PRATER®
1925®
AIRLOCKS • MILLS • SEPARATORS

ROTARY AIRLOCK/ FEEDER OPERATION/ MAINTENANCE MANUAL

DCS Series

Part Nos 9EC1 thru 9EF2
Serial Nos 5005151 and later

MODEL _____

SERIAL NO _____

Before using this equipment:

- AVOID INJURY, read and understand all instructions given in this manual
- Familiarize yourself and others with the safety labels installed on this equipment (See section 1.6)
- Designate an accessible place for this manual and keep it available to all users at all times

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1.0 SAFETY RULES

⚠WARNING

ROTARY AIRLOCK/ FEEDERS CONTAIN MOVING PARTS THAT CAN CRUSH AND CUT.

TO AVOID SERIOUS INJURY OR DEATH, READ AND UNDERSTAND ALL INSTRUCTIONS IN THIS MANUAL.

1.1 General

Rotary airlock/ feeders displace free flowing powders and granules from one vessel to another while maintaining an air seal.

To maintain this seal, all airlocks are designed with close tolerances between their rotor and housing that create hazardous pinch points at the inlet and discharge openings (Refer to Illustration 1.1.1).

Body parts inserted into a rotary airlock inlet or outlet will be crushed or cut.

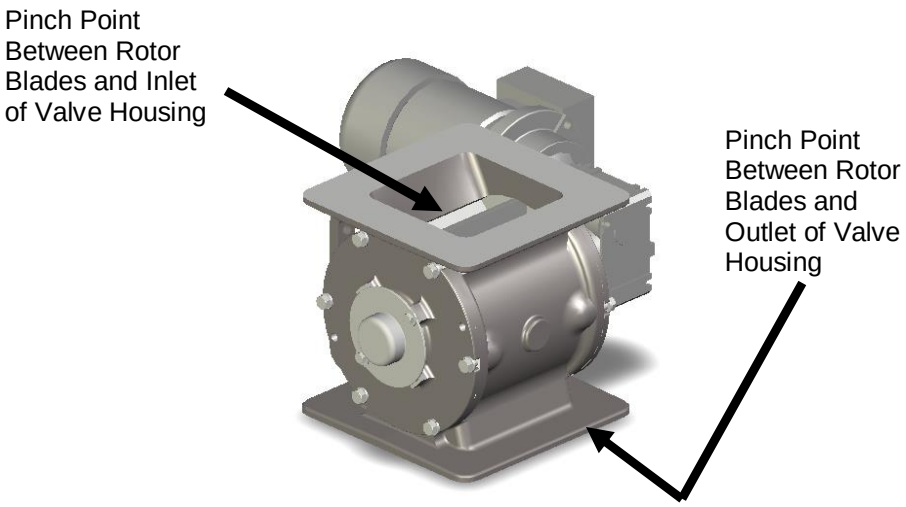


Illustration 1.1.1- Airlock Pinch Points

1.2 Lockout/ Tagout

Before installing and using your rotary airlock feeder, a proper lockout/ tagout procedure must be developed in accordance with OSHA Standard 29 CFR 1910.147 ñThe Control of Hazardous Energy (Lockout/ Tagout).ò

Although lockout/ tagout procedures are designed specifically for each installation, the standard ñrequires employees to establish a program and utilize procedures for affixing appropriate lockout devices or tagout devices to energy isolating devices and to otherwise disable machines or equipment to prevent unexpected energizing, start-up or release of stored energy in order to prevent injury to employees.ò

Furthermore, each person performing work on the airlock should be able to affix their own lockout/ tagout device in a manner that de-energizes the equipment and prevents start-up until all persons have removed their lockout/ tagout devices.

1.3 Training

Only those trained in the proper use of rotary airlock feeders should be permitted to install, use, or maintain them.

As the owner of this product, you are encouraged to instruct others that:

- A rotary airlock/ feeder can suddenly start without warning
- The rotating parts of an airlock will cut off body parts that come into contact with them
- Before performing any work on the airlock, an approved lockout/ tagout procedure must be followed
- A rotary airlock should never be operated without any of its guards in place

1.4 Installation

The care exercised during installation will ensure safe operation and long life of your new rotary airlock/ feeder.

- Never install and use the airlock for anything other than its intended purpose
- When handling the airlock, never place any body parts into the inlet or discharge

- Always connect the airlock's inlet and discharge to other components designed to prevent dangerous access to the airlock's rotor (See Section 3.4.2)
- If the components used with the airlock are designed for "quick-removal" or contain "access panels," interlock them so that removal or access de-energizes and locks-out the airlock. Refer to ISO 14119 for interlocking design considerations
- A lockable, local disconnect within sight of the rotary airlock is recommended as part of your lockout/ tagout program

1.5 Operation/ Maintenance

- Before using this device, read and understand all instructions given in this manual
- Never place body parts near moving components
- Avoid poking or prodding into the airlock inlet or outlet
- Always allow the airlock to stop naturally. Never attempt to artificially brake or slow its motion
- Never operate the airlock with access panels or safety guards removed
- Keep the area around the airlock free of debris and obstacles

1.6 Safety Labels

Referring to drawing 1.6.1 below, locate all safety labels on you equipment and ensure that all users understand their meaning.

