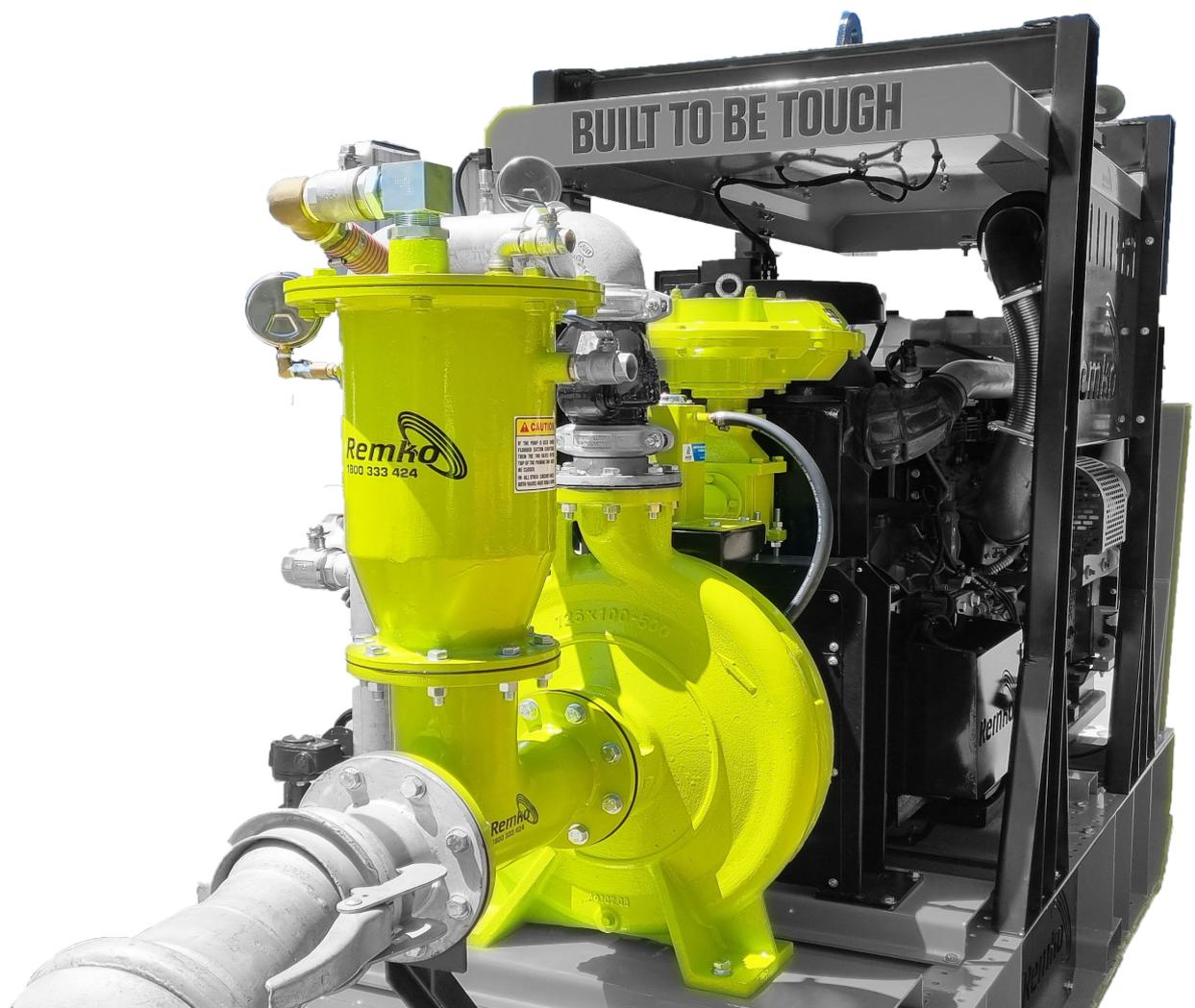




# RA Series 5 Automatic Dry Priming Pumps

## Operation & Maintenance Manual

Rev 1.0 (May 2025)



*Remko Pumps - Australia's go-to pump solutions provider.*

Corporate Office: 4 McHarry Place, Shepparton VIC 3630

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## **INSPECTION**

All equipment is inspected at the factory prior to shipment. However, you should inspect all equipment upon arrival for shipping damage and item shortages from the packing slip. Report any damage or shortages to the carrier and **Remko Pumps**.

## **RECORDING MODEL & SERIAL NUMBERS**

Please record the model and serial number for your **Remko Pump** in the spaces provided below. The factory will need this information when you require parts or service.

Pump Model : \_\_\_\_\_  
Pump Serial Number : \_\_\_\_\_  
Engine/Motor Serial # : \_\_\_\_\_  
Engine/Motor Model : \_\_\_\_\_

## **WARRANTY INFORMATION**

**LIMITED WARRANTY:** The Seller warrants for one year from the date of shipment Seller's manufactured products to the extent that Seller will replace those having defects in materials or workmanship when used for the purpose and in the manner which Seller recommends. If Seller's examination shall disclose to its satisfaction that the products are defective, and an adjustment is required, the amount of such adjustment shall not exceed the net sales price of the defective products, and no allowance will be made for labor or expense of repairing or replacing defective products or workmanship or damage resulting from the same. Seller warrants the products which it sells from other manufacturers to the extent of the warranties of their respective makers. Where engineering design or fabrication work is supplied, buyer's acceptance of Seller's design or of delivery of work shall relieve Seller of all further obligation, other than as expressed in Seller's product warranty. **THIS IS SELLER'S SOLE WARRANTY. NO OTHER WARRANTIES, WRITTEN OR ORAL, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE AND MERCHANTABILITY, ARE MADE OR AUTHORIZED. NO AFFIRMATION OF FACT, PROMISE, DESCRIPTION OF PRODUCT OF USE OR SAMPLE OR MODEL SHALL CREATE ANY WARRANTY FROM MANUFACTURER, UNLESS SIGNED BY THE DIRECTOR OF THE MANUFACTURER.** Seller neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of its engineering designs or products. This warranty shall not apply to any products or parts of products which (a) have been repaired or altered outside of Seller's factory, in any manner; or (b) have been subjected to misuse, negligence or accidents; or (c) have been used in a manner contrary to Seller's instruction or recommendations. Seller shall not be responsible for design errors due to inaccurate or incomplete information supplied by Buyer or its representative.

## SAFETY AND PRECAUTIONS

### DANGER



This marking warns of an imminent hazard to the life and health of people.

Failure to observe these instructions will lead to death or serious injury.

### WARNING



This marking warns of a potentially hazardous situation to the life and health of people.

Failure to observe these instructions can lead to death or serious injury.

### CAUTION



This marking warns of a hazardous situation to the health of people.

Failure to observe these instructions can lead to minor or moderate injury.

### NOTICE



This marking indicates potential property damage.

Failure to observe these instructions may cause property damage.

**IMPORTANT:** Identifies information that controls correct assembly and operation of the product.

**NOTE:** Identifies helpful or clarifying information.



This symbol alerts the user to the presence of dangerous voltage inside the product that might cause harm or electrical shock.



This symbol alerts the user to the presence of hot surfaces that might cause fire or personal injury.



This symbol alerts the user to the presence of heavy equipment that might cause personal injury.

## Safety Information

### Operating Safety

Failure to follow instructions in this manual may lead to serious injury or even death! This equipment is to be operated by trained and qualified personnel only! The following safety guidelines should always be used when operating any of the Remko Auto Prime Pumps:

- Never operate this machine in applications for which it is not intended or before reading the manual in full.
- It is important that no one is allowed to operate this equipment without proper training. People operating this equipment must be familiar with the risks and the hazards associated with it.
- Never touch the engine or muffler while the engine is on or immediately after it has been turned off. These areas get hot and may cause burns and serious injury. Allow these parts to cool before servicing the engine or Remko Auto Prime pump.
- Never attempt to open the pump maintenance or drain plugs while the pump is operating or immediately after it has been turned off. Make sure that all pressure is released from the casing before opening the pump maintenance drain plug —note high system pressures can be dangerous and may lead to serious injury or even death!
- Do Not use accessories or attachments that are not recommended by Remko. Damage to equipment and injury to the user may result. Remko will not take any responsibility for any accident due to equipment modifications or misuse.
- Always check the machine for loosened nuts or bolts and leaking fittings before starting the Remko Auto Prime pump.
- Make sure to store the equipment properly when it is not being used or when it is being transported. The Remko Auto Prime pump should be stored in a clean, dry location.
- Never operate the machine in explosive atmospheres or near combustible materials.
- Never operate the pump with volatile or flammable liquids. Otherwise, dangerous working conditions will occur with the potential to lead to serious injury or even death and / or damage the pump!
- Never operate this equipment in enclosed spaces (for diesel engines). The engine of the Remko Auto Prime pump requires an adequate free flow of cooling air. Never operate the Remko Auto Prime pump in any enclosed or narrow area where free flow of the air is restricted. If the air flow is restricted, it will cause serious damage to the Remko Auto Prime pump engine and may cause injury to the operator. Remember the Remko Auto Prime pump's engine also gives off DEADLY carbon monoxide gas.
- Never operate the pump with corrosive liquids — otherwise dangerous working conditions will occur with the potential to lead to serious injury or even death and / or damage the pump!
- Warning - Do Not operate the pump with a closed discharge pipe otherwise the pumped fluid will quickly rise to boiling point, resulting in damage to many pump components, rise in pump casing pressure, with a potential pump body breakdown and / or explosion.
- An Automatic dry priming pump needs a discharge check valve for priming—the centrifugal pump will not prime if the check valve does not shut properly to hold the check valve closed.
- Make sure all appropriate safety guards around all the exposed rotating parts of the pump (shafts and couplings) are fitted.
- Always shutdown the engine before transporting.
- Always Drain fuel when transporting the Remko Auto Prime pump over long distances or bad roads. Also drain the fuel if the machine is not to be used for long periods.
- Never run the engine without an air filter or severe engine damage will occur.
- Never operate this pump unless there is cooling oil in the mechanical seal cooling system. Also, make sure that the pump bearing housing and the priming bearing housing are adequately filled with lubricating oil.

