



**MAGNUM**  
S Y S T E M S

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**NOTICE**

**THIS ENVELOPE CONTAINS  
IMPORTANT DOCUMENTS**

**DO NOT DESTROY**

**ROTARY VALVE**  
O&M DOCUMENTATION

**MODEL: TYPE 1,2,3,4,5 & 8**  
*SIZES: FT-7 - FT-18*

**MODEL: TYPE 1, 2, 3**  
*SIZES: FTP-9 & FTP-12*

**N10-310**

# NOTICE

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IMPORTANT DOCUMENTS**

# DO NOT DESTROY



## MAGNUM SYSTEMS ROTARY VALVE AIRLOCK FEEDER INSTALLATION & MAINTENANCE INSTRUCTIONS

**WARNING! READ ALL INSTRUCTIONS. FAILURE TO FOLLOW SAFETY RULES LISTED BELOW, AND OTHER BASIC SAFETY PRECAUTIONS, MAY RESULT IN SERIOUS PERSONAL INJURY!**

**WARNING!** When installing Airlock Feeder DO NOT connect to the power source until chain guard is in place and the Airlock inlet and outlet are covered so that there is no chance for fingers and hands to get close to rotating blades.

**WARNING!** Disconnect Airlock Feeder motor from power source before attempting to make any repairs.

**DANGER!** Keep chain guard in place and keep both the inlet and outlet covered when the feeder is connected to a power source.

**DO NOT TRY TO FORCE THE ROTOR TO TURN WITH YOUR HANDS!**

After disconnecting power to Airlock, use a board between the blades or use a pipe wrench on the non-drive end of the rotor shaft in order to turn the Airlock rotor by hand. If the rotor does not turn relatively easy, look for the cause of the problem. Remember the Airlock is a precision piece of equipment and can be easily damaged if not handled properly by personnel trained to work on precision equipment. There are numerous reasons why the Airlock rotor could be binding. If you are unable to find the problem yourself, consult Magnum Systems trained factory personnel. It may be something that can be diagnosed over the phone. If not, you may have to send the Airlock to the Magnum Systems factory or obtain the services of a trained Magnum Systems technician.

**CAUTION!** All repairs, electrical or mechanical, should be attempted only by trained repairmen.

**STAY ALERT!** Watch what you are doing. Use common sense. Do not attempt to operate airlock feeder without the chain guard in place and without inlet and outlet covers in place.

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## **MAGNUM SYSTEMS AIRLOCK LONG TERM STORAGE INSTRUCTIONS.**

Rotary Valve Airlocks should be stored Indoors, in a dry ambient facility.

They should be stored on a pallet with the inlet and outlets covered.

Do not place valves where any other moisture can enter into the valve.

For long-term storage over 30 days, it is recommended that the internal carbon steel surfaces be sprayed with a rust preventative coating, such as, vegetable oil to prevent internal rust from forming.

Magnum Systems also recommends

The rotor should be turned every 30 days while in storage. Please refer to the IO&M instructions for the proper and safe method for turning the rotor.

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**MAGNUM SYSTEMS AIRLOCK FEEDER  
INSTALLATION & MAINTENANCE INSTRUCTIONS  
(TYPES 1-5 SQUARE FLANGE AIRLOCKS AND SIZES FT7 THROUGH FT18)  
(FTP9 and FTP12 ROUND FLANGE AIRLOCKS)  
(Ref MAGNUM SYSTEMS DWG No. 52-8 and 52-9)**

**TABLE OF CONTENTS:**

- I. LUBRICATION INSTRUCTIONS
- II. ROTOR SHAFT PACKING RINGS
- III. END PLATE DISASSEMBLY
- IV. END PLATE ASSEMBLE
- V. AIRLOCK FEEDER INSTALLATION

**I. LUBRICATION INSTRUCTIONS**

A shaft bearing and three (3) seals are provided in each end plate. Each bearing is equipped with two grease retention seals and is factory lubricated. These bearings **DO NOT** require re-lubrication for the lifetime of the bearing.

