

Technical Documentation
for WSF Retractable
Collet Chucks

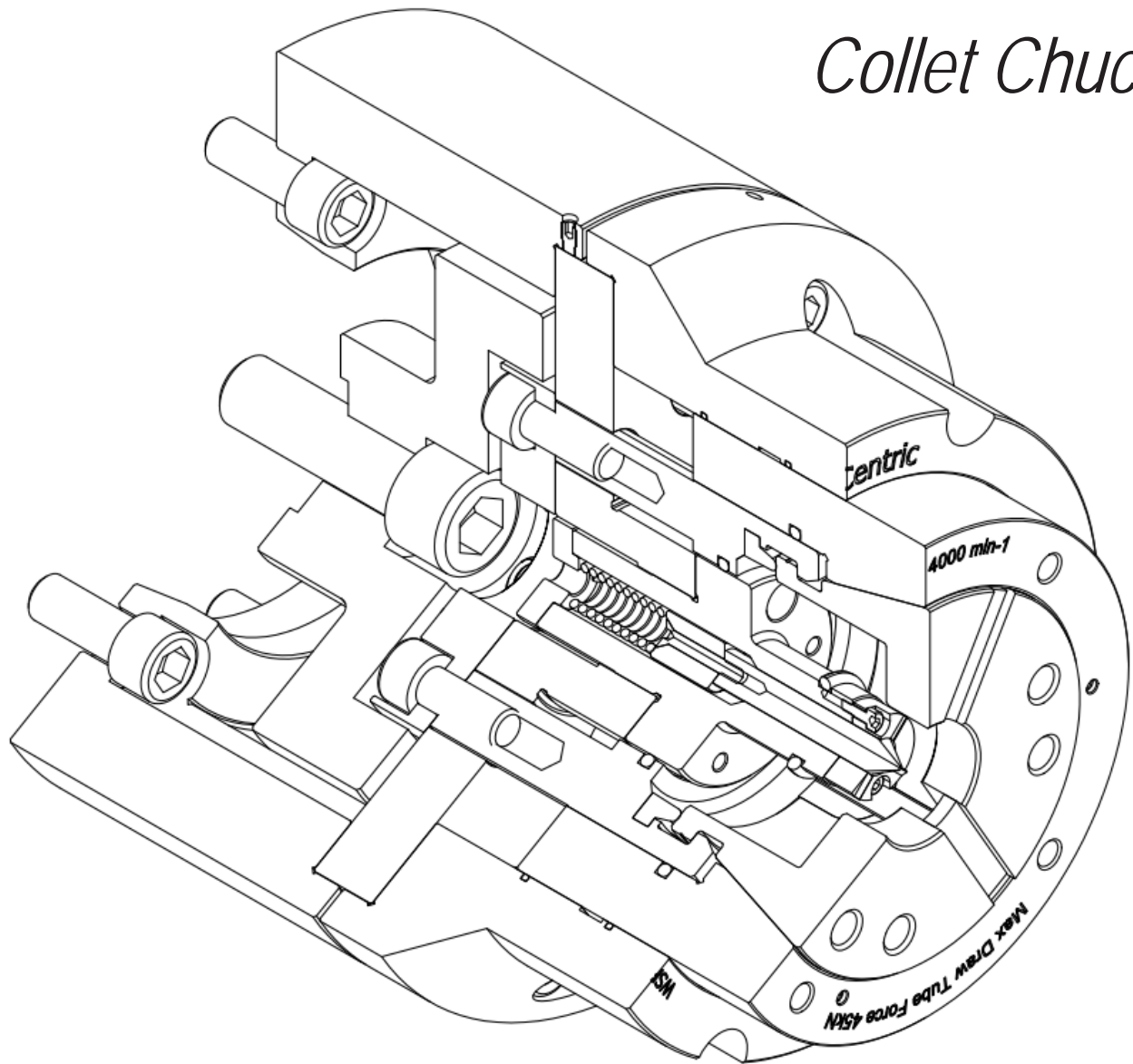


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1.0 CONTACT AND SERVICE INFORMATION

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2.0 INTRODUCTION

MicroCentric WSF Retractable Collet Chucks offer unmatched accuracy and long term performance. The information contained in this manual, if properly followed, will enable you to take full advantage of your chuck's capabilities.

We recommend you read through this entire manual to familiarize yourself with the installation and operation of MicroCentric collet chucks before installing and using your chuck. We also suggest you keep this manual at hand for future reference. 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, 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



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



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



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.



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, collet, or workpiece with a hammer.

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



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.

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 WSF COLLET CHUCK SPECIFICATIONS

Chuck Model	WSF-65	WSF-80	WSF-100
Collet Model	SK65BZI	SK80BZI	SK100BZI
Maximum Chucking Capacity	2.625"	3.250"	4.000"
	66mm	82mm	100mm
Clamping Range	± .020"	± .020"	± .020"
	± 0.5mm	± 0.5mm	± 0.5mm
Draw Tube Stroke	1.080"	1.341"	1.750"
	27.43mm	34.06mm	44.45mm
Max. Draw Bar Force	10,116 lbs	11,240 lbs	14,612 lbs
	45 kN	50 kN	65 kN
Max. Clamping Force	23,605 lbs	25,853 lbs	33,721 lbs
	105 kN	115 kN	150 kN
Max. Speed	4,000 rpm	3,500 rpm	3,000 rpm

6.0 CHUCKING GUIDELINES

6.1 ACURACY AND RUNOUT

To obtain high accuracy workholding it is important to correctly match the collet diameter to the workpiece diameter being clamped. Each workpiece has a dimensional tolerance, and to achieve best chucking accuracy the collet should be sized to correspond to the largest diameter of the workpiece's range. Figure 6.1 illustrates the principle of single line contact by each collet segment. This condition will enable you to obtain minimum workpiece runout.

When a workpiece is clamped by a collet that has a diameter that is smaller than the workpiece diameter, the condition shown in Figure 6.2 will result. This will produce higher clamping force on the workpiece, however, accuracy will be sacrificed.

Even when close chucking accuracy is not required, it is always important to use a collet with the proper bore size for each workpiece or bar stock. Following this principle will maximize the overall performance of the collet chuck system.

In order to obtain close chucking accuracy, the collet's surfaces must be kept clean and free from chip buildup. On long running operations it is recommended that the collet be removed periodically for cleaning.

IMPORTANT

Keep the clamping surface of the collet clean and free from chip buildup.

IMPORTANT

The collet should be removed periodically from the chuck and cleaned.