### Refuelling Safety

Diesel engines present special hazards during refuelling. Read and follow the warning instructions in the engine owner's manual as well as the safety guidelines below.

- Never smoke when refuelling the engine. Fire or explosion could result from fuel vapours.
- Do Not refuel hot or running engine. Allow engine to cool before refuelling. Fire or explosion could result if fuel is spilled on a hot engine.
- Never refuel the engine near an open flame or any other potential hot source of combustion.
- Do Not spill any fuel when refuelling the engine.
- Always refill the fuel tank in a well-ventilated area and replace the fuel tank cap after refuelling.

## Before Getting Started

This equipment should be installed and serviced by technically qualified personnel who are familiar with the correct selection and use of appropriate tools, equipment, and procedures. Failure to comply with national and local electrical and plumbing codes and within Remko Pump recommendations may result in electrical shock or fire hazard, unsatisfactory performance, or equipment failure. Know the product's application, limitations, and potential hazards. Read and follow instructions carefully to avoid injury and property damage. Do not disassemble or repair unit unless described in this manual.

Failure to follow installation or operation procedures and all applicable codes may result in the following hazards:



### DANGER



#### Risk of death, personal injury, or property damage due to explosion, fire, or electric shock.

- Do not use this product to pump flammable, combustible, or explosive fluids such as gasoline, fuel oil, kerosene, etc.
- If the liquid is hazardous, take all necessary precautions to avoid damage and injury before emptying the pump casing. If any external leaks are found while pumping hazardous products, immediately stop operations and repair.
- Do not use in explosive atmospheres or hazardous locations as classified by the NEC, ANSI/NFPA70.
- Never operate the pump for more than a short interval with the discharge valve closed as this can cause an explosion. The length of the interval depends on several factors including the type of fluid and its temperature. Contact Technical Support for additional support if required.
- When operating, the engine on this pump produces carbon monoxide, an odorless, colorless, poisonous gas that can cause asphyxiation and kill you in minutes. Breathing carbon monoxide can cause nausea, fainting, or death. Operate this pump ONLY outdoors in a well-ventilated area. Do not operate the pump inside any building, confined area such as a tunnel or trench, or enclosed area such as basement, garage, or similar locations, even if doors and windows are open.



### WARNING



#### Risk of severe injury or death.

- To reduce risk of electrical shock, disconnect power before working on or around the system. More than one disconnect switch may be required to de-energize the equipment before servicing.
- If the pump is driven by an electric motor, check local electrical and building codes before installation. The installation must be in accordance with their regulations as well as the most recent National Electrical Code (NEC) and the Occupational Safety and Health Act (OSHA).
- Never start or operate a pump known or suspected to be damaged, defective or malfunctioning.
- When lifting or moving heavy components, use suitable lifting equipment, in good condition, rated for at least 5 times the weight of the materials being moved.
- Never stand under a load as it hangs in the sling or hoist.
- Do not attempt to start the engine with the spark plug removed. Unintentional sparking can result in fire or electric shock. Ensure that the spark plug, muffler, fuel cap, and air cleaner are in place.
- For diesel engines, if fuel is spilled, avoid starting engine or creating any source of ignition until the fuel evaporates or is cleaned up and any fuel vapours have dissipated.
- Excessive pump noise or vibration may indicate a dangerous operating condition. Shutdown the pump immediately.
- Handling must be carried out by specialized personnel to avoid damage to the pump and persons.

**CAUTION****Risk of bodily injury, electric shock, or equipment damage.**

- This equipment must not be used by children or persons with reduced physical, sensory or mental abilities, or lacking in experience and expertise, unless supervised or instructed. Children may not use the equipment, nor may they play with the unit or in the immediate vicinity.
- Operation of this equipment requires detailed installation and operation instructions provided in this manual for use with this product. Read the entire manual before starting installation and operation. End User should receive and retain manual for future use.
- Keep safety labels clean and in good condition.
- Never operate the pump without all safety devices correctly installed, including pump guards over the rotating parts.
- All components must be handled and transported securely by using suitable slings and/or lifting devices.
- Avoid hot exhaust gases and do not touch hot surfaces.
- Wear Personal Protective Equipment (PPE) while installing, operating or servicing this pump.

**NOTICE****Risk of damage to pump or other equipment.**

- Do not operate the pump and/or the system for an extended period of time below the recommended minimum flow.
- Do not attempt to start the engine before it has been filled properly with the recommended type and amount of oil. Failure to follow these instructions will void the warranty and cause damage to the engine. Refer to the engine manufacturer's instructions for oil type and proper procedure for adding oil. Check the engine oil level before every use and add as needed.
- If in an environment where the fluid in the system could freeze, never leave liquid in the pump. Drain the system completely.
- Incorrect rotation of the pump for even a short period of time can cause severe damage to the pumping assembly.
- If items are dropped, banged, or mistreated in any way, misalignment and malfunction can occur.

## Product Specific Precautions

Remko pumps are designed for specific service and may not be suited for any other service without loss of performance or potential damage to equipment or personnel. This manual cannot possibly provide detailed instructions and precautions for each specific application. It is the owner's and installer's responsibility to ensure that applications not addressed in this manual are performed only after establishing that neither operator safety nor pump integrity are compromised. If there is any doubt about suitability for a specific purpose, contact Remko Pumps or your Remko Pump Distributor.

Rental companies and private owners: All persons to whom you rent or lend this pump must have access to and read the product's owner's manuals. Always keep the manuals with the pump and advise all operators to read them. You must also provide personal instruction on how to safely operate the pump, and you must be available to answer any questions the renter or borrower might have.

## PRODUCT INFORMATION

### Description

Remko Series 5 Centrifugal Pumps are designed to deliver outstanding performance in clear water applications such as high-pressure transfer and dewatering. These pumps have slightly lesser solids handling capacities compared to our other range of Auto Prime pumps.

The pump is basically a simple end suction pump which has a completely automatic priming system built into the design. This enables the pump to self-prime from a completely dry condition even with a long suction line. No liquid of any nature is required to prime the pump and therefore in temporary dry trench conditions the pump will 'snore' until such time as liquid is available.

The pump features a robust run-dry system at the pump end, allowing continuous operation without prime—without causing damage to the mechanical seal. The mechanical seal is fitted externally to the pump in its own self-contained oil. This system consists of an oil reservoir and a specially engineered mechanical seal gland.



These pumps are offered in a variety of mounting options, including trailer-mounted, skid-mounted, conventional channel base-mounted configurations or bare shaft pumps may be mounted by a third party. They are available with either electric or diesel motors. For detailed guidance on startup, installation, and maintenance, refer to the corresponding engine and motor manuals.

All standard models can be upgraded to Remko's vacuum-assisted, self-priming version for significantly higher flow rates, increased head capacity, and advanced priming capabilities.

Each unit is backed by a Limited Manufacturer's Warranty. Warranty durations vary depending on the product type. For complete details, please contact the Remko team.

### Conditions for use:

- Maximum ambient temperature: 60 degrees C.
- Maximum operating temperature: 80 degrees C.
- Minimum operating temperature: -10 degrees C.
- Maximum operating pressure: 16 bar
- Only operate the pump within the operating range as stated on the name plate — if ignored, serious engine or pump damage can occur.
- Only to be operated by qualified personnel and in accordance with this manual.

## **INSTALLATION**



### **CAUTION**

#### **Risk of personal injury or damage to pump or other equipment.**

- Make sure the pump is level.
- Use caution when positioning the skid-mounted unit to prevent damage to the fuel tank.
- For trailer mounted units, wheels should be properly chocked to prevent the trailer from rolling.
- For engine driven pumps, the reflective exhaust heat may damage the fuel tank, causing fire. Keep at least 1 meter of clearance on all sides of the pump for adequate cooling, maintenance, and servicing.
- For some systems with an electric motor, the SAE bracket is replaced with a bearing cap.

