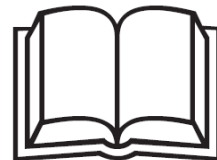
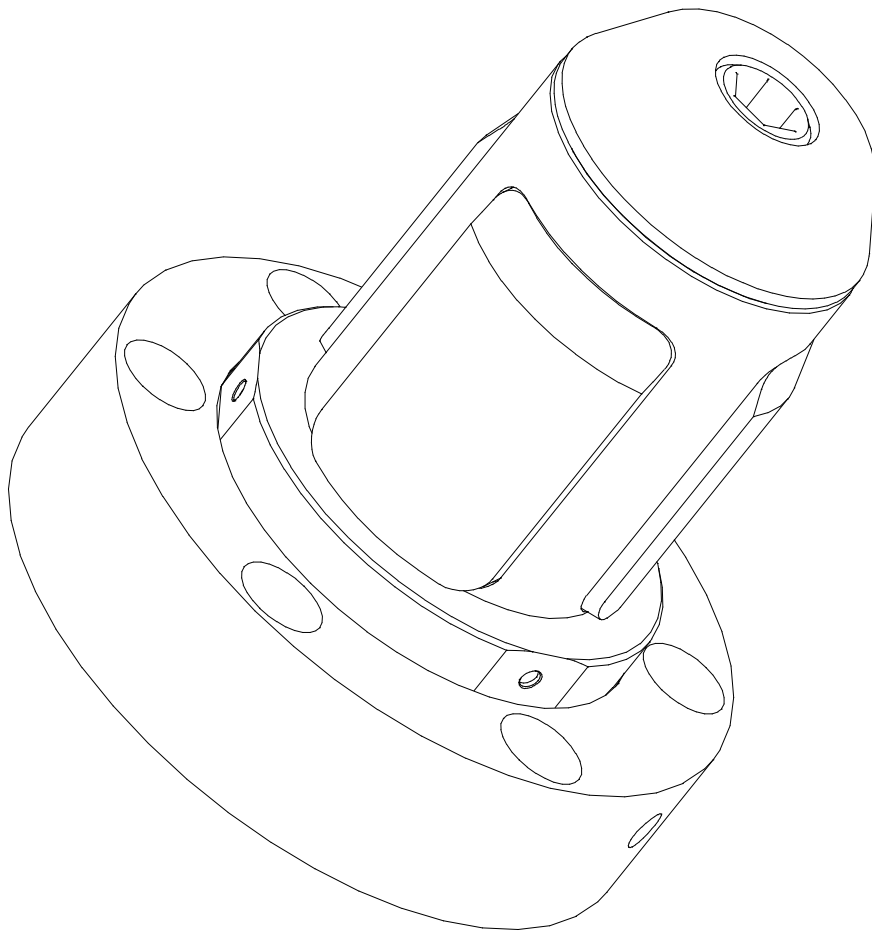




# USER'S GUIDE AND MAINTENANCE MANUAL FOR DF-2000 TORQUE ACTIVATED CORE CHUCKS



***USER'S GUIDE AND MAINTENANCE MANUAL FOR DF-2000 TORQUE ACTIVATED  
CORE CHUCKS***

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# A. INTRODUCTION

## A.1 Introduction

We thank you for choosing Double E Company DF-2000 torque activated core chucks and are pleased to have you as a customer. We are confident that our product will provide you with years of satisfaction. For optimal performance, please use and maintain your DF-2000 torque activated core chucks as outlined in this manual.

We recommend that you read this manual carefully and refer to it whenever a problem may arise. Our Technical Support department is also always available for advice and assistance. This manual describes the installation, operation, usage precautions, and detailed information about this product's accessories and options.

The product must be used according to the instructions. Keep this manual as a reference for the future.

Double E Company reserves the right, at any time, to make changes (without any obligation of revision), felt to be useful for the product improvement or for any constructive or commercial reason. Copying, buffering and transmission in any form (electronic, mechanical, by photocopying, translating or others) of this publication is forbidden without express Double E Company authorization.

Double E Company refuses any responsibility in case supplied safety chucks are set at work before the machine where they are going to be fitted has been declared to be in accordance with provision of the law 89/392 and its subsequent modifications.

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## A.3 Important

- Do not use this product before having read and understood the whole content of this manual.
- Double E Company has done everything possible to make this manual complete and correct.
- Please transfer this manual to subsequent users if the product is lent or sold.
- Should this documentation or the warning labels applied on the device be lost or damaged, please request replacements from the supplying company.

## A.4 Warranty

See general terms of sale. Our standard warranty is available on our website at [www.ee-co.com](http://www.ee-co.com).

# B. SAFETY

## B.1 Safety Instruction - Symbology

- For safe operation of DF-2000 chucks, carefully read these safety instructions before use.
- Follow every WARNING and ATTENTION note, described in this section, as they are extremely important for safety.
- In this manual, warnings and are indicated by the following signal word conventions.



Indicates a potentially dangerous situation that, if not avoided, is almost certain to cause serious injuries or death.



Indicates a potentially dangerous situation that, if not avoided, can cause moderate to serious injuries, or even death.



Indicates a potentially dangerous situation that, if not avoided, can cause minor to moderate injuries or damage to the equipment.



