DEKKER

VACUUM TECHNOLOGIES, INC.

Installation Operation & Maintenance Manual

MAXIMA-K

Large Capacity Liquid Ring Vacuum Pumps

Part No. 9983-0000-P04 / October 2018

MAXIMA-K

LARGE CAPACITY LIQUID RING VACUUM PUMPS

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DEKKER
VACUUM TECHNOLOGIES, INC.

THIS INSTALLATION, OPERATION, AND MAINTENANCE MANUAL MUST STAY WITH EQUIPMENT.

PLEASE REGISTER YOUR EQUIPMENT WARRANTY AND START-UP RECORD ONLINE AT *WWW.DEKKERVACUUM.COM*

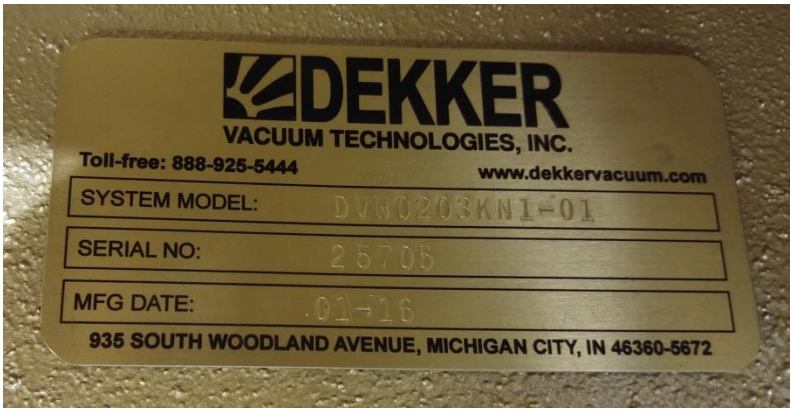
CUSTOMER SERVICE

Contact information

DEKKER
VACUUM TECHNOLOGIES, INC.
935 SOUTH WOODLAND AVENUE, MICHIGAN CITY, IN 46360-5672
TEL.: 219-861-0661 – FAX: 219-861-0662 – TOLL-FREE: 888-925-5444
Bus. Hours: 7:30 a.m. – 4:30 p.m. CST
Website: www.DEKKERvacuum.com

Order Information

When calling for service, parts or system information always have the pump or system model number and serial number(s) ready. Refer to the bill of lading or the gold-colored system information plate attached to the system (see image below).



Gold-colored system information plate

Parts should be purchased from the nearest authorized DEKKER Vacuum Technologies, Inc. (hereafter referred to as DEKKER) representative (visit www.dekkervacuum.com to find a distributor via the Distributor Locator) or from the vacuum pump system supplier. If, for any reason parts, cannot be obtained in this manner, contact the factory directly.

INTRODUCTION

The DEKKER **Maxima-K™** liquid ring vacuum pumps have been designed to give safe, reliable, trouble-free service, provided the basic maintenance and operation guidelines as set out in this manual are followed. Compared to other vacuum pumps, the Maxima-K liquid ring vacuum pump offers the advantages of no metal-to-metal contact between the impeller and casing. Grease lubricated bearings are mounted external to the pumping chamber, isolated by gland packing or mechanical shaft seals. This means that the pump requires no internal lubrication. However, a vacuum pump is a rotating piece of equipment and operators must exercise good judgment and follow proper safety procedures to avoid damage to the equipment or personal injury. Please review and follow all instructions in this manual before attempting to install, start, or operate equipment.

SAFETY

All vacuum pumps, systems and/or compressors (hereafter referred to as the Product) offered by DEKKER have been designed and manufactured for safe operation. However, the responsibility for safe operation rests with those who use and maintain these products. The safety department where the product is installed should establish a safety program based on OSHA, federal, state, and local codes. It is important that due consideration be given to hazards which arise from the presence of electrical power, hot liquids, harmful gases, and rotating equipment. Proper installation and care of protective devices is essential to safe system operation. These safety procedures are to be used in conjunction with the instructions contained in this manual.

WARNING: DO NOT PUMP OXYGEN or oxygen rich mixtures with these pumps - EXPLOSION HAZARDS!

THEORY OF OPERATION

The DEKKER **Maxima-K™** design is a robust, single stage design, which utilizes flat port plates mounted on each side of the impeller. The variable discharge port allows the pump to operate efficiently throughout the vacuum range. A heavy-duty impeller features reinforcing rings to improve strength of the impeller blades and thus the durability of the pump. Packed gland sealing is standard, featuring a split ring gland for ease of maintenance; mechanical seals are optional. Access plates on both sides of the pump allows quick access to evaluate clearance and perform borescope inspection. The Maxima-K pumps are available in capacities ranging 1500 ACFM to 39,500 ACFM, are available in various materials/coatings.