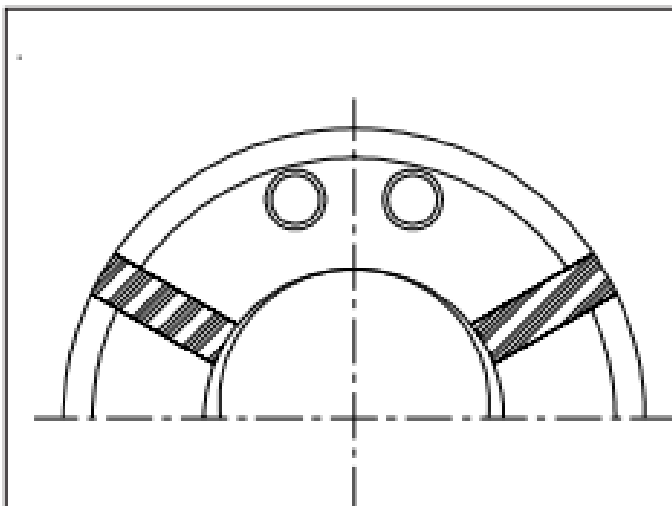


Figure 6.1

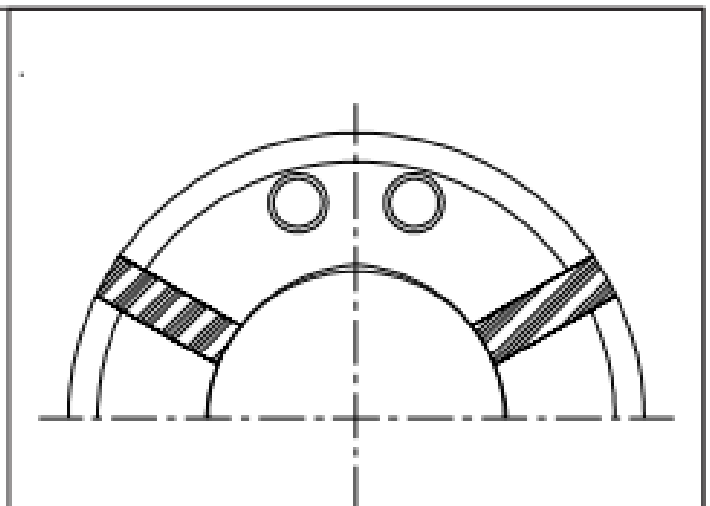


Figure 6.2

6.2 CLAMPING FORCE

Higher clamping force is generally required for roughing applications as compared to finishing operations. The clamping characteristics of a collet are enhanced by serrations, which will permitted higher rates of metal removal at the same draw tube force as compared to a smooth bore collet. The frictional force between the collet and workpiece or bar stock can also be increased by applying a carbide grit or diamond particle plating to the clamping surface of the collet. Sharp serrations that penetrate the surface of the workpiece provide the greatest clamping force to prevent workpiece slippage. Collets with widely spaced serrations also have enhanced clamping capability. The appropriate collet configuration for a given application is determined by a number of factors including cutting forces, spindle speed, and the material of the workpiece or bar stock. Recommendations for a specific applications can be obtained by calling MicroCentric's technical sales staff.

6.3 CENTRIFUGAL FORCE

The clamping force of a collet is affected by centrifugal force as spindle speed increases. Never exceed the maximum spindle speed recommended for a specific collet chuck model.

The loss of clamping force at high spindle speeds can be minimized by reducing the weight of a collet. Excess weight can be removed from a collet by drilling holes into the front face. For some high speed applications it may be necessary to dynamically balance the collet chuck. Consult MicroCentric's technical sales staff for further information.



WARNING

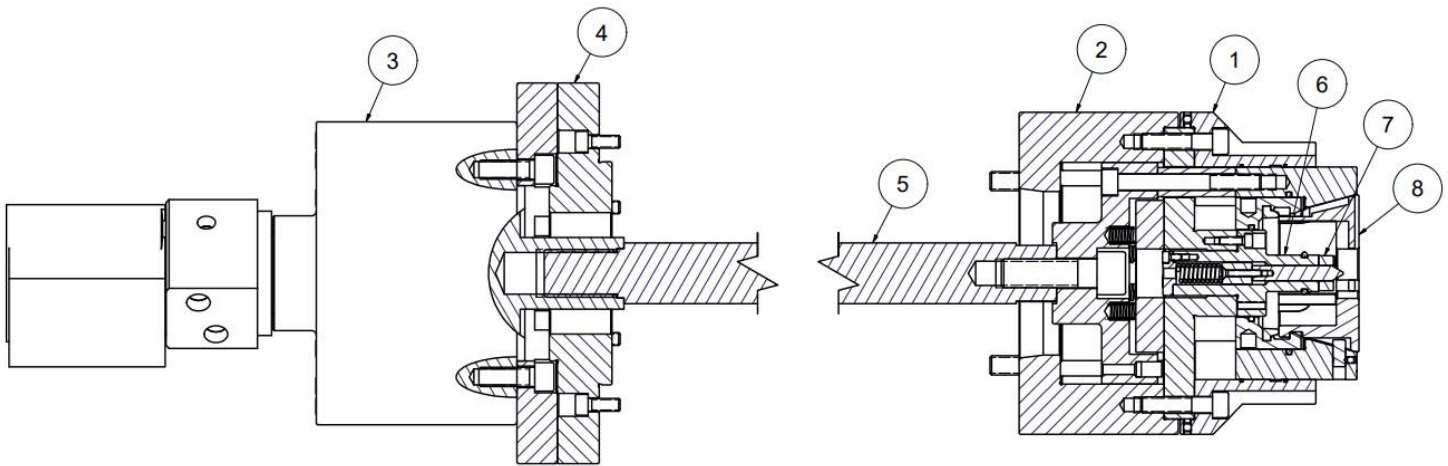
Do not exceed the maximum recommended draw tube force for a specific chuck model.