Highlights information needed to ensure the proper use of this device.

## B.2 Safe Operation of Equipment



*Double E Company designs and manufactures DF-2000 chucks with maximum safety in mind. Please take careful note of the following rules for safe operation:*

- Double E recommends always using the DF-2000 chuck carefully without abusing it. Avoid strong collisions and/or accidental impacts with foreign bodies. These collisions can damage the chuck's components such as the end cap, jaws, and jaw retainer.
- There is risk of injury from the rotation of the chuck during un/winding. Keep sufficient distance during un/winding and do not touch any part of the chuck during rotation.
- Do not wear loose hair or clothing near rotating chuck for risk of entanglement.
- Avoid unnecessary emergency braking.
- Do not cantilever a roll on a single chuck.
- Do not use chucks in working conditions different than stated in the specifications table or on any notes on the approval drawing.
- Do not exceed the operating loads of the chucks as specified on the customer quotation and/or approval drawing. This voids chuck warranty and can be unsafe.
- Make sure all fasteners are in place and torqued to the appropriate specification before operation.
- All replacement parts on this chuck should be original equipment supplied by the Double E Company.



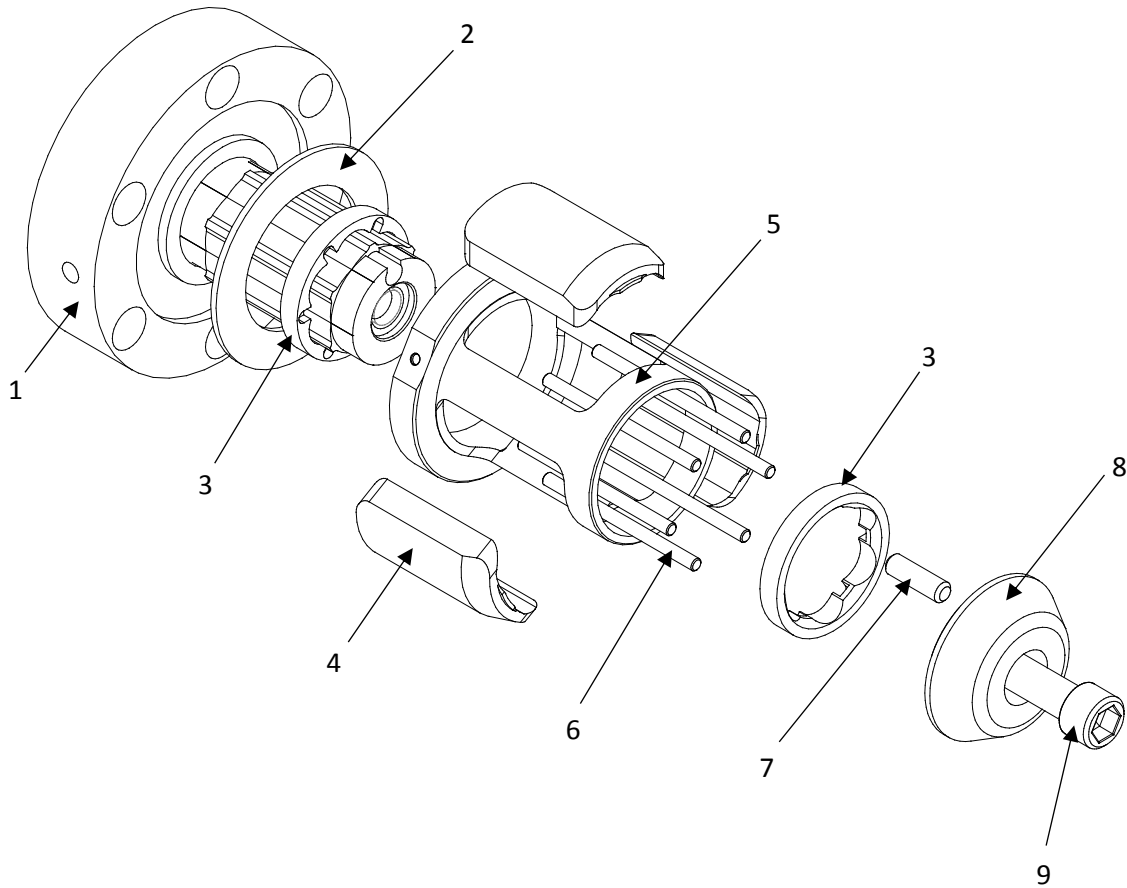
**Visually inspect the DF-2000 core chuck prior to each use:**

- Check that the jaw retainer is able to rotate and the jaws expand in both directions.
- Check that the fasteners are properly tightened.
- Check the whole unit to ensure there is no core material or extraneous dust in between rotational elements.