STORAGE

Keep the unit in a cool, dry environment and close the seal fluid isolation valve. Plug all open ports to keep out dirt and foreign objects. Every 2 weeks add a small amount of rust inhibitor into the inlet of the liquid ring pump and rotate the shaft by hand 2 ¼ turns.

After a long idle period, empty the pump completely and remove any scale deposit by using the specially formulated DEKKER descaling compound Scale-Ex. When the descaling process is complete, add a small amount of rust inhibitor and rotate the impeller by rotating the shaft by hand. If the shaft cannot be rotated because the impeller is locked up, contact the factory.

> **NOTE:** Do not use Scale-Ex in Maxima pumps. For Maxima Series Pumps please see pump manual for long term storage procedures.

INITIAL FREIGHT RECEIPT AND INSPECTION

Before a system ships from DEKKER, it is thoroughly tested, and will not be released unless it passes our Quality Control standards. All pumps are thoroughly inspected and are not released unless they pass our Quality Control standards. Once the product is received and signed for in Good Condition, DEKKER cannot be held accountable for undiscovered, unclaimed damage that is a result of freight transit. It is the responsibility of the receiver to thoroughly inspect and test the product for functionality upon delivery. The customer should take photos of the product as it arrives and send to DEKKER and the freight carrier if there are any issues. The party who selected the shipper is responsible for filing the freight claim. Failure to report these issues within the freight carriers' undiscovered damage window can result in non-acceptance of freight claims. DEKKER does keep photos of all systems, as shipped, to assist in freight claims. Report any damage immediately to the factory.

Key items to inspect:

- Is the product received as requested? Are all parts, accessories, and components delivered?
- Was the skid or crating received in good condition? Check for cosmetic damage.
- Check wiring inside of control panel. Are all wires should be terminated and connections tight? (If applicable)
- Check control panel components. Are they tight on DIN rail and/or other mounts/fasteners?
- Are there any leaks or puddles around the pump? Specify hose, piping or housing leak.

System must be given an initial startup test as soon as possible after delivery. This is to ensure that the motor has not shifted out of alignment during transit as well as to verify that electrical components are functioning without fault – Variable Frequency Drive (VFD), Programmable Logic Controllers (PLC), panel cooling fans, transducers.

INSTALLATION

Overview

The design of the piping system, foundation layout, and plant location are the responsibility of the purchaser. DEKKER Vacuum Technologies, Inc. and its representatives may offer advice, but cannot assume responsibility for operation and installation design.

Please consult the factory or a specialist skilled in the design of plant layout, system piping design, and foundation design. The installer should carefully read this manual before installing the equipment. DEKKER or authorized dealer can provide start up assistance in most instances for a fee. Contact DEKKER for hourly/daily service rates.

Unpacking

Upon receipt of pump or system, immediately inspect for signs of damage. Carefully remove packing or crating from around pump or system. Be sure to keep equipment in upright position.

Lifting

Lift the equipment carefully and with weight evenly distributed. DEKKER is not responsible for equipment that has been damaged through mishandling or dropping.

Location

Install the unit in a well ventilated and dust free area. The pump or system should be a minimum distance of 3 feet from surrounding walls to allow for checking fluid level, temperatures, pressures and general servicing.

Mounting

The pump or system must be installed on a level surface in the horizontal position. The foundation must be designed to support the total unit weight, without any settlement or crushing, be rigid and substantial enough to absorb any equipment vibration, maintain true alignment with any drive mechanism, and must permanently support the system baseplate at all points. The vacuum system must be leveled and secured with anchor bolts. Anchor bolts must be of adequate size to withstand the mechanical stresses exerted on it.

Systems 50 HP and larger should also be grouted into position per local codes. The foundation should be constructed to allow for ¾ to 1-½ inch of grout. The baseplate is set on shims and the grout is poured between the foundation and the baseplate. To have the required body to support the baseplate, grout should be at least ¾ inch thick.

The number and location of shims will be determined by the design of the baseplate. Firm support should be provided at points where weight will be concentrated and at the anchor bolt locations. Use enough, and large enough, shims to provide rigid support. Baseplates are usually designed with openings to allow pouring grout. When the baseplate has been shimmed, leveled, and the anchor bolts have been snugly tightened, a dam is constructed around the foundation to contain the grout. The dam level should be at least ½ inch above the top surface of the shims. Grout should be poured inside and around the outside of the baseplate and leveled. Allow the grout to dry for a minimum of 48 hours before tightening the anchor bolts.

Please note that the pump/motor coupling and V-belt units will need to be realigned prior to start-up, with the exception of monoblock units.

Ventilation

Locate the unit in an area with sufficient airflow and accessibility. To prevent excessive ambient temperature rise it is imperative to provide adequate ventilation. Cooling is an important aspect of reliable equipment operation and it is therefore important to install the unit in a reasonably cool area where the temperature does not exceed 104°F (40°C). For higher ambient temperatures contact the factory.

