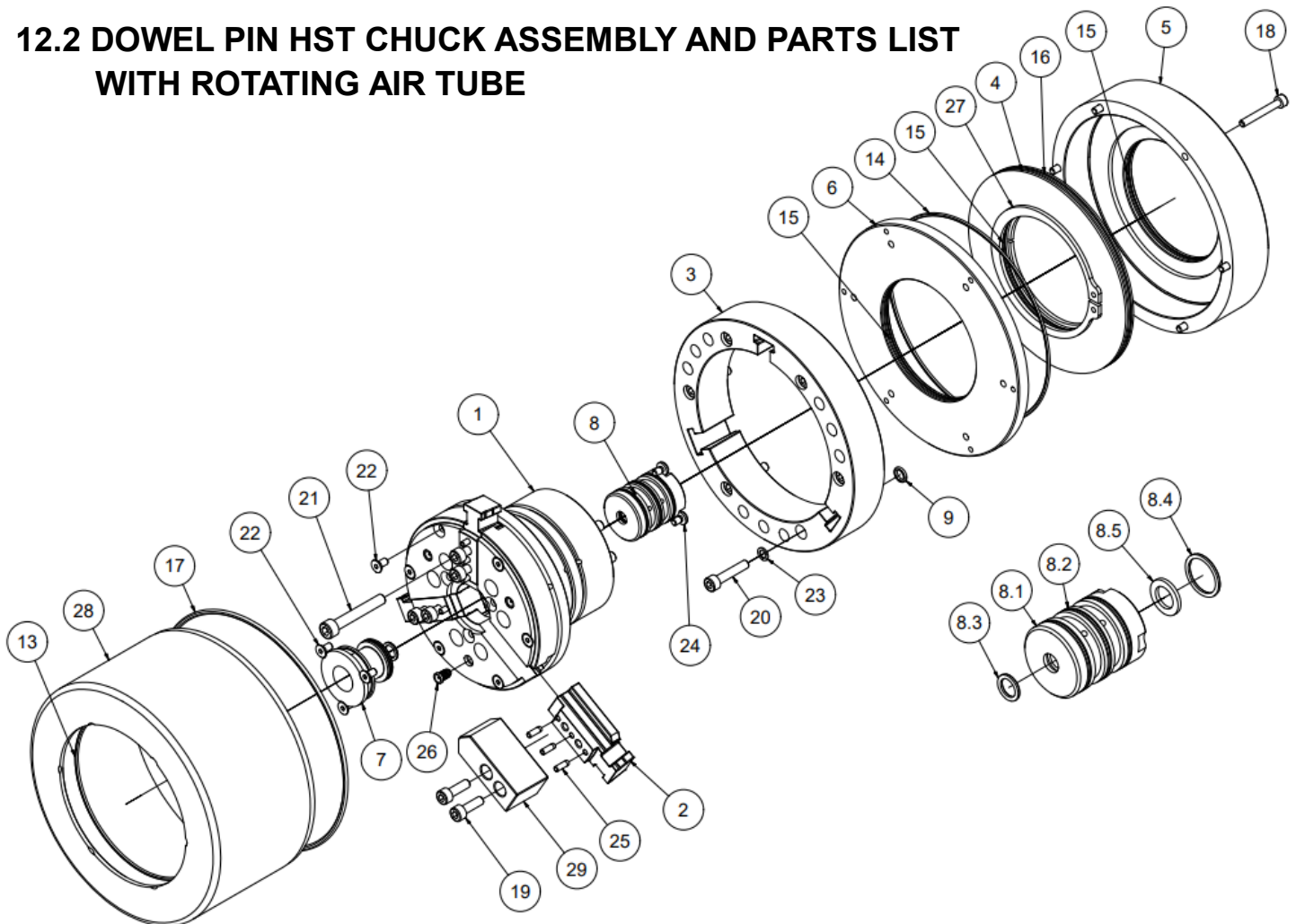
12.1 QC HIGH SPEED CHUCK ASSEMBLY AND PARTS LIST WITH NON-ROTATING AIR TUBE



ITEM	QTY	TITLE
1	1	BODY
2	3	MASTER JAW
3	1	ACTUATOR
4	1	PISTON
5	1	CYLINDER
6	1	COVER PLATE
7	1	CENTER SEAL
8	1	AIR BEARING ASSEMBLY
8.1	1	BEARING HOUSING
8.2	2	BALL BEARING
8.3	1	JOURNAL
8.4	1	RETAINING RING
8.5	1	O-RING
8.6	1	O-RING
8.7	1	O-RING
8.8	3	O-RING
8.9	2	DOWEL PIN
9	6	QC BUTTON
10	1	MULTIFLEX SEAL