**In the event that any of the above conditions are identified, do not put the chuck in service and contact Double E Company Technical Support at 508-588-8099 extension 571.**

## C. TERMINOLOGY

### C.1 DF-2000 Core Chuck Components (4 inch and smaller)

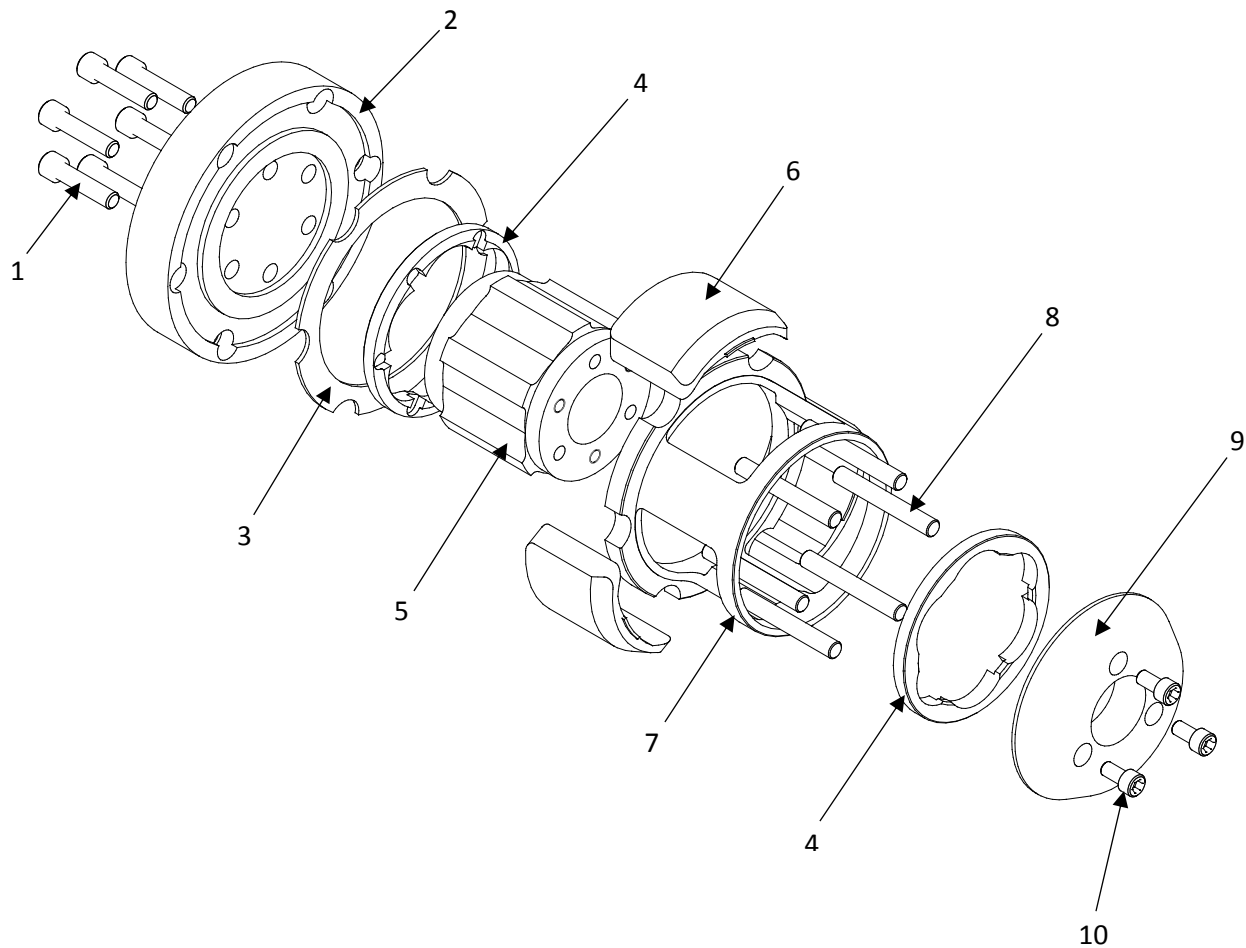


- 
- |                        |                        |
|------------------------|------------------------|
| 1. Hex Flange Assembly | 6. Rollers (6)         |
| 2. Thrust Washer       | 7. Spirol Pin          |
| 3. Roller Cages (2)    | 8. End Cap             |
| 4. Jaws (3)            | 9. End Cap Fastener(s) |
| 5. Jaw Retainer        |                        |

*Drawing is for reference only. Actual configuration may vary. Please refer to your approval drawing for an exact list of components included.*