WARNING

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

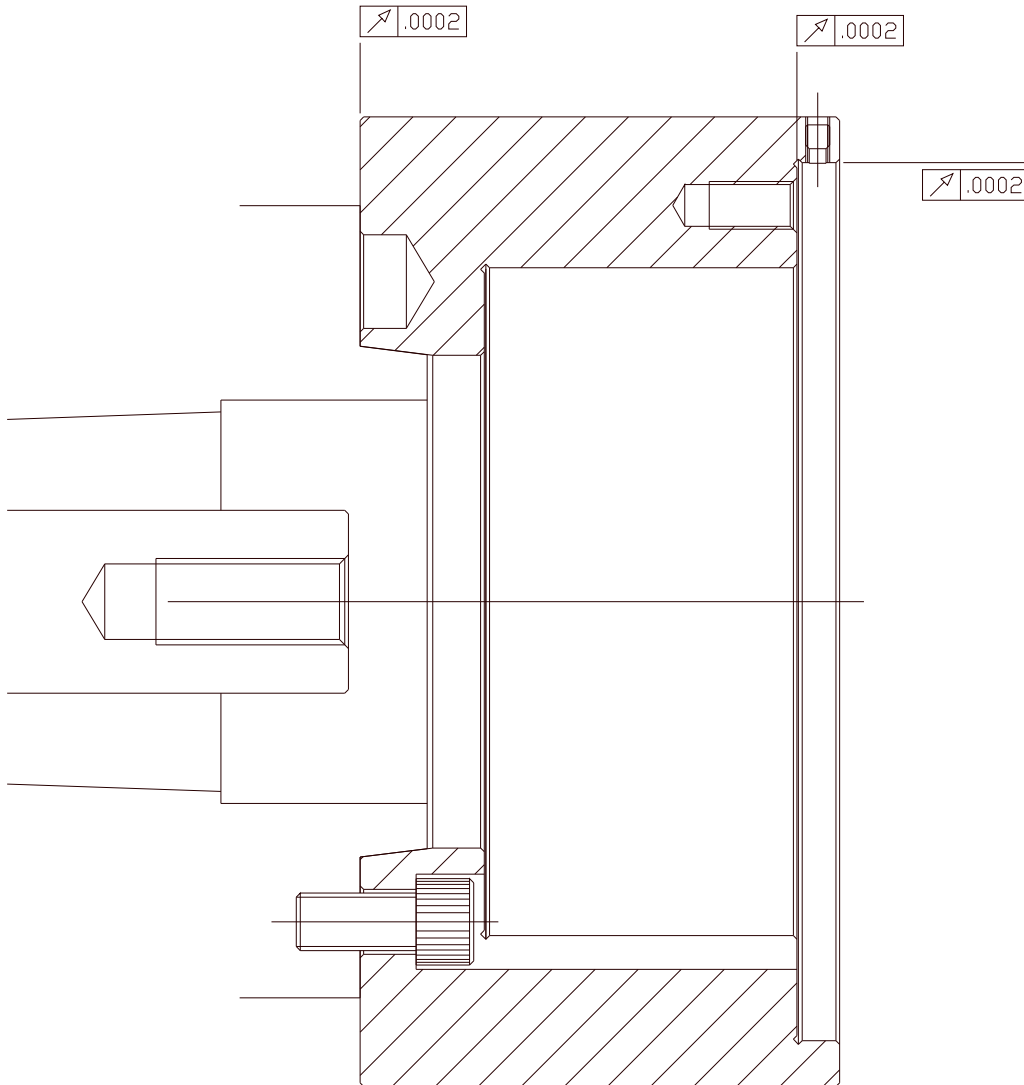
7.0 WSF SYSTEM ASSEMBLY



ITEM	QTY	TITLE
1	1	COLLET CHUCK ASSEMBLY
2	1	ADAPTER
3	1	HYDRAULIC CYLINDER
4	1	CYLINDER ADAPTER ASSEMBLY
5	1	DRAW BAR
6	1	FACE DRIVER ASSEMBLY
7	1	DRIVER CAP
8	1	COLLET