#### **Package Leveling**

Always make sure the package is level.

- For trailer-mounted units, use the tongue jack and blocking under the lower wheel.  
**NOTE:** Properly chock wheels of the trailer to prevent rolling.
- For skid-mounted packages, use blocks under the skid if the ground is not sufficiently level.
- For electric units with a motor stool, install on a solid, level foundation for adequate bearing lubrication.

#### **Foundation**

1. Locate the foundation as close as possible to the liquid to be pumped, allowing adequate space for operation, maintenance, and inspection of the pump and equipment.
2. Allow the foundation to completely dry and cure.
3. Use anchor bolts to attach the pump base to the foundation.
4. Use a machinist's level on the mounting pads for adjustments as the anchor bolts are tightened.
5. Provide leveling nuts or wedges for mounting the baseplate to the foundation.

#### **Mounting the Pump**

**NOTE:** Electric-driven pumps with a motor stool do not require alignment.

1. Remove all shipping protection.
2. Ensure all foreign material has been removed from the pump and system piping.
3. Mount the pump level, making sure the pump and its driver are aligned.  
**IMPORTANT:** Failure to align the pump driver and coupling will cause pump vibration and premature failure of the shaft, bearings, mechanical seal, and couplings.

#### **Motor & Pump Alignment**

Precise alignment is necessary to achieve correct performance of the system. Every time a component is moved, check the alignment.

**IMPORTANT:** When utilizing a diesel engine-driven pump system with a transmission/gearbox component, it is essential to verify the alignment each time the equipment is relocated.

## Piping Installation

### Suction Piping Installation

1. Select suction piping.
  - Consider NPSHA, site altitude, and temperature.

**NOTE:** Suction design must provide a margin of NPSH Available (NPSHA) over NPSH Required (NPSHR) of at least 0.5 mtr.

NPSHA is the measure of energy in a liquid above the vapor pressure. Consider losses from the foot valve and other entrance losses when calculating NPSHA. NPSHR is given in the pump data sheet and performance curve.

- Piping should be at least as large as the pump flange.
  - For diameters larger than the pump flange, install an eccentric reducer with the straight side up to avoid air pockets.
  - Use piping suitable for vacuum to avoid collapse during operation.
2. If long, level runs of piping cannot be avoided, slope up to the flange to prevent air pockets.
  3. Position the pump at the highest point of the suction piping.
  4. Slope the piping up to avoid air pockets.
  5. If required, install a foot valve at least 4 times the pipe diameter away from the pump inlet.
  6. Make sure the submergence of the suction pipe in the wet well, pond, etc. is at least 4 to 5 times the pipe diameter.

**NOTE:** If this is not possible, provide a baffle or other device suitable for preventing vortex formation, causing air to enter the pump's suction. For best performance, use a bell mouth fitting. Refer to the Hydraulic Institute Handbooks or other hydraulic data books for detailed sump design information.
  7. If a suction strainer is required, the open area should be at least 4 times the internal pipe diameter and rigid enough to prevent collapse if it becomes clogged.

Eccentric Reducer



### Discharge Piping Installation

1. Use a concentric taper on the discharge side to increase from pump discharge flange size to a larger discharge pipe diameter or maintain discharge piping the same size as the discharge size of the pump.

Note: The decision of what size discharge pipe to use in an economic one, a balance between the higher cost of larger piping versus the higher energy requirements imposed by pipe friction. Otherwise, the only detrimental effects of discharge piping size choice is derived from the pump running too near shut off or too far out on its curve.
2. The discharge pipe size should be adequate to maintain reasonable velocities and reduce friction losses.
3. All valving and additional fittings should be the same size as the discharge line.

## **Screening**

Make provisions for the installation of a suction screen or strainer to prevent any debris from clogging the impeller. The open area of the strainer should be equal to at least four (4) times the area of the pipe. The screen should be rigid enough to prevent collapse when flow is reduced due to clogging.

## **Sump Design**

The submergence of the suction pipe into the liquid should be at least four (4) to five (5) times the pipe diameter. If this is not possible then provide a baffle or a floating board. This is to prevent any vortex action allowing air into the pipe. For best performance a bell mouth fitting is recommended. Refer to the Hydraulic Institute Handbooks or other Hydraulic Data books for detailed sump design information.

## **Lifting**

Any lifting equipment is to be rated for at least five (5) times the weight of the item being lifted. Use only established methods when lifting or moving any heavy components.

## **Alignment of pump and motor**

Precise alignment is necessary to achieve correct performance of the system. Every time a component is moved this alignment will have to be checked. The alignment can be checked with a straight edge and an outside calliper, taper thickness gauge, dial indicators or, for best results, use a laser alignment tool. Use the straight edge across the outside diameters of the coupling halves to ensure that they are concentric and parallel. The outside callipers or the taper thickness gauge is to correct for any angular misalignment and to verify the correct gap between the coupling flanges. Use a laser alignment tool or dial indicators to adjust for concentric and angular displacement. With dial indicators, rotate shafts together and take readings every ninety (90) degrees. Make adjustments by placing shims under the driver and be sure that the mounting bolts are properly tightened while taking readings and after final adjustment then install coupling guard.

If the pump is equipped with an SAE bracket and flywheel coupling for direct mounting of the pump to the engine bell housing, alignment between crankshaft and pump shaft is automatically attained due to the register fits between the bell housing and pump bracket.

## **Rotation**

Before the pump is started, correct rotation must be confirmed. If the rotation is not correct, then interchange any two of the leads on a three (3) phase driver. For a single-phase driver refer to the wiring diagram. Engine rotation should be confirmed with the engine supplier.

## **OPERATION**



### **WARNING**

#### **Risk of severe injury or property damage.**

- Fuel and its vapours are extremely flammable and explosive. Fire or explosions can cause severe burns or death. Do not add fuel indoors. Do not add fuel when the engine is running or hot. Do not light cigarettes or smoke when adding fuel. Keep fuel away from furnaces, stoves, water heaters, clothes dryers, or other appliances that have a pilot light or other ignition source (heat, flame, sparks, lit cigarette, etc.) because they can ignite fuel vapours.
- When adding fuel, ensure that the pump is outdoors on a flat, level surface. Do not add fuel to pump while indoors. Turn the pump OFF and let it cool at least 2 minutes before removing the fuel cap. Loosen the cap slowly to relieve pressure in tank. Refer to the engine manufacturer's instructions for recommended fuel type and proper procedure for adding fuel.
- If fuel is spilled, avoid starting engine or creating any source of ignition until the fuel evaporates or is cleaned up and any fuel vapours have dissipated.
- Never operate the pump without all safety devices correctly installed, including pump guards over the rotating parts.

### **Priming**

Remko pumps are available with a fully automatic vacuum priming system. If this priming device is not supplied on your pump model you will need either a flooded suction or a foot valve and some other means of evacuating air from the pump case and suction line. With a flooded suction use a bleed valve at the top of the volute to allow trapped air to escape. If you are using a foot valve, then fill the suction line and pump case with water and use a bleed valve for trapped gas as above. If a hand primer is to be used it will be necessary to have an airtight check valve or closeable control valve on the discharge line to prevent the entry of air from the discharge side. Rotating the pump shaft will release trapped gas in the impeller. If the pump is used with a flooded suction condition and your pump has a fully automatic vacuum priming system, you can close the isolation (failsafe) valve at the top of the priming chamber. This will isolate the vacuum pump inlet line from the pumpage and allow the vacuum pump to "coast" (extending the life of the vacuum pump and reducing the horsepower requirements on the driver).

### **Pre-Start Checklist**

1. Verify that rotation is correct and that the shaft rotates freely.
2. Check all piping connections for tightness.
3. Inspect all accessories and make sure they are appropriate for your installation.
4. Verify that the driver and coupling are aligned correctly and that all guards are in place.
5. Ensure that all bearings and grease seals are lubricated.
6. If vacuum assisted, check the vacuum pump oil level as well as the oil level in the backplate/bracket reservoir.
7. Oil levels should also be checked and maintained during pump operation.
8. Follow the instructions on all tags, labels and decals attached to the equipment

## Starting the System



### DANGER



#### Risk of death, personal injury, or property damage due to explosion, fire, or electric shock.

- Never operate pump with both the suction and discharge valves closed as this could cause an explosion.
- Failure to open the discharge valve upon starting the driver could cause a dangerous buildup of heat and possibly an explosion.
- If the pump is operated in an enclosed space and the pumpage may contain potentially hazardous fumes make certain that an exhaust hose is securely connected to the vacuum pump exhaust nozzle and routed outside the enclosed space. Failure to do so may result in injury or death.
- If liquid pump contains solids that may cause downstream clogs, take special care the pump is not operating against a blocked discharge for a prolonged period. Do not loosen flanges or open valves if the pump is suspected of operating against a downstream clog, as the release of stored heat can result in severe injury or death.



