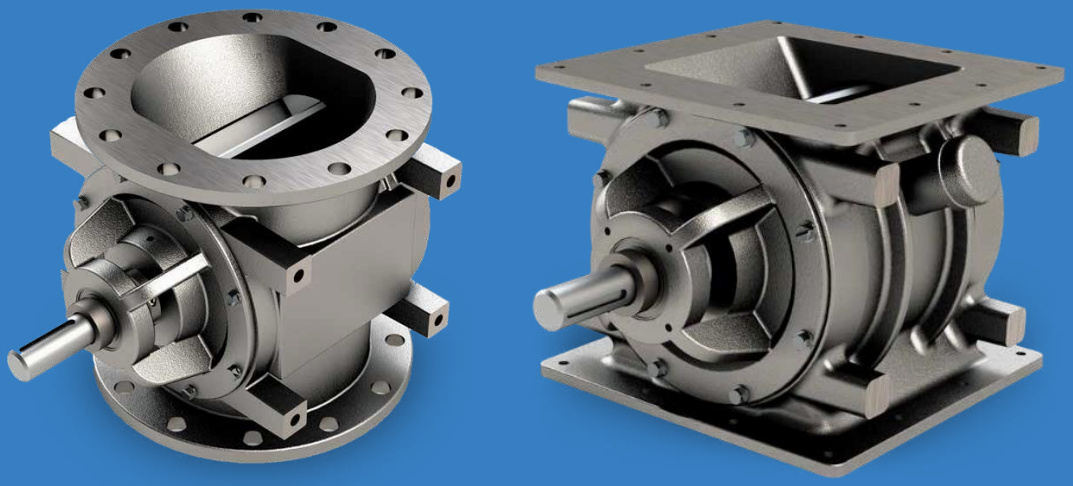
Installation, Operation & Maintenance Manual



ACS Rotary Airlock Valve/Feeders

ACS VALVES

Introduction

These instructions are intended to familiarize the user with the product and its permitted use. Operating the product in compliance with these instructions helps to ensure reliability in service and avoid risks. Installation and maintenance of equipment should always be performed by qualified personnel in compliance with applicable codes and regulations.

Equipment owners are responsible for understanding the contents of this document and compliance with applicable government laws and regulations and appropriate industry standards.

Control of the equipment must be in accordance with OSHA Standard 1910.147 "Control of Hazardous Energy (Lockout-Tagout)" or similar hazardous energy control procedure as defined by CSA or ANSI. "Lockout/Tagout" refers to specific practices and procedures to safeguard employees from the unexpected energization or startup of machinery and equipment, or the release of hazardous energy during service or maintenance activities. This requires, in part, that a designated individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance and that the authorized employee(s) either lock or tag the energy- isolating device(s) to prevent the release of hazardous energy and take steps to verify that the energy has been isolated effectively.

Rotary Valve for Metering, Feeding and Airlock Applications

ACS valves are designed and built to application-specific requirements, including custom rotor configurations, factory-applied internal coatings, and sanitary materials of construction.

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Safety First

SAFETY ALERT SYMBOLS

This Safety alert symbol is used to call your attention to an important safety message on equipment, safety decals and in manuals, to warn you of possible danger to your personal safety. When you see this symbol, be alert; your personal safety or the safety of the other persons is involved.

THE FOLLOWING DEFINITIONS FOR IDENTIFYING HAZARD LEVELS ARE:

DANGER (RED) – Danger is used to indicate the presence of a hazard that WILL cause SEVERE personal injury, death, or substantial property damage of the warning is ignored.

WARNING (ORANGE) – Warning is used to indicate the presence of a hazard that CAN cause SEVERE personal injury, death, or substantial property damage if the warning is ignored ends maintenance cycles.

CAUTION (YELLOW) – Caution is used to indicate the presence of a hazard that WILL, or CAN cause MINOR personal injury or property damage if the warning is ignored.

SAFETY PRECAUTIONS

Prior to starting work on the equipment, we recommend the following:

1. Always de-energize all electrical equipment by following lock out/tag out procedures. If working on a quick clean design valve, disconnect all sources of power before cleaning or performing maintenance on your quick clean valve.
2. Do not operate rotary airlock valves & feeders with the inlet or the outlet flange openings unguarded or disconnected from system components. Inlet & outlet flange guards are mandatory. These flange guards are available for purchase upon request.
3. Always allow equipment to come to a complete stop. Never attempt to artificially brake the motion of the equipment.
4. Warning labels must be located on the equipment and near access openings to remind operating personnel of the risk.
5. Block the rotor from turning if the drive chain is disconnected or the gear drive has been removed.

HAZARD WARNINGS AND SAFETY PRECAUTIONS

The safety warnings below are basic guidelines and by no means all inclusive. National and local safety codes and even common sense should be used by qualified personnel to carry out installation and maintenance of the equipment. The hazards listed below are the most likely to be encountered during installation, operation and maintenance of your equipment.

Shear Hazard

There are shear points wherever the rotor and housing meet. Contact with moving rotor blades will amputate fingers, hands, arms or legs and may result in death. Accidents can occur when operators reach through upstream or downstream equipment mounted adjacent to the valve through access openings to clean or remove blockage.

Drive Chain Hazard

There are pinch points where the chain and sprocket engage. Exposed moving parts can cause severe injury or death. Never operate the valve without the guard installed. Follow Lockout/Tagout procedure before removing guard.

Exposed Rotating Shafts

Exposed shaft locations exist at the seal access area and tail shaft. Contact with rotating shafts can crush or amputate fingers, hands or arms. Avoid touching or contact with the exposed shaft. Tail shaft guards are available as an option.

Electrical Hazard

Electrocution accidents are most likely during maintenance of the electrical system. Follow Lockout/Tagout procedures before working on the equipment.

Automatic Startup of the Valve - Quick Clean on Rail Design

Rotary airlocks are often controlled by an automated system and may start without warning. Ensure that Lockout/Tagout procedure is followed before working on the equipment. The quick clean on rail design is specifically designed for ease of cleaning by the operator without tools. There is a factory supplied safety switch for protection of personnel and equipment which must be installed and operational to prevent accidental start-up of the valve.

Pressurized System

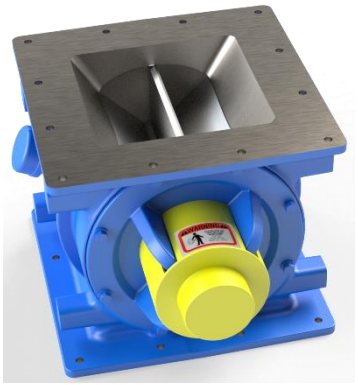
Danger from opening of equipment if the process is under pressure or from compressed air. Ensure that process pressure has been relieved prior to opening unit.

ACS VALVES

SAFETY LABELS AND GUARDS

This piece of equipment contains several warning decals located in many different locations. It is the owner/operator's responsibility to maintain the integrity of these decals and to ensure that all operators of the equipment are aware of them and understand their meaning. Replacement decals are available free of charge by calling customer service department at 1-800-655-3447 or 1-905-765-2004.

This piece of equipment may contain one or more safety guards to protect the operator(s) from injury. It is the owner/operator's responsibility to maintain and ensure that they are in place when the equipment is in operation. If you have any safety or operational questions related to the design or applications of the Rotary Airlock Feeder we encourage you to contact our factory at 1-800-665-3447 or 1-905-765-2004.



General Information

Record the MODEL and SERIAL NUMBER of the ACS Rotary Airlock, including the same information for the auxiliary equipment (gearmotors, motors, sheaves size, type and any special modifications to standard).

For additional information, application assistance or special service, contact the factory. For ready reference, please record this information on the lines in the adjacent table. The SERIAL NUMBER is clearly indicated on the valve nameplate installed on the valve.

Typical Nameplate showing Serial Number location. Serial no. should be provided when consulting the factory

MODEL

SERIAL NUMBER

MODEL

SERIAL NUMBER

MODEL

DATE OF DELIVERY

ACS VALVES

WARNING – All owners and operators should read this manual, or be instructed in safe operating and maintenance procedures, before attempting to uncrate, install, operate, adjust or service this equipment. Read All Instructions contained in this manual before installing and operating this equipment.

Receiving Your Equipment

Equipment should be carefully inspected immediately after receipt to make certain the unit is in good condition and all items listed on the packing list are included. All damages or shortages should be reported immediately to ACS. Purchaser should take immediate steps to file reports and damage claims with the carrier. All damages incurred to the units in transit are the responsibilities of the common carrier. Any claims for in transit damage or shortage must be brought against the carrier by the Purchaser.

HANDLING AND STORAGE OF YOUR EQUIPMENT

Moving the valve during unloading or installation site should always be done with the use of a hand truck, forklift or overhead crane with slings. Do not lift by its flanges or shaft. We recommend installing lifting eyes on the inlet flange for lifting chains or slings. Take care to prevent the unit from rotating due to unbalanced weight distribution.

Short Term Storage

If the equipment is not put into immediate use it should be stored in a clean, dry location. Care should be taken to keep the equipment covered when moving from a cold location to a warm location, otherwise condensation may occur. If condensation does occur, allow it to dry thoroughly before applying power. If the unit is not going to be installed shortly after arrival, it should be stored in a warm, dry location to protect from corrosion to the machined surfaces. Flange covers should be left in place until ready to install.

Long Term Storage

If the equipment storage is required for longer than 90 days, additional precautions are required.

1. Storage should be indoors in a temperature-controlled facility such as a warehouse or enclosed building.
2. Leave weatherproof covering in place. Keep vented parts exposed.
3. Make certain unpainted portions are covered and retouch any scratches or flaked areas.
4. If condensate plugs or drain plugs have been used, make sure they are operative.
5. Consult vendors instruction manual for guidance on recommendations for long term storage. i.e., If motor is equipped with space heaters make sure space heaters are properly connected and operative.
6. A systematic inspection and maintenance schedule should be established. If rotating apparatus is to be stored for 6 months or longer, it should, in addition to the precautions above, be given a visual inspection every month.
7. Contact ACS for recommendations where equipment has been in storage for periods longer than 12 months.

Design and Construction

Rotary airlock construction consists of a housing with two endplates, rotor and drive package. The housing has a top inlet and bottom outlet and is precision machined to provide close tolerances between the rotor and housing internal surfaces. The endplates have a raised face that extend into the body bore to provide sealing and proper alignment of the rotor. The rotor is a one piece design with multiple vanes that extend radially from the shaft to the housing. The rotor shaft extends through the endplates and is supported by two outboard bearings. Product sealing uses a glandless teflon sleeve with elastomeric seal rings.

Model Nomenclature

This is the model designation and size. A CI 12 is our CI series with a 12-inch inlet and outlet.

C.F.R.

Cubic Feet per Revolution, or the displaced volume of material that the airlock moves from inlet to the outlet in one revolution of the rotor. C.F.R. is calculated assuming that the rotor pockets are 100% filled; actual C.F.R. will vary due to pocket fill efficiency and rotor speed. Capacity can be determined by multiplying the C.F.R. by the speed and density of the product.

ROTARY VALVE CAPACITY (CUBIC FEET/HR.)

VALVE SIZE (INCHES)	ROTOR SPEED (RPM)									
6	6	30	48	60	72	84	96	108	120	132
8	12	60	96	120	144	168	192	216	240	264
10	24	120	192	240	288	336	384	432	480	528
12	45	225	360	450	540	630	720	810	900	990
14	66	330	528	660	792	924	1056	1188	1320	1452
16	84	420	672	840	1008	1176	1344	1512	1680	1848
18	162	810	1296	1620	1944	2268	2592	2916	3240	3564
22	276	1380	2208	2760	3312	3864	4416	4968	5520	6072
24	384	1920	3072	3840	4608	5376	6144	6912	7680	8448
26	540	2700	4320	5400	6480	7560	8640	9720	10800	11880
	1	5	8	10	12	14	16	18	20	22

Clearance

This refers to the measurement between the rotor vane tip and housing and/or endplate. The standard design clearances are 0.004"-0.007" for sizes up to 12" but these are increased for higher temperatures or special materials such as stainless steel.