Electrical Preparation

All system wiring is performed at the factory if a control panel is supplied and installed on the skid. Check area classification to ensure all electrical enclosures comply with code. Required customer wiring is minimal, but should be done by a qualified electrician in compliance with OSHA, National Electric Code and any other applicable local electrical code concerning switches, fused disconnects, etc. DEKKER includes a wiring diagram in the control panel for use by the installer. DEKKER recommends a main disconnect switch be fitted between the vacuum system and the incoming power.

After the electrical wiring connections are completed check the incoming voltage to make sure the incoming voltage is the same as the vacuum system voltage. Line voltage should be within the voltage tolerance as specified on the motor or to local code. Check the system for proper motor rotation. The direction of rotation is marked by an arrow on the motor or pump housing. Jog the motor by pressing the ON button and then the OFF button. If the rotation is incorrect switch any two of the three main power leads (three phase power) on the contactor inside the control panel. Failure to do so could result in serious equipment damage.

WARNING: Install, ground, and maintain equipment in accordance with the National Electrical Code and all applicable federal, state and local codes.

Pipe Connection and Sizing

Before installation, remove all protective inserts on the pump suction and discharge. Piping connected to the pump must be installed without imposing any strain on the pump components. Improperly installed piping can result in misalignment, general operating problems and pump failure. Use flexible connectors where necessary. Piping must be cleaned of debris before installation.

Inlet Piping

Note: Install a temporary screen at the pump inlet flange at first start-up to protect the unit against carryover of pipe debris and weld slag. The screen must be removed after the initial run in period.

Inlet piping should be at least the size of the pump inlet. Install the system as close as possible to the process to minimize losses due to the length of the suction line. If the system has to be installed further away from the process, be sure the inlet piping is properly sized to minimize the overall line pressure drop. For more information contact the factory.

Pump systems operating in parallel on a common manifold must each have a manual or automatic shut-off valve and a suitable check valve installed in the suction line close to the pump suction flange. This allows each individual system to be isolated when it is not in operation. The line size of the manifold should be a minimum equal to the sum of the individual system pipe areas.

Systems are supplied with an inlet check valve as standard. This valve is installed close to the pump suction flange to prevent back flow of process gas and seal fluid when the pump is stopped.

If the inlet gas pumped contains dust or foreign particles, a suitable 5 micron (or finer) inlet filter should be installed at the inlet port. For more information contact the factory.

If the possibility exists that the pump inlet can become closed during operation it will be essential to install some type of vacuum relief valve (anti-cavitation valve) so that air can enter the pump inlet.

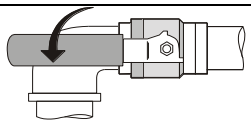
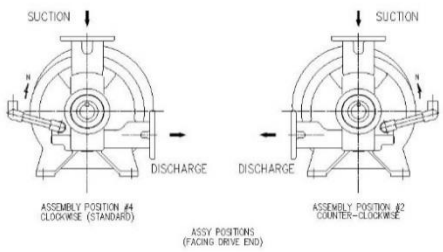
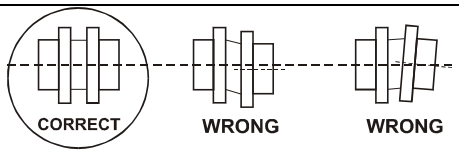
Never run a pump with a closed suction. This causes hydraulic knock / cavitation and can damage the pump.

Discharge Piping

Discharge piping must be at least the size of the separator discharge. Do not discharge the exhaust gases from the pump system into the area where the system is installed. Vapors pulled over from the process could be hazardous. Install an exhaust line of at least the same diameter as the discharge connection on top of the separator reservoir leading outside.

For units operating in parallel on a common discharge, DEKKER recommends the installation of a suitable check valve close to the separator discharge flange of each unit. Discharge check valves should be a low differential pressure type with positive shutoff. This will prevent discharge gasses from back flowing to other systems. When discharging more than one pump in a common discharge line and/or over a long distance, oversize pipe accordingly.

START-UP PROCEDURES

1	Ensure all shipping plugs and/or paper covers are removed from system and tagging information is followed for successful startup.	
2	Ensure seal fluid isolation valve is open. This valve is located before the y-strainer. Add a small amount of seal fluid into the pump inlet. Do not fill the pump above the shaft centerline.	
3	Jog the motor briefly and check direction of rotation. An arrow on the motor or pump housing marks the correct direction of rotation. If direction is incorrect, switch any two of the three leads at the power connection (three phase only).	
4A	Check drive-coupling alignment. Angular alignment should be within the following chart allowances. Parallel alignment should also be within the following chart allowances. Contact the factory for specific system size alignment. Mono-block units do not require any field adjustment (motors are C-face mounted)	