### CAUTION

#### Risk of bodily injury or property damage. A pressurized system can cause a pump to deadhead.

- Rapidly closing the discharge valve can cause a damaging pressure surge. A dampening arrangement should be provided in the piping.
- Do not operate the pump without guards in place over the rotating parts. Exposed rotating parts can catch clothing, fingers or tools, causing severe injury to personnel.
- Never use the suction valve to throttle the flow.
- Do not attempt to run the pump without water; this could result in permanent damage to the pump.

**IMPORTANT:** Precise alignment is necessary for correct performance.

**IMPORTANT:** Some components and lubricants have shelf lives of less than 12 months. Inspect and replace as necessary.

1. **If starting after storing the pump for more than one month:**
  - Remove all rust preventive coating and drying agents, such as silica gel.
  - Clean the pump thoroughly to remove any foreign material that may have accumulated.
2. **Confirm the pump rotates clockwise when viewed from the drive input end. If incorrect:**
  - For a three-phase electric motor, interchange any two of the power leads.
  - For single-phase electric motors, refer to its wiring diagram.
  - For diesel engines, confirm engine rotation with the supplier.
3. **Check all piping and fittings for foreign materials (rocks, bolts, wire, etc.) that could disrupt pump flow.**
4. **For suction lift applications, open the priming chamber ball valve.**
  - For flooded suction applications, keep the priming chamber ball valve closed.
5. **Check the run-dry mechanical seal lubrication system:**
  - Make sure the oil level is not above half the length of the sight tube and the oil is clean.
  - Check fittings and oil level sight tube for leaks.
  - Ensure the mechanical seal oil drain plug is tight and not leaking.
6. **If the bearing housing is oil lubricated:**
  - Hold the pump level.
  - Clean around the oil level plug on the side of the bearing housing and then unscrew it.
  - For oil level sight gauge windows, make sure the oil level is near the centre.
  - Make sure the oil is at the level of the plug opening and the housing is not overfilled.
7. **Close the vacuum pump water drain.**

8. **Check the tension of the vacuum pump drive belt.**
  - **The belt should be just tight enough to remove any slack. Do not over-tighten.**
9. **Verify the vacuum pump crankcase oil level is centred in the sight glass when the pump is level.**
10. **If applicable, make sure the Vacuum Assist System is functioning properly, and the pump is primed before startup.**
11. **Check all accessible hardware, piping, and fittings are tight, secure, and supported.**
12. **Refer to the diesel engine or electric motor manuals for pre-start instructions.**
  
13. **Close the discharge valve.**
14. **Start the pump and slowly open the discharge valve to fully open.**
  - **Avoid any abrupt changes in the discharge flow rate to prevent pressure surges in the piping.**
15. **If the design pressure is not achieved shut the pump down immediately.**
  - **Verify pump is adequately primed and restart.**
  - **Check all suction and discharge piping for leaks.**

## Run Dry System

The run dry system in the pump end allows it to run indefinitely when it is not primed without damaging the mechanical seal. The system can be either enclosed in the pump backplate or external to the pump wet end.

Whether enclosed or external, both configurations work the same:

1. As the pump starts, the mechanical seal is fed a constant supply of lubricating oil from the inside of the stationary seat.
2. Due to the centrifugal force generated by the rotating seat, a small amount of oil is fed between the two seal surfaces and forced out of the seal and into the pumped liquid.
3. The oil cools and lubricates the seal surfaces, prolonging its life.

## Pump Dynamic Test

1. Before starting the engine, check that the shaft, pulleys and belt are free to rotate with the guards in position.
2. Start pump and run completely dry for a minimum period of 10 minutes (initial run up speed at 900rpm increasing during test to 1100rpm). During this period, generally check and observe for any unusual vibrations, overheating, fuel, oil or air leaks.
3. These faults must be rectified immediately to prevent a possible engine seizure.
4. After the dry running period, check that the pump unit will raise a minimum vacuum of 0.81bar (24 inches mercury).

## Cavitation

If the Net Positive Head Available of the pump is less than the Net Positive Head Required, the pump end liquid will vaporize in the region of the impeller eye i.e. where the local pressure is less than the vapour pressure. In this region, the fluid will consist of a liquid plus vapour cavities. This can, in the extreme case, result in the formation of a vapour lock and the prevention of the fluid entering the impeller. This phenomenon is called 'cavitation'. The cavitation cycle comprises therefore of two-phase changes: one from liquid to vapour during the initiation and the other from vapour back to liquid during cavity collapse.

Cavitation may be caused by excessive suction lift, insufficient NPSHA or operation at too high a speed. The resulting effects include:

- (1) Pitting of material surfaces due to the continual hammering action of the collapsing vapour cavities.
- (2) Significant reduction of performance due to vapour formation.
- (3) The crackling noise (like gravel going through the pump) caused by vapour cavity collapse.

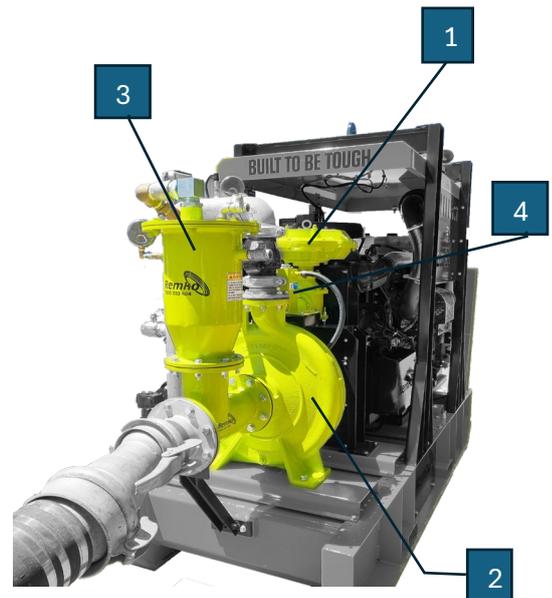
Severe cavitation usually results in excessive noise, vibration and damage to pump, whereas mild cavitation may produce nothing more than a small reduction in pump efficiency and moderate wear of pump components.

## Vacuum Priming Assist System

Item	Description
1	Vacuum Priming System (Diaphragm Pump 50cfm)
2	Pump casing
3	Priming Chamber
4	Mechanical Seal Cooling Oil Reservoir

The Remko Pump Priming Vacuum Assist System is designed to allow the pump to prime without using a foot valve or manually adding water to the system:

1. The pump starts with the suction pipe in the water and the discharge check valve closed.
2. The vacuum pump then evacuates air from the suction pipe and pump end.
3. The resulting vacuum in the suction pipe causes water to rise in the pipe until it floods the pump end.
4. The pump primes.
5. Carryover (water transfer into the priming pump) is prevented when the float in the priming chamber rises with the water level, closing a valve.



## REMKOPRIME™ - Automatic Dry Priming System

This pump is fitted with either a 50cfm or a 100cfm REMKOPRIME™ Automatic Dry Priming system for fast and efficient priming. This system allows for the pump to be primed automatically even though the water level may be below the pump.

The REMKOPRIME™ system has the ability to lift the water up to 8.4m or 27ft from the water source (at sea level). The mechanical seal cooling system is specially developed to allow the pump to run safely without any water in the system.

**The REMKOPRIME™ Automatic Dry Priming System consists out of four main components which includes:**

- a. A diaphragm pump for the 50cfm unit or alternatively a twin 100cfm (2 x 50cfm) unit.
- b. A priming chamber with an inbuilt safety valve system mounted on the suction pipe work of the pump.
- c. An oil based mechanical seal cooling system for the ability to dry prime the pump.
- d. A rubber flapper check valve mounted on the pump discharge to enable the pump to be primed. (not shown below).

The diaphragm pump has two compression chambers and are fitted with two sets of valves. The first chamber pre-vacuum's the air to approximately 15" of mercury. The second chamber brings it up to the full system vacuum capacity. The priming pumps are designed to run at approximately 1450rpm to achieve the 50 or 100cfm nominal free air displacements

## Belt Reassembly & Tension

**NOTE: For aluminium housings, be careful not to over-tighten parts, as the threads may be damaged.**

For top-mounted vacuum pumps, adjust by adding or subtracting shims at the vacuum pump base and at the mounting surface until the drive belt is just tight enough to eliminate slack. For side-mounted vacuum pumps:

1. Remove the belt guard.
2. Loosen the four vacuum pump drive mounting screws.
3. Loosen the nut and locknut on the adjusting screw.
4. Relax or tighten the adjustment of the belt as needed.
5. Use a belt tension gauge. Tightness should be 5.6 lbs at 0.14" deflection (2.5 kg at 3.5 mm).
6. Tighten the locknut and mounting screws and replace the belt guard.