**II. ROTOR SHAFT PACKING RINGS**

1. Two types of shaft seals are used in most Magnum Systems Airlock feeders. The most effective type (our standard) are polyurethane U-cup packing rings. All other types of packing rings are braided packing of one type or another. High temperature packing rings are made of braided PTFE fiber.
2. U-cup packing rings are endless. Braided packing is not endless and must be cut to the proper length. Braided packing when ordered from Magnum Systems will be pre-cut to the proper length for the Airlock size for which the braided packing is ordered. U-cups are self-energizing and need very little compression in order to be an effective shaft seal. In fact, too much compression will damage them. Braided packing rings on the other hand depend upon the proper amount of compression to be an effective shaft seal.
3. Installation of new U-cup packing rings:
  - a. Remove end plates per Instruction No. III.
  - b. Before installing, dip new U-cup packing rings in a light oil. Press three (3) rings into each end plate with lips toward the inside. Install the gland plate and tighten the gland plate screws with an Allen wrench by hand until very light resistance can be felt, then lock the screws in place with the jam nuts against the bearing housing.
  - c. After both housing end plates have been installed per Instruction No. IV, check the U-cup packing rings to make sure they have only a slight amount of compression. Back off the two gland plate screws enough to be sure the U-cups are not being compressed and then re-tighten the gland plate screws and their jam nuts. **Do not over compress the U-cup packing rings.** The gland plate screws should be tightened only enough to snug the U-cup packing rings down against the packing seat. With the roller chain removed and the Airlock Feeder **NOT** connected to a power

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source, the rotor should rotate with some resistance caused by the lightly compressed U-cup packing rings when pulling on the rotor vanes using an approximately 3 foot long wood 2 by 4 between the vanes. As a safety precaution, **do not pull on the rotor vanes with your fingers.**

3. Installation of new braided packing rings:
4. Remove end plates as per Instruction No. III and remove the old packing rings from the end plates.
  - a. For each end plate, use three (3) braided rings.
  - b. The cut ends of the braided packing rings, when placed in the end plate, should be rotationally staggered. The gland plate can be used to push the packing rings down inside the packing gland in each end plate. The gland plate can also be used to push the packing rings down inside the packing gland in each end plate. The gland plate can also be used to keep the packing rings in the packing gland when the end plate is re-installed onto the rotor shaft, but do not compress the three braided packing rings with the gland plate at this time.
  - c. After end plates and gland plates have been re-installed per Instruction No. IV, the gland plates can now be tightened down against the braided packing rings. The gland plate screws should be tightened so as to firmly compress the packing down against the shaft. With the roller chain removed, the rotor should rotate with some resistance when pulling on the rotor vanes using an approximately 3 foot long wood 2 by 4 between the vanes. As a safety precaution do not pull on the rotor vanes with your fingers.

### III. **END PLATE DISASSEMBLY**

1. Before either end plate is disassembled, the drive assembly must be removed.
2. Remove air purge hardware from both end plates if so equipped.
3. Loosen the packing gland plate and bearing set screws on both end plates.
4. Remove the hex bolts which fasten the non-drive end plate to the cylinder housing.
5. Pull the non-drive end plate off the rotor shaft. **Do not attempt to remove the end plate by forcing a wedge between the end plate and housing.** This could mar the critical machined surfaces of the housing and end plate. **Do not hammer on the end of the rotor shaft with a steel hammer,** as this will deform the shaft. If force is required, use a gear puller or use a wood block on the end of the rotor shaft to hammer on. Be careful not to damage the center in the end of the rotor shaft. Note the number of shims on the non-drive end (shims are not used on Type-2 Airlocks) so that the same number can be re-installed.
6. Extract the rotor from the cylinder housing. If force is necessary to remove the rotor, use a block of wood on the rotor shaft to hammer on or a gear puller. Avoid setting the removed rotor on concrete or other hard surfaces, as the machined rotor blade tips might be damaged.