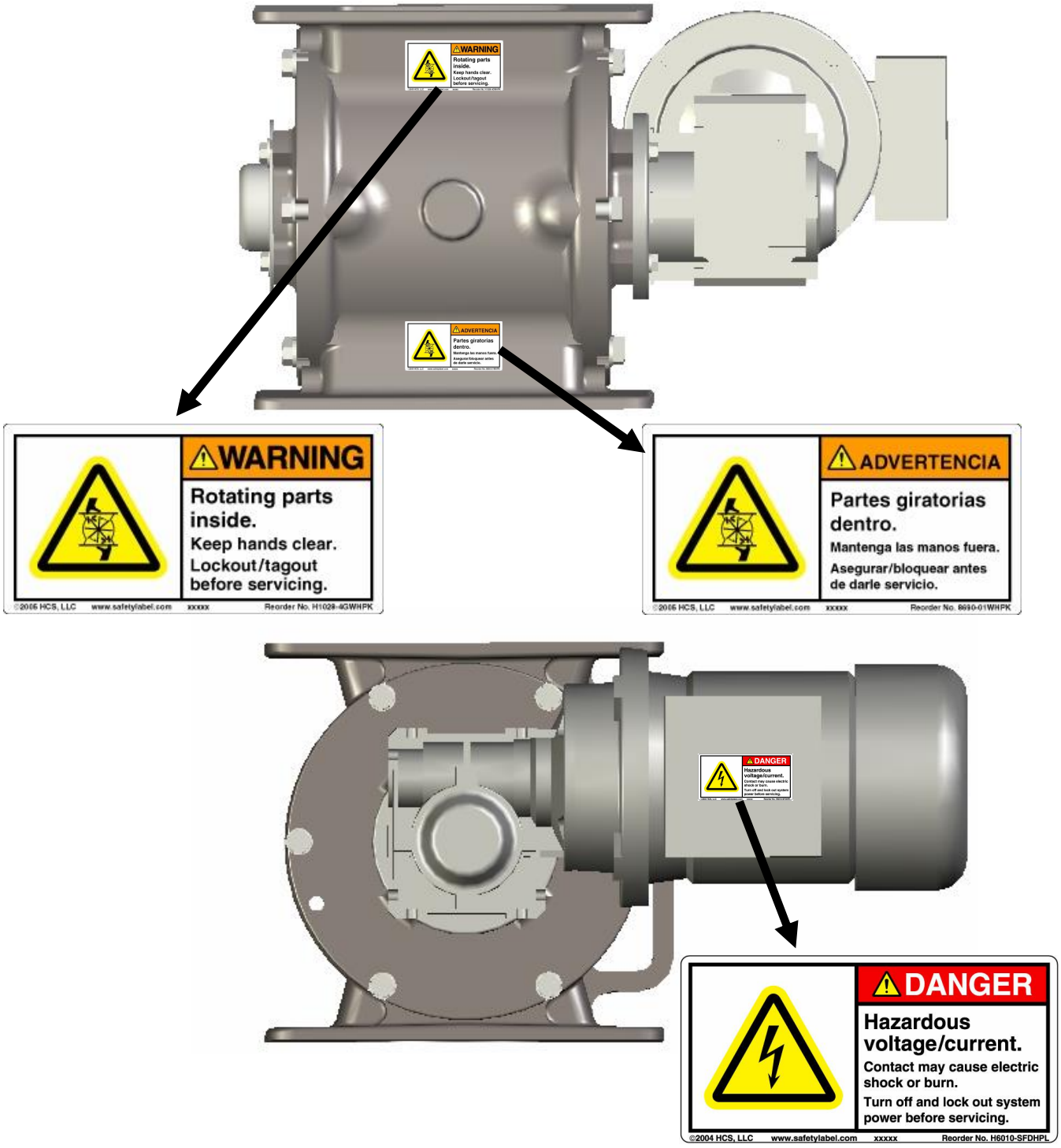
If any safety labels are worn, faded, or missing,

REPLACEMENT DECALS ARE AVAILABLE FREE OF CHARGE BY CONTACTING:

PRATER-STERLING
2 SAMMONS COURT
BOLINGBROOK, IL 60440
PH: 800-323-5735 FX: 630-759-6099
info@prater-sterling.com

Illustration 1.6.1 DCS Airlock Label Diagram

(Reorder Label Kit No. 5LA100010)



1.7 Signal Words

Signal words are used on all safety labels and throughout this manual to call your attention to potentially hazardous situations. The meaning of each signal word is as follows:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

(NOTICE is used on Prater safety labels and in collateral materials to indicate a situation which, if not avoided, could result in equipment damage.)

2

2.0 INTRODUCTION

2.1 Overview

This manual describes the installation requirements, procedures, and routine maintenance of DCS Series Rotary Airlock Feeders. Read the entire manual before installation and keep it available for future reference. A detail drawing is located in Chapter 7 and can be folded out for easy reference while reading.

Reliable operation, personnel safety, and long service life of this equipment depend on three important considerations:

- The care exercised during installation
- The quality and frequency of maintenance and periodic inspections
- Using the valve only for its intended purpose

2.2 Unpacking the Unit

When your shipment arrives, thoroughly inspect the Airlock and related accessories. In the event of shipping damage, note the problem on your bill of lading or freight bill and make sure you obtain the driverôs signature for possible claim against the delivering carrier.

NOTICE

Prater equipment is shipped FOB Factory. Therefore, itôs the purchaserôs obligation to file damage claims with the shipping carrier.

After unpacking your unit, locate the serial tag located on the airlock housing. (See Illustration 2.2.1)

Record the model and serial number on the front of this manual and keep the information handy for future reference when contacting Prater.

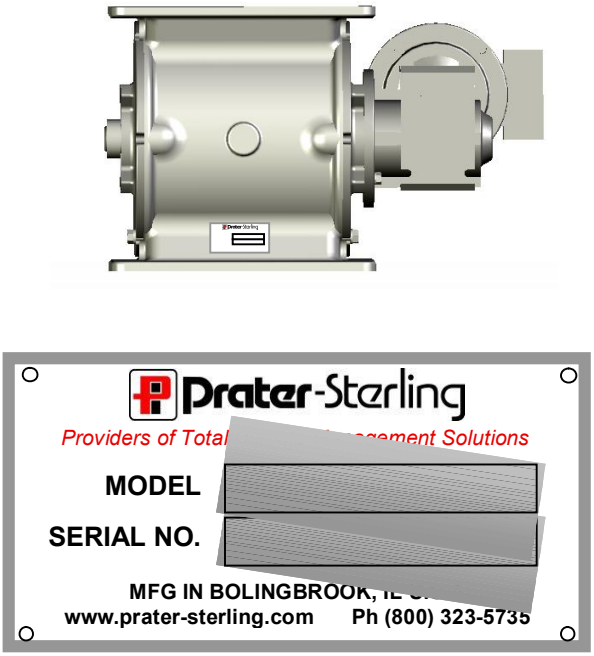


Illustration 2.2.1- Serial Tag Location

2.3 Storage

Airlocks contain ferrous components that will rust if left exposed to rain or humidity.

To prevent damage during extended storage, always keep the airlock in a temperature and humidity controlled environment.

2.4 Before Installation

Be sure personnel are aware of installation requirements. If they have questions or are unsure of proper procedures, clarify the matter to avoid errors.

Section 3 of this manual covers important steps to ensure a safe, reliable installation. Only trained personnel familiar with these procedures should install the airlock.

2.5 Limitations of Use

Unless specifically designed otherwise, your DCS Series Rotary Airlock Feeder is primarily used to perform one or a combination of the following functions:

- Feed fine, free-flowing material from one vessel to another vertically through its housing.
- Discharge fine, free-flowing material from a dust collector or cyclone while sealing against air loss.
- Feed free-flowing material into or out of a pneumatic conveying line operating at less than +/- 3 PSI.

Due to their design, all Prater DCS Series Rotary Airlock feeders are limited to use in applications of less than 300 ºF and less than +/- 3 PSI pressure differential.