ITEM	QTY	TITLE
11	6	O-RING
12	1	O-RING
13	1	O-RING
14	1	O-RING
15	3	O-RING
16	1	O-RING
17	1	O-RING
18	6	SOCKET HEAD CAP SCREW
19	12	SOCKET HEAD CAP SCREW
20	6	SOCKET HEAD CAP SCREW
21	9	FLAT HEAD CAP SCREW
22	6	BRASS WASHER
23	3	SLOTTED PAN HEAD SCREW
24	3	LUBRICATION FITTING
25	2	RETAINING RING
26	1	RETAINING RING
27	1	GUARD
28	3	TOP JAW

12.2 DOWEL PIN HST CHUCK ASSEMBLY AND PARTS LIST WITH ROTATING AIR TUBE



ITEM	QTY	TITLE
1	1	BODY
2	3	MASTER JAW
3	1	ACTUATOR
4	1	PISTON
5	1	CYLINDER
6	1	COVER PLATE
7	1	CENTER SEAL
8	1	MANIFOLD ASSEMBLY
8.1	1	FIXED MANIFOLD
8.2	3	O-RING
8.3	1	O-RING
8.4	1	O-RING
8.5	1	MANIFOLD WASHER
9	6	O-RING
10	1	O-RING
11	1	O-RING
12	1	O-RING

ITEM	QTY	TITLE
13	1	O-RING
14	1	O-RING
15	3	O-RING
16	1	O-RING
17	1	O-RING
18	6	SOCKET HEAD CAP SCREW
19	6	SOCKET HEAD CAP SCREW
20	6	SOCKET HEAD CAP SCREW
21	6	SOCKET HEAD CAP SCREW
22	9	FLAT HEAD CAP SCREW
23	6	BRASS WASHER
24	3	SLOTTED PAN HEAD SCREW
25	9	DOWEL PIN
26	3	LUBRICATION FITTING
27	2	RETAINING RING
28	1	GUARD
29	3	TOP JAW

13.0 HST CHUCK MAINTENANCE

13.1 LUBRICATING HST 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 face 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. HST chucks should be lubricated at least once daily. On lower volume installations the chuck must be lubricated at least once per week.
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 HST CHUCKS

1. After removing the chuck from the machine, set the chuck face up on blocks (or parallels) and remove The guard. Make note of the letter stamped on the face of the actuator. It must align with jaw slot no. 1 when reassembling.
2. Flip chuck over on blocks and remove the cylinder from the back of the chuck.
3. Remove retaining rings securing the piston, and remove the piston from the chuck body.
4. Remove the actuator and cover plate. As the actuator is lifted, the master jaws should move freely from within the body. However, if the master jaw or actuator is binding and the chuck does not disassemble freely, it will be necessary to tap the chuck body or actuator with a soft plug. Then completely remove master jaws from the chuck. Be sure to take note of the letter stamped on the actuator, and the numbers on each jaw, as well as the numbers on the chuck body. Numbers must match accordingly during reassembly.
5. After the master jaws are removed, the center seal can be unscrewed and removed from the chuck body.
6. Remove bolts securing the cover plate to the actuator if the master jaw slots in the actuator cannot be properly cleaned.



WARNING

HST 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

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



CAUTION

High speed 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 HST CHUCKS

1. After the chuck has been disassembled, remove all sludge and buildup on the sliding surfaces of the chuck body, actuator, 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 HST 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 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. Replace center seal. Make sure the top face of the screws are below the face of the chuck.
6. Turn the chuck face down with jaw slot no. 1 at 12 o'clock.
7. Reassemble the cover plate to the actuator if they were separated during disassembly. Liberally coat the surfaces of the actuator that contact master jaws with grease.
8. Turn the actuator so that the rear side is facing up. Rotate the actuator to align the letter stamped on its rear face with jaw slot no. 1.
11. Looking into the three master jaw slots in the actuator, engage each master jaw into its actuator slot. Ensure the master jaws can move freely with the actuator.
12. Apply an even coat of O-Ring lubricant to the ID of the piston bore. Insert the piston with retaining rings onto the chuck body.

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

13. After the piston is secured to the chuck body, replace the cylinder that encloses the piston.
14. Turn the chuck body over and support it on the blocks (or parallels) used to disassemble the chuck.
15. Install the outer guard to the chuck making certain that it is seated properly on the chuck body. Tighten the mounting bolts alternately and evenly. Tighten securely but do not over-torque.
16. Reinstall high speed air chuck onto the spindle, with the steps indicated in Section 9.0.
17. Ensure the chuck is operating properly. Set the air pressure to 40 psi and open and close the chuck. Next set the air pressure at 15 psi and open and close the chuck several times. Checking the operation of the chuck at a low air pressure verifies that the chuck's operating mechanism is moving freely.

14.0 TROUBLE SHOOTING GUIDE

If your high speed 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 is broken.	Disassemble chuck and contact MicroCentric for replacement or repair of the component or chuck.
	The master jaw slides or actuator 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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