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7. Upon Completion of Steps 4, 5, and 6, remove the hex bolts, which fasten the drive end plate to the cylinder. The drive end plate should then be separated from the housing. Use a 2 by 4 of the proper length to pound on interior of end plate if force is required. Note the number of shims on the drive end (shims are not used on Type-2 Airlocks) of the cylinder housing, so that the same number can be re-installed.
8. If replacement of bearings is necessary, remove the shaft bearing from the end plate by use of a soft metal or fiber drift. Do not mar or dent any machined surfaces. See Instruction 1 of Part IV for bearing installation.

#### **IV. END PLATE ASSEMBLY**

1. Insert a shaft bearing in each end plate. The bearing should be a light press fit. Be sure the bearing is pressed down against the bearing snap ring.
2. For installation of shaft seals, see Instruction II.
3. For easier installation of the end plates, leave the packing gland plates loose.
4. Before installing the drive end plate, polish the sealing surfaces and the bearing journals with a fine (100 grit or finer) emery cloth. Be sure there is no foreign matter on the machined mating surfaces.
5. Install the drive end plate and tighten down the hex bolts to fasten the drive end plate to the cylinder housing. Move from bolt to bolt (not adjacent bolts) and tighten each down gradually.
6. Install the rotor assembly. Be sure not to scratch or mar the machined surfaces of the housing.
7. Repeat Step 4 and 5 for the non-drive end plate assembly.
8. Tighten down the packing gland plate screws. See instruction II for information as regards the proper compression of the packing rings.
9. Check the axial clearances between the rotor and the end plate. To increase the total axial clearance, a shim or shims must be added. To decrease the total axial clearance, a shim or shims must be removed. Each shim is .003 inch thick. An end plate assembly must be removed in order to add or remove end plate shims. See Magnum Systems Drawing #52-9 for the required clearance.
10. When installing or adjusting gear reducer on the motor mounting plate, the bottoms of the four reducer mounting feet must be set equidistant from the face of the motor mounting plate to within  $\pm 1/64$ th inch. It is recommended that lock joint inside calipers be used to check this requirement. Failure to hold the reducer mounting feet in the same plane, parallel to the motor mounting plate may cause enough stress in the reducer to break the feet of during installation or they may break later during operation.

#### **V. AIRLOCK FEEDER INSTALLATION**

1. An Airlock feeder is a precision piece of equipment operating with small internal clearances. Any distortion in the housing will cause the rotor to rub against the housing and thus cause premature failure of the Airlock. The Airlock should be bolted to a flat surface using a sponge rubber gasket between mating flanges.

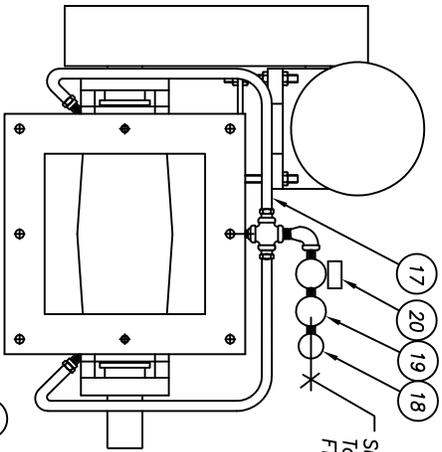
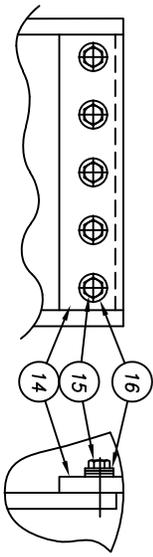
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2. Before attaching the Airlock feeder to the system, check the interior to which the Airlock is to be bolted to for any foreign materials that might cause the Airlock to bind while in operation.
3. MOST GEAR MOTORS [but not all] are shipped to Magnum Systems Co with a sufficient quantity of lubricant for operation. BEFORE OPERATION, the user is responsible for checking to see that the gear motor has oil to the proper level. Most gear motors are supplied with three pipe plugs at different levels. The top [breather] plug is where oil is put in the gear head with breather plug removed. The center plug when removed is used to indicate when the proper amount of oil is in the gear head. When oil starts flowing out the center plug [with plug removed], sufficient oil is in the gear head and both the top [breather] plug and the center plug can be replaced. The purpose of the bottom [magnetic] plug is to be able to remove the oil from the gear head and of course should be in place except to drain oil out of the gear head. The customer should check and make sure the breather plug is the highest of the three plugs and the magnetic plug lowest of the three plugs. NOTE: Please refer to the operation instructions supplied by the gear motor manufacturer enclosed with your Airlock Feeder or the lubrication instruction plate on the gear motor for more details.
4. Before operating the Airlock, the motor should be bumped to determine the proper direction of rotation. When attaching the feeder to the system, take care that the direction of rotation is that which is required.
5. If the Airlock is equipped with air purge hardware, be certain that compressed air is supplied and the solenoid is properly wired before operating the Airlock.