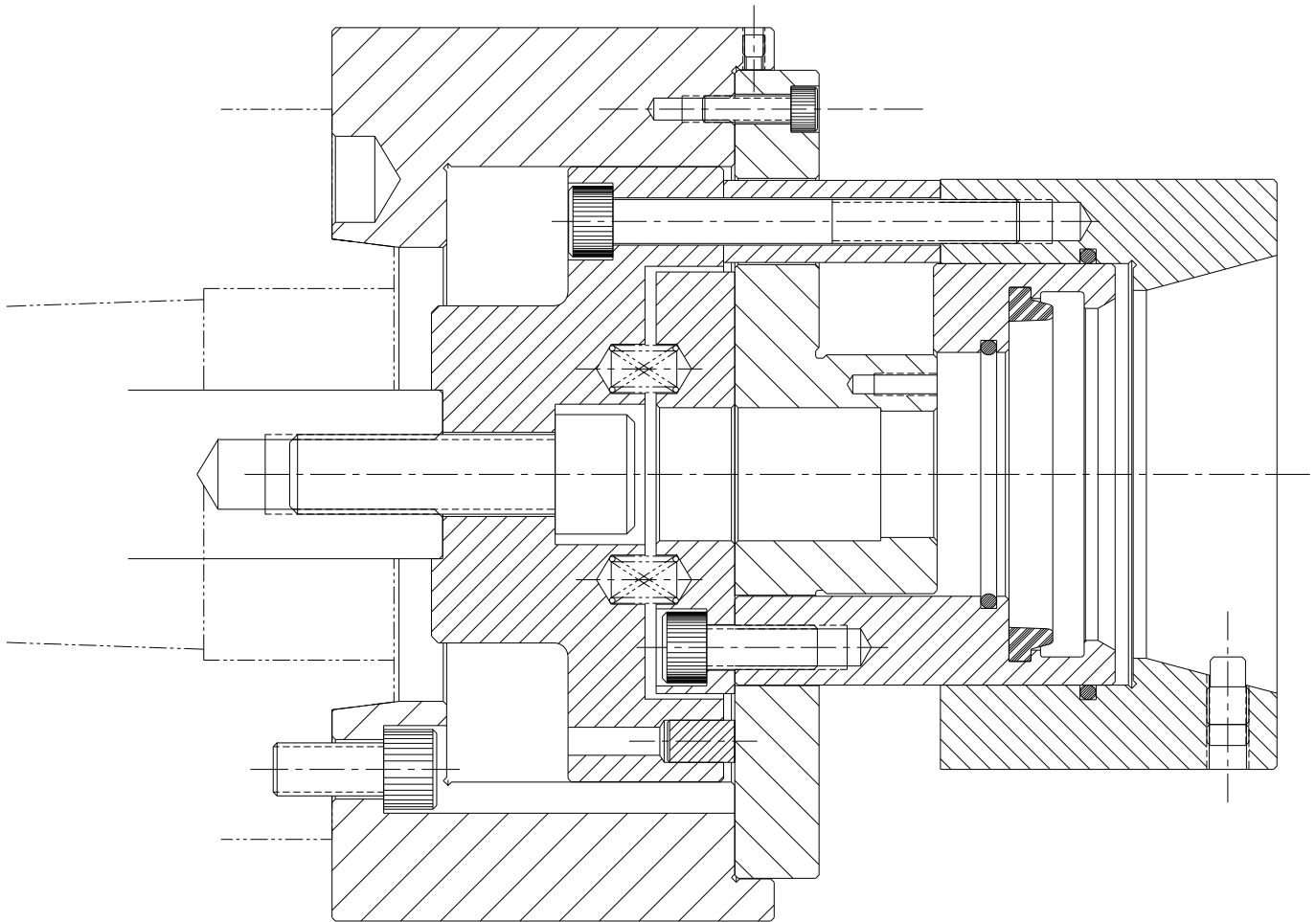
8.0 WSF INSTALLATION

8.1 INSTALL ADAPTER PLATE



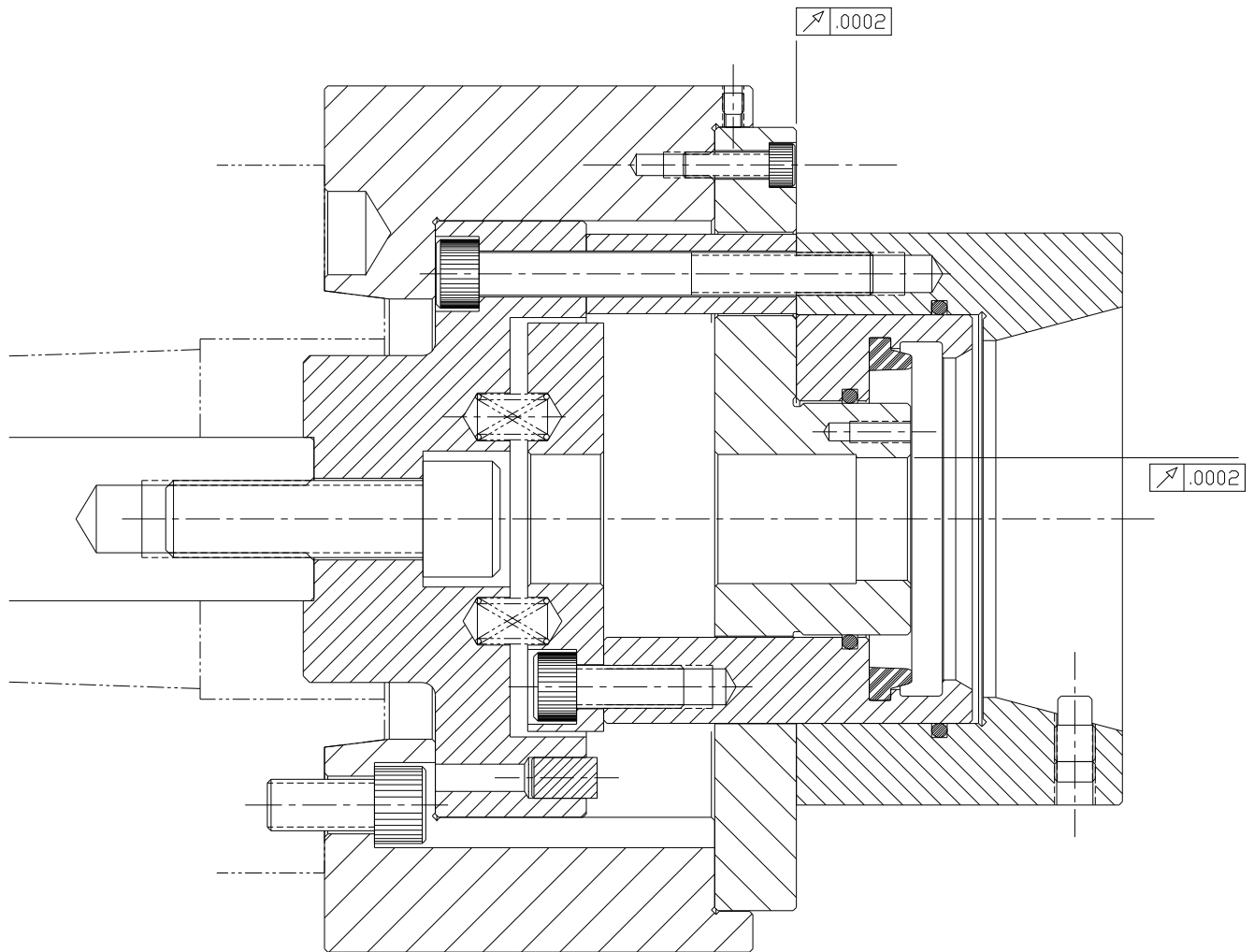
1. Make certain that the mounting faces of the machine spindle and the adapter plate are free of nicks, burrs, or foreign material that could prevent proper seating.
2. Mount the adapter plate to the spindle nose using the cap screws supplied with the chuck. Tighten the mounting screws lightly. With a test indicator, measure the radial and lateral runout as shown. If the runout is within specifications, tighten the mounting hardware securely.

8.2A INSTALL CHUCK ASSEMBLY



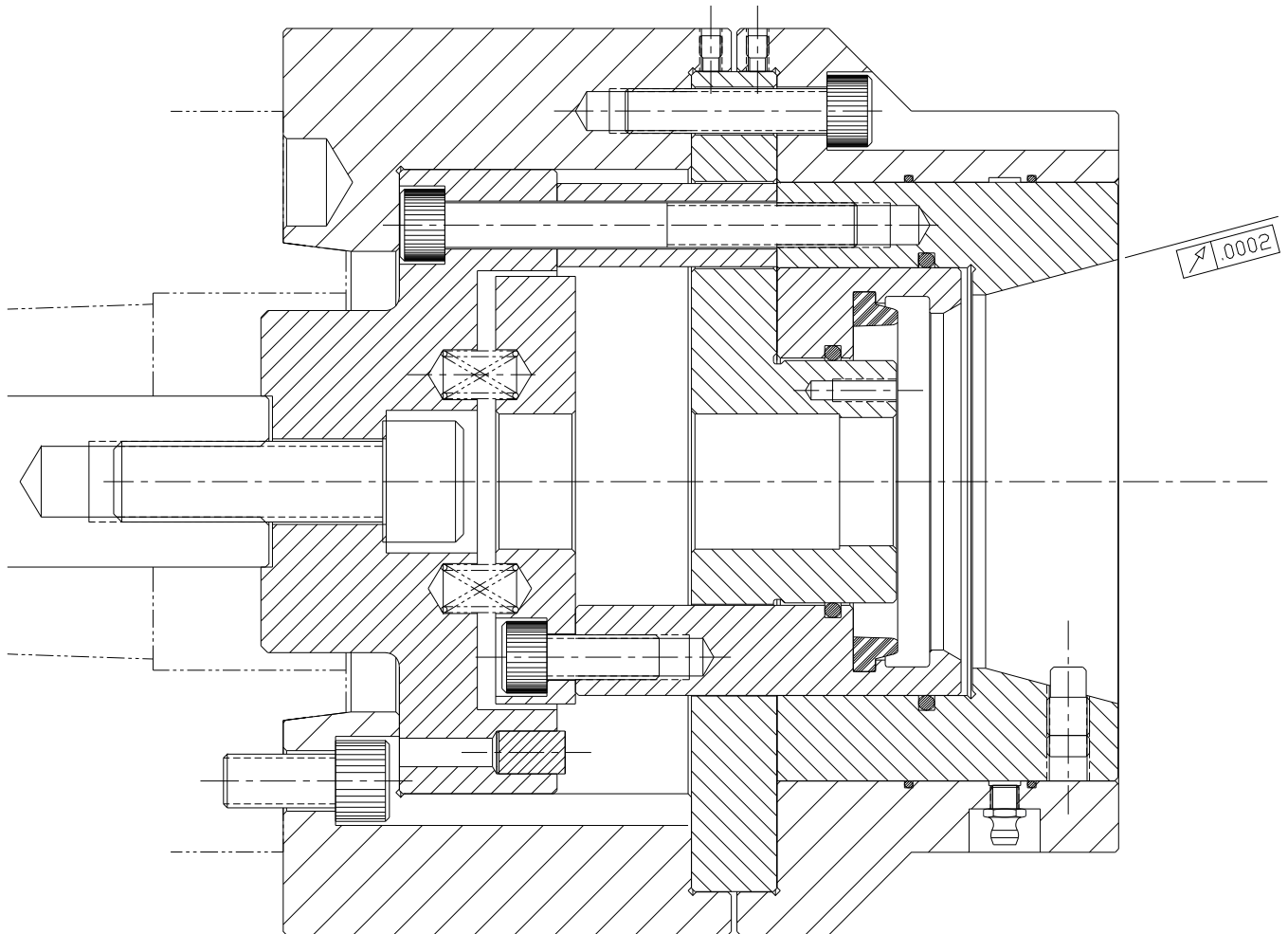
1. Actuate the hydraulic cylinder using minimal cylinder pressure to fully extend the draw bar.
2. Install the chuck assembly onto the adapter plate. Engage the draw bar into the draw bar connector into the draw bar connector and install the M18 cap screw and tighten securely.
3. Install the 6 mounting screws and tighten lightly.