Temperature Ratings

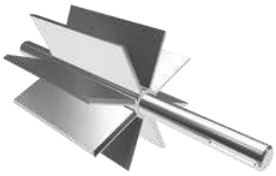
The standard temperature rating is 250 F. Special high-temperature airlocks rated at temperatures above 250 F are available on special order. Refer to the Order documentation for the temperature rating of your airlock

Rotor Types

Several Rotor options are available including open or closed end design, adjustable or fixed vanes, additional vanes on higher differential pressure services, serrated vane edges, rounded pockets for sanitary services, flexible tips, reduced volume or metering styles and staggered pockets.

Open End Rotor

Open end rotors are easier to clean and maintain compared to closed end, which could ultimately lead to less material build up and wear on your valve. They are also better suited to mechanical seal applications. This is also a better option with lighter materials, as closed end rotors are more likely to have materials escape into the space between the endplates and the rotor disc.



Open End Rotor

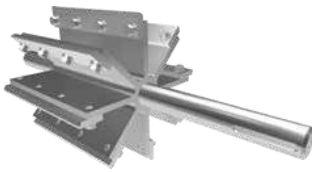
Closed End Rotor

A closed end rotor has a round disc at both ends that are welded to the blades and shaft. There is a gap between the disc and the endplates that allows any material that does end up outside of the rotor to fall out the bottom easily. Closed end rotors are used with extremely abrasive material, and flake or chip material as the shield protects the outboard bearings and endplates from damage. It also prevents material from building up on the endplates, causing wear.

Closed End Rotor

Adjustable Rotor

With very harsh and abrasive material, tips will wear prematurely. With this type of valve, you can adjust the tips by sliding them up as they wear to keep them compliant and keep the clearance as close to their starting point as possible. This ultimately helps your valves last longer. This is available for open or closed type rotors.

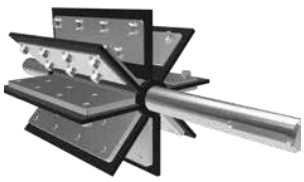


Adjustable Rotor

Flex Tip Style Rotor

There are a few different types of flex tip rotors, depending on what material you're working with, but various grades of EPDM, Polyurethane or Rubber Belting are the most common. The purpose of this type of rotor is to prevent material jams inside the valve. Unlike the helical rotor, which slices the jammed material, the flex tips can bend out of the way while moving the material through the valve and keeping a tight seal.

IMPORTANT: Flex Tip Rotors are not compliant for NFPA services.



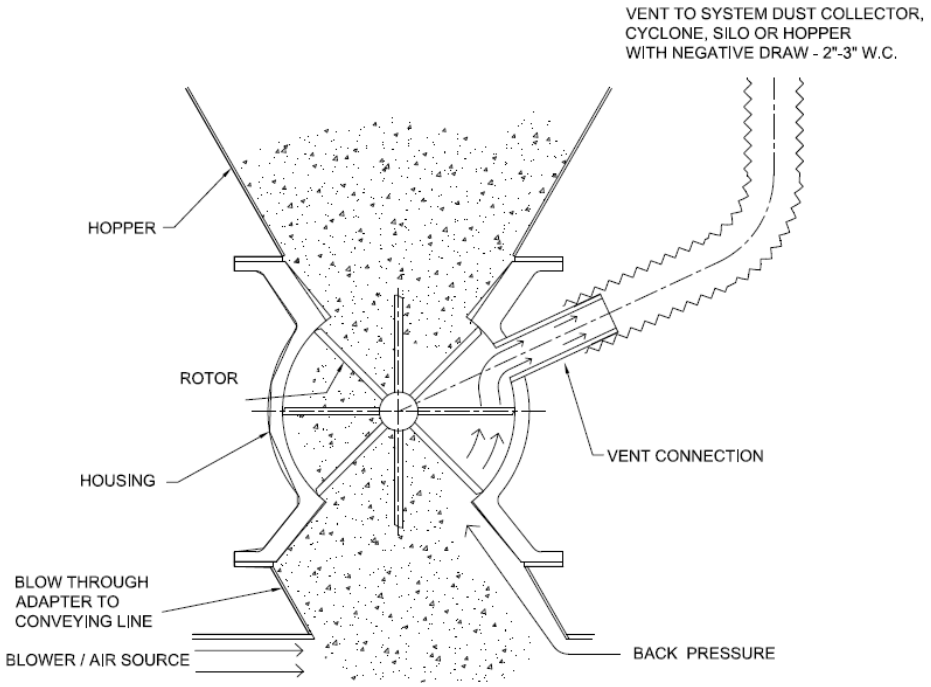
Flex Tip Rotor

Operation

The Rotary Airlock is one of the most important units in your material handling system. The function of the airlock is to hold pressure or vacuum in a pneumatic system and to meter products into conveying lines or storage areas, (bins, tanks, hopper, etc.). The airlock operates by filling each rotor pocket with material at the high point of rotation and then empties into conveying lines or storage areas at the low point of rotation.

In the case of conveying lines, a blow-through is used to allow the velocity of the air to move the material through the conveying line. After each rotor pocket has emptied into the blow-through it still contains pressurized air. With some products, this air can escape up through the bulk material as soon as the edge of the rotor blade passes the edge of the inlet opening. The release of this pressurized air assists in maintaining a continuous flow of product to the airlock inlet. With some products, this air must be vented to atmosphere or to a system that has a negative pressure such as a dust collector, as it tends to prevent the flow of material into the airlock. The rotation produces a continuous flow of material at the discharge end of the conveying line.

The airlock rotor is precision machined to obtain the desired high degree of accuracy and close tolerance. Rotors may be supplied either with fixed or adjustable tips. The airlock rotor is mounted on bearings at each end of the rotor shaft. Rotor clearance is small to prevent excessive air leakage back to the product inlet.



Rotary Airlock Installed on Pressure Conveying Line with Vent

CAUTION – Equipment is shipped factory assembled. Accessories such as blow through adaptors may be mounted to the inlet of the valve for safe shipping even though they are designed to be mounted on the outlet of the valve.

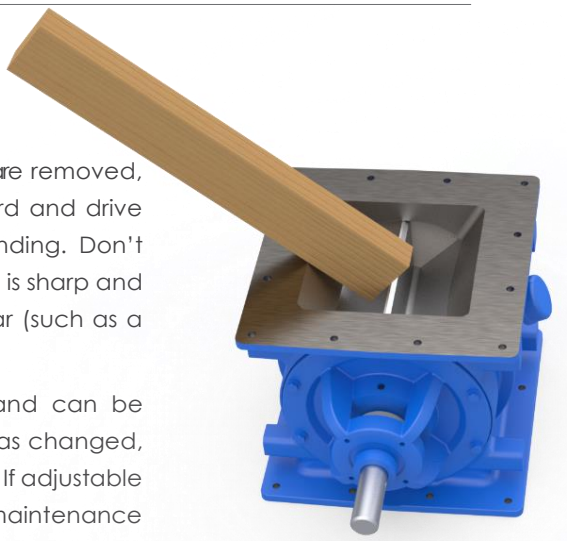
Always check the general arrangement drawing, rotation arrows or contact ACS factory if there are any questions regarding how the equipment and accessories are to be installed and mounted.

Installation

Inspection:

Once the protective flange cover and shipping materials are removed, check the valve and drive components. Remove the guard and drive chain to confirm that the rotor turns freely without any binding. Don't attempt to turn the rotor assembly by hand as the rotor vane is sharp and can easily cut or pinch hands or fingers. Use a soft push bar (such as a wooden 2 x 4) to ensure that it rotates freely.

The as-built clearance is recorded on the inlet flange and can be measured with feeler gauges. If the clearance measured has changed, this is an indication that the rotor has shifted during shipment. If adjustable tips are provided, re-adjust as per instructions found in maintenance section of this manual. If airlock clearances and rotations are correct, replace chain drive, position and anchor package.



After removing the protective flange cover, use soft push bar to turn the rotor

Mounting to Inlet and Discharge:

Numerous types of bulk materials feeding devices can be connected to the inlet opening of an airlock. Bins, hoppers, mixers and screw conveyors can be adapted for attachment to the airlock by rigidly attaching to the airlock flange using silicone caulk or flexible gasket to obtain an air-tight connection. Be sure all seams in the feeding device are air-tight. Moving feed devices such as sifters require special consideration to support the valve and a flexible connection.

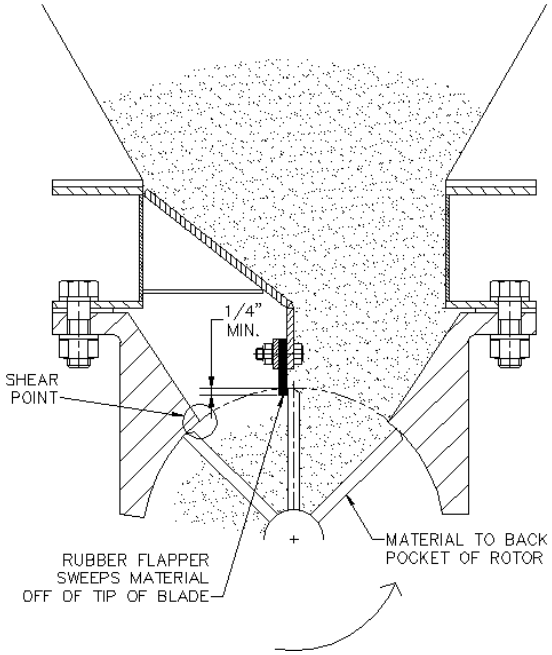
If the airlock package is to be hung from a hopper, storage tank, etc. it may be necessary for some type of structural steel support. However, in most cases, the hopper or tank flange will have enough strength to support the weight of the airlock package. It is not good practice to use the airlock to support equipment loads either in compression on the top flange or in tension from the bottom flange. Excessive loads will cause the housing to distort, which will cause reduced clearance with the rotor. This will result in excessive noise, binding and galling. Flanges of components, which attach to the airlock must be flat and "square" with the airlock flanges. The flanges of the airlock housing should never be forced in place or attached to warped or twisted mating connections. This practice can result in broken airlock housing or loss of clearance as noted above.

If the airlock is to be installed with either the inlet or discharge exposed, a guard must be mounted to the appropriate flange to reduce the risk of personal injury to operators, maintenance personnel and others who may be near the equipment. Any object placed in the inlet area or discharge area of the airlock will be sheared off. Inlet and discharge guards are available from ACS. Contact Sales for further information.