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**WARNING**  
**DESIGN ENGINEERS, TECHNICIANS & INSTALLERS**  
 THE INLET AND OUTLET OF THE ROTARY VALVE MUST HAVE PROPER ATTACHMENTS TO PREVENT ANYONE FROM BEING ABLE TO INSERT THEIR HANDS OR ANY OTHER BODY PARTS INTO THE VALVE WHEN IN OPERATION.



Supply 75-125 PSI plant air  
 To 1/4" FPT for feeders under  
 FT14, 1/2" NPT for FT14 & up

Required only when  
 Airlock feeders supplied  
 with Air Purge assembly

*Recommended Spare Parts*

Detail #	Qty
8	2
9	1 Set (6 Per Set)
10	3
14	1 Set

DETAIL NO.	DESCRIPTION	QTY
20	1 Regulator with pressure guage	1
19	1 Solenoid valve	1
18	1 Filter	1
17	AR Hose and fittings	AR
16	AR Flat washers & lock washers	AR
15	AR Bolt	AR
14	AR Adjustable tip	AR
13	12 Lock washer	12
12	2 Bolt	2
11	1 Gasket	1
10	AR .003 Spacer shim (use w/open end rotors only)	AR
9	6 Packing "U" cup	6
8	2 Bearing	2
7	4 Lock nut	4
6	4 Gland plate screw	4
5	4 Flat washer	4
4	2 Gland plate	2
3	2 End plate	2
2	1 Rotor assembly	1
1	1 Cylinder	1

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FT17 - FT18 ROTARY AIRLOCK FEEDER  
 W/ CLOSED END ROTORS, ADJUSTABLE TIPS  
 SQUARE AND ROUND FLANGE HOUSINGS  
 PARTS DRAWING

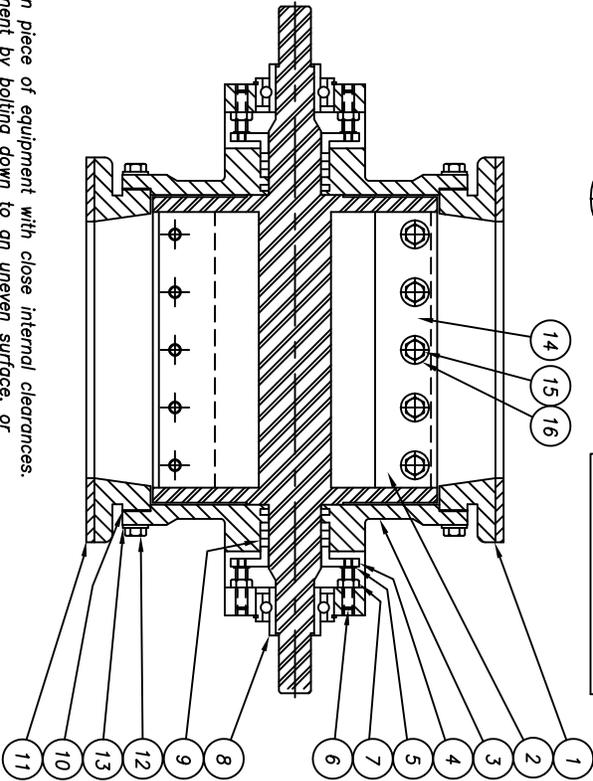
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 DWG. NO.: 52-8  
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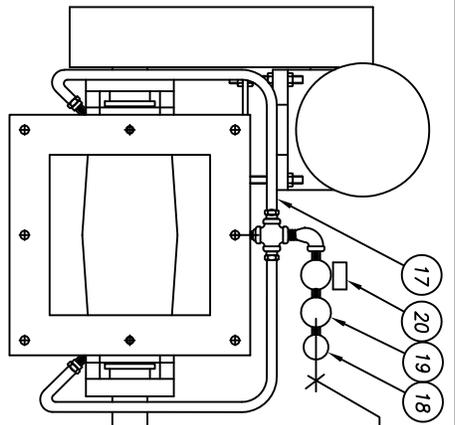
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 REV No 10 01/25/99  
 Pg No 1 OF 1