8.2B INSTALL CHUCK ASSEMBLY



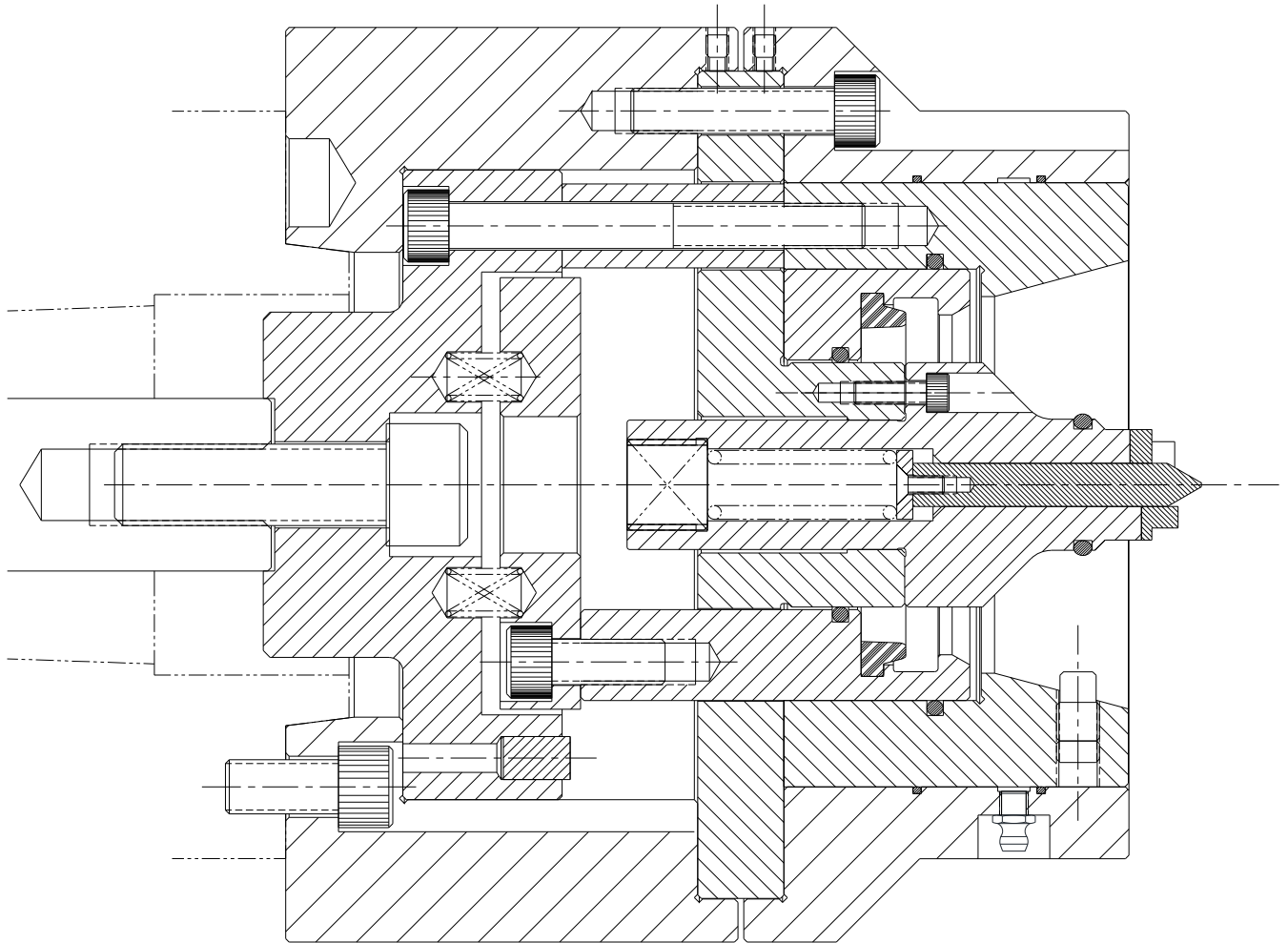
1. Actuate the hydraulic cylinder to fully retract the draw bar.
2. With a test indicator, measure the radial and lateral runout as shown. Use the four radial adjusting screws to true up the runout of the chuck assembly.
3. Tighten the mounting screws alternatively and equally. Do not over tighten.