2.6 Design

All Prater Rotary Airlock Feeders are manufactured with quality materials and workmanship. If given reasonable care, they will continue to perform well with minimal maintenance. Each part has been computer machined to close tolerances, ensuring the best possible fit between components. Basic construction consists of:

- Heavy cast iron housing and end plates provide rigidity
- 8 pocket, cast rotor with 3/8òthick blades and scalloped pocket bottoms
- Permanently lubricated, sealed for life bearings, mounted inboard
- Packing type seal
- OPTIONAL beveled rotor for reducing drag on products that smear or stick to the valve body (See Section 2.7, Optional Rotor Designs)
- OPTIONAL flexible tip rotor for handling fibrous products (See Section 2.7, Optional Rotor Designs)
- Standard TEFC direct drive gear-motor
- OPTIONAL TEXP gear-motor

2.7 Optional Rotor Designs

2.7.1 Beveled Rotor

Sticky materials or certain powders that tend to smear or pack can produce frictional drag between the rotor and housing. A partial list of these materials includes:

- Sugar
- Gypsum
- Limestone
- Fine Clays
- Detergents
- Stearates
- Powdered Plastics

For these materials, an Airlock can be equipped with beveled rotor edges. Beveling is a relief cut made to the trailing edge of each blade. The relief cut helps to prevent material from smearing between the rotor tips and housing. It also helps to reduce horsepower consumption.

Beveled rotors are unidirectional. For proper rotation, the square edge of the rotor should lead and the beveled edge should trail. This normally results in clockwise rotation when viewed from the drive end of the airlock. (Refer to Illustration 2.7.1)

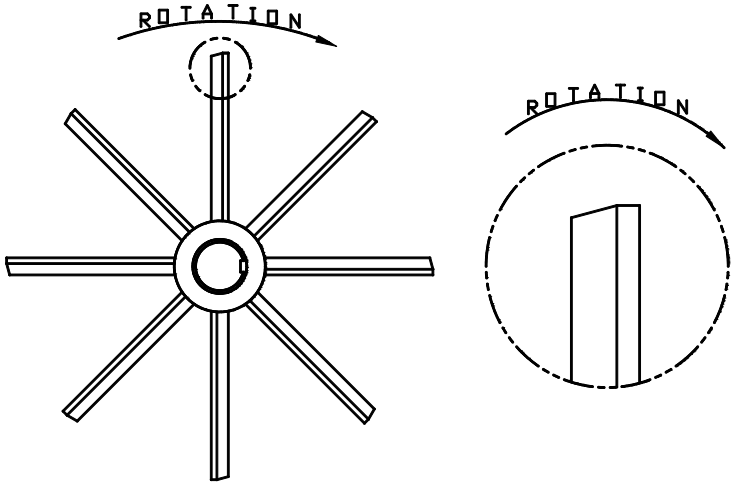


Illustration 2.7.1- Beveled Rotor

2.7.2 Flexible Tip Rotor

Certain materials, such as fibers, can get caught between the blade tips and housing, causing the rotor to jamb. For these products, an Airlock may be equipped with flexible rotor tips.

Flexible tips are usually made from neoprene or rubber and are bolted to the leading edge of the blade. Flexible tips are designed to seal against the airlock housing and bend slightly in operation.

Flexible tip rotors are unidirectional. For proper rotation, the flexible portion should be on the leading edge of the blade. This normally results in clockwise rotation when viewed from the drive end of the airlock. (Refer to Illustration 2.7.2)

Flexible tips are not recommended for airlocks that operate under pressure or vacuum greater than 30òWG. Temperature limitations also apply depending on the flexible material used. For more information on the wiper material and its temperature rating, please contact Prater.

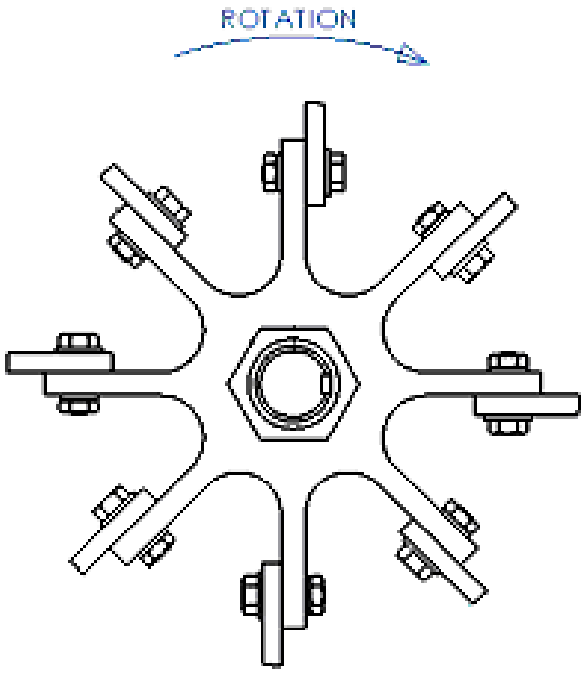


Illustration 2.7.2- Flexible Tip Rotor

2.8 Operating Principle

(Fold out and Refer to Illustration 7.1.1)

A multiple pocket rotor (3) is supported inside the housing (1) by bearings (5) mounted to end plates (2). The end plates lock into the side of the housing and seal the sides of the rotor. The housing inlet and outlet are flanged and drilled for making process connections to external components.

A direct drive gear-motor (7) mounted to one end plate (2) spins the rotor (3) at a predetermined RPM. As the rotor turns, free flowing powder drops through the inlet and fills the rotor pockets. The rotor transfers the powder vertically to the outlet and gravity or pneumatic air aids flow of powder out of the pocket and away from the airlock. The empty pockets then return to the inlet.

2.9 Clearances

Airlocks are designed to operate like a valve: they displace powders across their housing while minimizing air leakage. Because airlocks contain moving parts, they are built with a small clearance around the rotor to prevent metal-to-metal contact. Minimizing this clearance is critical for effective operation and a good seal.

Manufacturers refer to two types of clearances when designing and building airlocks:

- Nominal or Static Clearance- The clearance measured under ambient temperature (less than 100°F) with the valve at rest.
- Design or Dynamic Clearance- The clearance a valve is expected to operate with once reaching actual operating temperature under expected process conditions. Design clearance of Prater airlocks is expected to be between 0.004ò to 0.010ò depending on the application and airlock size.

Nominal clearances and design clearances are not always the same. When the airlock operates above 100°F, the nominal clearance will be greater than the design clearance.

The larger nominal clearance is created at the factory by temperature correcting the rotor. A temperature corrected rotor is machined to a smaller diameter and length to allow for its thermal expansion as the airlock reaches operating temperature.

Proper temperature correction ensures that the airlock will operate with the correct design clearance once the rotor fully expands.

NOTICE

Check your serial tag or sales order and verify that your airlock is built for the correct operating temperature. If not, damage to the airlock could occur.

The nominal clearances of your new airlock should match the values given in Chart A-3 for your operating temperature. If not, it could indicate a problem with assembly or an airlock built for the wrong temperature.