## C.2 DF-2000 Core Chuck Components (5 inch and larger)

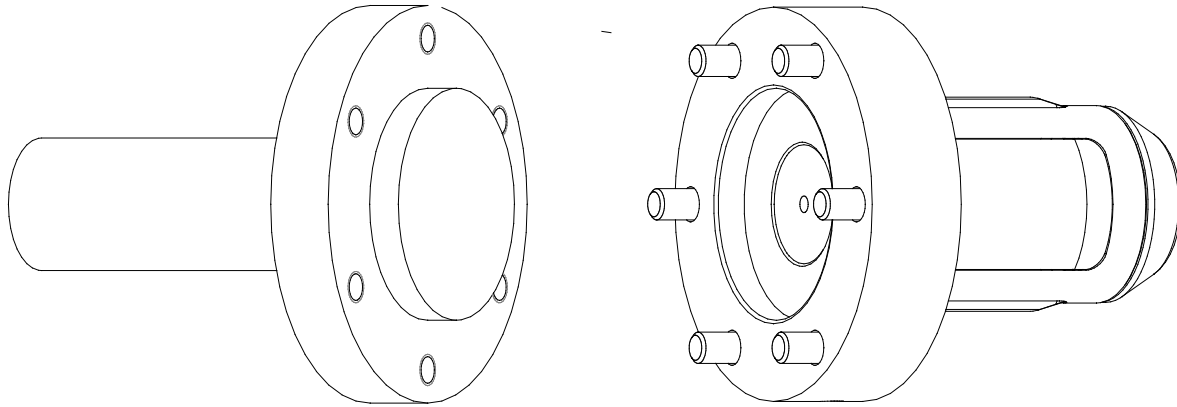


- 
- |                               |                           |
|-------------------------------|---------------------------|
| 1. Hex Mounting Fasteners (6) | 6. Jaws (3)               |
| 2. Mounting Plate             | 7. Jaw Retainer           |
| 3. Thrust Washer              | 8. Rollers                |
| 4. Roller Cage (2)            | 9. End Cap                |
| 5. Hex                        | 10. End Cap Fasteners (3) |

*Drawing is for reference only. Actual configuration may vary. Please refer to your approval drawing for an exact list of components included.*

## D. PRODUCT DESCRIPTION

### D.1 Flange Mounted Chucks



**DESCRIPTION:** This mounting style uses a pattern of fasteners, typically consisting of three, four, or six fasteners, combined with a centering pilot. It is the strongest, simplest, and most reliable method of mounting. If chuck(s) need to be changed often to accommodate different core sizes, fewer larger fasteners can be used.

#### **CAUTION**

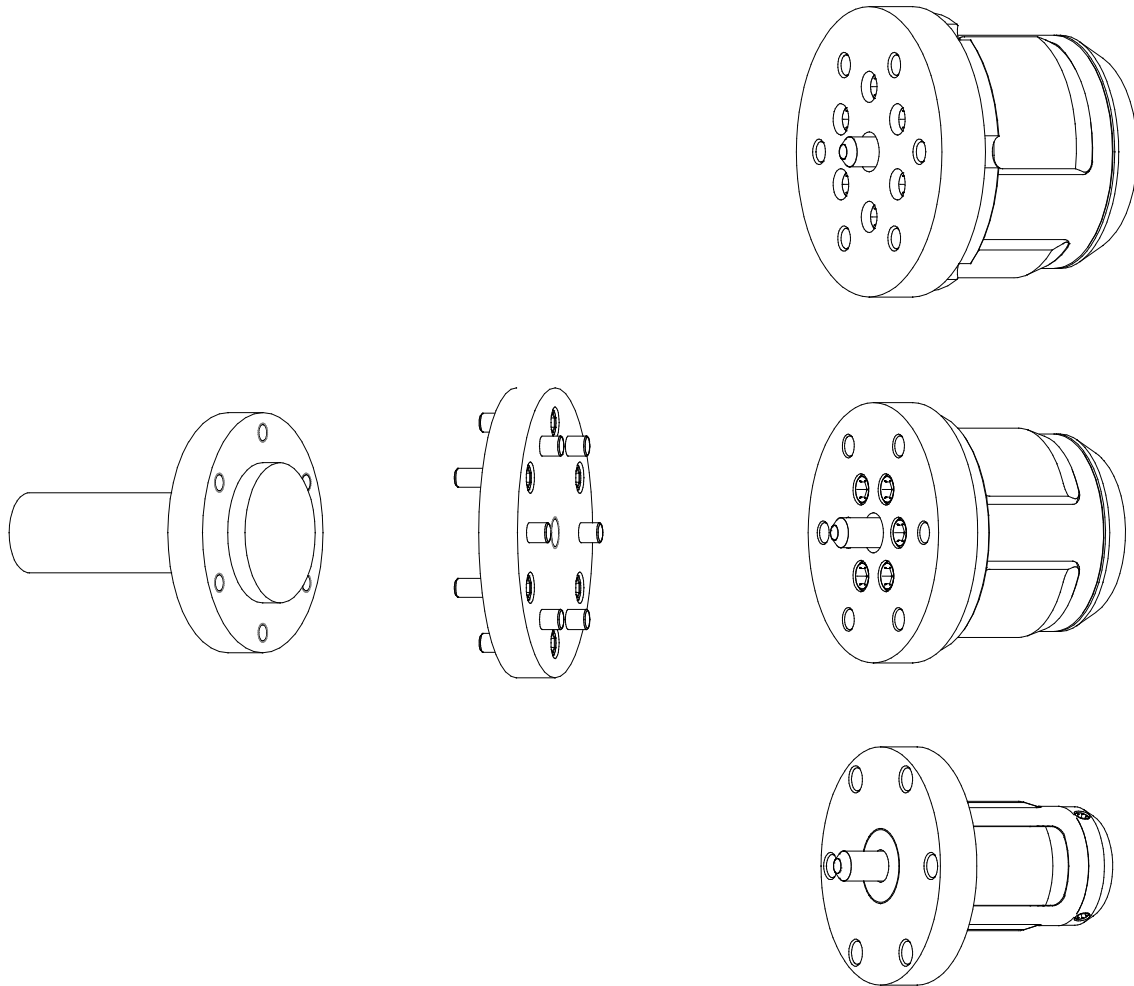
*Always consult with Double E before reducing the number of fasteners.*

**PILOT:** The pilot controls the concentricity of the chuck yet should still permit easy installation. Therefore, a diametrical clearance of approximately .004 inch (.10mm) is recommended.