Accessories

Inlet Shear Protector

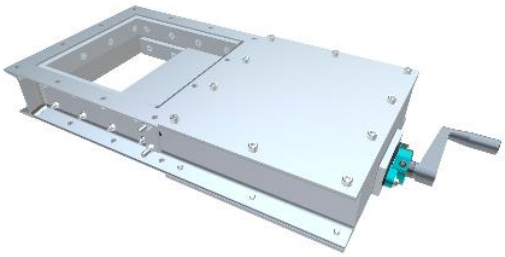
Prevents shearing of material, as well as jamming of material in rotor clearances. Available for various flange configurations and materials, flat or spool style, vented or without. The vented style is provided for connecting to a vent sock or dust collection system where pressure from the discharge can disrupt material entering the inlet. It is designed to be bolted above the inlet using sealant or flexible gaskets. Available for square (CI) or round (MD), vented,



Inlet Shear Protector

Maintenance Slide Gate

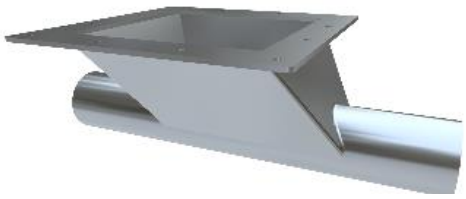
Designed for gravity-flow applications; variable slide gate actuation settings enable partial material flow, as well as full-open or closed settings. They allow the airlock to be removed or serviced without removing material from the feed hopper. Available in various configurations, materials. Manual, air or electric actuators are available. The slide gate is installed directly above the inlet and the mounting arrangement can be oriented for easier access.



Maintenance Slide Gate

Blow Through Adapter

Adapter to connect the discharge of the rotary valve to a pneumatic or vacuum conveying line. Install using sealant or flexible gasket and through bolts.



Blow Through Adapter

Flange Guard

Mandatory safety feature for rotary valves with an open or exposed discharge. Available in steel or stainless steel construction. They are designed to mount directly on the inlet or discharge with sealant or flexible gasket.

Flange Guard

Zero Speed Switch Assembly

Shaft speed-monitoring device, which signals when the shaft has stopped rotating. The switch is mounted on the non-drive end of the valve. Typically, the drive shaft is drilled and tapped for mounting but there is an optional magnetic mounted connector for field retro-fit.

Standard assembly includes: motion switch, target, bracket and guard.

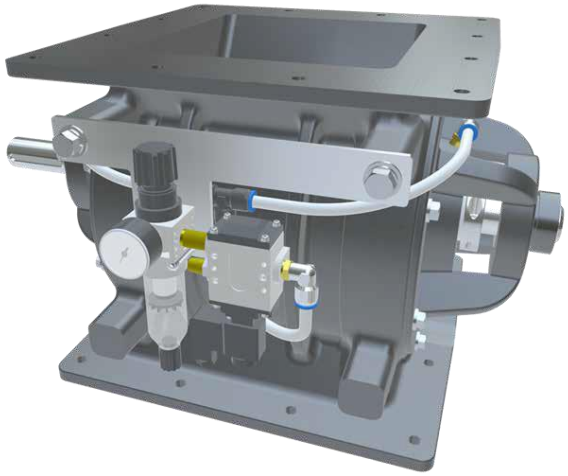
Refer to manufacturer's instruction manual for installation and maintenance or settings.

Zero Speed Switch Assembly

Air Purge Kit

The Air Purge Kit is used to provide compressed air the shaft seal area and/or rotor pocket on airlocks with either open or closed end rotors. This kit may also be used to provide compressed air to the end plate cavity on the airlocks with closed end rotors. The Air Purge Kit includes a Filter/ Regulator, 0-30 psi pressure gauge, poly tubing and miscellaneous push to connect fittings.

Rotor Pocket Purge Kit



Shaft Seal Purge Kit

WARNING – Equipment must be wired in accordance with local, state and national electrical codes to the appropriate power circuits before it can be operated. This installation is the responsibility of the airlock owner. Installation must be done by qualified personnel who are familiar with proper installation practices of the equipment and with the control functions of the devices they are installing.

Initial Start-up Procedure

Prior to Starting

1. Remove the drive guard. Make sure that the drive chain is properly tensioned. If this is a direct drive unit, skip to 4.
2. Check tension in drive chain. There should be 3/8 to ½" slack in the top of the chain. Adjust if necessary.
3. Make sure the chain is properly lubricated. The chains are pre-lubricated by the vendor.
4. The gearmotors are shipped filled with oil. Check the oil level in the drive gearbox and top off if necessary. Oil level and drain plugs must be accessible. Remove any shipping provisions from the breather plug. Refer to the manufacturer's instructions included with the shipment.
5. Make sure that the airlock, feed device, and conveying line are free of foreign material.
6. Verify that all electrical connections have been properly made.
7. Replace all guards and covers.

Start-Up

1. Energize the electrical service (and instrument air if applicable.)
2. Jog the airlock to verify the direction of rotation is correct. Listen for sounds of unwanted mechanical contact and correct if necessary. Reverse operation can result in jamming and possible motor overload.
3. Start the airlock and operate it for a period with no load. Check for excessive noise or other indications of improper operation. Investigate and correct if necessary.
4. Start feed device or fill the hopper. As material flows into the airlock, listen for excessive noise or other indications of improper operation. Investigate and correct.
5. Verify that the current draw of the motor does not exceed its full load amp rating. Refer to motor nameplate for rating.
6. While the system is operating check for air leaks. Correct as needed.
7. Monitor the operation of the main components for heat, noise or vibration as these are indications of a potential problem.

WARNING – Prior to beginning any service or maintenance activities, ensure that "Lockout/ tagout" procedures have been completed to safeguard employees from the unexpected energization or start-up of machinery and equipment. If working on a quick clean design valve, disconnect all sources of power before cleaning or performing maintenance on your quick clean valve.

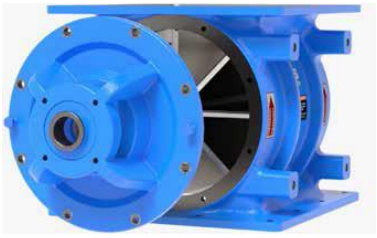
Maintenance Procedures

Regular maintenance is important to the operation and life of your airlock. Areas requiring regular inspection and maintenance are the rotor clearance, seals and/or packing and the drive package including motor, gear and drive chain.

General Disassembly Procedure

1. Remove the auxiliary equipment (zero speed switch, air purge piping) if supplied.
2. For chain driven units, loosen and remove chain drive guard.
3. Loosen the 4 tensioning nuts at the motor mount until there is slack in the chain. Remove the chain and rotor sprocket from drive shaft.
4. For direct driven units, remove the gearmotor. Remove the end cap from the gearmotor. **NOTE:** some models (FT Direct Drive) use a retaining bolt and lock washer in the end of the shaft which must be removed first.
5. Remove the (4) hex bolts located on mounting plate. Use the (2) 3/8"-16 NC threaded holes for installing jacking bolts to separate the gearmotor from the mounting plate.
6. While supporting the weight of the gearmotor, move the gearmotor away from the mounting plate and remove from driveshaft once it is clear.
7. With the gearmotor removed, the motor mounting plate is accessible. Remove fasteners and motor mount.

Removing Endplates



Removing Endplates

1. Remove bolts that attach end cover to housing.
2. Loosen and remove bearing lock collar. Remove set screw from collar and flatten the mark formed by set screw using a small flat punch. Loosen collar by rotating collar in direction opposite shaft rotation. Use drift pin in the non-threaded hole. Tap with hammer to rotate collar. Slide collar off shaft.
3. If equipped with an ACST-4 Shaft Seal, use a 1/4" Allen key (5/16" for larger valves) loosen the lock collar clamping the teflon seal to the shaft (both sides). NOTE: On valves equipped with "Push Type" seal assembly, loosen the pusher nuts, allowing pusher to retract from teflon packing.
4. Attach wheel puller behind bearing housing. Tighten slowly until cover moves away from housing. If cover tends to bind on shaft, tap puller bolt with rubber mallet as you tighten.
5. With the endplate removed, the rotor and housing is accessible.

Removing Rotor

The rotor can be removed if damaged or clearances are worn. Usually the drive side is pulled to avoid removing drive sprocket, but the procedure is similar for both cases. The rotor should be accessible from the inlet or outlet side of the housing.

1. Remove the auxiliary equipment and drive package. Refer to general disassembly procedure.
2. Loosen and remove bearing lock-collar on non-drive end. Remove set screw from collar and flatten mark formed by set screw using a small flat punch. Loosen collar by rotating collar in the same direction as the shaft rotation. Use drift pin in the non-threaded set screw hole and tap with hammer to rotate collar. Slide collar off shaft. Remove any burrs left from the set screw.
3. For airlocks supplied with packing gland seals, loosen the packing gland bolts (2 ea.) on the non- drive side. For airlocks with Teflon shaft seals, loosen the shaft seal collar, located within the end plate bearing port.
4. Remove the bolts on end cover (side to be pulled).
5. Attach wheel puller behind bearing housing. Tighten slowly until cover slides off shaft. If cover tends to bind on shaft, tap puller bolt with rubber mallet as you tighten.
   Note: Larger model sizes have jacking holes to assist with removing the endplate.
6. Slowly remove rotor from housing.

Replacing Rotor

1. Carefully check to see if rotor or housing have burrs. (shaft, blade tips, shrouds, and housing matching surfaces). If burrs are found, file them smooth using a fine file and then polish with emery paper.
2. Wipe off rotor and shaft to clean any foreign material. Also, check end cover to see that matching edges to housing are clean.
3. Gently slide rotor into housing. Rotor normally will not slide the last few inches easily. Use a rubber mallet to move rotor vanes past the end of the housing, far enough to start end cover bolts. Install endplate,
4. Centre rotor in housing by tapping end of shaft. Check end clearance with feeler gauge or dial indicator in case of a closed rotor and re-position until the end clearance is equal.
5. Tighten bearing lock collars in the direction opposite to shaft rotation.
6. Tighten packing gland bolts evenly or tighten shaft seal collar.
7. Turn rotor by hand. Check clearances and see that rotor turns freely in housing. If rotor does not turn freely, adjust as necessary.

Replacing Bearings and Seals

Our standard design uses sealed permanently lubricated bearings and ACST-4 seals consisting of a PTFE (teflon) sleeve and 3 quad rings with shaft collar which require replacement when worn. It's recommended to always replace the seals and bearings at the same time.

1. Remove endplate from housing as described in procedure REMOVING ENDPLATES.
2. The bearing, split locking collar, teflon bushing and quad ring seals will come out with the endplate.
3. Remove bearing by pressing away from the seal arrangement. Use of a small diameter soft punch can also be used to "drive" the bearing out of its seat.
4. Pry the lock collar off teflon seal and set aside. Pry the teflon seal straight up and out of the quad ring assembly. Remove quad rings by poking with a sharp object and prying out of seat. Repeat for remaining two (2) rings.
5. Install new quad rings and Teflon sleeve in end plate. Apply a small amount of lubricant to the teflon seal and gently push into the quad ring bore.
6. Install teflon seal lock collar.
7. Align bearing with machined hole in end cover taking care to make sure of direction and orientation before pressing the new bearing in place.
8. Install endplate onto driveshaft, move into position, install and tighten fasteners.
9. Slide bearing collar on shaft. Rotate the collar in the opposite direction of shaft rotation until eccentric faces of collar and inner bearing ring engage.
10. Check clearances and see that rotor turns freely in housing. If rotor does not turn freely, adjust as necessary.
11. Lock the bearing in place by rotating the collar using a drift or flat punch in the non-threaded hole and tapping the collar with a light weight hammer in the opposite direction of rotation until snug. Tighten set screws.
12. Position teflon sleeve and shaft seal collar. Tighten seal collar.

Rotor Machining

Rotor machining may be required if there are operating problems caused by the rotor clearances being too small for the application. In this case the rotor can be removed and machined to suit. **Please contact ACS for directions and instructions.**

CAUTION –The rotor is precision machined to extremely close operating clearances between the rotor vane tips and the housing. Take extra care to protect the shaft center holes on the rotor in the event there is repairs or rework needed.

Checking Rotor Clearance

Rotor clearance should be checked as part of the maintenance program as increased clearance will affect the performance. Rotor clearance should be within the allowable range as indicated in the table below (See table or if your model isn't shown contact ACS) determined by its size and design operating conditions.