Refer to Section 5.6 for detailed information on how to check clearances.

If unsure of your valveôs operating temperature, please call the Prater Customer Service Department at (1-800-323-5736).

3

3.0 INSTALLATION

3.1 Site Evaluation

Proper site preparation and installation of the Rotary Airlock Feeder (and the equipment attached to it) is critical for safe and efficient operation.

There are several considerations when choosing a suitable installation site:

- Proper Support/ Foundation
- Vibration Dampening
- Leveling
- Guarding the Inlet and Outlet

3.1.1 Location

Make sure the operating location will provide strong, vibration-free support and allow easy access to all parts of the Airlock. (See Section 3.1.2) The Airlock should never independently support the weight of equipment attached to it.

NOTICE

Additional weight supported by the airlock will distort the housing, causing damage to valve internals, and voiding the warranty.

3.1.2 Foundation/ Support

The support or foundation to which the Airlock attaches must be a flat, horizontal surface with sufficient strength to prevent deflections of no more than 0.003" when bolting the airlock in place. It must also be large enough to incorporate the full flange of the Rotary Airlock Feeder.

3.1.3 Vibration

The Airlock must be supported in a vibration free location. Vibration indicates a problem that must be found and corrected immediately. Left uncorrected, vibration will cause damage to the airlock and surrounding structures.

Rotary Airlock Feeders require flange gaskets to prevent leakage of product and air. Gaskets ***are not*** sufficient to prevent vibration transfer from other equipment. If you expect vibration, flexible couplings are recommended to isolate the airlock.

3.1.4 Clearance

There should be sufficient open space in all directions around the Airlock to allow access for maintenance.

3.2 Preparing the Airlock

Your new Airlock is fully assembled and calibrated for immediate installation. However, rough handling in shipment can cause the rotor to shift sideways in its housing. Before installing, check the side clearances of the rotor and re-center if necessary. See Section 5.6 and Chart A-3 for detailed instructions.

Unpacking, storage, and handling can cause debris to become lodged in the rotor. Before installing, clean any foreign debris from the inlet of the valve.

3.3 Mounting/ Leveling

Once a suitable location is chosen and prepared for installation, mount the unit. Using a spirit level, check for plumb and level along the sides and at the corners of the Airlock before tightening the flange bolts.

If leveling is required:

1. Insert shims between the flanges where required
2. Re-check for plumb and level
3. When satisfied, tighten all fasteners
4. Check for plumb and level again

If the airlock is not plumb and level after bolting in place, the support or foundation could be insufficient to prevent the deflections specified in Section 3.1.2.

3.4 Guarding

3.4.1 Drive Guarding

DCS Airlocks are supplied with a balanced and mounted, direct-coupled drive motor. Direct drives do not require further guarding in the field.

3.4.2 Finger Guarding

⚠WARNING

ROTATING PARTS CAN CRUSH AND CUT.

TO PREVENT INJURY, ALWAYS CONNECT THE AIRLOCKÕS INLET AND OUTLET TO OTHER COMPONENTS DESIGNED TO PREVENT DANGEROUS ACCESS.

Airlocks are normally attached to other components that enclose the inlet and outlet, preventing dangerous contact with the rotor.

If the airlock is not attached to other components, and the inlet or outlet are left exposed, a suitable finger guard that prevents contact with the rotor must be installed in those areas. (See Illustration 3.4.2)

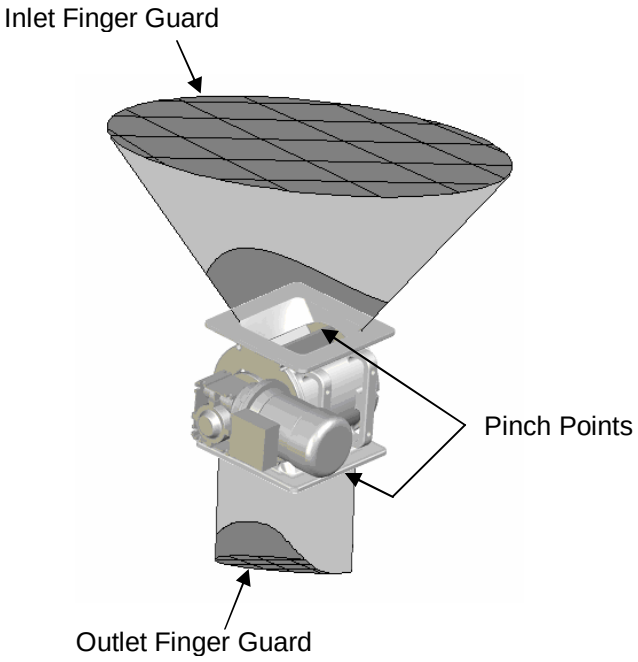


Illustration 3.4.2- Finger Guarding

3.5 Electrical

Electrical connections must meet all national and local electrical codes.

The National Electrical Code requires a manually operable disconnect switch located within sight of the motor, or a controller disconnecting means capable of being locked if not within sight of the motor.

Effective October 31, 1989, OSHA requires that all energy disconnect devices be capable of accepting a lock-out/tag-out device. This requirement is mandatory for any new equipment being installed or for replacement, repair or modification of older equipment. The employer must:

- Produce a written lockout/ tagout program
- Conduct an annual inspection to verify compliance
- Provide documented employee training in these procedures

Most DCS airlocks ship with dual voltage motors. Before making electrical connections, verify that the motor is pre-wired for your supply voltage. If not, refer to the motor wiring diagram before making any changes.

The motor manufacturerûs wiring diagram can be found on or the inside of or near the junction box cover.

3.6 Sequence of Operation

Proper sequencing ensures that your system components work reliably with one another.

As a general rule, the last piece of process equipment is started first, with subsequent starts working back to the feed point of the system.

When located at the end of a system and used to discharge material from a dust collector or cyclone, an airlock should start first and stop last. (ex: nuisance dust collector)

When located at the beginning or in the middle of system and used to material from a dust collector, cyclone, or vessel to a pneumatic convey line, the airlock should start after the pneumatic line blower and stop before purging the pneumatic line.

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4

4.0 OPERATION

DANGER

HAZARDOUS VOLTAGE OR CURRENT.

CONTACT MAY CAUSE ELECTRIC SHOCK OR BURN.

TURN OFF AND LOCKOUT SYSTEM POWER BEFORE PERFORMING INSTRUCTIONS GIVEN IN THIS CHAPTER.

WARNING

ROTATING PARTS CAN CRUSH AND CUT.

KEEP HANDS CLEAR.

LOCKOUT/ TAGOUT BEFORE PERFORMING THE INSTRUCTIONS GIVEN IN THIS CHAPTER.