**FASTENERS:** Socket Head Cap Screws are typically used to mount core chucks. Regardless of the head style, it is important to use high-grade (SAE 5 minimum) heat-treated fasteners. Premium brand fasteners, such as “Unbrako” or “Holo-Krome” are recommended. To protect against loosening due to vibration, it is essential to tighten fasteners adequately according to the fastener manufacturers’ recommendations. See table of seating torques in Section E.1 Torque Requirements.

**VARIATIONS:** If the roll stand is equipped with a mounting flange, but the bolt hole pattern cannot be accommodated directly, then an adapter plate may be used. If the chuck is large compared to the bolt hole pattern, a “Thru-Hex” mount is an option.

## D.2 Quick Disconnect Chucks

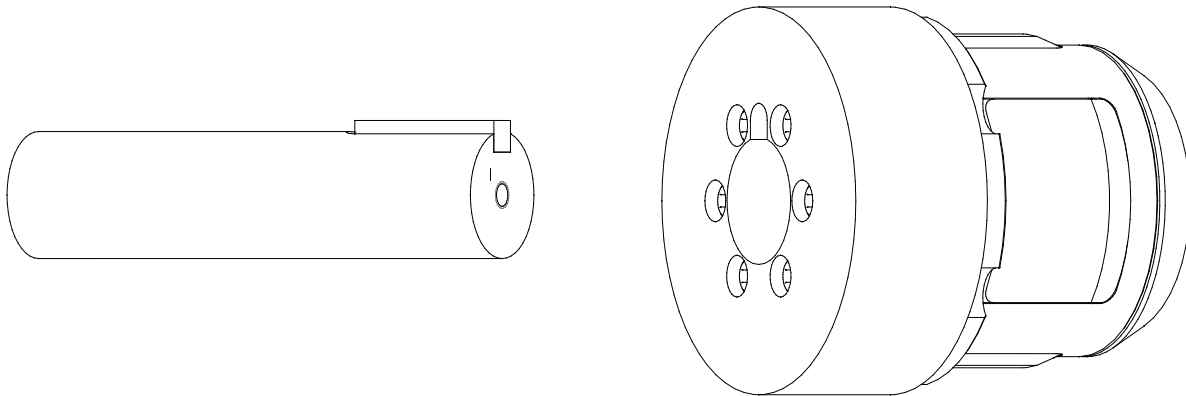


**DESCRIPTION:** This mounting style allows chucks to be installed with a single center fastener (3/4" or M20 in diameter). This mounting style is often selected to permit simplified changeover between different size chucks, especially when there is not enough room for step chucks.

Often, multiple sized chucks are provided with a quick disconnect adapter plate, shown above, which has a centering pilot and a bolt hole pattern adequate for permanently mounting it to the existing roll-stand arbor. This type of adapter plate also uses a pattern of dowel pins to center the chucks and transmit torque and a tapped hole to accommodate the center fastener.

**CENTER FASTENER:** The center fastener enables the chucks to withstand service loads. To protect against loosening due to vibration, it is essential to tighten fasteners adequately according to the fastener manufacturers' recommendations. See table of seating torques in Section E.1 Torque Requirements.

## D.3 Stub Arbor Mounted Chucks



**DESCRIPTION:** This configuration mounts to a roll stand arbor with a key and a single center fastener. Some chucks can utilize a bore inside the hex of the chuck while others must be in the mounting plate.

### **NOTICE**

*This mounting configuration is not recommended if frequent chuck removal is required. An adapter plate can be made to convert the roll stand to either flange mount or quick disconnect mount if the chuck will be removed often.*

**ARBOR:** The arbor must be in good condition, with uniform diameter. This enables a close fit of the chuck onto the arbor; typically .002" (.05mm) diametric clearance to .0012" (.03mm) diametric interference. The key requires a close clearance fit. If the arbor has a shoulder, the chuck should be bored deep enough to permit clamping against the shoulder.

**CENTER FASTENER:** To protect against loosening due to vibration, it is essential to tighten fasteners adequately according to the fastener manufacturers' recommendations. See table of seating torques in Section E.1 Torque Requirements.

## D.4 Other Variations and Options

**EHD/LG:** These chucks have a jaw and jaw retainer that are 50% longer than the standard length DF-2000. Extra heavy duty long chucks are able to handle higher roll weights and transmit more torque. These chucks have a larger jaw contact patch, reducing the imprint on the core.

**D2 MATERIAL:** Chucks with D2 tool steel are able to handle higher roll weights than the same length chuck in standard steel. On D2 chucks, the hex is always upgraded to D2 tool steel. On some sizes, the jaws are also upgraded to D2 tool steel.

**STEP CHUCKS:** These two tiered chucks are put together as a flange mount base chuck and a quick disconnect top chuck. It allows for running multiple core sizes with minimal changeover time.

**SHORT:** Chuck with a shorter jaw and jaw retainer for applications that have little room for the chuck. These chucks also have a reduced weight and torque capacity.