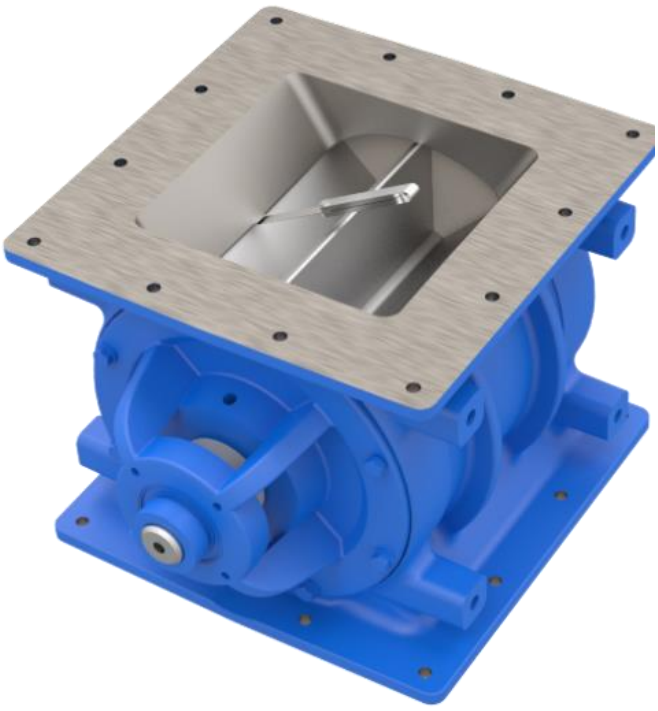
Fixed and flexible tip rotors have no adjustment at tips but should be checked for wear or damage to determine if the airlock is functioning in the system properly.

ROTOR CLEARANCE		
Model & Size	**Standard**	**High Temperature**
CI / MD / DR-S 4 through 12	0.004" to 0.007"	0.007" to 0.010"
CI / MD 14 through 16	0.007" to 0.010"	0.012" to 0.016"
CI 18 through 22	0.012" to 0.016"	0.016" to 0.020"
CI 24 through 30	Refer to Factory	Refer to Factory

If the inlet or outlet of the valve is accessible, the clearances can be measured directly through this opening. Remove the drive guard and disconnect the drive chain (if applicable).

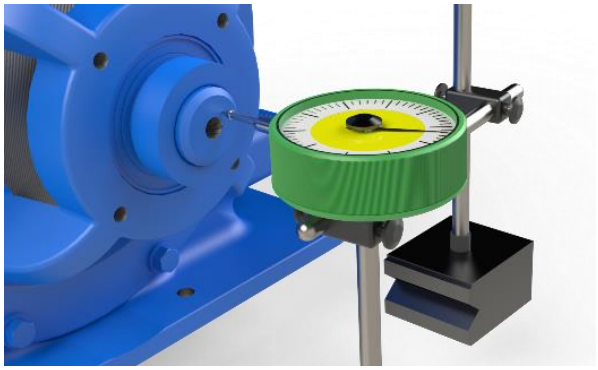
1. Number each blade for ease of checking and measure the gap between the rotor blade and housing at each end of the blade and center.
2. Check the inlet and outlet. Measure the side clearance between end of the blade and the endplate.

   Increased clearances will allow more leakage through the airlock resulting in reduced performance. The allowable loss of performance will indicate when repair or replacement is required.



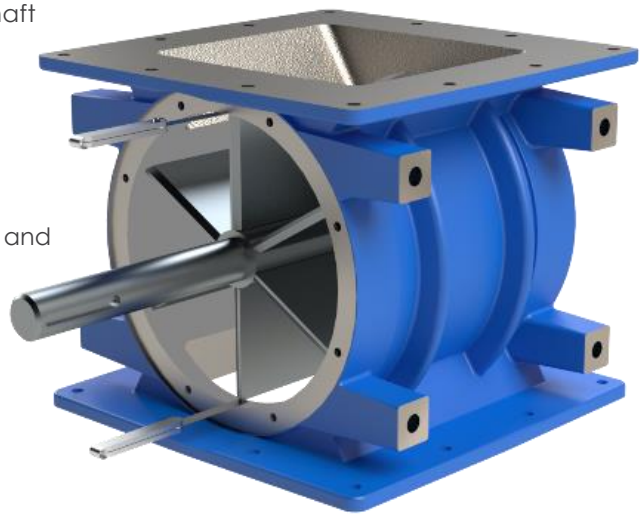
Checking clearance of rotor with feeler gauge

If the inlet or outlet is not accessible, inspection is performed with the endplate removed. It's easier to do this from the tail side (non-drive end) as it's not necessary to remove your drive package.



Side clearance check with indicator

1. Loosen, but don't remove the shaft seal and bearing locking collars on both ends as described in the general disassembly procedure.
2. To measure the clearance between the rotor and the endplate, attach a dial indicator to the end of the shaft and push the shaft towards one endplate.
3. Set the indicator to zero and then push the shaft towards the other endplate. The indicator will show the total clearance. The side clearance is half the total measurement.
4. Remove tail side endplate by following the disassembly procedure.
5. Insert the feeler gauges between the housing and both the bottom and top rotor blades until you feel friction from both feeler gauges.

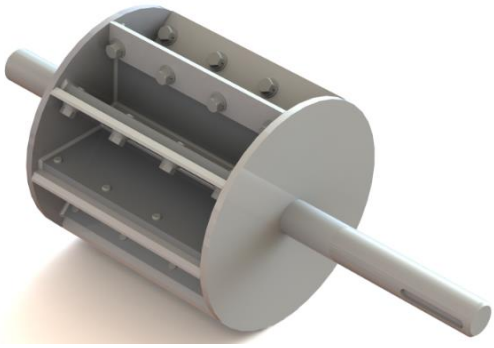


Clearance check with endplate removed with feeler gauges

Adjustable Rotor Tip Clearance

Airlocks equipped with adjustable rotor tips can have their clearances renewed when worn for extended operating life.

1. With the drive chain disconnected, number the blades as a means of showing when the adjustment has been completed. Loosen, but do not remove the fasteners.
2. Insert 2 sets of the appropriate size of feeler gauge between the rotor tip and housing on the inlet side. One at each end. Push blade against the feeler gauge and tighten fasteners.
3. Turn rotor so that the same blade appears on the outlet side and measure the clearance to determine which position is tighter. Adjustment should be made on the remaining blades from the side of the airlock that is tighter.



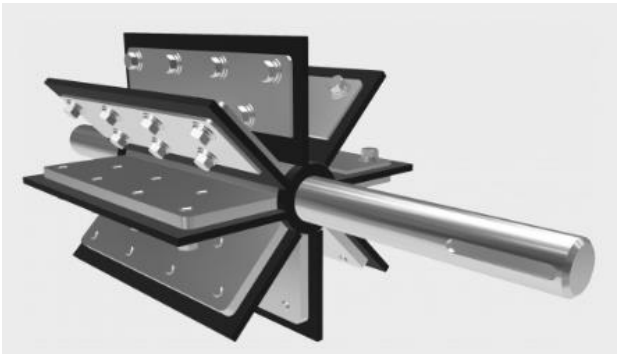
Adjustable Rotor-Closed type

4. Make a final check of clearances by turning the rotor and checking each blade at each end, center and both sides of the housing.

Adjustable Rotor Tip Adjustment and Replacement

For adjustment of rotor clearances, see Checking Rotor Clearance

1. Remove drive guard and chain.
2. Remove the rotor blade fasteners and rotor vanes to be replaced. It is recommended that you replace the backing plates and hardware in the same position they were removed.
3. Make sure the blades are on the leading edge of the rotor.
4. Fasten the new blades onto the valve using a thread adhesive. As you tighten each bolt, ensure the blade is centered between end caps.
5. Begin tightening the bolts one at a time starting from the end caps. Note that flexible material expands when it's tightened so take care not to over compress the vane tips.
6. Turn rotor by hand all the way around. Be sure the clearance is not any less for the full rotation. When tightening each bolt and blade, ensure the rotor can be turned by hand.

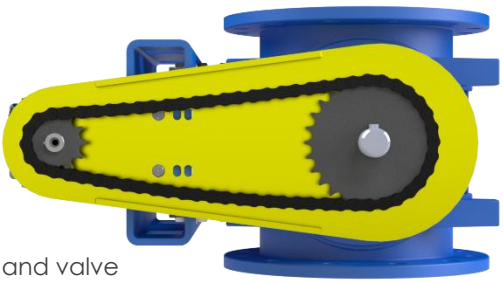


Flexible Tip Rotor

7. Repeat this procedure until all blades are installed and rotor can still be turned by hand.
8. Replace chain.
9. Adjust motor plate & replace guard.

Checking and Adjusting Drive Chain

Check tension of airlock drive chain every 200 hours of operation. Chain tension will change due to normal wear.



Drive Chain

1. Remove chain guard. Airlock drive chain should have a small amount of slack (3/8" to 1/2") between gearmotor and valve sprockets. The chain should be loose enough to allow a slight up and down motion with hand pressure applied midway between sprockets. To adjust airlock drive chain, loosen two bolts securing gearmotor and change position of gearmotor to obtain desired degree of tightness. Tighten mounting parts and reinstall chain guard.
2. Chain manufacturer's guidelines recommend to clean and lubricate the chain periodically.

Zero Speed Switch

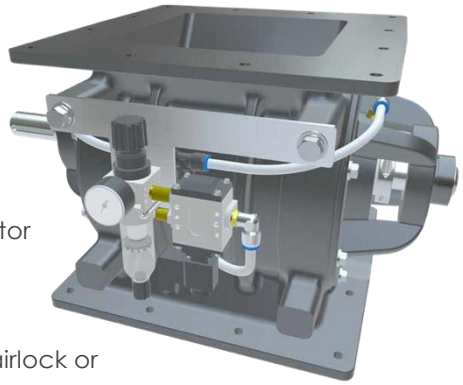
Refer to the manufacturer's instruction manual for installation details. If sensor does not detect Whirligig Target check the sensing range of the sensor being used and move sensor closer to the target.

Gear Drive and Motor

Inspect, lubricate and service the gear drive and motor in accordance with the manufacturer's instructions.

Air Purge Pressure Adjustment

Shut off the compressed air supply and bleed off air pressure before attempting to install or service the air purge assembly. After installation is complete and while the filter/regulator is shut off completely, the air supply should be turned on.



Purge Kit

1. After verifying that all connections are tight the regulator should be adjusted to provide the appropriate purge pressure to the airlock using the following guidelines.
2. Initial setting, prior to conveying product through the airlock or system should be 5 PSIG.
3. If the airlock is either receiving product from or discharging product to a pressure system, the regulator should be set at 5 PSIG above the system conveying pressure.
4. If the airlock is used in a gravity flow application or is receiving or discharging only to a vacuum system, the regulator should remain set at 5 PSIG.

AIR PURGE ASSEMBLY FOR AIRLOCKS WITH OPEN OR CLOSED END ROTORS		
Item	**Qty**	**Description**
1	1	Filter/Regulator with gauge and bracket
2	1	3/8" Male Branch Tee Poly fitting
3	4 ft.	3/8" O.D. Seal Tubing
4*	2	3/8" PTC to 1/8" MNPT Connector
5	1	0-30 PSI, 2" Face, 1/4" CTR Back Gauge
6**	2	3/8" Poly to 3/8" MNPT Connector
7**	2	3/8" Union Tee
8**	2	3/4" x 3/8" Hex Bushing
	1	Air Purge Kit (includes items 1 thru 8)

Please Note: *Fittings for purging shaft seal **Fittings for purging end plate cavity

ACS Rotary Valve Lubrication Chart

Standard bearings on CI and MD series airlocks are sealed for life bearings and do not require lubrication, but greaseable bearings are supplied according to the service conditions.