**REMKOPRIME™ - Diaphragm Pump**

The REMKOPRIME™ system can be supplied in two configurations i.e. with the standard 50cfm system or the optional 100cfm system for when larger priming volumes are involved.

**50 cfm unit****100 cfm unit**

The REMKOPRIME™ system can be supplied in two formats i.e. with the standard 50cfm system or the optional 100cfm system for when larger priming volumes are involved.

**Maintenance and Service of diaphragm pumps:**

The diaphragm pumps are easy to service.

A. **Oil:** The pump base needs to be filled with oil for lubrication of the camshaft. The base is fitted with a sight glass. The oil level must be to the centre of the sight glass when the pump is in a horizontal position. Generally, the pump uses a SAE15W-40 motor oil however if the pump is used in temperatures below freezing point refer to the chart on following pages for alternative oil types. Make sure that the oil is replaced every 2000 hours. Check to make sure that the oil has no metal particles in it, if it does then the unit will have to be ripped down to investigate the source of the metal. If the oil has turned a milky grey-white colour then this is an indication that water has entered the system and the causes need to be investigated. Please note: The oil will, however, change colour under normal operation to a darker cloudier look - this is normal.

B. **Valves:** Each diaphragm pump is fitted with four rubber check valves (Item 6-2 page 35). Each rubber valve is mounted in a detachable aluminium housing for ease of servicing. Refer to items 6-1 to 6-6 on the exploded view page 35 of this manual for the complete valve assembly. To reach the upper chamber valves, first remove the upper body casing (item 1 page 35). To reach the lower chamber, the main diaphragm together with the diaphragm disc also need to be removed—this can easily be done by removing the split pin and castellated nut items 12-1 and 12. The whole valve assembly is removed from the pump by first removing the circlip 6-6. The valves can now be removed and replaced. These check valves should last to a minimum of 2000 hours, and if they are in good condition leave them in the pump unit. However, we do recommend that regardless of their apparent condition that they be replaced after approximately 3000 hours (maximum) of pump operation.

**IMPORTANT: Use a Loctite thread locker to secure the valve bolt item 6-3 into the housing, this will ensure that the valve will not come loose under normal operating conditions.**

C. **Diaphragm rubbers:** Each diaphragm pump is fitted with two diaphragm rubbers, the main diaphragm (item 5) and the smaller upper shaft sealing rubber (item 16). These two items should be replaced after approximately every 4000 hours of pump operation. The main diaphragm is reached by removing the upper casing body (item 1) and the diaphragm locking ring (item 4). To reach the upper shaft sealing rubber also remove the diaphragm disc (item 3), shaft sleeve (item 45) and the lower body casing (item 2). You can now remove and replace the upper shaft sealing rubber.

**Important:**

1. Make sure that the smaller rubber diaphragm (4" diameter) support washers (items 13-1 have the machined sloping edge facing towards the rubber.
2. Tighten the castellated nut (item 12) and further tighten the nut if required to reach a position that split pin (item 12-1) will go through the nut. Never back the nut off to reach this position as this may leave a sloppy connection that will lead to early wear and potential part failure.

D. **Guide / wear bush and oil seal:** It is important to replace the guide wear bush (item 52) at approximately every 4000 hours of pump operating time. This is to keep the main shaft in a straight position and within the required tolerances. Also replace the oil lip seal (item 39) at the same time. To reach these items, remove the shaft housing (item 17), you will now be able to replace the oil lip seal (item 39) and you have access to the bronze wear bush (item 52).

The wear bushes should now be removed. For the 50cfm unit, the wear bush can also be replaced by removing the connecting housing (item 18-1) and then by gently tapping out the bush from underneath the connecting housing. Replace the bush by gently tapping in the new bush using a soft hammer. Make sure that it is seated all the way down. Reverse the above procedures to assemble the full pump, make sure that all O-rings and gaskets are in place.

**Important:**

**The guide / wear bush may need to be replaced earlier if bronze particles are found in the oil / oil chamber. For the twin 100cfm unit insert the bushes after the shafts have been inserted through the twin unit connecting housing - otherwise the unit cannot be assembled.**

E. **General:** When servicing the unit, look for any wear points on any of the parts, replace these parts where necessary.

## REMkopRIME™ - Priming Chamber

The REMkopRIME™ system's Priming Chamber is mounted on the inlet tee piece which in turn is fitted to the pump inlet.



## Priming Chamber (External Parts / Features)

The priming chamber unit has been fitted with the following features accessible from the outside of the priming Chamber.

1. **Vacuum gauge:** The vacuum gauge on the priming tank indicates the total suction lift of the pump — this will maximise out at the approximate distance of the source water level to the centre of the pump. Note: This is not an accurate indication of priming depth, it is more an indication that the vacuum system is working (it usually shows a lower amount than the actual priming depth).
2. **Vacuum release ball valve:** the small ball valve on the side of the priming chamber is there to release the vacuum from the priming system when or if required. This should only be required when
  - a. The pumping process has been completed, and the pump is about to be removed from the site. This will drain the water from the suction pipework
  - b. When it is deemed that the strainer at the end of the suction pump maybe clogged -releasing the water stream may help to dislodge the foreign articles.

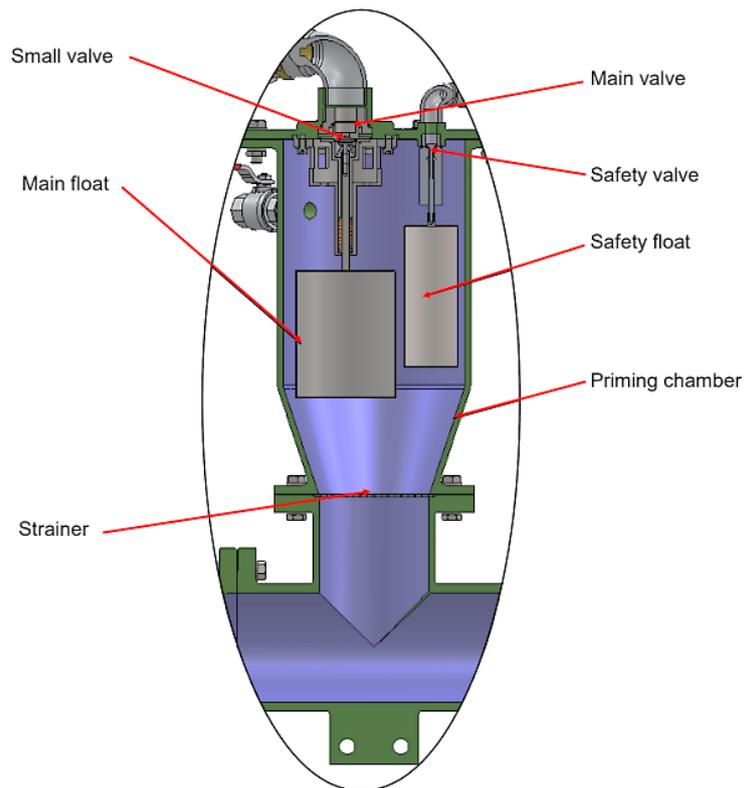
### **IMPORTANT:**

**Only open this ball valve when the engine has been stopped!  
If this is not done than a violent water hammer reaction could occur in the  
priming chamber which could damage the internal parts of the pump.**

3. **Tapping point:** The tapping point on the "Tee Piece" can be used for auxiliary pump testing purposes.
4. **Vacuum hose:** The priming system is interconnected with the use of a 2" heavy duty non collapsible hose.
5. **Vacuum hose isolation valve:** The priming system can be isolated from the inlet pipe work by closing this ball valve. **However, in normal operation this valve should always remain in the open position. The only exception is when the pump is used with a flooded suction when this valve and the safety ball valve should both be closed.**
6. **Safety ball valve:** The priming system is fitted with a special safety valve which guarantees that no pumped fluid will enter the diaphragm pump at any stage. **But for the valve to be 100% effective under in normal operating conditions this valve should always remain in the open position. The only exception is when the pump is used with a flooded suction when this valve and the vacuum hose isolating ball valve should both be closed. If this valve is not closed under flooded suction Conditions, then the area will be flooded with the pumped liquid.**

## Priming Chamber (Internal Parts / Features)

The unit has been fitted with the following features only accessible from the inside of the priming Chamber. To access these, you will need to remove the priming tank cover (item 2 of page 36). There are only a few moving parts including the main float (item 7 pages 36) and the small valve assembly which includes the housing, valve body and small valve rubber (items 6, 10, 11, 12, 16 and 19). The only other parts that are moveable are the safety valve parts including the safety float item 8 as well as items 5 and 20.