4A.1

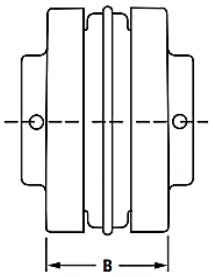


Figure 1
B Dimension

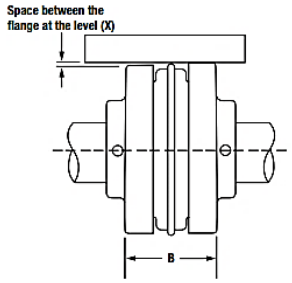


Figure 2
Parallel Measurement

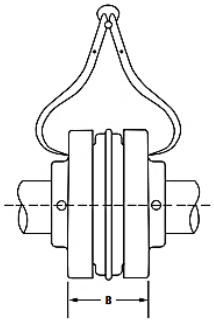


Figure 3
Angular Measurement

4B	For units utilizing V-belt drives, make sure the sheaves are properly installed and aligned before attempting to tension the drive. The V-belts should be placed over the sheaves and in the grooves without forcing them over the sides of the grooves. The tensioning steps below can be used for all types of V-belts, all cross sections and number of belts and all types of construction. **Avoid excessive heat** (140°F and higher); belt life will be shortened. **Never switch or mix belts** from one groove to another on the sheaves. **Do not use belt dressing**. Sheaves should remain free of oil and grease. **When replacing belts install an identical set.** For more specific V-belt tensioning guidelines contact factory. Sheave alignment should be checked by placing a straight edge or tight cord across the sheave faces so that it touches all four points of contact. Ordinarily, a misalignment of more than one-half of one degree (one eighth inch in one foot) will adversely affect belt life. Improper sheave alignment produces uneven wear on one side of the belt, causes the belt to roll over in the sheaves or throws the entire load on one side of the belt, stretching or breaking the cords on that side. **Tensioning a Drive - General Rules of Tensioning** 1. Ideal tension is the lowest tension at which the belt will not slip under peak load conditions. 2. Check tension frequently during the first 24-48 hours of run-in operation. 3. Over tensioning shortens belt and bearing life. 4. Keep belts free from foreign material which may cause slip. 5. Make V-Drive inspection on a periodic basis. Tension belt when slipping. Never apply belt dressing as this will damage the belt and cause early failure. 6. If the unit is idle for an extended period of time, the tension on the belts should be removed.	**Simple Tensioning Procedure** 1. Measure the span length. 2. At the center of the span apply a force (perpendicular to the span) large enough to deflect the belt 1/64", for every inch of span length. For example, one deflection of a 100 inch span would be 100/64 or 1-9/16 inches. 3. Compare the force you have applied with the values given in Table 4B.1 on the next page. If the force is between the values for normal tension, and 1-1/2 times normal tension, the drive tension should be satisfactory. A force below the value for normal tension indicates an under tensioned drive. If the force exceeds the value for 1-1/2 times normal tension, the drive is tighter than it needs to be. 4. After the proper operating tension has been applied to the belts, double check the following: A) Parallel position of the sheave shafts. B) Correct alignment of sheave grooves. ***Tensioning rules and procedure courtesy of Dodge PT Manual MN-4002***

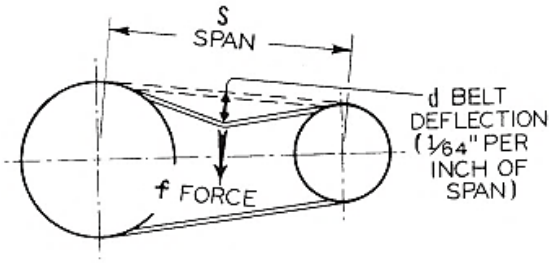
4B.1

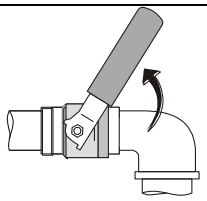
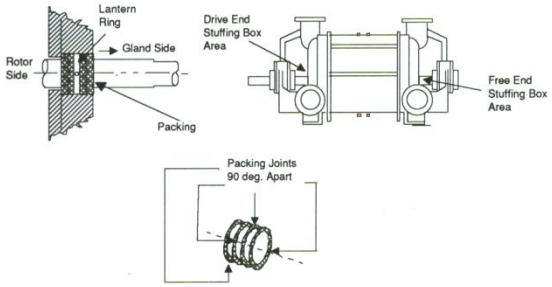
Tensioning Table