The following chart is a list of oil lubrication product suppliers including a maintenance schedule for gear reducers based upon an ambient factory atmosphere and normal factory operating conditions. This chart is only a suggested list of suppliers and maintenance schedule times, end users may select from their own list of supplier products and adjust the recommended scheduled maintenance times to suit their own facility conditions.

SEW EURODRIVE GEAR REDUCERS				
Reducer	**Application**	**Oil or Grease Type (s)**	**Quantity (L)**	**Frequency (Hours)**
SEW Eurodrive R series FAF series KAF series	Standard (-15°C to +40°C)	Shell Omala S2 G 220 Mobil Mobilgear 600 XP 220 Castrol Optigear BM 220	R series standard M6 Pos. R37(0.95), R47(1.50) R57(1.70), R67(2.00) R77(3.40), R87(6.50 FAF series standard M1 Pos. FAF37(0.95), FAF47(1.50) FAF57(2.70), FAF67(2.70) FAF77(5.90), FAF87(10.80) KAF series standard M1 Pos. KAF37(0.50), KAF47(0.80) KAF57(1.20), KAF67(1.10) KAF77(2.10), KAF87(3.70)	Check oil every 3,000 hrs Replace oil every 10,000 hrs
	High temperature (-20°C to +80°C)	Shell Omala S4 WE 220 Mobil Glygoyle 220 Castrol Optiflex A 220		Check oil every 3,000 hrs. Replace oil every 6,000 hrs.
	Low temperature (-40°C to +40°C)	Shell Omala S4 GX 150 Mobil SHC 629 Castrol Optigear Synthetic X 150		Check oil every 3,000 hrs. Replace oil every 18,000 hrs.
	Food grade (-20°C to +30°C)	Shell Cassida Fluid GL 220 Mobil SHC Cibus 220 Castrol Optileb GT 220		Check oil every 3,000 hrs. Replace oil every 12,000 hrs.
SEW Eurodrive S series SAF series	Standard (0°C to +40°C)	Shell Omala S2 G 680 Mobil Mobilgear 600 XP 680 Castrol Optigear BM 680	S series standard M1 Pos. S37(0.25), S47(0.35) S57(0.50), S67(1.00) S77(1.90), S87(3.30) SAF series standard M4 Pos. SAF37(0.50), SAF47(1.00) SAF57(1.50), SAF67(2.90) SAF77(5.80), SAF87(10.80)	Check oil every 3,000 hrs. Replace oil every 10,000 hrs.
	High temperature (-20°C to +80°C)	Shell Omala S4 WE 680 Mobil Glygoyle 680 Castrol Optiflex A 680		Check oil every 3,000 hrs. Replace oil every 6,000 hrs.
	Low temperature (-40°C to +30°C)	Shell Omala S4 GX 150 Mobil SHC 629 Castrol Optigear Synthetic X 150		Check oil every 3,000 hrs. Replace oil every 18,000 hrs.

The following chart is a list of grease lubrication product suppliers including a maintenance schedule for bearing and roller chains based upon an ambient factory atmosphere and normal factory operating conditions. This chart is only a suggested list of suppliers and maintenance schedule times, end users may select from their own list of supplier products and adjust the recommended scheduled maintenance times to suit their own facility conditions.

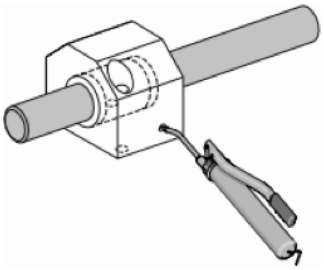
BEARINGS AND ROLLER CHAIN				
Component	**Application**	**Oil or grease type(s)**	**Quantity (ml)**	**Frequency (hrs)**
Greaseable Insert Bearing	Standard (-30°C to +130°C)	Shell Alvania RL2 Mobil Mobilith SHC 220 Castrol Tribol 4020-220-2	ø1.000" (20), ø1.500" (30) ø1.938" (35), ø2.438" (38) ø2.500" (40), ø2.938" (45)	Grease every 3,000 hrs.
	High temperature (-20°C to +180°C)	Shell Stamina RL2 Mobil Mobiltemp SHC 100 Castrol Tribol 4747-220-2		Grease every 2,200 hrs
	Food grade (-10°C to +100°C)	Shell Cassida Grease RLS2 Mobil Mobilith SHC 220 Castrol Molub-Alloy 823-2 FM		Grease every 2,200 hrs
Linear Bearing sets for Quick Clean RotorRail Design	Standard (-20°C to 80°C)	NLGI 00 or 2, DIN 51818 or DIN 51825, KP2K-20 Lithium based High Performance grease	Lubricate on shaft until lubricant emerges	Grease every 3,000 hrs. See Note
Roller Drive Chain	Manual lubrication where the user applies oil periodically with a brush or aerosol spray. Roller chain manufacturer's recommend frequency is once every eight hours, but a longer interval may be used if experience shows it is adequate. The amount of oil and the frequency of its application must be adequate to prevent the formation of a reddish brown discoloration in the chain joints. Manufacturer's recommend high quality oil be used. SAE 20 is recommended for ambient temperatures below 32 F (0 C), SAE 30 from 32 to 104 F (0 to 40 C) and SAE 40 The chain should be periodically cleaned with a petroleum cleaner and inspected.			

Note:

Linear bearing sets for quick clean on rails come pre- lubricated by the manufacturer. Service lubrication intervals are dependent on the severity of the service and the environment they are installed. Monitor the lubrication condition of the Linear Bushings and Linear Sets after start-up. If necessary, adapt the lubrication intervals.

Between in-service lubrication intervals, check that:

- there is no dirt, even coolants/ cutting fluids can be critical;
- no chips can become trapped around the Linear Bushing guideway;
- there is no red-brown discoloration of the lubricant. if there is, lubricate immediately, increase the lube quantity, reduce the lubrication interval, ask for advice if in doubt;
- the seals are functioning correctly.



Clean shafts and shaft support rails if necessary.

Troubleshooting

Inspection and repair procedures given below provide guidance for restoring the package to peak operation. In many cases, repair consists of component replacement.

A. If airlock is not operating efficiently or satisfactory, remove from system, inspect and repair in accordance with preceding information.

B. Inspect airlock drive chain and sprockets for wear, loose links, and damage. Replace chain and sprockets if damage is noted. Be sure the same size sprockets are replacements for original sprockets.

C. Inspect base structure, chain guard, and brackets, for damage and deformation. Replace defective parts.

D. Check all accessory equipment to assure proper operation. Replace any components found to be defective.

When requesting service assistance, please have the following information at hand.

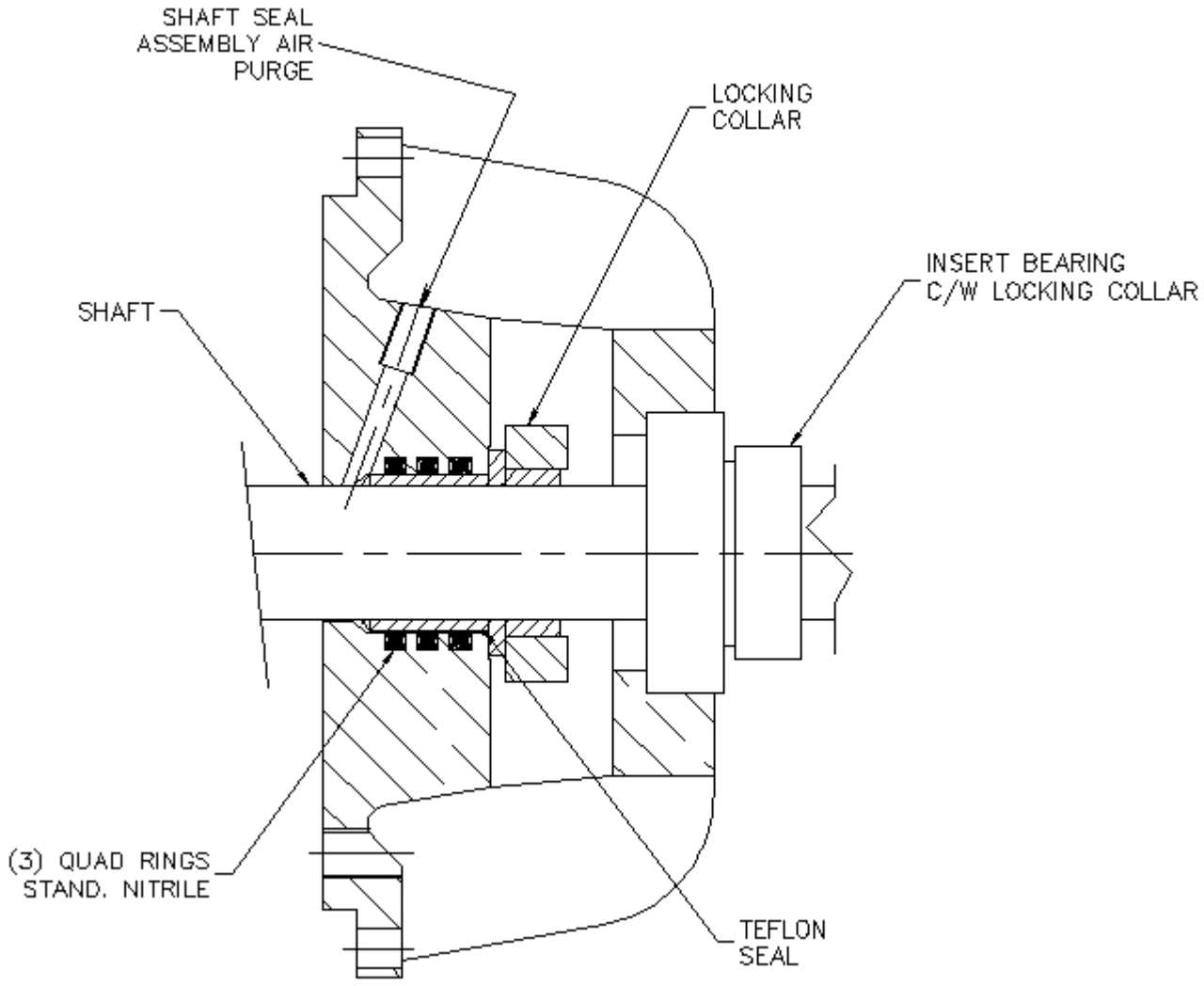
1. Serial no. and/or ACS Sales Order no. or drawing number if available.
2. Application conditions of service including such as product, temperature, ambient temperature.
3. Vacuum or pressure gauge reading above and below the valve,
4. Airlock speed.
5. Method of feeding the valve.
6. Blower speed.
7. Pressure switch setting.
8. Blower motor amperage reading.
9. Gearmotor amperage reading
10. Conveying line length. a) Horizontal run b) Vertical run c) Number of elbows.
11. Photos or video of the installation.