8.3 INSTALL CHUCK BODY



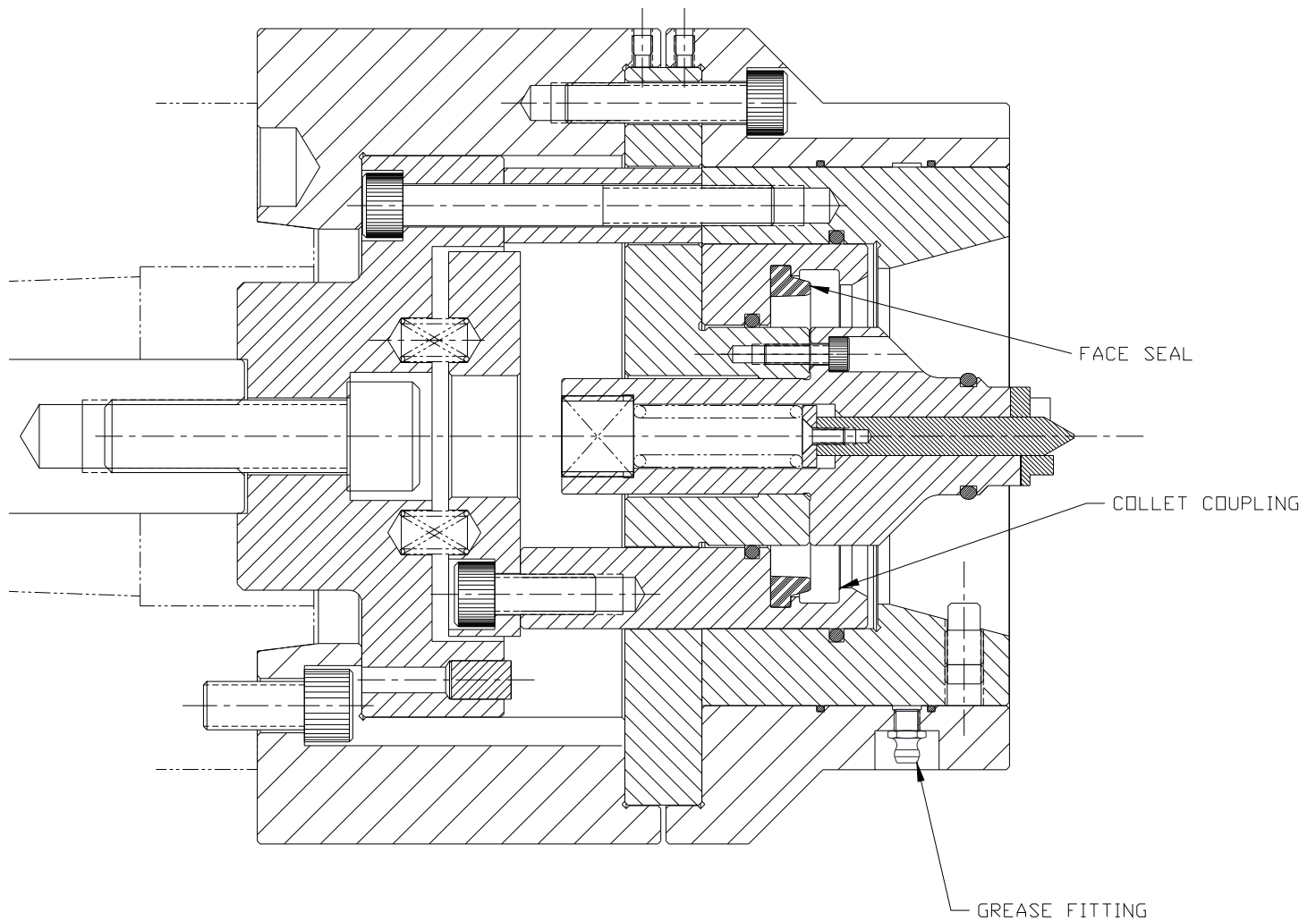
1. Install chuck body over chuck assembly and lightly tighten mounting screws.
2. With a test indicator, measure the radial runout as shown. Use the 4 radial adjusting screws to true up the runout of the chuck assembly.
3. Tighten the mounting screws alternately and equally. Do not over tighten.

8.4 FACE DRIVER INSTALLATION



1. With a test indicator, ensure the runout of the ID of the driver mounting plate is within .0002, as shown in Step 8.2B. If runout is not within .0002, remove chuck body and return to Step 8.2B.
2. Install face driver onto driver mounting plate. Tighten the mounting screws alternatively and equally. Do not over tighten.
3. Install driver cap onto face driver. Tighten the mounting screws alternatively and equally. Do not over tighten.