**FRICTION-WELD/SPINWELD:** All standard hex-flange assemblies are made from two pieces. Spinweld hex-flanges are fused together as one piece. This procedure allows for higher roll weight with the same length standard chuck.

**THROUGH SHAFT:** This version of a DF-2000 core chuck can be mounted on a shaft. Typically a through shaft chuck is paired with a retractable roll collar on the opposite side.

## E. Fastener Specifications

### E.1 Torque Requirements

Double E recommends that you only use premium brand fasteners, such as “Unbrako” or “Holo-Krome.” Using high strength thread adhesive such as “Red Loctite”, install the fasteners. Tighten all fasteners moderately, and then, to protect against loosening due to vibration, tighten fasteners adequately, according to the fastener manufacturers’ recommendations. See the table of seating torques below.

Use the table below for all fasteners that are part of the chuck and also any fastener that is used to mount the chuck to the machine.



*Failure to properly torque any load bearing fastener can result in a critical failure, potentially causing the chuck and/or roll to fall. “Red Loctite” or equivalent must be used to ensure that the fasteners will not loosen.*

Fastener Size	Torque Requirement Lbs (Nm)	Ft-
M6	12 (16)	
1/4-20 UNC	12.5 (17)	
1/4-28 UNF	14 (19)	
5/16-18 UNC	25 (34)	
5/16-24 UNF	27 (37)	
M8	29 (39)	
3/8-16 UNC	45 (62)	
3/8-24 UNF	48 (64)	
M10	57 (77)	
7/16-14 UNC	70 (95)	
7/16-20 UNF	75 (102)	
M12	100 (135)	
1/2-13 UNC	108 (147)	
1/2-20 UNF	114 (155)	
5/8-11 UNC	211 (286)	
5/8-18 UNF	222 (301)	
M16	243 (330)	
3/4-10 UNC	367 (497)	
3/4-16 UNF	400 (542)	
M20	479 (650)	
7/8-9 UNC	583 (791)	
7/8-14 UNF	633 (859)	
M24	811 (1100)	
1-8 UNC	867 (1175)	
1-12 UNF	917 (1243)	

## F. CORE CHUCK OPERATION

### F.1 Application Limitations



*Do not exceed the operating parameters of the chuck as specified on the drawing. This voids the chuck warranty and can cause serious injury.*

**ROLL WEIGHT:** Rolls in excess of chuck capacity can cause failure of the structure and/or mechanism of the chuck.

**PRESENCE OF TORQUE:** The DF-2000 reacts to applied torque and, therefore, cannot be used without a center brake or drive. Examples include the non-brake side of a single brake unwind or a surface driven rewind. However, if center torque is used in conjunction with a surface assist, the DF-2000 is applicable. Idlers or torque independent chucks can be provided as required.

**TORQUE CAPACITY:** Torque magnitudes, in excess of chuck capacity, can cause failure of the structure and/or mechanism of the chuck. This is particularly important when using single-brake roll stands and/or when executing extreme emergency stops. In some cases, the core cannot transmit the rated torque of the chuck. If this problem cannot be solved directly with improved fiber (paper) or metal cores, long chucks may be required.

**CORES:** The DF-2000 is designed for use with fiber (paper), steel, and aluminum cores. Fiber cores must be strong and without excessive damage. All cores must have inside diameters which are within reasonable tolerances. The DF-2000 is not recommended for use with coreless rolls. Although some plastic cores might be too slippery to enable the reliable use of the standard DF-2000, modifications to the standard DF-2000 design can be executed if required.

**ROLL STAND ALIGNMENT:** All core chucks require roll stand alignment to avoid elevated mechanical stress.

### F.2 Core Chuck Insertion, Activation, and Removal

**NEUTRALIZE THE JAWS:** It is sometimes necessary to manually collapse the jaws of the chuck prior to insertion. This is accomplished by grasping the jaws and rotating the jaw assembly to the neutral position.

**CHUCK INSERTION DEPTH:** The jaws should be engaged in the core with no more than a 1/8" (3mm) gap between the core and the jaw retainer flange.

**DO NOT USE SIDARM FORCE:** Excessive sidearm force creates unnecessary, potentially damaging loads on both the chuck, and the roll stand components. Indications of excessive sidearm force include core crushing, thrust washer wear, and difficulties in chuck-core separation.

**JAW EXPANSION/ACTIVATION:** The jaws grip the core automatically with the initiation of applied torque, either from a brake or a motor, for either roll unwinding or rewinding.

**CHUCK REMOVAL:** To remove the chuck from the core, it may be necessary to release the chuck's grip by rotating the core backwards. For unwind applications, this might require the activation of the brake(s).

# G. MAINTENANCE

## G.1 Routine Inspection

Routine inspection can usually be accomplished without disassembly or removal of the chuck from the roll stand. The purpose of routine inspection is to ensure that the expansion mechanism works freely. The jaws need to be grasped to simulate inward force from the core and the jaw assembly is then rotated throughout its range. If this is accomplished smoothly and with ease, the chuck is functioning correctly. If tightness or roughness is felt, maintenance is required.

## G.2 Routine Maintenance

If the chuck action feels tight, it may be contaminated with dust. This can usually be corrected without chuck removal or disassembly. Using an air nozzle, directed at the edges of the jaws, blow the dust from the chuck. If the chuck action becomes free, continue normal use. This cleaning procedure can be used as preventive maintenance as conditions require. If this cleaning procedure does not free the mechanism, proceed to disassemble.