ACS VALVES

FAULTS, CAUSES AND REMEDIES		
Fault	**Possible Cause**	**Possible Remedy**
Excessive noise during operation	Incorrect direction of rotation.	Check markings for correct direction. Rewire motor if necessary, to correct.
	Insufficient rotor clearance due to material buildup or thermal expansion	Check clearances and for signs of contact. Clean material buildup. Adjust clearance as described in manual. Contact ACS for assistance.
	Drive chain rubbing on guard	Adjust guard and/or sprocket position.
	Drive shaft rubbing on guard	Adjust guard position.
	Bearing failure	Remove and inspect bearings. Replace if necessary, as described in manual.
Airlock does not rotate	No power to airlock	Check motor, settings for electrical issues.
	Chain not connected	Check chain for signs of wear, repair or replace chain.
	Foreign object caught in inlet throat	Inspect and remove.
	Faulty or damaged gearbox	Check for signs of wear or damage. Replace gearbox if necessary.
Material flow problems	Supply source or feed device plugged, empty, or not operating	Check supply source.
	Conveying line piping layout, size or increased pressure	Inspect and review conveying line layout.
	Airlock turning too fast	Adjust motor speed or replace sprockets.
	Excessive rotor pocket fill	Inlet shear protector.
	Excessive moisture in Product	Clean rotor. Check flange connections for proper seal. Check process for proper product condition.
	Excessive blowby air	Check and adjust rotor clearances. Install vent or vented shear protector.
Short seal life	Conveying line piping layout	Inspect and review conveying line layout.
	Incorrect air purge pressure	Adjust air purge pressure as described in relevant section in Instruction Manual
	Seal out of position	Inspect and reposition seal.

Spare Parts and Service

Use only ACS replacement parts. Parts are available from ACS directly or our authorized representative. For prompt, efficient service, always provide the following information when ordering parts: Serial number, model number and part description and reference number, as given in this manual.



ACST-4 SEAL AND BEARING DETAIL

Spare Parts and Service

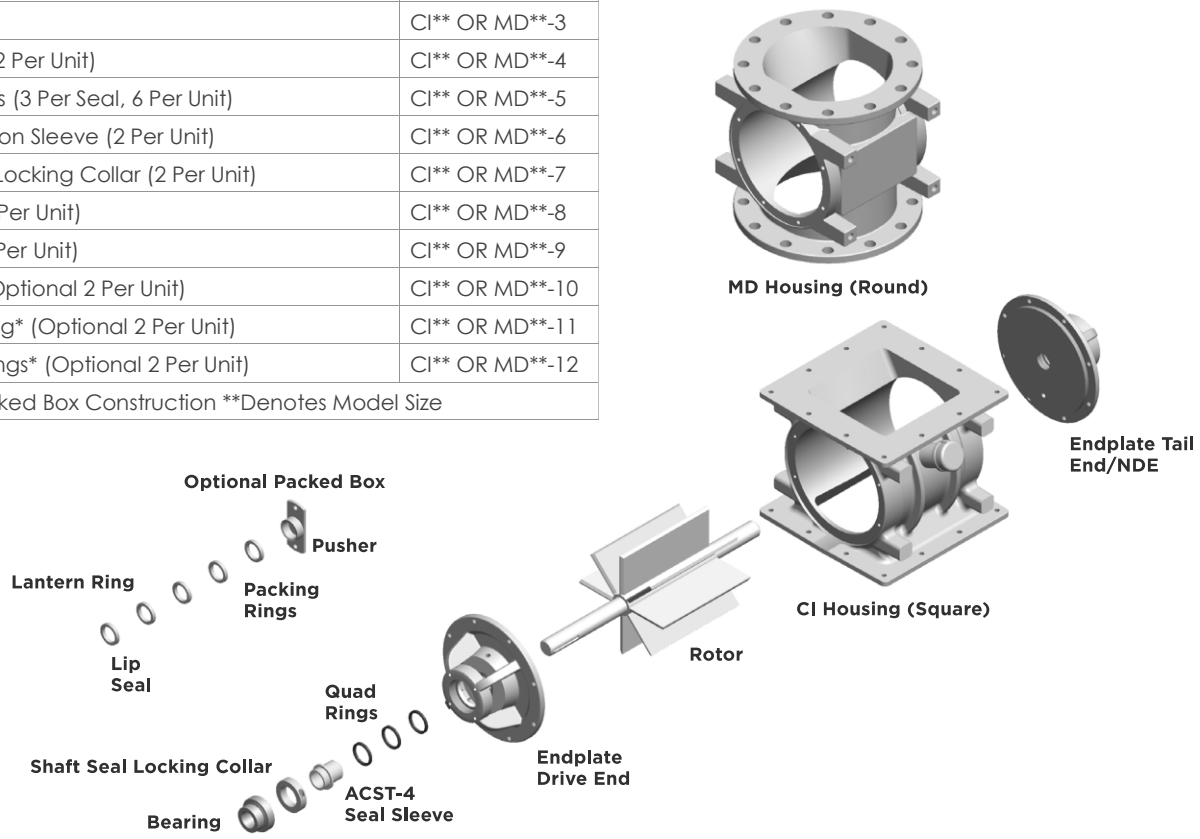
For assistance in service or ordering parts, contact the Sales Department at:

ACS Valves

611 Argyle Street North, Caledonia, ON, N3W1M1 Phone: 1-800-665-3447 / 905-765-2004

Or visit our website at http://www.acsvalves.com

ACS MD or CI Rotary Airlock Spare Parts	Part Number
MD or CI Rotary Airlock Complete Less Drive	CI** OR MD**-1
Housing	CI** OR MD**-2
Rotor	CI** OR MD**-3
Endplate (2 Per Unit)	CI** OR MD**-4
Quad Rings (3 Per Seal, 6 Per Unit)	CI** OR MD**-5
ACST-4 Teflon Sleeve (2 Per Unit)	CI** OR MD**-6
Shaft Seal Locking Collar (2 Per Unit)	CI** OR MD**-7
Bearing (2 Per Unit)	CI** OR MD**-8
Pusher* (2 Per Unit)	CI** OR MD**-9
Lip Seal* (Optional 2 Per Unit)	CI** OR MD**-10
Lantern Ring* (Optional 2 Per Unit)	CI** OR MD**-11
Packing Rings* (Optional 2 Per Unit)	CI** OR MD**-12
*Packed Box Construction **Denotes Model Size	



Motor and Speed Reducer Parts and Service

The motor and speed reducer are covered by their own manufacturer's warranty. If there is a problem, check with the local supplier or service representative referencing the manufacturer model and serial number for prompt service or contact ACS Valves Sales for support.

800-655-3447
acsvalves.com

Gearmotors and Gear Reducers

OPERATING INSTRUCTIONS

01 805 52 US

GENERAL
These operationg instructions are intended to help you install and operate the drive. For trouble free service, proper installation and operation are essential. Additionally, these instructions contain important recommendations on maintenance.

Before shipment, every SEW-Eurodrive gear unit is tested, checked and properly packed. However, please inspect the drive immediately upon arrival for shortage or transit damage. Note the damage or shortage on the freight bill of lading and file a claim with the carrier. Also, notify SEW-Eurodrive of the shortage or damage.

LUBRICANTS
All gearmotors and gear reducers are supplied with the correct grade and quantity of lubricating oil for the specified mounting position. Exceptions include reducers shipped without input assemblies. The recommended lubricants are found on page 2.

LONG TERM STORAGE
If the drive is not installed immediately, it should be stored in a dry, protected area. If the drive is to be stored for an extended period of time and was not ordered from SEW for long term storage, contact your nearest SEW assembly plant for information on Long Term Storage or request **Document #2115**.

Drives which are used for standby service should be stored as a sealed gearcase.

INSTALLATION OF COMPONENTS ON DRIVE SHAFTS
Do not hammer on the shafts. Hammering can cause brinelling of the reducer's bearings shortening the bearing life. We recommend heating the components to approximately 175°F (when possible) and sliding them on the shaft. This will reduce possible damage to the reducer's bearings. **Document #2116**.

For both standard and metric SEW shaft tolerances, refer to the SEW Catalog or request **Document #2154.**

Shaft couplings should be properly aligned to prevent vibration, coupling wear, and premature failure of the shaft bearings.

To prevent the output shaft and bearings from being subjected to excessive loads, the maximum overhung load, as shown in SEW-Eurodrive catalogs, should not be exceeded. Please consult our engineering department if the load may exceed the recommended figure given or where there are combined radial and axial loads. In such cases, the exact operating conditions must be stated including speed, direction of rotation, position, magnitude and direction of the external radial and axial loads being applied.

SHAFT MOUNTED REDUCERS
SEW-Eurodrive supplies the recommended hollowshaft mounting paste with every hollowshaft reducer. The mounting paste is to be applied on the keyed output shaft. The mounting paste is to aid in the prevention of rusting and fretting corrosion between the reducer hollowshaft and the shaft of the driven machine. The mounting paste will aid in shaft removal when necessary.

Warning! Always ensure exposed, rotating parts are properly covered to ensure safety.

For additional information on shaft mounted reducers, drive shaft configuration and tolerances, refer to the SEW-Eurodrive Catalog or request **Documents #2201 and #2202**.

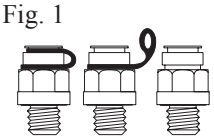
INSTALLATION AND OPERATION
The drive installation site should be selected to ensure:

- Ambient temperatures below 40°C (104°F).
- Unimpeded flow of air to the motor and variable speed units.
- Accessibility to the drain, level and breather plugs.
- Adequate space for the removal of brakemotor fanguard for brake adjustment and maintenance.

The drive unit should be mounted on a flat, vibration damping, and torsionally rigid structure. Careful alignment is critical. Mounting to an uneven surface will cause housing distortion. The flatness tolerance of the supporting surface should not exceed:

- For gear units size 80 and smaller — 0.004 inch.
- For gear units above size 80 — 0.008 inch.

Fig. 1



For transportation, the units are supplied with the breather plug already mounted. After the unit is installed, the black rubber seal located on the breather MUST BE REMOVED (Fig. 1). In addition, the oil level should be checked. Remove the plated (non-painted) oil level plug. The oil level is correct when the surface of the oil is level with the lowest point of that tapped hole, the exception is S37. Units W20 and W30 are sealed in any position.

After installation, the actual mounting position should be confirmed against the mounting postion shown on the gear reducer nameplate. Adequate lubrication is only guaranteed if the unit is mounted in the specific nameplated mounting position.

Refer to the SEW Catalog or request **Document #2111, #2112, #2113, or #2114 (R, F, K, orS, respectively)** if a specific mounting position diagram is needed.

MAINTENANCE
Warning! Always ensure equipment is secure and electrical power is off before removing or performing maintenance on the drive assembly. Oil levels and oil quality should be checked at regular intervals, determined by usage and the environment. Grease and oil should be changed per the recommendations on page 2. Check coupling alignment, chain or belt tension, and mounting bolt torque periodically. Keep the drive relatively free of dust and dirt.

For additional information, call the SEW FAXline, 1-800-601-6195, and request document number shown.