8.5 LUBRICATION AND MAINTENANCE



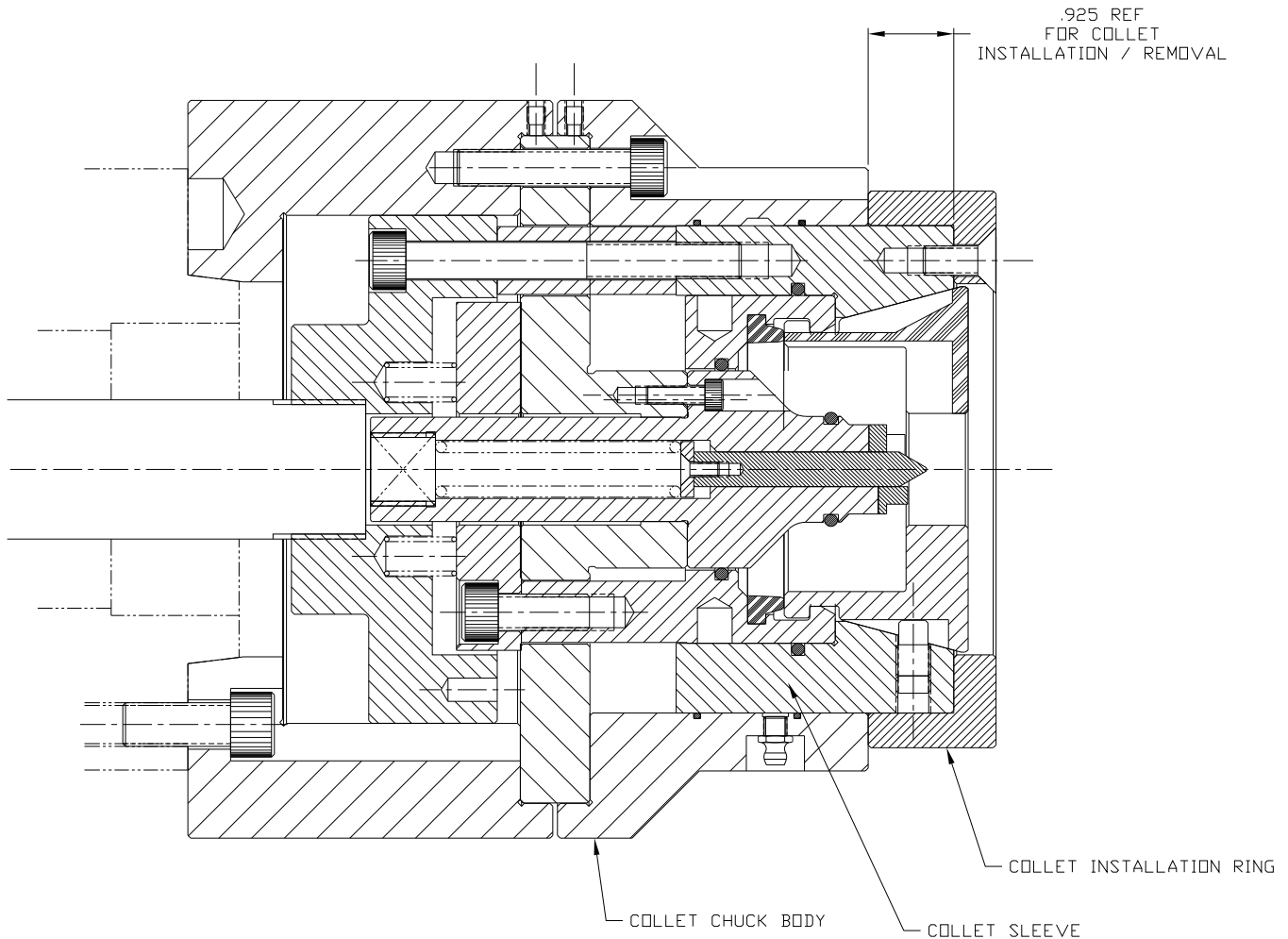
Lubrication

There is a grease fitting on the OD of the chuck body. Every 4 weeks, one shot of grease from a grease gun should be applied to the fitting. Cycle the chuck several times after applying grease.

Maintenance

When changing collets, inspect the coupling inside the actuator for an accumulation of dirt and chips. If necessary, remove the face seal inside the actuator and clear out all dirt and chips before replacing the face seal and installing the collet.

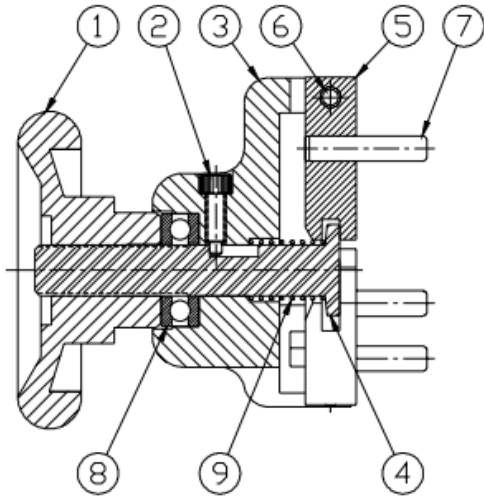
8.6 COLLET INSTALLATION



1. Actuate the hydraulic cylinder to fully extend the draw bar.
2. Install the collet installation ring onto the collet sleeve.
3. Reduce the hydraulic pressure to the minimum required to operate the hydraulic cylinder.
4. Using low pressure, retract the draw bar to seat the collet installation ring against the collet body as shown.
5. Install the collet using the collet changing fixture.
6. Actuate the hydraulic cylinder to fully extend the draw bar.
7. Remove the collet installation ring from the collet sleeve.
8. Reset the hydraulic pressure to the desired clamping pressure.

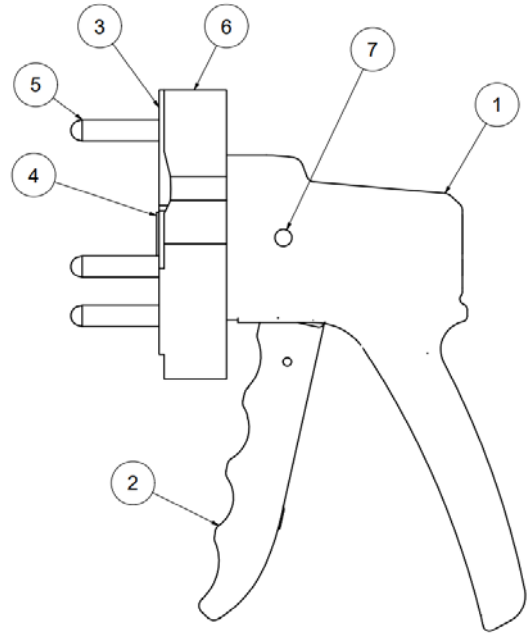
9.0 CHANGING FIXTURE ASSEMBLY & PARTS LIST

9.1 MANUAL COLLET CHANGING



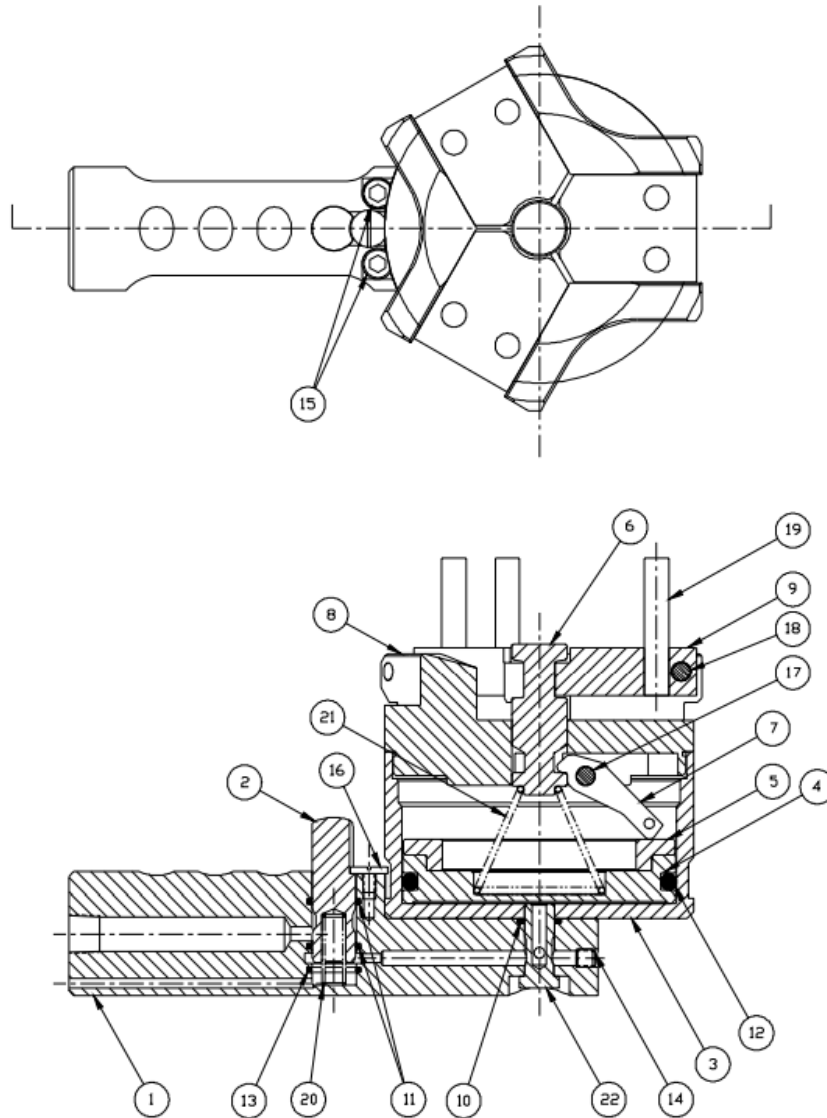
ITEM	QTY	DESCRIPTION
1	1	Hand Wheel
2	1	Retaining Screw
3	1	Housing
4	1	Rod Actuator
5	3	Jaw
6	3	Pivot Pin
7	3	Collet Pin
8	1	Bearing
9	1	Spring