Radial clearance  
 between rotor and housing  
 (FT7 thru FT16)  
 CI .005", that is,  
 .004" GO, .006" NO-GO.  
 SS .007", that is,  
 .006" GO, .008" NO-GO.  
 (FT18)  
 CI .006", that is,  
 .005" GO, .007" NO-GO.  
 Seen note 6

**NOTE:**

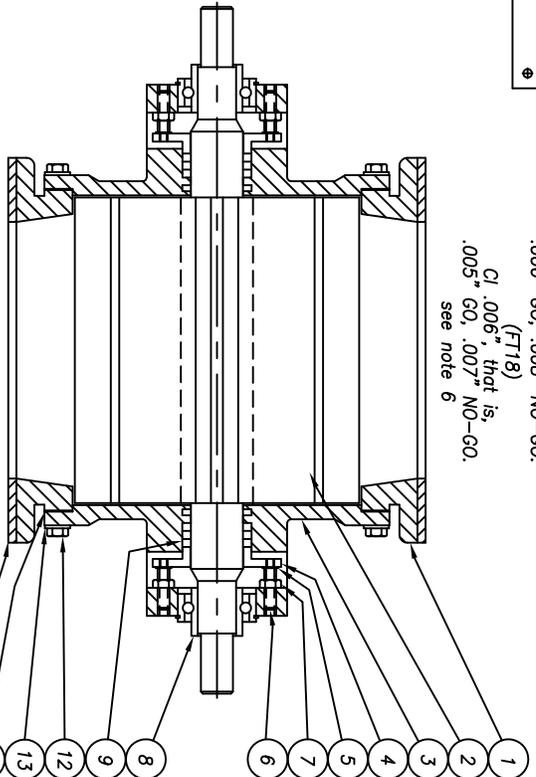
1. This feeder is a precision piece of equipment with close internal clearances. Do not cause misalignment by bolting down to an uneven surface, or by structurally putting feeder in a strain.
2. To avoid premature failure, do not over tighten the "U"-cup packing (detail 9) gland plate screws (detail 6) should be tightened only enough to snug "U"-cup packing against packing box seat. With chain drive end removed. The rotor should rotate by hand, with about 10lbs of pull on rotor vane.
3. Internal radial clearances between rotor and housing increases about .002" when both rotor and housing are of stainless steel construction.
4. bearings are lifetime lubricated.
5. Regulator (detail 20) should be set at 10 PSI above Airlock internal pressure.
6. If feeder is built to operate at high temperatures, consult factory for clearances.