V-Belt Section	Small Sheave		Deflection Force			
	Speed Range	Diameter	1.0	1.5	2.0	4.0+
3VX	1200-3600	2.2	2.2	2.5	2.7	3
	1200-3600	2.5	2.6	2.9	3.1	3.6
	1200-3600	3	3.1	3.5	3.7	4.2
	1200-3600	4.1	3.9	4.3	4.5	5.1
	1200-3600	5.3	4.6	4.9	5.1	5.7
	1200-3600	6.9	5	5.4	5.6	6.2
5VX	1200-3600	4.4	6.5	7.5	8	9
	1200-3600	5.2	8	9	9.5	10
	1200-3600	6.3	9.5	10	11	12
	1200-3600	7.1	10	11	12	13
	900-1800	9	12	13	14	15
	900-1800	14	14	15	16	17
8VX	900-1800	12.5	18	21	23	25
	900-1800	14	21	23	24	28
	700-1500	17	24	26	28	30
	700-1500	21.2	28	30	32	34
	400-1000	24.8	31	32	34	36
5V	900-1800	7.1	8.5	9.5	10	11
	900-1800	9	10	11	12	13
	900-1800	14	12	13	14	15
	700-1200	21.2	14	15	16	17
8V	900-1800	12.5	18	21	23	25
	900-1800	14	21	23	24	28
	700-1500	17	24	26	28	30
	700-1200	21.2	28	30	32	34
	400-1000	24.8	31	32		36

Tensioning Table and installation image courtesy of Dodge PT Manual MN-4002

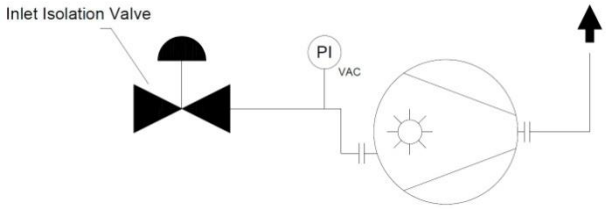
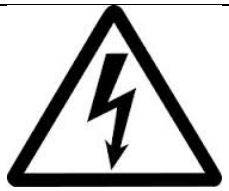
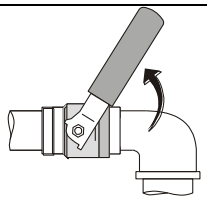
Notes:
1. Use approximately 130% of above values to tension a new set of belts.
2. Use closest sheave diameter for sizes not shown.



5	If the system contains an inlet valve in the vacuum line, set it to approximately 3/4 closed, and start pump. If valve is not supplied, one should be installed. After 3 minutes running time, slowly open valve completely.	
6	If applicable, loosen or tighten the packing glands to where there is approximately 60 drips/minute at the operating point. See Stuffing Box Packing section below for further instruction.	
7	Check the voltage and motor current. They should be within the specifications for the motor. Amperage should be checked at the Overload. **Note:** This test should also be performed under normal system operating conditions.	**DANGER: HIGH VOLTAGE!** **Lethal shock hazard present.** **USE EXTREME CAUTION!**

SHUT DOWN PROCEDURES

To stop the vacuum pump follow the procedure as outlined below.

1	Close the system inlet isolation valve	
2	Push the STOP button or turn switch to the OFF position.	
3	Ensure seal fluid isolation valve is closed. **Note:** Close the seal fluid isolation valve and the pump inlet isolation valve during extended periods of storage or when transporting. See **Storage** section for details. Open valves before starting system.	

MAINTENANCE

WARNING: Before attempting any maintenance such as changing the fluid, disconnect all power from the unit by switching off the main breaker, isolate all energy sources and allow system to cool.

Pump Bearing Lubrication

DEKKER Maxima-K large capacity liquid ring vacuum pumps require lubrication every 6 months or 1500 hours of operation. Extreme operating conditions may require more frequent lubrication.

Greasing Bearings:

1. Acquire access to the bearing caps. Removal of the coupling/belt guard and coupling/sheave from the shaft may be required.
2. Thoroughly clean the exterior of the bearing caps and bearing housing with solvent.
3. Carefully keeping the free end shims intact, remove the outer bearing caps from both ends of the pump.
4. Adjust the inner bearing caps inward toward the packing gland/stuffing box.
5. Inspect the grease around the bearing looking for metal particles. These particles may be a sign that the bearing is in need of replacement.
6. Remove all old grease from the bearing caps and thoroughly clean with solvent.
7. Remove as much grease as possible from the bearing housings and bearings.
8. Remove the plug(s) from the bearing housings and temporarily install one grease zerk.
9. With a grease gun, install grease into the bearing, via the fitting, while slowly rotating the shaft by hand. The old grease will be pushed out of the bearing and replaced with new grease. Continue this process until all of the old grease is expelled. Larger pumps have two (2) tapped holes in the inner bearing housing. By utilizing one tapped hole at a time for replenishing the grease, the process is faster and assures a more uniform distribution of the grease.
10. Remove the grease zerks and re-install the plug(s) into the bearing housing and wipe away all of the old grease that has been pushed out.
11. Inspect the grease seals. Replace as necessary. Fill the void of the bearing caps 1/2 - 2/3 full of grease.
12. Re-install the caps with new gaskets and re-install the shims on the outer free end cap exactly as removed.