The DF-2000 mechanism can function without any lubrication or coating. This helps prevent dust contamination. However, if corrosion is a known problem, it is important to coat the internal chuck parts. Dry silicon spray is suitable and will not attract dust. Oils such as WD-40 may also be used and can be reapplied without disassembly. However, oil may attract dust which may lead to more frequent internal cleaning. All three alternatives have been successful in various applications. Routine inspection can evaluate this requirement. In general, Double E recommends either no lubrication or dry silicon lubrication unless a corrosion problem is known to be severe and requires frequent use of oils such as WD-40.

## G.3 Non-Routine Maintenance

If the product is used under normal conditions and inspected regularly, it is rare that any non-routine or extraordinary maintenance will be needed. In the event that it is necessary, it is recommended that you contact Double E Company Technical Support at 508-588-8099 extension 571.

## G.4 Decommissioning

If the product is withdrawn or removed from service, it is necessary to make all at-risk components harmless through proper demolition. These operations must be carried out in accordance with the provisions existing in the nation or locale in which the product will be disposed.

## G.5 Product Storage

All Double E chucks should be carefully stored when not in use. To ensure maximum performance, Double E chucks should be rested on padded surfaces to protect the components. Storage locations should be in cool, dry environments away from high levels of human or vehicle traffic.



# H. Assembly, Disassembly, and Inspection

## CAUTION

*Replace components only when the machine is completely stopped and locked out.*

Internal inspection of the DF-2000 is valuable for preventive maintenance as well as for the correction of existing problems. Internal inspection can be accomplished without removing the chuck from the roll-stand. To minimize downtime and to facilitate maintenance, however, it is recommended to remove the chuck from the machine and replace it with a spare. The chuck can then be placed upright on a bench for servicing.

## H.1 Generic Disassembly Procedure

Refer to Section C for a parts diagram for part descriptions used in the following instructions

1. Remove the end cap, which is secured with a center fastener or with one or more fasteners on the top or around the end cap. "Red Loctite" has been used to secure the end cap fastener(s), so an impact wrench, breaker bar, or moderate heat may be required for their removal. Once the fasteners have been removed, removing the end cap may require upward force.

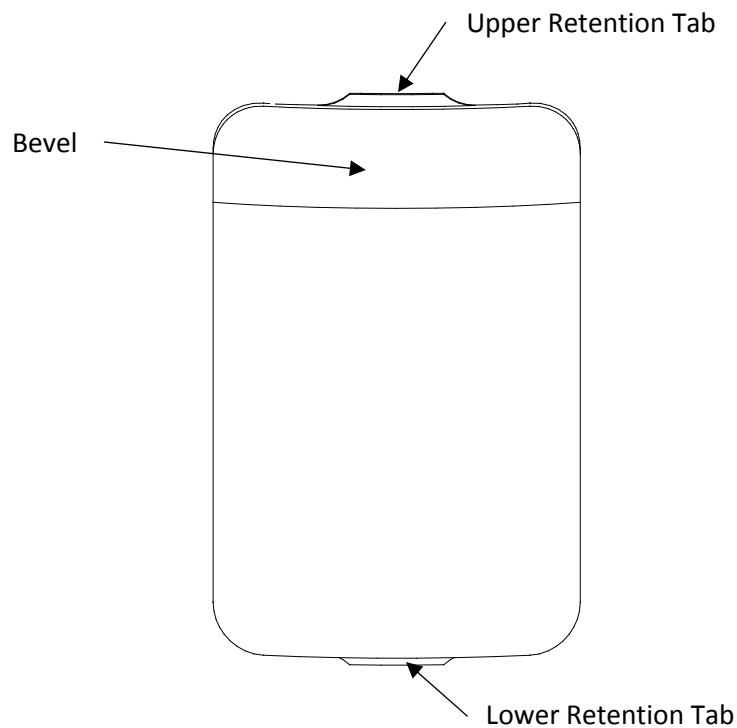
## WARNING

*Only trained operators should use a torch. Double E recommends applying heat to a steel bar and holding it against the head of the fastener to conduct heat into the fastener and to melt the "Red Loctite." Direct flame should not be applied to the fasteners.*

2. Lift off the jaw assembly. The top roller cage will remain in the jaw retainer and the rollers will often fall from the hex assembly. Remove the jaws and the top roller cage from the jaw retainer.
3. The hex and mounting plate should remain together on all models unless the mounting plate needs to be replaced (5 inch models and larger).

## H.2 Part Inspection

1. Inspect the general condition of the parts for rust, dust, and other contamination.
2. Examine the hex and jaws for indentations made by the rollers.
3. Inspect the thrust washer which does not require removal from the hex/mounting plate assembly except when being replaced. The top surface of the thrust washer should be recessed between .04" (1mm) and .08" (2mm) into the mounting plate. Check that the jaw retainer is able to spin freely on the thrust washer.
4. Examine the jaws for fractures to the retention tabs (one per end). See illustration below.