Supply 75-125 PSI plant air to 1/4" FPT for feeders under FT14, 1/2" NPT for FT14 & up

Clearance between rotor and endplate, per end measured 1-3 inches in from rotor O.D.  
(FT7 Thru FT16)  
Cl .005", that is, .004" GO, .006" NO-GO, SS .007", That is, .006" GO, .008" NO-GO, (FT18)  
Cl .006", that is, .005" GO, .007" NO-GO, see note 6



Radial clearance between rotor and housing  
(FT7 Thru FT16)  
Cl .005", That is, .004" GO, .006" NO-GO, SS .007", That is, .006" GO, .008" NO-GO, (FT18)  
Cl .006", That is, .005" GO, .007" NO-GO, see note 6

**WARNING**  
**DESIGN ENGINEERS, TECHNICIANS & INSTALLERS**  
THE INLET AND OUTLET OF THE ROTARY VALVE MUST HAVE PROPER ATTACHMENTS TO PREVENT ANYONE FROM BEING ABLE TO INSERT THEIR HANDS OR ANY OTHER BODY PARTS INTO THE VALVE WHEN IN OPERATION.

Required only when Airlock feeders supplied with Air Purge assembly

Recommended spare parts

Detail #	Qty.
8 Bearings	2
9 Shaft packing	1 Set (6 per set)
10 .003 Spacer shims	3
11 Flange gaskets	2

DETAIL NO.	NO. REQ.	DESCRIPTION
20	1	Regulator with Pressure gauge
19	1	Solenoid Valve
18	1	Filter
17	AR	Hose and fittings
13	12	Lock washer
12	12	Bolt
11	2	Gasket
10	AR	.003 Spacer shim
9	6	Shaft packing
8	2	Bearing
7	4	Lock nut
6	4	Gland Plate screw
5	4	Flat Washer
4	2	Gland Plate
3	2	End Plate
2	1	Rotor Assembly
1	1	Cylinder

- NOTE:
- This Feeder is a precision piece of equipment with close internal clearances. Do not cause misalignment by bolting to an uneven surface, or by structurally putting feeder in a strain.
  - If "U" cup packing is used (standard), to avoid premature failure, do not overtighten on "U" cup packing (detail 9) gland plate screws (detail 6) should be tightened only enough to snug rotate by hand, with a 2 by 4, 3 to 4 feet long. The rotor should internal radial clearance & per end clearances between rotor and housing increases about .002" when both rotor and housing are of stainless steel construction.
  - Bearings are lifetime lubricated.
  - Regulator (detail 20) should be set at 10 PSI above airlock internal pressure.
  - If feeder is built to operate at high temperature, consult factory for clearances.

CAT FILE No 10,1-6-A  
REV No 8 01/25/99  
Pg No 1 OF 1

DATE 5/16/68  
DMH BY DMH  
SCALE NONE

DATE 5-2-9  
DMG: NO. 52-9  
APPROVED

FT7 - FT18 ROTARY AIRLOCK FEEDER WITH OPEN END ROTORS SQUARE AND ROUND FLANGE HOUSINGS PARTS DRAWING

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## TROUBLE SHOOTING COMMON ISSUES

PROBLEM	SOLUTION
<b>System Plugs Up</b>	<ol style="list-style-type: none"> <li>1. Check belt tension on air blower and tighten if loose.</li> <li>2. Check air filter and clean out. Locate in a place where there is less dust.</li> <li>3. Check tubing system for any obstructions.</li> <li>4. Reduce feed-in rate.</li> <li>5. Air pressure switch setting may be too low.</li> <li>6. Outlet gate valve too far open.</li> </ol>
<b>Excessive Grain Damage</b>	<ol style="list-style-type: none"> <li>1. May be overfeeding airlock, causing vanes to shear off grain. Reduce feed rate.</li> <li>2. Air velocity may be excessive. Slow air blower by changing pulleys or by opening gate valve.</li> <li>3. Damage can occur if system is running at less than full capacity. Increase feed rate.</li> <li>4. Rubber hose used to change grain direction, or used for extended lengths.</li> <li>5. Airlock shear protector installed wrong.</li> </ol>
<b>Airlock Stops or Noisy</b>	<ol style="list-style-type: none"> <li>1. A foreign object may have become lodged in the airlock vanes.</li> <li>2. Check belt tension</li> <li>3. Check gearbox drive</li> <li>4. The rotor vanes may be rubbing on the ends of the airlock. Check clearance at both ends of rotor and center in housing by loosening the set screws in the bearings on both ends of the rotor shaft and moving rotor. Tighten set screws after repositioning.</li> <li>5. The rotor vanes may have become rusted to the airlock housing. The airlock can be broken loose by using a pipe wrench on the exposed rotor shaft.</li> <li><b>!!CAUTION!!</b> – <i>The worm drive gearbox cannot be driven in reverse and can be damaged. Remove the airlock drive chain before attempting to turn the airlock by hand.</i></li> <li>6. “U” cup packings on rotor too tight (Contact Factory)</li> </ol>