4.1 Introduction

The pre-run inspections in this chapter ensure that the Rotary Airlock Feeder is in proper condition for effective operation. It is recommended to perform these inspections prior to initial start-up, after any maintenance is performed, or following extended downtime.

At minimum, these checks are recommended at least once per week.

4.2 Start-up Checklist

Before applying power to the airlock, check the following:

- Inspect system piping and surrounding components for foreign material, such as nuts, bolts, wire, rags, paper, wood, etc., that may have fallen into the system components during installation

NOTICE

Foreign material left inside the airlock will cause damage the rotor or housing and void the warranty.

- Electrical starting equipment, meters, disconnect switches, and other control devices are clearly visible and readily accessible
- Rotation matches directional arrow decals on the equipment. (If not, have a qualified electrician rewire the motor.)
- Oil level in gear reducer (See Appendix B)
- The airlock is not supporting any weight from surrounding equipment.

4.3 Initial Start

Initial operation should be a dry run without product. Operate the valve for 15 minutes after it reaches actual operating temperature. Check for vibration or noises.

Slowly introduce product and check for vibration, noises, or chopping motion as the rotor turns.

If any abnormal conditions exist, it could indicate a problem with the valve or the product handled in the valve. Discontinue operation and refer to Chapter 6 for troubleshooting procedures.

4.4 Vibration

All Prater Rotary Airlock Feeders are constructed to run without noticeable vibration. Vibration indicates a problem that must be found and corrected immediately.

Left uncorrected, vibration will lead to:

- Damage to the Airlock
- Damage to surrounding equipment
- Structural damage

There are many conditions that can cause vibration:

- Uneven base (See Section 3.3)
- Loose fasteners on the motor or body
- Defective motor
- Worn or damaged bearings
- Vibration transfer from other equipment (See Section 3.1.3)

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5

5.0 MAINTENANCE

DANGER

HAZARDOUS VOLTAGE OR CURRENT.

CONTACT MAY CAUSE ELECTRIC SHOCK OR BURN.

TURN OFF AND LOCKOUT SYSTEM POWER BEFORE PERFORMING INSTRUCTIONS GIVEN IN THIS CHAPTER.

WARNING

ROTATING PARTS CAN CRUSH AND CUT.

KEEP HANDS CLEAR.

LOCKOUT/ TAGOUT BEFORE PERFORMING THE INSTRUCTIONS GIVEN IN THIS CHAPTER.

5.1 Introduction

Fold out and refer to Illustration 7.1.1 for the procedures in this chapter.

Routine inspections and regular maintenance will identify worn or broken parts before they become a problem. Operating the airlock with worn or broken parts could lead to un-repairable damage.

For reference purposes, the end plates (2) are referred to in this Chapter as follows:

- Left end plate- the non-drive end plate shown left in the illustration
- Right end plate- the drive end plate shown right in the illustration

5.2 Preventative Maintenance

Rotating equipment requires routine preventative maintenance.

5.2.1 Wear

Perform regular inspections of the airlockís internal components, particularly where abrasive materials are being processed. Scoring of the housing or rounding of rotor blades indicates wear that should be corrected.

NOTICE

A worn valve will leak air, reducing its effectiveness. Wear is application dependent and rate of wear is difficult to estimate. Consult Prater for optional products and coatings.

5.2.2 Bearings

Bearings are permanently lubricated from the manufacturer and do not require re-greasing. Regularly check the bearings for signs of contamination or wear. If worn, the airlock may run rough or squeal. Check the bearings by lifting the shaft up and down. Deflection of more than 0.003ò could indicate a worn bearing.

5.2.3 Seals

Seals are factory installed to provide good service life when handling most dry, non-abrasive powders. If powder is leaking from the shaft, the seal is worn and should be replaced.

5.2.4 Drive Motor

DCS airlocks utilize a direct drive, worm gear motor/ reducer. These units are pre-lubricated from the factory and normally require no maintenance.

Periodically check the oil level in the gearbox and fill according to the manufacturerís recommendations. (Refer to Appendix B)

Worm gear reducers can run warm. If the gearbox temperature is over 120 °F, consult Prater. An overheating gearbox could indicate a defective drive or an overloading condition.

5.3 Airlock Disassembly

The airlock should first be removed from its installation and moved to a stable, level work surface.

5.3.1 Disassembly of Non-Drive Side

1. De-energize the Airlock motor and allow it to come to a complete stop
2. De-energize all equipment feeding material to or away from the airlock (i.e. slide gate, vibrating bin discharger, bin aerator pads, pneumatic convey line blower, etc.)
3. Lockout/ tagout all energy sources for equipment identified in steps 1 and 2
4. Remove the bearing cap (4) from the left end plate
5. The bearings (5) are secured to the rotor shaft (3) using an eccentric collar. Loosen the two set-screws on the eccentric collar
6. Rotate the eccentric collar counterclockwise until free, and then slip it off the shaft. If necessary, using the blind hole on the eccentric collar, tap counterclockwise to free it
7. Remove the six cap screws that secure the left end plate (2) to the housing (1)
8. Slide the left end plate assembly (2) off the shaft (3)

For complete disassembly, continue to Section 5.3.2.

5.3.2 Disassembly of Drive Side

9. Remove the four cap screws holding the drive motor (7) and slide the drive motor off the rotor shaft
10. Repeat steps 6 thru 9 in Section 5.3.1 for the right side end plate
11. Remove the rotor (3) from the housing (1) through the left side opening

5.4 Airlock Assembly

1. Insert rotor (3) and center in housing (1)
2. Slide left end plate (2) over shaft and snug against body (1) using 6 cap screws. Do not torque bolts
3. Slide the right end plate (2) over the shaft and using 6 cap screws, snug against the housing (1) Do not torque bolts
4. Gap the rotor according to directions given in Section 5.6 and values in Chart A-3
5. Once the rotor is gapped, slip the eccentric collars over the shaft and onto the bearings (5)
6. Rotate the eccentric collars clockwise until resistance is felt. If necessary, using the blind hole on the collar, tap it clockwise an additional 1/8 of one full turn
7. Tighten the two set-screws on each eccentric collar
8. Rotate the airlock by hand to check for interference. If the rotor does not turn freely or squeals, the rotor is not gapped properly. Loosen the locking collars and repeat the gapping procedure
9. Torque all end plate bolts and repeat step 8
10. Install the drive motor (7) on the shaft using four cap screws. Torque bolts in place
11. Install the bearing cap (4) on the left end plate

5.5 Bearing and Seal Removal/ Installation

5.5.1 Removal

1. Complete disassembly of the valve (See Section 5.3)
2. Using a bearing puller, remove the bearing (5) from the end plate (2)
3. Remove the seal shim and seal (6) from the end plate

5.5.2 Installation

1. Install packing seal (6) into housing (1). Ensure that the seal sits flat against the bottom of the end plate and that the cut ends are flush against one another. Do not fray the ends of the packing during installation
2. Install the seal shim over the seal
3. Using an arbor press, install the bearing (5) into the end plate (2) until it bottoms out
4. Complete assembly of the airlock (See Section 5.4)

5.6 Rotor Gapping Procedure

In order to provide a good seal, all airlocks are precision machined and assembled to operate with minimal clearances. Minimal clearance ensures a good air seal while eliminating interference between the rotor and housing.