**Essentially the unit operates as follows:**

1. The Vacuum pump creates a vacuum situation in the inlet pipework including the priming chamber.
2. Water starts to rise into the pipework. When the water starts to rise into the priming chamber the float will move up taking with it the small valve (item 11). This closes against the valve body (item 6).
3. As the water continues to rise, the valve body or large valve (item 6) now closes against the valve housing (item 3). This now effectively closes all of the priming chamber from any further effects of the priming pump.
4. When or if the water level drops due to the ingress of air into the inlet pipework, the valve system will open up by firstly opening the small valve due to the gravity effects of the float, followed directly by the opening of the main valve due to the loss of prime.
5. The system will now reprime as per the steps mentioned above.
6. Should for some unforeseen reason the small and large valves fail to 100% close and the water continues to rise in the priming chamber then the safety valve (items 8 and 5) will activate and let a sufficient amount of air into the priming chamber to drop the water level preventing the water from escaping through the valve system into the priming pump. Should the pump operator notice a repeating sound coming from the safety valve then it will be time to maintain and clean the small and larger priming valves.

**Maintenance and Service of Priming Chamber:**

The priming chamber is easy to service. Only the following items need to be looked at:

1. Remove the vacuum hose from the priming tank valve and elbow (items 36).
2. Remove the priming tank cover (item 2) and carefully remove the cover completer with the valve / float assemblies.
3. Remove the valve housing (item 9) to gain access to the small valve rubber (item 11)
4. Replace the valve rubber when required and certainly after each 4000 hours of pump operation.

**IMPORTANT—use a Loctite thread locker to secure the small valve rubber to item 12 and to the stem of the float. If this is not done than the small valve may become loose and the system will fail to function. This will be noticeable when the safety valve is repeatedly activated which is a clear indication that the priming chamber is no longer sealing when required.**

5. Check for any general wear and tear on all components and replace where deemed necessary.
6. Check that all internal parts are clean so that they will function properly when required.
7. Check that the stainless-steel mesh at the bottom of the priming chamber is clean and not obstructed.
8. Re-assemble the unit in reverse order making sure that all seals and O-rings are in place

**REMKOPRIME™ - Mechanical Seal Cooling System**

To enable the full REMKOPRIME™ system to operate, the pump needs to be able to run without the aid of the cooling effect of the pumped liquid on the mechanical seal. The mechanical seal will be destroyed in a matter of seconds without the aid of any external cooling. To this end the mechanical seal is fitted over a small oil chamber machined in the main pump shaft. This oil chamber has recirculating oil which cools the mechanical seal from the inside. The heated oil is taken away by the pumping action of the main pump shaft via reinforced hoses to an external stainless steel heat exchanger / reservoir.

**Caution:** The oil temperature in the system may rise to approximately 35 degree C above the ambient temperature. The system including the reservoir and hoses will become too hot to touch and can lead to burn injuries.

Servicing: The cooling system is easy to service as follows.

- A. Oil: The oil reservoir needs to be filled with oil for the cooling of the mechanical seal. The reservoir is fitted with a sight glass on the side of the tank. The oil level must be to the centre of the sight glass when the pump is in a horizontal position.

The cooling system uses a SAE15W-40 motor oil as it can withstand the higher operating temperatures however if the pump is used in temperatures below freezing point refer to the chart on following pages for alternative oil types. Make sure that the oil is replaced every 2000 hours. Check that the oil has no metal or rubber particles in it, if it does than the unit will have to be stripped down to investigate the source of the metal or rubber. Particles in the oil could mean that the mechanical seal is failing.

Also, if the oil has turned a milky grey white colour than this is an indication that water has entered the system and the most likely cause will be that the mechanical seal has failed. In the case of a mechanical seal failure, the oil reservoir will also most likely overflow due to the addition of water to the oil volume.

- B. Hoses: Daily check the hoses and reservoir for any leaks. Tighten all connections if required.

**REMKOPRIME™ - Discharge Check Valve**

1. When the pump begins to prime, the discharge check valve is closed to create a positive seal of the suction area.
  - The suction area includes the pump end, the suction manifold, and the priming chamber.
  - Without the seal, outside air would enter the priming system and disrupt the vacuum system.
2. When the pump is primed, the discharge flow opens the discharge check valve.
3. When the pump stops or loses prime, the weight of the flapper causes the valve to close.
  - This prevents reverse flow when the pump is stopped.

**Disabling the Automatic Priming System**

Remko RA series pumps are equipped with an automatic priming system that begins upon pump start-up as long as the suction pipe is immersed and the ball valve is open (parallel to the vacuum hose). Disabling the system will extend the life of the vacuum pump and reduce the engine's horsepower requirements.

To disable, close the ball valve at the top of the priming chamber. The priming system will then turn off and allow the vacuum pump to "coast".

**Shutting Down the Pump**

For electric motor driven pumps, turn off the motor power supply. For engine driven pumps:

1. Slowly reduce the engine speed to idle.
2. Allow the engine to run at idle for four to five minutes.
3. Shut down the engine and turn it off at the control panel.

## **MAINTENANCE**



### **WARNING**



#### **Risk of severe injury or property damage.**

- To minimize risk of electrical shock, disconnect power before working on or around the system.
- When lifting or moving heavy components, use suitable lifting equipment, in good condition, rated for at least 5 times the weight of the materials being moved.
- Never stand under a load as it hangs in the sling or hoist.



### **CAUTION**

#### **Risk of bodily injury or property damage. A pressurized system can cause a pump to deadhead.**

- Rapidly closing the discharge valve can cause a damaging pressure surge. A dampening arrangement should be provided in the piping.
- Never use the suction valve to throttle the flow.
- If items are dropped, banged, or mistreated in any way, misalignment and malfunction can occur.
- If the pump or components are hot, allow adequate cooling prior to servicing the unit.
- Store the pump in a well-ventilated area away from furnaces, stoves, water heaters, clothes dryers, or other appliances that have a pilot light or other ignition source (heat, flame, sparks, etc.) because they can ignite fuel vapours.
- Safety glasses, heat resistant welder's gloves, cut-resistant gloves, and safety boots should be worn. Use proper protective gloves and clothing when handling heated parts.

**IMPORTANT:** Precise alignment is necessary for correct performance.

## **Storage**

If the pump is to be stored for more than one month:

1. If applicable, open the ball valve to drain the pump.
2. Drain the pump by removing the NPT plug on the volute drain.

**IMPORTANT:** Drain the pump completely to avoid water freezing and cracking its case and reduce corrosion.

3. Store the unit off the ground on blocks.
4. Protect the pump from blowing sand and dirt.
5. Do not stack other items on top of the pump and its equipment.
6. Shield the pump from entry of animals.
7. Protect the pump with drying agents, like silica gel.
8. Use a rust preventive coating on all bare metal parts.
9. Every 30 days:
  - Inspect the pump.
  - Reapply the drying agents (silica gel).
  - Rotate the pump shaft.
  - Lubricate bearing and seals.
10. Keep inspection records showing inspection dates and the condition of the stored pump.

## Periodic Service

Frequency	Service
Daily	<ul style="list-style-type: none"> <li>Check all piping connections, pipe supports, and equipment fasteners for tightness.</li> <li>Verify the driver (engine or electric motor) is aligned correctly and all guards are in place.</li> <li>Check all oil quality and levels. If contaminated, replace immediately.</li> <li>Follow the instructions on all tags, labels, and decals attached to the equipment.</li> </ul>
Monthly or every 500 hours	<ul style="list-style-type: none"> <li>Apply grease to the bearing housing.</li> </ul>
Every 6 months or 1000 hours	<ul style="list-style-type: none"> <li>Ask your Remko Pump Distributor to check the wear rings for excessive wear.</li> <li>For belt-driven pumps, recheck drive belt tension with a belt tension indicator.</li> </ul> <p><b>NOTE:</b> The Vacuum Pump belt should only be tight enough to eliminate slack. Adjustment is made by adding or removing shims between the vacuum pump crankcase and support table.</p>
Yearly or every 2000 hours	<ul style="list-style-type: none"> <li>Change all lubricating oils in the bearing housing (if applicable), mechanical seal, and priming pump.</li> </ul>

## Lubrication

### Oil Lubrication



#### NOTICE

#### Risk of damage to pumps or other equipment.

- Over-filling of oil can result in premature failure of bearings.

#### To change the oil in the priming pump crankcase, bearing housing, and run dry reservoir:

- Clean the area around the fill and drain plugs to reduce the possibility of contamination.
- Remove the drain plugs.
- Drain the oil.
- Replace the drain plugs.
- Remove the oil fill plug(s).
- Fill the compartment with oil to the indicated correct levels on the oil level or sight gauge.
- Replace the oil fill plug(s).

#### NOTE:

- Grease lubricated bearing housing does not require any oil service.

### Oil Capacities

Compartment	Lube Specification	Capacity (mL)
Priming Pump / Vacuum Pump (50cfm)	SAE15W-40	350 mL
Priming Pump / Vacuum Pump (100cfm)		600 mL
Bearing Frame Housing		1800 – 2000 mL
Run-Dry Seal Gland and Reservoir (Mechanical Seal Cooling System)		1900 mL

Note: All systems use a SAE15W-40 motor oil as it can withstand higher operating temperatures. However, if the pump is used in temperatures below freezing point, refer in the chart provided in following pages for alternative oil types. Make sure that the oil is replaced every 2000 operating hours. Do not overfill as this could lead to overheating of the system.