Motor Bearing Lubrication (where required)

For information regarding motor bearing lubrication, refer to the motor manufacturer's maintenance and operation manual.

Seal Fluid

The system is shipped from the factory without seal-fluid. Cool, clean water should be supplied. Standard performance is based on actual tests at a seal-fluid temperature of 60°F. Temperatures above 60°F result in capacity reduction. Water that is not clean or abrasive should be avoided whenever possible. Extremely hard water may result in the formation of scale deposits within the pump. If this occurs, please contact factory for methods of removal.

Guidelines for suitable water are:

- Minimum pH: 7
- Maximum Chlorides: 10 ppm
- Maximum total dissolved solids: 200 ppm
- Maximum hardness: 200 ppm

When charging the system with fresh water, make sure that the pump is filled with water to the shaft centerline level. Do not fill the pump above the shaft centerline. Starting the pump with fluid level above the shaft centerline may result in shaft or impeller damage or failure. Add water by removing the suction or discharge flange and pouring water through pump suction or discharge port.

Seal Fluid Strainer

After the first 50 hours of operation, clean the strainer, if installed, in the seal fluid line. This is done to remove any debris carried over into the system from the process. Clean and inspect the strainer every 1000-3000 hours depending on application.

Stuffing Box Packing

Leakage through the packing glands is expected to keep the packing from overheating and damaging the shaft. Normal seal leakage is approximately 60 drops per minute. If leakage rates observed at the site exceed this value the packing gland screws should be tightened to reduce this leakage.

The pump must be operational for this adjustment to take place. This adjustment is made while there is minimal vacuum on the equipment. Each adjustment will require running the pump for 10 minutes before proceeding to the next step. Exercise all caution when making adjustments to the packing.

Figure 1 below shows a typical packing arrangement. A packing consists of multiple packing rings installed between the shaft and end plate of a vacuum pump. These rings are compressed to provide the adequate amount of sealing via the packing gland and packing gland adjusting screws. Over time the packing rings wear, thus the initial setting from the factory will need to be adjusted.

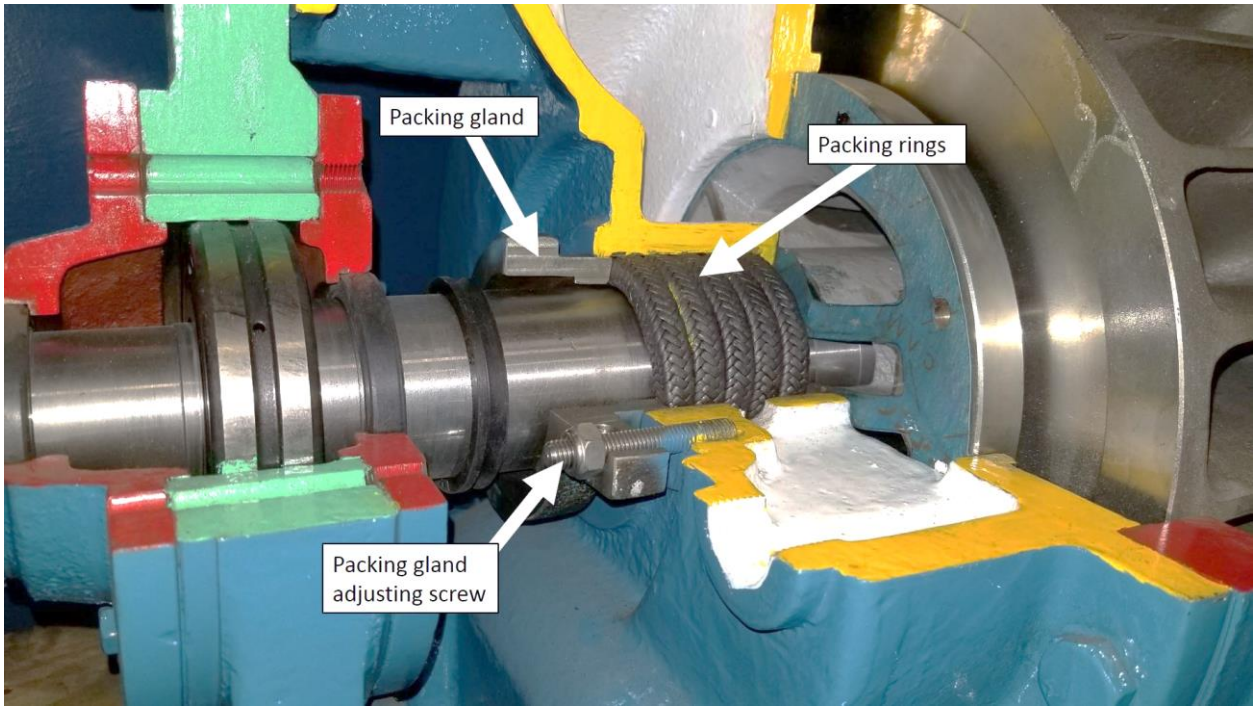


Figure 1

To adjust the tightness of the packing gland rotate the adjusting screws clockwise, ONE FLAT AT A TIME. Adjust all four adjusting screws equally and in a standard cross pattern starting with the upper right hand one (located at 2 o'clock position). Once the first adjustment is made wait for 10 minutes to determine the effect, if further adjustment is needed proceed as described above for the next adjustment. Closely monitor the temperature of the packing gland before proceeding to the next adjustment. If temperature of the packing gland exceeds 130°F no further adjustments shall be made.