There are two types of measurable clearances:

- Radial- measured between rotor tips and housing
- Side- between rotor sides and end plates

Radial clearances are established at the factory and cannot be adjusted without machining the rotor.

Side clearances are also established at the factory by centering the rotor between the end plates during assembly.

If the bearing locking collars are removed for any reason, such as removing an endplate, the rotor must be re-centered.

Proper clearances are measured with the airlock at ambient temperature. Table A-3 lists the proper nominal clearances for your operating temperature.

NOTICE

Nominal clearances will vary based on your operating temperature. Nominal clearances do not change design clearances. See Section 2.9 for more information.

To gap the rotor:

1. Select a feeler gauge according to the chart value for your operating temperature
2. Insert the feeler gauge between the side of the rotor (3) and one endplate (2)
3. Bottom the rotor against the shim and end plate
4. Check the gap in the same spot on the opposite side of the rotor blade. Improper gaps could indicate a problem with the rotor or assembly of the valve (1)
5. If there is only minimal difference between measurements, center the rotor by lightly tapping the shaft ends back and forth
6. When the rotor is centered, lock the bearing eccentric collars on the bearings (5)
7. Check radial gap between rotor blade tips and housing. Improper radial gap could indicate a problem with the rotor or assembly of the valve

6

6.0 Troubleshooting

DANGER

HAZARDOUS VOLTAGE OR CURRENT.

CONTACT MAY CAUSE ELECTRIC SHOCK OR BURN.

TURN OFF AND LOCKOUT SYSTEM POWER BEFORE PERFORMING INSTRUCTIONS GIVEN IN THIS CHAPTER.

WARNING

ROTATING PARTS CAN CRUSH AND CUT.

KEEP HANDS CLEAR.

LOCKOUT/ TAGOUT BEFORE PERFORMING THE INSTRUCTIONS GIVEN IN THIS CHAPTER.

6.1 Introduction

This section is offered as a general guide to analyzing the more common problems with a DCS rotary airlock.

If after reviewing this section you have not identified a solution, contact the Prater-Sterling Customer Service Department @ 1-800-323-5735 for further assistance.

When calling, please have your serial number ready for reference purposes.

6.2 Troubleshooting

Symptom	Possible Cause	Corrective Action
Airlock does not turn or turns slowly.	Motor not wired or not wired correctly.	Check motor wiring diagram and verify connections for your input voltage.
	No incoming power or incorrect voltage.	Working backward from the motor, check for presence of correct voltage at each wiring junction or disconnect switch.
	Fuses, circuit breakers, or overload elements blown.	Check continuity across overload devices and reset/ replace if necessary. Verify that overload device is of proper size according to motor nameplate data.
	Drive motor may be burned out or gearbox may be jambed or broken.	Repair or replace motor.
	Speed set too low on drive (if equipped with VFD or other speed controller)	Reset speed to a higher value.
	Airlock rotor jammed.	Clear jam. Disassemble and clean airlock. Check for product wedging between rotor and housing. Verify that airlock is built for product being handled.
		Let valve cool to ambient conditions, then check clearances. Verify that nominal clearances match charted values for your operating temperature.
Product is not discharging from airlock, or discharging too slowly.	Rotor not turning or turning too slowly for application.	Check sypmtoms for "airlock not turning or turning too slowly." Verify airlock displacement for desired rate of output.
	Product stuck in pockets and will not come out.	Airlock may not be designed to handle wet/ sticky products.
	No product above valve or poor flow of product above valve.	Check for presence of product above valve and proper delivery of product to valve. Install devices that aid in mass flow of product above valve.
	Product backed up into discharge outlet.	Check devices downstream of airlock. Ensure they are not plugged. Verify that displacement of downstream devices matches or exceeds that of airlock.
	Airlock is leaking air from the pneumatic convey line or airlock is not properly designed to vent convey line air.	Check rotor and housing clearances. Replace if worn. Verify operating pressure.Valve is not designed to operate at greater than +/- 3PSI pressure differential. Install a vented inlet adaptor.

Symptom	Possible Cause	Corrective Action
Airlock squeals, vibrates, or emitts gritty humming noise.	Build-up of product on housing.	Clean product from housing. Use dryer product. Airlock may not be designed to handle wet/ sticky products. Choose beveled rotor for products that smear.
	Rotation incorrect.	Verify that rotation matches directional decals.
	Rotor interferring with housing (squealing).	Let valve cool to ambient conditions, then check clearances. Verify that nominal clearances match charted values for your operating temperature. Verify proper assembly of valve. Check bearings for wear or looseness.
	Bearings worn or contaminated with product.	Replace bearings and shaft seal.
	Airlock not installed level, is racked, or installation site not suitable for airlock mounting.	Check for rack and level, remount. Modify installation site to provide flat, rigid support.
	Airlock housing is distorted, not round.	Don't use airlock to support weight from above or below. Remove weight and replace housing.
	Foreign products caught between rotor tips and housing.	Clean valve, remove foreign objects. Check rotor and housing for burrs and replace if necessary.
Drive is noisy or runs hot.	Drive not aligned properly.	Check for loose mounting bolts. Make sure drive is flush to end plate mounting pad. Check fit between drive bore and airlock shaft.
	Low oil level in gearbox or improper oil used in gearbox.	Check oil level and fill with recommended amount/ type of oil.
	Build-up of dust on motor.	Keep dust off motor and gearbox to ensure proper ventilation.
	Drive overloaded.	Check for build up of product inside valve. Change process conditions to reduce operating load on airlock.
Product leaking from shaft.	Seal, shaft or end plate worn.	Disassemble valve. Inspect shaft and end plate for wear. Replace seal and bearing.
Airlock runs hot.	Drive or drive motor running hot.	See above symptom for drive motor.
	Bearings worn or contaminated with product.	Replace bearings and shaft seal.