## Grease Lubrication

### Re-greasing recommendations:

- Use only one type of grease.
- Lithium or Lithium Complex greases are preferred.
- Do not mix Polyurea greases with Lithium types.

Recommended greases include:

- Texaco Starplex Moly 2
- Mobil Mobilux No. EP2
- Shell Alvana EP2
- Chevron SR1

To re-grease the bearings:

1. Clean the grease point.
2. Use a hand-operated grease gun with ball bearing grease.  
**NOTE:** Grease guns dispense widely varying amounts of grease per stroke. Test before using on the pump.
3. For a new pump or on bearing replacement, apply startup grease service for the pump:
  - Drive-end bearings: 40 grams
  - Pump-end bearings: 16 grams
4. To lubricate the ball bearings, remove the plastic covers from the zerk fittings.
  - Ensure the zerk fitting and the end of the grease gun are clean.

### Grease Lubrication Intervals

Frame Size (AK Frame)	Hours		
	2200 RPM	1800 RPM	1200 RPM
8.5	500	2,500	10,000
12.4	2,500	3,500	5,000

**NOTE:** Lubrication intervals and quantities for the ball bearings depend on speed, load, ambient temperature, contamination, moisture, intermittent or continuous service and other factors. Contact your Remko distributor for details.

## Centrifugal Pump (ISO or DIN standard)

The supplied centrifugal pump is a single stage, horizontal, end suction pump with overhung impeller and radially split casing. The range is designed for continuous service in clean water pumping applications.

### 1. Safety instructions for operation

- Do not touch any moving or rotating parts.
- Guards must be in place before operating the equipment.
- Failure to supply the stuffing box or mechanical seal with cooling of flush water may result in damage and premature failure of the pump.
- Do not touch surfaces, which during normal running will be sufficiently hot to cause injury. Allow sufficient time for cooling before maintenance. Be cautious and note that other parts of the pump may become hot if a fault is developing.
- In addition to local or site regulations for noise protection, we recommend the use of personal ear protection equipment in all enclosed pump rooms and particularly those containing diesel engines. Care must be taken to ensure that any audible alarm or warning signal can be heard with hearing protection worn.

### 2. Pre-Commissioning Procedure and Checklist

The following steps should be followed at initial startup and after the equipment has been overhauled:

1. Confirm correct pump is fitted into the designated functional location.
2. Prior to installing the pump, flush the suction side of the system to remove all deposit (slag, bolts etc). Remove all pre-commissioning screens and replace with operational units.
3. Ensure the pump and piping is clean. Before putting the pump into operation, the piping should be thoroughly back flushed to remove any foreign matter which may have accumulated during installation. Take all possible care not to contaminate your system.
4. Inspect all nozzle connections for
  - i. Missing bolts or loose bolts
  - ii. Missing gaskets
  - iii. Flange alignment / Misalignment
5. Check pipe work for
  - i. Correct sizing
  - ii. Any suction restrictions
  - iii. Make sure that all hold down bolts are in place and pulled down
6. Check drive coupling for
  - i. Correct Alignment
  - ii. The presence of preload caused by misalignment
  - iii. All fasteners are tight
  - iv. Coupling has been fitted correctly
  - v. Coupling guard is correctly fitted and firm.
  - vi. Check that keys are secured in the correct position and locked down
  - vii. Turn shaft by hand and check for running clearance
7. For oil lubricated Pumps, fill the bearing housing with the appropriate oil to the correct level. Bearings must receive a small amount of oil prior to starting to ensure adequate lubrication at start up. See section 3 for details.
8. For Grease lubricated pumps, fill about 15 gms for grease to ensure adequate lubrication at start up.
9. Install suction strainer if required.
10. Check that the Electrical connection is completed and signed off
  - i. Have the safety lock out device removed.
  - ii. Bump start pump to check for correct orientation. If rotation is not correct refer to motor manual for appropriate connections to change rotation. Take appropriate precaution before working on the motor.

11. If a Mechanical Seal is fitted, check
  - i. Quench or Flush is operational before startup
  - ii. Check that seal is located correctly
  - iii. Check that seal is locked to the shaft
  - iv. Remove setting Tabs

## Running

On account of its simple construction, the centrifugal pump requires practically no attention while running. Lubrication of the bearings and manipulation of the glands are the only things that need attention from the operator.

## Pumps fitted with wear rings

Casing and impeller wear rings are fitted in the casing and impeller to reduce the quantity of water leaking back from the high-pressure side to the suction side. When these wear rings are worn out, the clearance becomes greater, and more water passes back into the suction. They must be replaced from time to time to restore the pump efficiency to its normal value.

## Pump Startup

- i. Close discharge valve if valve is not already closed. Crack open the valve to assure minimal flow.
- ii. Prepare the driver for startup in accordance with the driver manufacturer's instructions.
- iii. Ensure the relevant ball valves on the Auto-priming system is open (depending on negative or flooded suction)
- iv. Ensure suction valve is open.
- v. If pump re-circulating line is used, ensure it is open, clear and free of obstructions.
- vi. Turn on cooling liquid and assure correct flow exists (to cooler, insert gland etc.) as specified.
- vii. Double check pump rotation by starting unit momentarily. The direction of input shaft rotation is clockwise when facing pump shaft from coupling end. Ensure that the pump coasts down to a gradual stop.
- viii. Start the driver and bring it up to speed.
- ix. As soon as the pump is up to rated speed slowly open discharge valve.
- x. This will avoid abrupt changes in velocity and prevent surging in the suction line.
- xi. Perform the operating checks

## Pumps fitted with Mechanical Seal

- i. Before pumping dirty liquids, it is advisable, if possible, to run in the pump mechanical seal using clean liquid to safeguard the seal face.
- ii. External flush or quench should be started before the pump is run and allowed to flow for a period after the pump has stopped.
- iii. Never run a mechanical seal dry, even for a short time (This is in case the mechanical seal is not oil cooled).

## During Running the Pump

Check the following and regulate, if necessary

- The pump is running smooth.
- If packed gland is used, Leakage through stuffing box is normal. There should be leakage of 60-80 drops per minute.
- The bearings are not getting heated up excessively.
- Head and capacity developed by the pump is as specified.
- Power consumption is within the limit.
- Ensure that there is no mechanical friction in the pump.
- Check suction and discharge pressure gauges.
- Check for excessive leakage at seal areas.
- Check for unusual noises and vibrations.
- Stop the pump immediately, if any defects are noticed. Do not start the pump unless the defects are rectified. Report immediately to the supplier if it is not possible to rectify the defects.

## Stopping and Shutting Down

- The centrifugal pumps can be shut down by switching off the power to the motor or the engine, with open or closed flow regulating valve. If there are no provisions against water hammer, it is recommended to close the flow regulating valve at pump discharge prior to stopping the pump but ensure that the pump runs in this condition for no more than a few seconds.
- Avoid the use of instantaneous shut-off valves, such as solenoid valves. These can cause severe pump damage.
- If a non-return valve is not fitted, or the isolating valve at the discharge side is not completely closed, it may happen that during the shut-down the pump shaft will rotate in the opposite direction than is normal: in such cases absolutely avoid restarting the pump until the pump shaft has stopped rotating.
- After the first start-stop and if necessary, check pump/motor alignment and make sure that no external forces or moment rest on pump or piping.

## Safety Instructions while Maintenance and Servicing

- Before attempting any maintenance on a pump particularly if it has been handling any form of hazardous liquid, it should be ensured that the unit is safe to work on. The pump must be flushed thoroughly with suitable cleaner to purge away any of the product left in the pump components. To avoid any risk to health it is also advisable to wear protective clothing as recommended by the site safety officer especially when removing old packing which may be contaminated.
- Check and ensure that the pump operates at below the maximum working pressure specified in the manual or on the pump nameplate and before maintenance, ensure that the pump is drained down.
- Be aware of the hazards relating to the pumped fluid, especially the danger from inhalation of noxious and toxic gases, skin and eye contact or penetration. Obtain and understand the hazardous substance data sheets relating to the pumped fluid and note the recommended emergency and first aid procedures.
- Isolate the equipment before any maintenance work is done. Switch off the mains supply, remove fuses, apply lockouts where applicable and affix suitable isolation warning signs to prevent inadvertent reconnection. In order to avoid the possibility of maintenance personnel inhaling dangerous fumes or vapours, it is recommended that the maintenance work be carried out away from the pump locations by removal of bearing housing and shaft assembly to a suitable to a suitable maintenance area.

## Maintenance Checklist

### Daily Checks

- a. Pressure gauge reading.
- b. Bearing temperature.
- c. Leakage through stuffing box.
- d. Noise and vibration.
- e. Voltage and current.
- f. Constant flow of external sealing liquid if provided.
- g. Check all lubricant levels
- h. On grease lubricated pumps, check running hours since last recharge of grease or complete grease change.