Figure 2 below shows the packing gland adjusting screws provided with the pumps. There are total of 4 screws per pump end.

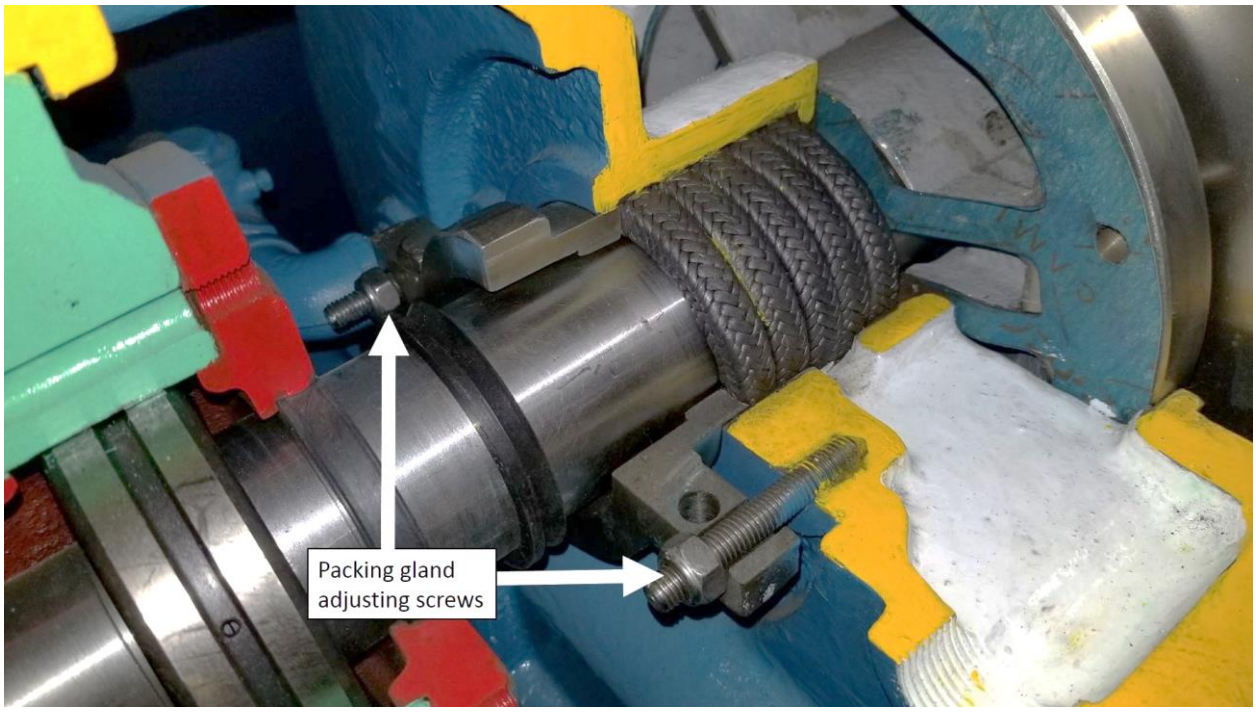


Figure 2

Shaft Seals

Mechanical seals (if installed) do not require maintenance unless there is more than a small amount of leakage. To define this we differentiate between the following:

Weepage: Mechanical seals work by having two flat surfaces pushed together by axial force from the closing mechanism and by product pressure in the seal chamber. When the seal is in operation, the seal fluid lubricates the two faces. This thin film of lubrication protects the faces of the seal from heat and excessive wear, but it can also allow for a small amount of leakage across the seal face. This small leakage is called a "weep". While a weep has rather arbitrary limits, it is commonly considered to be a leakage rate of less than one drop of liquid every minute. Seal weeps are not covered under warranty.

Leakage: A leakage rate of more than one drop per minute is considered to be a "leak". Seal leakage is normally a result of a build-up of abrasive particles carried over in the pump suction. These particles cause excessive wear on the seal faces. Leakage caused by wear and tear is not covered under warranty.

Seal replacement is addressed in the assembly and disassembly instruction for the specific pump model used. Contact the factory for assistance.

MAINTENANCE SCHEDULE

To help ensure trouble free operation, a basic maintenance schedule consisting of the following system checks is recommended.