7

7.0 Parts

7.1 Drawings and Part Lists

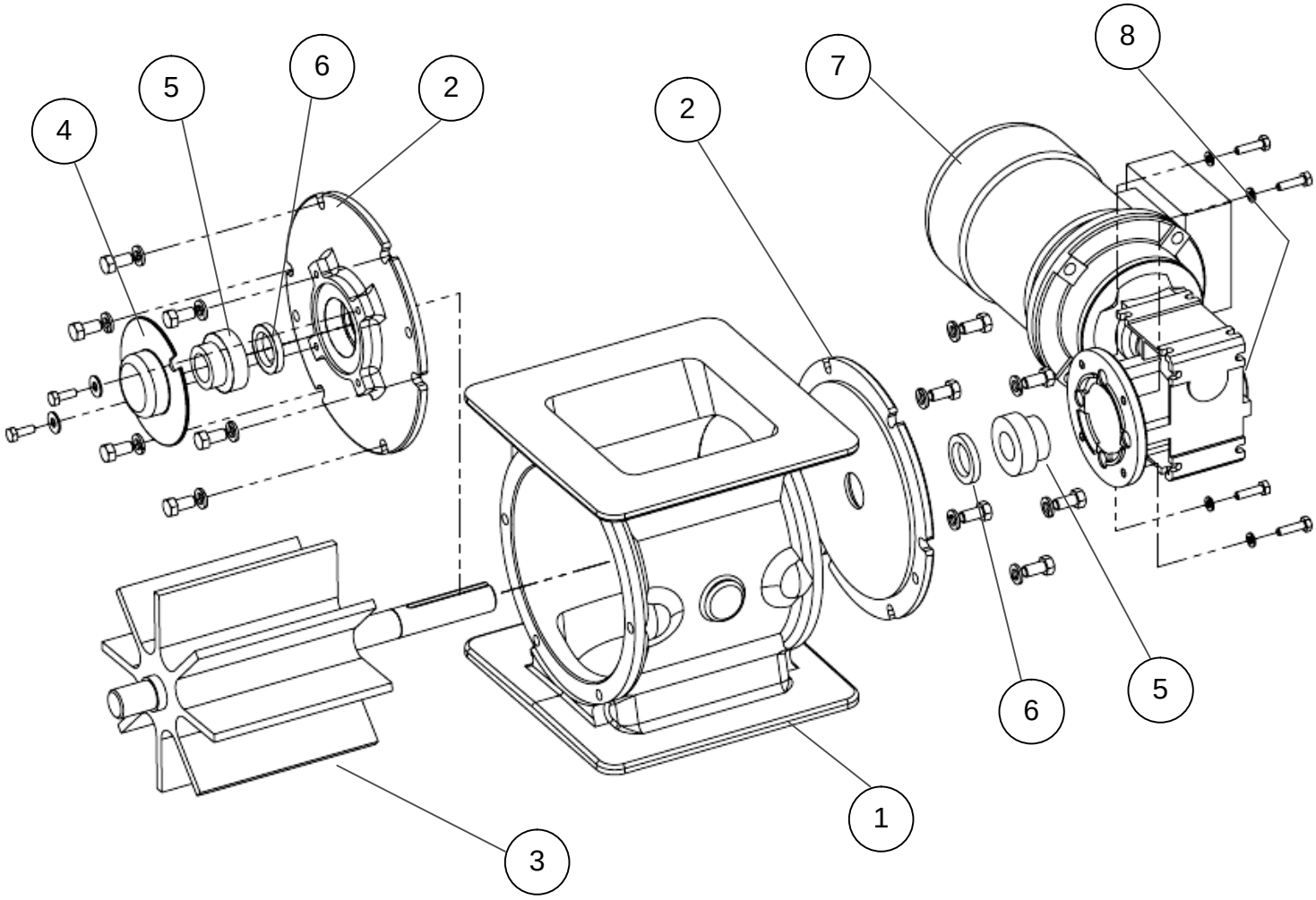


Illustration 7.1.1- Exploded View, DCS Series Valve

Item #	Description	Item #	Description
1	Housing	5	Drive Side Bearing Opposite Drive Side Bearing
2	Drive Side End Plate Opposite Drive Side End Plate	6	Seal & Shim
3	Rotor	7	Drive Motor
4	Bearing Cover	8	Drive Shaft Cover

A

APPENDIX A- CAPACITIES/ SPECIFICATIONS

Chart A-1
DCS Airlock Dimensions

	DCS 6	DCS 8	DCS 10	DCS 12
Rotor (Nominal)				
Diameter (Inches)	7.493	9.368	11.618	13.991
Length (Inches)	6.869	8.619	10.237	13.366
Rotor Speed (RPM)	24-29	24-29	24-29	24-29
Motor Size (HP)	1/3	1/2	3/4	1
Weight (Lbs.)	90	125	225	420
Blades	8	8	8	8

Chart A-2
DCS Airlock Displacement (CFM) @ 80% Pocket Fill

	RPM	
	24	**29**
DCS 6	2.88	3.48
DCS 8	5.76	6.96
DCS 10	10.08	12.18
DCS 12	18.24	22.04

Chart A-3 Nominal Clearances
Measured Per Side of Rotor Under Ambient Conditions
(Values in Inches)

For Operating Temp of:	DCS 6		DCS 8	
	Radial	Ends	Radial	Ends
Up to 75 °F	.010	.010	.010	.010
100 °F	.011	.011	.011	.011
150 °F	.012	.012	.012	.012
200 °F	.013	.013	.014	.013
250 °F	.014	.014	.015	.015
300 °F	.015	.015	.016	.016

For Operating Temp of:	DCS 10		DCS 12	
	Radial	Ends	Radial	Ends
Up to 75 °F	.010	.010	.010	.010
100 °F	.011	.011	.011	.011
150 °F	.013	.012	.013	.013
200 °F	.014	.014	.015	.015
250 °F	.016	.015	.017	.017
300 °F	.018	.017	.019	.019

B

APPENDIX B- DRIVE MOTOR

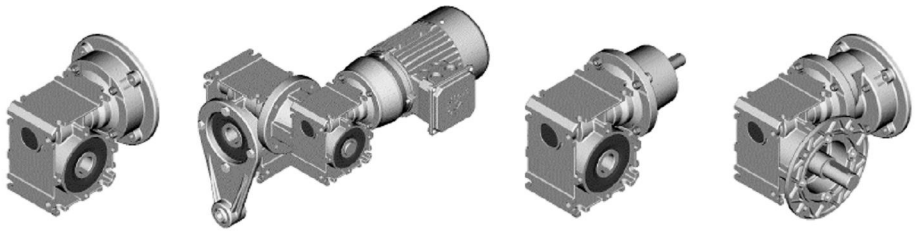
BIM 1033

USA

CDN

SI Design FLEXBLOC™ Worm Gearboxes Installation and Maintenance Instructions

Retain These Safety Instructions For Future Use



WARNING:

LOCK OUT POWER before any maintenance is performed. Make absolutely sure that no voltage is applied while work is being done on the gearbox.

It is presumed that system design, as well as all work with regard to transport, assembly, installation, starting-up, maintenance and repair, is performed by qualified personnel or supervised by skilled labor taking overall responsibility.