SEW EURODRIVE

SOUTHEAST MANUFACTURING & ASSEMBLY CENTER
1295 Old Spartanburg Hwy, Lyman, SC 29365
(864) 439-7537 Fax: (864) 439-7830

SOUTHWEST ASSEMBLY CENTER
3950 Platinum Way, Dallas, TX 75237
(214) 330-4824 Fax: (214) 330-4724

MIDWEST ASSEMBLY CENTER
2001 West Main Street, Troy, OH 45373
(937) 335-0036 Fax: (937) 222-4104

EAST COAST ASSEMBLY CENTER
200 High Hill Road, Bridgeport, NJ 08014
(856) 467-2277 Fax: (856) 330-4724

WEST COAST ASSEMBLY CENTER
30599 San Antonio Road, Hayward, CA 94544
(510) 487-3560 Fax: (510) 487-6381

ISO 9002

LUBRICANTS

LUBRICATION SCHEDULE FOR SEW-EURODRIVE GEAR UNITS									
Gear Reducer Type[1)]	**Lubrication Type**	**Ambient air temperature range °F**	**ISO Viscosity Grade**	**Mobil Oil Co.**	**CHEVRON Oil Co.**	**Shell Oil Co.**	**Texaco Oil Co.**	**BP Oil Co.**	**Kluber Oil Co.**
R F K	**Oil**	+14 to +104	VG220	Mobilgear 630	Chevron Non-Leaded Gear Compound 220	Shell Omala Oil 220	Meropa 220	BP Energol GP-XP 220	Kluberoil GEM 1-220
		-4 to +77	VG150 VG100	Mobilgear 629	Chevron Non-Leaded Gear Compound 150	Shell Omala Oil 100	Meropa 150	BP Energol GP-XP 100	Kluberoil GEM 1-150
S	**Oil**	+32 to +104	VG680	Mobilgear 636	Chevron Non-Leaded Gear Compound 680	Shell Omala Oil 680	Meropa 680	BP Energol GP-XP 680	Kluberoil GEM 1-680
		+5 to +77	VG220	Mobilgear 630	Chevron Non-Leaded Gear Compound 220	Shell Omala Oil 220	Meropa 220	BP Energol GP-XP 220	Kluberoil GEM 1-220
General	**Synth. Oil**	+176 to -40	Consult Factory For Use of Synthetic Oils						
	Synth. Grease	+176 to -40	Consult Factory For Use of Grease Filled Reducers						
Ball & Roller Bearings	**Grease** Used for normal application Temp. Range: -22°F to 140°F			**Mobilux EP2**	**Chevron Dura-Lith EP2**	**Shell Alvania Grease R3**	**Multifak EP2**	**BP Energrease LS3**	**CENTOPLEX 2EP**

[1)] Applies to all reducers with or without motor and input shaft.

Oil levels and oil quality should be checked at frequent intervals, depending on usage. Oil changes are required at intervals of 10,000 operating hours or every two years, whichever comes first. If a synthetic oil lubricant is used, then this period can be extended to 20,000 operating hours or every four years, whichever comes first. In applications where hostile operating conditions exist, such as high humidity, corrosive environment, or large temperature changes, the lubricant should be changed at more frequent intervals.

The gear units W20 and W30 are supplied with a synthetic oil which is good for the life of the reducer, independent of the mounting position.

Grease packed bearings should be cleaned and regreased every 10,000 hours or 20,000 hours for synthetic grease. Input (high speed) bearings should not be overgreased. They should be filled with grease not to exceed 1/3 of the bearing's free volume. For output bearings and bearings with replaceable grease shields, fill to 2/3 of their free volume.

ATTENTION

When the recommended lubricant is not avilable, it is permissible to use a lubricant having equivalent characteristics but we do not recommend that lubricants of different brands be mixed. Under no circumstances should synthetic lubricants be mixed with one another or with one having a mineral base.

LUBRICANTS

The approximate lubricant in US **gallons and liters** per mounting position is as follows:

	Mounting Position											
	M1 [1]		M2 [1]		M3 [2]		M4		M5 [2]		M6 [2]	
Gear Unit	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
RX57	0.16	0.6	0.21	0.8	0.34	1.3	0.34	1.3	0.24	0.9	0.24	0.9
RX67	0.21	0.8	0.21	0.8	0.45	1.7	0.50	1.9	0.29	1.1	0.29	1.1
RX77	0.29	1.1	0.40	1.5	0.69	2.6	0.71	2.7	0.42	1.6	0.42	1.6
RX87	0.45	1.7	0.66	2.5	1.27	4.8	1.27	4.8	0.77	2.9	0.77	2.9
RX97	0.55	2.1	0.90	3.4	1.96	7.4	1.85	7	1.27	4.8	1.27	4.8
RX107	1.03	3.9	1.48	5.6	3.06	11.6	3.14	11.9	2.03	7.7	2.03	7.7
RXF57	0.13	0.5	0.21	0.8	0.29	1.1	0.29	1.1	0.18	0.7	0.18	0.7
RXF67	0.18	0.7	0.21	0.8	0.40	1.5	0.45	1.7	0.26	1	0.26	1
RXF77	0.24	0.9	0.40	1.5	0.63	2.4	0.66	2.5	0.42	1.6	0.42	1.6
RXF87	0.42	1.6	0.66	2.5	1.29	4.9	1.24	4.7	0.77	2.9	0.77	2.9
RXF97	0.55	2.1	0.95	3.6	1.88	7.1	1.85	7	1.27	4.8	1.27	4.8
RXF107	0.82	3.1	1.56	5.9	2.96	11.2	2.77	10.5	1.90	7.2	1.90	7.2
R17/R17F	0.07	0.25	0.16	0.6	0.09	0.35	0.16	0.6	0.09	0.35	0.09	0.35
R27/R27F	0.07 (0.11)	0.25 (0.4)	0.18	0.7	0.11	0.4	0.18	0.7	0.11	0.4	0.11	0.4
R37/R37F	0.08 (0.26)	0.3 (1)	0.24	0.9	0.26	1	0.29	1.1	0.21	0.8	0.26	1
R47/R47F	0.18 (0.40)	0.7 (1.5)	0.42	1.6	0.40	1.5	0.45	1.7	0.40	1.5	0.40	1.5
R57/R57F	0.21 (0.45)	0.8 (1.7)	0.50	1.9	0.45	1.7	0.55	2.1	0.45	1.7	0.45	1.7
R67/R67F	0.29 (0.61)	1.1 (2.3)	0.69 (0.92)	2.6 (3.5)	0.74	2.8	0.85	3.2	0.48	1.8	0.53	2
R77/R77F	0.32 (0.79)	1.2 (3)	1.00 (1.14)	3.8 (4.3)	0.95	3.6	1.14	4.3	0.66	2.5	0.90	3.4
R87/R87F	0.61 (1.59)	2.3 (6)	1.77 (2.22)	6.7 (8.4)	1.90	7.2	2.03	7.7	1.66	6.3	1.72	6.5
R97	1.22 (2.59)	4.6 (9.8)	3.09 (3.70)	11.7 (14)	3.09	11.7	3.54	13.4	2.99	11.3	3.09	11.7
R107	1.59 (3.62)	6 (13.7)	4.31	16.3	4.46	16.9	5.07	19.2	3.49	13.2	4.20	15.9
R137	2.64 (6.61)	10 (25)	7.40	28	7.79	29.5	8.32	31.5	6.61	25	6.61	25
R147	4.07 (10.57)	15.4 (40)	12.29	46.5	12.68	48	13.74	52	10.44	39.5	10.83	41
R167	7.13 (18.49)	27 (70)	21.66	82	20.61	78	23.25	88	17.44	66	18.23	69
RF17	0.07	0.25	0.16	0.6	0.09	0.35	0.16	0.6	0.09	0.35	0.09	0.35
RF27	0.07 (0.11)	0.25 (0.4)	0.18	0.7	0.11	0.4	0.18	0.7	0.11	0.4	0.11	0.4
RF37	0.11 (0.26)	0.4 (1)	0.24	0.9	0.26	1	0.29	1.1	0.21	0.8	0.26	1
RF47	0.18 (0.40)	0.7 (1.5)	0.42	1.6	0.40	1.5	0.45	1.7	0.40	1.5	0.40	1.5
RF/RM57	0.21 (0.45)	0.8 (1.7)	0.48	1.8	0.45	1.7	0.53	2	0.45	1.7	0.45	1.7
RF/RM67	0.32 (0.66)	1.2 (2.5)	0.71 (0.95)	2.7 (3.6)	0.71	2.7	0.82	3.1	0.50	1.9	0.55	2.1
RF/RM77	0.32 (0.69)	1.2 (2.6)	1.00 (1.08)	3.8 (4.1)	0.87	3.3	1.08	4.1	0.63	2.4	0.79	3
RF/RM87	0.63 (1.59)	2.4 (6)	1.8 (2.09)	6.8 (7.9)	1.88	7.1	2.03	7.7	1.66	6.3	1.69	6.4
RF/RM97	1.35 (2.69)	5.1 (10.2)	3.14 (3.70)	11.9 (14)	2.96	11.2	3.70	14	2.96	11.2	3.12	11.8
RF/RM107	1.66 (3.94)	6.3 (14.9)	4.20	15.9	4.49	17	5.07	19.2	3.46	13.1	4.20	15.9
RF/RM137	2.51 (6.61)	9.5 (25)	7.13	27	7.66	29	8.59	32.5	6.61	25	6.61	25
RF/RM147	4.33 (11.10)	16.4 (42)	12.42	47	12.68	48	13.74	52	11.10	42	11.10	42
RF/RM167	6.87 (18.49)	26 (70)	21.66	82	20.61	78	23.25	88	17.17	65	18.76	71

[1] On compound gear units the primary (larger) gear unit is provided with the oil quantity in parenthesis.

[2] On compound gear units having mounting positions M3, M5, or M6 the secondary (smaller) gear unit is provided with the oil filling of the M1 flanged mounting position.

For additional information on R-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2111.

LUBRICANTS

The approximate lubricant in US **gallons and liters** per mounting position is as follows:

Gear Unit	Mounting Position											
	M1		M2		M3		M4		M5		M6	
	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
F27	0.16	0.6	0.21	0.8	0.18	0.7	0.18	0.7	0.16	0.6	0.16	0.6
F37	0.26	1	0.32	1.2	0.18	0.7	0.32	1.2	0.26	1	0.29	1.1
F47	0.40	1.5	0.48	1.8	0.29	1.1	0.50	1.9	0.40	1.5	0.45	1.7
F57	0.69	2.6	0.98	3.7	0.55	2.1	0.92	3.5	0.74	2.8	0.77	2.9
F67	0.71	2.7	1.00	3.8	0.50	1.9	1.00	3.8	0.77	2.9	0.85	3.2
F77	1.32	5	1.93	7.3	1.14	4.3	2.11	8	1.59	6	1.66	6.3
F87	2.64	10	3.43	13	2.03	7.7	3.65	13.8	2.85	10.8	2.91	11
F97	4.89	18.5	5.94	22.5	3.33	12.6	6.66	25.2	4.89	18.5	5.28	20
F107	6.47	24.5	8.45	32	5.15	19.5	9.91	37.5	7.13	27	7.13	27
F127	10.70	40.5	14.53	55	8.98	34	16.12	61	12.29	46.5	12.42	47
F157	18.23	69	27.48	104	16.64	63	27.74	105	22.72	86	20.61	78
FF27	0.16	0.6	0.21	0.8	0.18	0.7	0.18	0.7	0.16	0.6	0.16	0.6
FF37	0.26	1	0.32	1.2	0.18	0.7	0.34	1.3	0.26	1	0.29	1.1
FF47	0.42	1.6	0.50	1.9	0.29	1.1	0.50	1.9	0.40	1.5	0.45	1.7
FF57	0.74	2.8	1.00	3.8	0.55	2.1	0.98	3.7	0.77	2.9	0.79	3
FF67	0.71	2.7	1.00	3.8	0.50	1.9	1.00	3.8	0.77	2.9	0.85	3.2
FF77	1.35	5.1	1.93	7.3	1.14	4.3	2.14	8.1	1.59	6	1.66	6.3
FF87	2.72	10.3	3.49	13.2	2.06	7.8	3.73	14.1	2.91	11	2.96	11.2
FF97	5.02	19	5.94	22.5	3.33	12.6	6.74	25.5	4.99	18.9	5.42	20.5
FF107	6.74	25.5	8.45	32	5.15	19.5	10.17	38.5	7.27	27.5	7.40	28
FF127	10.96	41.5	14.80	56	8.98	34	16.64	63	12.29	46.5	12.95	49
FF157	19.02	72	27.74	105	16.91	64	28.01	106	22.99	87	20.87	79
FA/FH/FV27 FAF/FHF/FVF27 FAZ/FHZ/FVZ27	0.16	0.6	0.21	0.8	0.18	0.7	0.18	0.7	0.16	0.6	0.16	0.6
FA/FH/FV37 FAF/FHF/FVF37 FAZ/FHZ/FVZ37	0.26	1	0.32	1.2	0.18	0.7	0.32	1.2	0.26	1	0.29	1.1
FA/FH/FV47 FAF/FHF/FVF47 FAZ/FHZ/FVZ47	0.40	1.5	0.48	1.8	0.29	1.1	0.50	1.9	0.40	1.5	0.45	1.7
FA/FH/FV57 FAF/FHF/FVF57 FAZ/FHZ/FVZ57	0.71	2.7	1.00	3.8	0.55	2.1	0.95	3.6	0.77	2.9	0.79	3
FA/FH/FV67 FAF/FHF/FVF67 FAZ/FHZ/FVZ67	0.71	2.7	1.00	3.8	0.50	1.9	1.00	3.8	0.77	2.9	0.85	3.2
FA/FH/FV77 FAF/FHF/FVF77 FAZ/FHZ/FVZ77	1.32	5	1.93	7.3	1.14	4.3	2.11	8	1.59	6	1.66	6.3
FA/FH/FV87 FAF/FHF/FVF87 FAZ/FHZ/FVZ87	2.64	10	3.43	13	2.03	7.7	3.65	13.8	2.85	10.8	2.91	11
FA/FH/FV97 FAF/FHF/FVF97 FAZ/FHZ/FVZ97	4.89	18.5	5.94	22.5	3.33	12.6	6.61	25	4.89	18.5	5.28	20
FA/FH/FV107 FAF/FHF/FVF107 FAZ/FHZ/FVZ107	6.47	24.5	8.45	32	5.15	19.5	9.91	37.5	7.13	27	7.13	27
FA/FH/FV127 FAF/FHF/FVF127 FAZ/FHZ/FVZ127	10.30	39	14.53	55	8.98	34	16.12	61	11.89	45	12.29	46.5
FA/FH/FV157 FAF/FHF/FVF157 FAZ/FHZ/FVZ157	17.97	68	27.21	103	16.38	62	27.48	104	22.46	85	20.34	77