5. Check the jaw retainer for fractures, deformation, and other signs of damage.
6. Check both roller cages to be sure they can spin freely around the hex. Check the slots for denting or wear.
7. Check the rollers for pitting, non-uniform diameters, and other signs of damage. Use the following chart to determine when to replace worn rollers. Roller replacement is valuable preventive maintenance because it maximizes jaw expansion and prevents damage to the hex and/or jaws.

Chuck Size	Roller Diameter (New)	Roller Diameter (Minimum)
2.76" - 3.11" 70mm - 79mm	0.230" 5.8mm	0.217" 5.5mm
3.50" - 5.75" 89mm - 146mm	0.312" 7.9mm	0.295" 7.5mm
5.91" - 7.375" 150mm - 187mm	0.480" 12.2mm	0.457" 11.6mm
8.00" - 8.75" 203mm - 222mm	0.610" 15.5mm	0.579" 14.7mm
10.00" - 12.00" 254mm - 305mm	0.860" 21.8mm	0.819" 20.8mm

### H.3 Generic Assembly

1. Clean and dry the end cap fastener(s) and the corresponding hole(s), using a solvent such as acetone, making sure they have been fully blown dry.

2. If removed, seat the thrust washer in the slot on the base of the hex assembly.
3. Place the lower roller cage on the hex assembly with the slots facing upwards.
4. Place the jaws into the jaw retainer, making sure that the bevel side of the jaw is facing up.
5. Slide the jaw assembly onto the hex assembly.
6. Line up the points on the inside of the jaw retainer with 3 of the peaks of the hex and then place the rollers into the hex assembly, one in each hex cavity.
7. Place the upper roller cage on top with the slots facing down. Rotate the jaw retainer back and forth with light downward pressure on the roller cage until it drops into place.
8. Position the end cap so that the hole(s) line up.
9. Apply high strength thread adhesive (“Red Loctite” or equivalent) and install the end cap fastener(s). Refer to the torque chart in Section E.1 Torque Requirements for recommended seating torque.
10. Manually test the chuck’s expansion action.

# I. TROUBLESHOOTING

## I.1 Troubleshooting

<b>Problem</b>	<b>Chuck will not enter core</b>
Solution 1	Confirm that the correct size chuck was purchased. For example, a 6" chuck will fit very tightly, if at all, into a 150mm core.
Solution 2	Check for core damage. If necessary, trim the core entrance with a knife. Eliminate cause of core damage.
Solution 3	Test the chuck function. If the chuck is jammed, preventing jaw retraction, disassemble and repair.

<b>Problem</b>	<b>Chuck spins in core</b>
Solution 1	Confirm that the correct chuck size was purchased (oversized jaws are available).
Solution 2	The core may have been previously damaged (cut, burst, peeled, plowed, etc.) due to the use of cones or sidearm activated chucks. Eliminate cause of core damage.
Solution 3	The chucks may be fouled and unable to exert full grip force. Maintain as required (refer to routine cleaning and internal inspection guidelines).
Solution 4	The core may be too weak to transmit the loads transmitted by the chuck (compression and shear). If possible, decrease web tension and/or use stronger cores.

<b>Problem</b>	<b>Chuck will not withdraw from core</b>
Solution 1	Chuck may still be engaged inside core. Rotate the core manually then extract chucks.
Solution 2	Excessive sidearm force may have embedded the jaw retainer flange into the core. Avoid excessive sidearm force.
Solution 3	Various core damage and/or weakness may be involved. Examine cores prior to chuck insertion to confirm this explanation. Eliminate the problem.
Solution 4	The chuck may be fouled and/or damaged. Repair as required (refer to sections V and VI of this manual). If the damage is found to be denting of the hex and/or jaws by the rollers, check operating loads and roll stand alignment.
Solution 5	Check roll stand alignment.

<b>Problem</b>	<b>Structural Failure</b>
Solution 1	Check load capacities and operating loads (roll weight & torque). If loading is found to be excessive, consult the Double E Company for alternative options.
Solution 2	If loads do not appear to be excessive, investigate the possibility of accidental overloads. These would include the “hanging” of an unsupported roll from a single chuck or severely misaligned roll stand. Carefully repair the chuck, or return to the Double E Company for repair and discontinue abuse.

## J. MANUFACTURER'S DECLARATION

Buyer shall afford Double E Company prompt and reasonable opportunity to inspect any goods as to which a claim is made and Double E Company shall have the right of final determination of the cause and existence of any defect under this warranty. No material may be returned to Double E Company without Double E Company's express prior permission in the form of a return authorization number.

Correction of non-conformities, in the manner and for the period provided above, shall constitute fulfillment of all liabilities of Double E Company to Buyer with respect for the goods, whether based on contract, negligence, strict tort, or otherwise.

## K. RETURNS

Warranty and non-warranty returns are initiated through the issuance of a return material authorization (RMA) number from an authorized Double E Company sales or service/support representative. This can be obtained by calling Double E Company in West Bridgewater, MA at 508-588-8099.

The RMA number should be clearly evident on the shipping label and/or invoice and the package should be shipped freight prepaid. If questions arise or if additional information is required, please call the Inside Sales department at 508-588-8099

Product returns should be sent to the address below:

Double E Company, LLC  
319 Manley Street  
West Bridgewater, MA 02379  
ATTN: RMA # \_\_\_\_\_



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