Preparing and performing installation

- lifting devices on the drive are designed to carry the drive weight
- foundation (base) should be of adequate size and vibration-proof
- install gear unit or geared motor rigid and braceless
- ensure sufficient ventilation for cooling
- make use of tapped hole for fastening to the shaft end
- when installing shaft connections, avoid shocks on shafts which can cause bearing damage
- preferably use flexible coupling between output shaft and driven machine
- fit output elements to shaft end or secure feather key before starting the motor
- it is the owner's responsibility to properly guard all moving parts of the machine

Efficiencies

A new wormgear reducer will have slightly lower efficiency than when the gear set is broken in. This effect increases with higher ratios. Efficiencies shown in the catalog are after a break in period of 25 hours at full load.

WARNING:

Exposed moving parts can cause severe injury. It is the responsibility of the system designer to install adequate guards.

Maintenance

NORD Gear FLEXBLOC™ drives are maintenance free. The FLEXBLOC™ series of worm gear reducers are filled with polyglycol (PG) synthetic lubricant/bearing-grease. This ensures proper operation throughout the *full lifetime* of the units. No breather plugs are required because of synthetic lubricant used. The FLEXBLOC™ drives are completely sealed.

Lubrication

The units are filled with two different types of lubricants to meet different market needs. The English Inch shaft version of the FLEXBLOC™ is supplied with a food grade PG oil. The metric version is a general duty PG oil. The lubrication ratings are shown in the table below.

	Oil Formulation	Viscosity	Temp Range
INCH	PG (Food Grade)	ISO VG 220	23°F to +140°F (-5°C to +60°C)
METRIC	PG	ISO VG 220	

Parts Package

If the unit was specified with any of the available options (shown on back page), the modular parts will come in a plastic bag with picture instructions for assembly.

CAUTION:

Any change in normal operation (excessive noise, increased temperature or power consumption) may indicate a problem with the application.

Notify qualified maintenance personnel to inspect equipment; otherwise physical injury or damage to the machine may occur.

IN CASE OF DOUBT, DISCONNECT THE MACHINE IMMEDIATELY!

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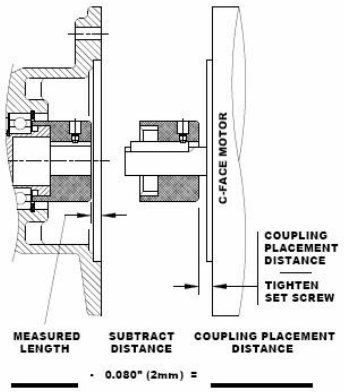
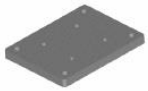
NEMA C-face Motor Installation Instructions

1. Put the coupling onto the splined input shaft until it is firmly seated.
2. Measure the distance from the face of the input adapter to the face of the coupling and record that measurement.
3. Subtract 0.08" (~2mm) from the distance. **This needs to be done so that the coupling will not be preloaded after installation!**
4. Use that measurement to locate the coupling from the face of the motor onto the shaft.

Once in place, tighten the setscrew to lock the coupling in place. It is also recommended that the shaft key be staked or bonded (Loctite) in place to prohibit the key from vibrating out.



Available Bolt-on Modules

 Standard Worm Reducer	 NEMA C-Face Coupling Adapter	 Double Worm Adapter	 2nd Helical Reduction
 Solid Input Shaft	 NORD C-Face Motors	 Solid Output Shaft	 Shaft Protection Cover
 B5 Output Flange	 Torque Reaction Arm	 Foot Plate	

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NORD Gear Limited
Toll Free in Canada 800-668-4378

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Fax 800-373-6673

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Brampton, Ontario L6T 4A1
Phone 905-796-3606
Fax 905-796-8130

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C

APPENDIX C- RETURN POLICY

To obtain a return authorization number (RMA), fill out this form in its entirety and return to

PRATER-STERLING
2 SAMMONS COURT
BOLINGBROOK, IL 60440
PH-630-759-9595 FX- 630-759-6099
info@prater-sterling.com

CUSTOMER IMFORMATION:

Request Date: _____

Contact: _____

Company: _____

Address: _____

_____

_____

Phone: _____

Fax: _____

E-Mail: _____

Materials To Be Returned: _____

Reason for Return: _____

_____

Serial Number: _____

Requested By (Prater-Sterling Employee): _____

Product Materials are being used with:_____

Prater- Sterling RMA POLICY

Please advise the product owner of these rules. Failure to perform one or all of the above will result in refusal of acceptance of shipment to Prater-Sterling and the Returned item(s) will be shipped back at customer's expense.

1. Returned items must be cleaned of all products and materials that have come into contact with them during storage, installation, usage, and removal from its associated process. Any product or material found on the item after our acceptance of the return will delay processing and require additional charges to the customer for cleaning.

2. When preparing your return shipment, use the original packaging whenever possible. If the original packaging is unavailable, provide packaging that will protect against shipping damage. Prater is unable to warranty any shipping damages.

3. Mark the RMA number in at least two locations on the outer package. Any packages received without this information could result in processing delays or refusal of the shipment.

4. Affix one copy of the MSDS to the outer package for each product or material used in conjunction with each returned item. Any packages sent without an MSDS will result in refusal of the shipment.

5. Shipping should be arranged freight prepaid. We cannot accept shipments sent COLLECT or COD.

**RMA's are valid for 30 Days from issue date. If Materials are NOT RETURNED in this 30-day period the RMA will expire and the materials will no longer be returnable.

When your item arrives and is accepted, Prater will process the return as follows:

CREDITS- Please allow 4-6 weeks to receive your credit memo. The amount of credit will be based on the item's original price, less any restocking fees.

REPLACEMENTS- Replacement items can be shipped prior to receiving your return. If you require an immediate replacement, a new order for identical merchandise will be entered against the original purchase order number. Replacement cost will be based on the replacement item's current list price plus shipping and handling charges. Acceptance of your return will generate a credit memo, less any restocking fees.

do not hear back from you within 30 days of notifying you of the repair estimate, we will consider that you have elected not to have the item repaired and it will then be scrapped.

If you have questions or concerns, please contact our customer service department at 1-800-323-5735.

See also Prater Sterling Terms and Conditions.

FINE GRINDERS
HAMMERMILLS
CRUSHER/FLAKE BREAKERS
COMPACTORS/BRIQUETTERS
AIR CLASSIFIERS
ROTARY SIFTERS
VIBRATING SCREENS
ROTARY FEEDERS
QUICK-TAKE-APART AIRLOCKS
MINI-SIFTERS
BATCHING SYSTEMS
MODULAR WEIGHING SYSTEMS
BAGGING CONTROLS

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