For additional information on F-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2112.

LUBRICANTS

The approximate lubricant in US **gallons and liters** per mounting position is as follows:

Gear Unit	Mounting Position											
	M1		M2		M3		M4		M5		M6	
	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
K37	0.13	0.5	0.26	1	0.26	1	0.34	1.3	0.26	1	0.26	1
K47	0.21	0.8	0.34	1.3	0.40	1.5	0.53	2	0.42	1.6	0.42	1.6
K57	0.32	1.2	0.61	2.3	0.66	2.5	0.79	3	0.69	2.6	0.63	2.4
K67	0.29	1.1	0.63	2.4	0.69	2.6	0.90	3.4	0.69	2.6	0.69	2.6
K77	0.58	2.2	1.08	4.1	1.16	4.4	1.56	5.9	1.11	4.2	1.16	4.4
K87	0.98	3.7	2.11	8	2.30	8.7	2.88	10.9	2.06	7.8	2.11	8
K97	1.85	7	3.70	14	4.15	15.7	5.28	20	4.15	15.7	4.10	15.5
K107	2.64	10	5.55	21	6.74	25.5	8.85	33.5	6.34	24	6.34	24
K127	5.55	21	10.96	41.5	11.62	44	14.27	54	10.57	40	10.83	41
K157	8.19	31	16.38	62	17.17	65	23.78	90	15.32	58	16.38	62
K/KH167	9.25	35	26.42	100	26.42	100	33.03	125	22.46	85	22.46	85
K/KH187	15.85	60	44.91	170	44.91	170	54.16	205	34.35	130	34.35	130
KF37	0.13	0.5	0.29	1.1	0.29	1.1	0.40	1.5	0.26	1	0.26	1
KF47	0.21	0.8	0.34	1.3	0.45	1.7	0.58	2.2	0.42	1.6	0.42	1.6
KF57	0.34	1.3	0.61	2.3	0.71	2.7	0.79	3	0.77	2.9	0.71	2.7
KF67	0.29	1.1	0.63	2.4	0.74	2.8	0.95	3.6	0.71	2.7	0.71	2.7
KF77	0.55	2.1	1.08	4.1	1.16	4.4	1.59	6	1.19	4.5	1.19	4.5
KF87	0.98	3.7	2.17	8.2	2.38	9	3.14	11.9	2.22	8.4	2.22	8.4
KF97	1.85	7	3.88	14.7	4.57	17.3	5.68	21.5	4.15	15.7	4.36	16.5
KF107	2.64	10	5.81	22	6.87	26	9.25	35	6.61	25	6.61	25
KF127	5.55	21	10.96	41.5	12.15	46	14.53	55	10.83	41	10.83	41
KF157	8.19	31	17.44	66	18.23	69	24.31	92	16.38	62	16.38	62
KA/KH/KV37 KAF/KHF/KVF37 KAZ/KHZ/KVZ37	0.13	0.5	0.26	1	0.26	1	0.37	1.4	0.26	1	0.26	1
KA/KH/KV47 KAF/KHF/KVF47 KAZ/KHZ/KVZ47	0.21	0.8	0.34	1.3	0.42	1.6	0.55	2.1	0.42	1.6	0.42	1.6
KA/KH/KV57 KAF/KHF/KVF57 KAZ/KHZ/KVZ57	0.34	1.3	0.61	2.3	0.71	2.7	0.79	3	0.77	2.9	0.71	2.7
KA/KH/KV67 KAF/KHF/KVF67 KAZ/KHZ/KVZ67	0.29	1.1	0.63	2.4	0.71	2.7	0.95	3.6	0.69	2.6	0.69	2.6
KA/KH/KV77 KAF/KHF/KVF77 KAZ/KHZ/KVZ77	0.55	2.1	1.08	4.1	1.22	4.6	1.59	6	1.16	4.4	1.16	4.4
KA/KH/KV87 KAF/KHF/KVF87 KAZ/KHZ/KVZ87	0.98	3.7	2.17	8.2	2.32	8.8	2.93	11.1	2.11	8	2.11	8
KA/KH/KV97 KAF/KHF/KVF97 KAZ/KHZ/KVZ97	1.85	7	3.88	14.7	4.15	15.7	5.28	20	4.15	15.7	4.15	15.7
KA/KH/KV107 KAF/KHF/KVF107 KAZ/KHZ/KVZ107	2.64	10	5.42	20.5	6.34	24	8.45	32	6.34	24	6.34	24
KA/KH/KV127 KAF/KHF/KVF127 KAZ/KHZ/KVZ127	5.55	21	10.96	41.5	11.36	43	13.74	52	10.57	40	10.57	40
KA/KH/KV157 KAF/KHF/KVF157 KAZ/KHZ/KVZ157	8.19	31	17.44	66	17.70	67	22.99	87	16.38	62	16.38	62

For additional information on K-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2113.

LUBRICANTS

The approximate lubricant in US **gallons and liters** per mounting position is as follows:

	Mounting Position											
	M1		M2		M3 [1]		M4		M5		M6	
Gear Unit	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters	Gallons	Liters
S37	0.07	0.25	0.11	0.4	0.13	0.5	0.16	0.6	0.11	0.4	0.11	0.4
S47	0.09	0.35	0.21	0.8	0.18 (0.24)	0.7 (0.9)	0.29	1.1	0.21	0.8	0.21	0.8
S57	0.13	0.5	0.32	1.2	0.26 (0.32)	1 (1.2)	0.40	1.5	0.34	1.3	0.34	1.3
S67	0.26	1	0.53	2	0.58 (0.82)	2.2 (3.1)	0.85	3.2	0.69	2.6	0.69	2.6
S77	0.50	1.9	1.11	4.2	0.98 (1.43)	3.7 (5.4)	1.59	6	1.16	4.4	1.16	4.4
S87	0.87	3.3	2.14	8.1	1.82 (2.75)	6.9 (10.4)	3.17	12	2.22	8.4	2.22	8.4
S97	1.80	6.8	3.96	15	3.54 (4.76)	13.4 (18)	5.94	22.5	4.49	17	4.49	17
SF37	0.07	0.25	0.11	0.4	0.13	0.5	0.16	0.6	0.11	0.4	0.11	0.4
SF47	0.11	0.4	0.24	0.9	0.24 (0.29)	0.9 (1.1)	0.32	1.2	0.26	1	0.26	1
SF57	0.13	0.5	0.32	1.2	0.26 (0.40)	1 (1.5)	0.42	1.6	0.37	1.4	0.37	1.4
SF67	0.26	1	0.58	2.2	0.61 (0.79)	2.3 (3)	0.85	3.2	0.71	2.7	0.71	2.7
SF77	0.50	1.9	1.08	4.1	1.03 (1.53)	3.9 (5.8)	1.72	6.5	1.29	4.9	1.29	4.9
SF87	1.00	3.8	2.11	8	1.88 (2.67)	7.1 (10.1)	3.17	12	2.40	9.1	2.40	9.1
SF97	1.96	7.4	3.96	15	3.65 (4.97)	13.8 (18.8)	6.24	23.6	4.76	18	4.76	18
SA/SH37 SAF/SHF37 SAZ/SHZ37	0.07	0.25	0.11	0.4	0.13	0.5	0.16	0.6	0.11	0.4	0.11	0.4
SA/SH47 SAF/SHF47 SAZ/SHZ47	0.11	0.4	0.21	0.8	0.18 (0.24)	0.7 (0.9)	0.29 [2]	1.1 [2]	0.21	0.8	0.21	0.8
SA/SH57 SAF/SHF57 SAZ/SHZ57	0.13	0.5	0.29	1.1	0.26 (0.40)	1 (1.5)	0.42	1.6	0.32	1.2	0.32	1.2
SA/SH67 SAF/SHF67 SAZ/SHZ67	0.26	1	0.53	2	0.48 (0.69)	1.8 (2.6)	0.77	2.9	0.66	2.5	0.66	2.5
SA/SH77 SAF/SHF77 SAZ/SHZ77	0.48	1.8	1.03	3.9	0.95 (1.32)	3.6 (5)	1.56	5.9	1.19	4.5	1.19	4.5
SA/SH87 SAF/SHF87 SAZ/SHZ87	1.00	3.8	1.96	7.4	1.59 (2.30)	6 (8.7)	2.96	11.2	2.11	8	2.11	8
SA/SH97 SAF/SHF97 SAZ/SHZ97	1.85	7	3.70	14	3.01 (4.23)	11.4 (16)	5.55	21	4.15	15.7	4.15	15.7

[1] On compound gear units the primary (larger) gear unit is provided with the oil quantity in parenthesis.

[2] When combined with a 2-pole motor at M4 mounting position, the oil quantity must be reduced to 0.28 gallons (1.05 liters).

For additional information on S-Series mounting positions, refer to the SEW Catalog or call the SEW FAXline, 1-800-601-6195, and request Document #2114.

For compound drives the R reducer requires its own oil filling as shown in the chart:

	Mounting Position					
	M1/M3/M5/M6		M2		M4	
Gear Unit	Gallons	Liters	Gallons	Liters	Gallons	Liters
R17	0.07	0.25	0.16	0.6	0.16	0.6
R37	0.11	0.4	0.24	0.9	0.29	1.1
R57	0.21	0.8	0.48	1.8	0.53	2
R77	0.32	1.2	1.00	3.8	1.08	4.1
R87	0.63	2.4	1.8	6.8	2.03	7.7
R97	1.35	5.1	3.14	11.9	3.70	14
R107	1.66	6.3	4.20	15.9	5.07	19.2