First 8 Hours of Operation

- Clean strainers and remove temporary inlet screen
- Check piping for signs of leakage and tighten if necessary
- Check belt tension, if applicable.

500 Hours of Operation

- Under normal operating conditions repeat 8 hour check procedure as described above.

1,000 Hours of Operation

- Clean and inspect the strainer every 1000-3000 hours depending on application.
- Every 1000 hours, or every year, it is recommended to replace the vacuum pump's packing in the stuffing boxes.
- Remove debris from pump housing, motor fan guard and heat exchanger.
- Applicable to pumps equipped with grease fittings located on each bearing housing. Grease bearings with a #2 quality lithium grease. Do not over-grease, 3 to 4 pumps with a grease gun is sufficient under normal conditions.

10,000 Hours of Operation

- Check coupling element for wear, if applicable. Replace if worn.
- Clean strainer in seal fluid line.
- Check belt tension, if applicable.

30,000 Hours of Operation

- Every 30,000 hours, or every 5 years, it is recommended to replace the vacuum pump's shaft seals and bearings as preventative maintenance. This should be done by a DEKKER authorized distributor or properly trained service technician.

ACCESSORIES (IF INCLUDED)

Packed gland sealing is standard with optional mechanical seals available. Other features include removable bearing brackets, multiple inlet/discharge port configurations and an optional casing partition allowing for different operating pressures at each inlet port.

The following accessories are available:

- **Inlet or Discharge Flexible Connectors (optional):** These flex connectors are used in piping systems to eliminate vibration transmission from machinery throughout the piping network.
- **System Isolation Valve (optional):** This valve may be installed on the vacuum receiver tank or vacuum pump manifold. Usually the valve is used to isolate the vacuum system from the piping network.
- **Vacuum Relief Valve (optional):** This valve may be installed on the pump suction manifold or on the receiver. The vacuum relief valve is used to protect the vacuum pump from closed suction which can damage the pump.

TROUBLESHOOTING

The following is a basic troubleshooting guide and not all options may be included. Service should be done by a DEKKER authorized distributor or a properly trained service technician. Each unit is tested and checked at the factory. Always indicate model and serial number when calling. The model and serial number is viewable on the gold-colored information plate attached to the unit.

WARNING: Before attempting any maintenance such as changing the fluid, disconnect all power from the unit by switching off the main breaker, isolate all energy sources and allow unit to cool. All electrical work should be done by a qualified electrician in compliance with OSHA, National Electric Code and any other applicable local electrical code.

Vacuum Problems

Unit operates, but does not achieve desired vacuum level

1. Stop unit and disconnect power.
2. Confirm vacuum gauge is working.
3. Ensure that pump has adequate sealing fluid.
4. Check that the pump is rotating in the correct direction.
5. Check isolation valve for proper operation.
6. Check seal fluid temperature.

Unit operates, but vacuum level is not stable

1. Stop unit and disconnect power.
2. Confirm pump is not operating deeper than suggested vacuum levels.
3. Check seal fluid flow rate to ensure it is not too low.
4. Confirm seal fluid piping is sized correctly.
5. Confirm inlet separator is draining properly.
6. Ensure there are no low areas in the inlet piping.
7. Verify there is not high flow, or widely varying flow, of process liquid through pump inlet.

Pump Locked Up

Pump will not rotate

1. Stop system and disconnect power.
2. Verify there is no build-up of rust, scale, or process solids on pump interior.
3. Check for foreign objects in pump.
4. Confirm packing rings are not too tight.
5. Verify pump clearances.

Overheating Problems

Unit overheats

1. Stop unit and disconnect power.
2. Check for proper water supply.
3. Check seal-fluid strainer.
4. Condensable vapor load entering the pump could be too high. Contact factory.
5. Check for scale build-up in pump.
6. On full-recovery systems, check for proper cooling water temperature and sufficient cooling water supply flow rate to heat-exchanger.

Noise and Vibration Problems

Unit is making an abnormal noise or vibrating excessively

1. Stop unit and disconnect power.
2. Check the coupling/sheave for proper alignment.
3. Check belt tension on belt drive systems.
4. Check seal fluid flow rate to ensure it is not too low.
5. Verify bearings are not defective.
6. Confirm there is not high discharge pressure.
7. Check if baseplate is properly supported. Uneven floor will distort baseplate, which could cause vibrating problems.
8. Check that the mounting bolts of pump, coupling, fan and cooler are not loose. Tighten as required.

Abnormal Bearing Wear

Unit runs, but bearings are abnormally wearing

1. Stop unit and disconnect power.
2. Confirm bearing lubricant is not excessive and is clean.
3. Confirm there is not high discharge pressure.
4. Check the coupling/sheave for proper alignment.
5. Check belt tension on belt drive systems.
6. Ensure there is no strain on the pump from system piping.
7. Check that the mounting bolts of pump, coupling, fan and cooler are not loose. Tighten as required.