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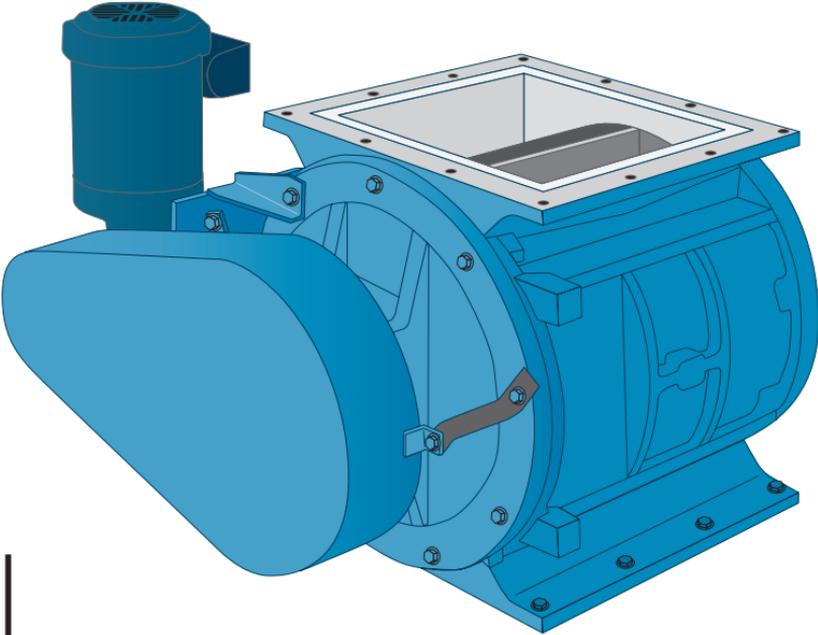
SAFETY FIRST

ROTARY  
AIRLOCK

**SAFETY**

# ROTARY AIRLOCK SAFETY PROCEDURES

Prevent damage to yourself and your new Rotary Airlock by following these simple safety procedures.

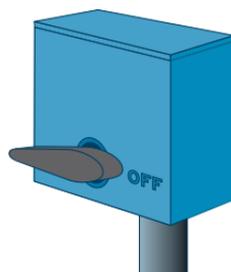




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## ALWAYS

DISCONNECT power and remove the roller chain BEFORE working on the valve.



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## NEVER

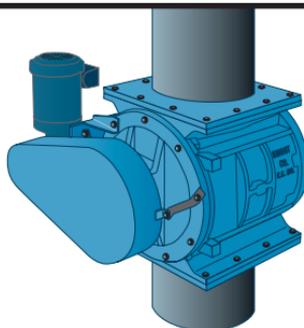
Put HANDS into the inlet or outlet openings of the valve.



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## ALWAYS

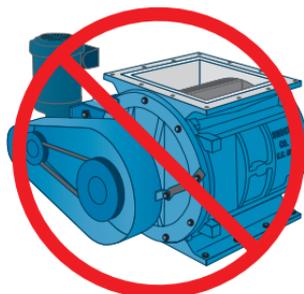
Have inlet and outlet PROPERLY COVERED when operating valve.



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## NEVER

Operate the valve WITHOUT chain guard in place.



## SAFETY FIRST

Rotary Airlocks are powerful and can be dangerous if you do not follow procedures. Prevent damage to yourself and your new Rotary Airlock by following these simple safety procedures.

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