9.2 PISTOL GRIP COLLET CHANGING



ITEM	QTY	DESCRIPTION
1	1	Housing
2	1	Trigger
3	3	Jaw
4	1	Bushing
5	6	Collet Pin
6	1	Front Plate
7	1	Retaining Pin

9.3 PNEUMATIC COLLET CHANGING

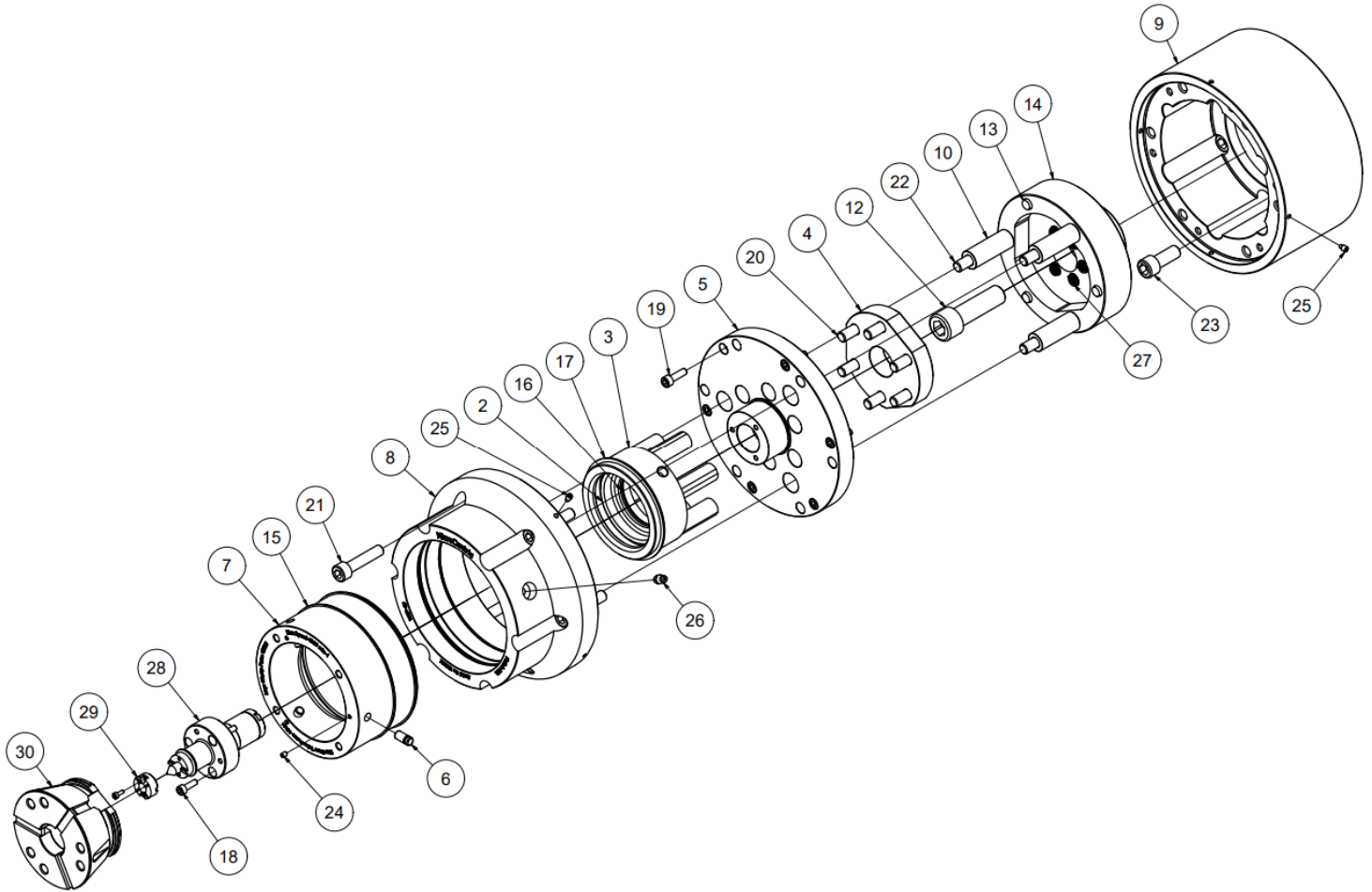


ITEM	QTY	DESCRIPTION
1	1	Handle
2	1	Trigger
3	1	Cylinder
4	1	Piston
5	3	Wear Plate
6	3	Actuator Rod
7	3	Lever*
8	1	Front Plate
9	1	Jaw
10	1	O-Ring
11	1	O-Ring

ITEM	QTY	DESCRIPTION
12	1	O-Ring
13	1	O-Ring
14	1	Set Screw
15	1	Socket Head Cap Screw
16	3	Retaining Screw
17	3	Lever Pivot Pin*
18	3	Jaw Pivot Pin*
19	1	Collet Pin**
20	1	Trigger Spring
21	1	Conical Spring
22	1	Hollow Bolt

*CP-100 Changing Fixture has six of each of these components.

10.0 WSF ASSEMBLY DRAWING AND PARTS LIST



ITEM	QTY	TITLE
1	1	COLLET CHUCK ASSY
2	1	FACE SEAL
3	1	ACTUATOR
4	1	ACTUATOR PLATE
5	1	DRIVER MOUNTING PLATE
6	3	LOCATING KEY
7	1	COLLET SLEEVE
8	1	BODY
9	1	ADAPTER
10	3	BUSHING
11	1	DRAW BAR CONNECTOR
12	1	SOCKET HEAD CAP SCREW
13	3	DOWEL PIN
14	1	DRAW BAR CONNECTOR
15	2	O-RING

ITEM	QTY	TITLE
16	1	O-RING
17	1	O-RING
18	3	SOCKET HEAD CAP SCREW
19	6	SOCKET HEAD CAP SCREW
20	6	SOCKET HEAD CAP SCREW
21	6	SOCKET HEAD CAP SCREW
22	3	SOCKET HEAD CAP SCREW
23	6	SOCKET HEAD CAP SCREW
24	3	CUP POINT SET SCREW
25	8	DOG POINT SET SCREW
26	1	GREASE FITTING
27	6	SPRING
28	1	FACE DRIVER ASSY
29	1	DRIVER CAP
30	1	COLLET



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