### Periodic Maintenance

- a. Replenish the grease.
- b. Change the stuffing box packing.
- c. Check the alignment of the pump set.
- d. Calibrate the measuring instruments.
- e. Check all paint or protective coatings.
- f. Check all power/instrument cable glands for tightness.
- g. Check the sealing connections for leakage etc.

## Maintenance Schedule – ISO Pumps

The below schedule provides a suitable timetable to monitor pump and system performance and will provide a guide to pending maintenance requirements by comparing the current situation with previous recordings. Extreme or unusual operating environments should be taken into consideration, and shorter maintenance intervals are recommended.

ITEM	PERIOD	ACTION
Bearings	Monthly	Check bearing temperatures by thermometer. If bearing temperature is above 80 Deg. C, it may be because of too much, or insufficient lubrication. If necessary, check the condition of the bearings. Regreasable bearings should be supplied with fresh grease of the recommended grade. Check for lubricant leaks. Replace seals if leaking.
	3 Monthly	Oil lube bearings should be supplied with fresh oil of the recommended grade. Check old oil for metal particles or water. Check shaft for excessive free play.
Seal or Gland	3 Monthly	Check mechanical seal for leaks. Replace if leaking. Check packing for excessive leaks, and adjust or repack if necessary with the recommended grade and style of packing. When replacing packing, ensure that the lantern ring is aligned with the lubricant supply drillings. When repacking or replacing seals, check the condition of the shaft or sleeve. Replace if badly worn or corroded, and fit new bearings and seals. Check seal or gland flush piping for leaks, and repair or replace.
	Yearly	Check seal for wear, and replace if necessary. Check flush piping for scaling or blockages and clean and replace.
Flexible Coupling	6 Monthly	Check alignment of pump and motor. Re-align if necessary. Check for coupling wear and replace worn flexible element if necessary. Where frequent adjustment of alignment is necessary, check for cause (eg pipe loading, foundation failure, loose fasteners etc). If pipe loads are suspected, unbolt piping at suction and discharge flanges and check for mis-alignment. Check pipe supports and pack or adjust as required.
Pressure & Flow Recordings	3 Monthly	Check inlet and discharge pressure and rate of flow. Record these values and compare with previous recordings. A change in reading may indicate a fault in the system, wear or blockage in the pump. Investigate, and rectify as appropriate, as continued operation may result in untimely plant shutdown.
Valves & Fittings	6 Monthly	Check that ancillary fittings operate correctly. Improper function may cause premature pump failure.
Rotating Element	Yearly	Remove the rotating element and inspect for wear, scale buildup, or blockages. Clean unwanted deposits from components, as buildup will result in loss of performance. Check impeller running clearance. Replace defective components.

## Dismantling Procedure

### Tools Required:

A typical range of tools that will be required to maintain these pumps is listed below:

TOOL		WHERE USED
Open ended spanners (wrenches) to suit up to 2" (M50) screws/nuts		Undoing bearing cover
Tension wrench		Pretensioning impeller nut
Socket spanners (wrenches)		Undoing impeller nut
Socket sizes 28, 38, 48, 50 and 60 A/F		
Metric Allen keys (up to 10mm)		General disassembly
Screw driver set		Removing and assembling seals/gaskets
Soft mallet		Soft loosening assembled parts
Metal wedges		removing impeller off tapered pump shaft
Dial indicator		Checking impeller run-out
Shaft Locker		Holding shaft while undoing impeller nut

### **Dismantling Steps:**

1. Remove the back plate to casing bolts. Jacking screw holes are provided in the back plate, to facilitate removal of the bearing housing shaft element.
2. Unscrew the impeller nut and remove the Nord-lock washer. Screw the impeller nut back on the shaft by hand and drive a pair of wooden wedges gently between the impeller and back plate, being careful not to distort the impeller. Remove the impeller nut and lift off impeller. Lift out impeller key.
3. Remove the bearing housing to back plate bolts and remove the back plate.

***Note: Some pumps do not have separate bearing housing to back plate bolts, and these would have been removed in step (1)***

4. Remove the bearing cover to bearing housing bolts. By tapping on the end of the shaft with a piece of wood, the shaft, bearing assembly and bearing cover can be removed.

A pump which has become worn in the body or impeller may be repaired by fitting bronze wear rings. These rings, with full instructions for machining the pump parts and fitting rings are obtainable from Remko Pumps.

### **Re-Assembly Procedure**

Re-assemble the pump by following the procedure below, paying particular attention to the following:

1. Ensure gasket surfaces are clean.
2. Ensure shaft seal is fitted according to manufacturer's instructions.

Bearing Housing Assembly

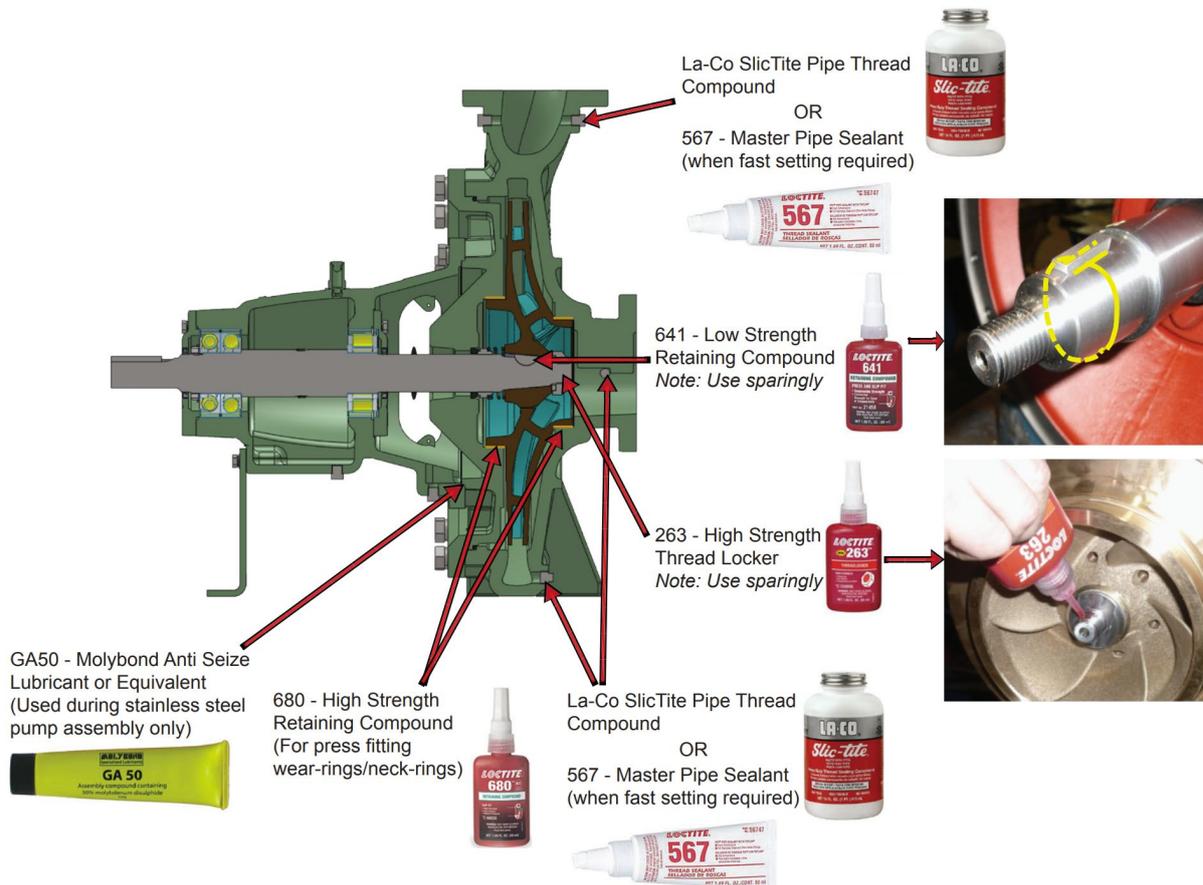
Step 1	Step 2	Step 3	Step 4
			
<p>Fit oil slinger and wet end bearing inner race to shaft then place in appropriate press setup (&gt;30t). *Note bearing orientation. Flange end towards center of shaft*</p>	<p>Slide on a drive end bearing so that the large face of the inner race is towards the impeller end of shaft as shown. Press assembly together.</p>	<p>After pressing first bearing, fit and press second drive bearing. *Note: Second bearing faces opposite direction*</p>	<p>Securely mount bearing housing before assembly.</p>
Step 5	Step 6		Step 7
			
<p>Fit lock washer and nut. Tighten nut then lock.</p>	<p>Fit shaft from driven end</p>		<p>Fit outer race to previously pressed on inner race.</p>
Step 8	Step 9		
			
<p>Fit oil seal to bearing cap.</p>	<p>Fit bearing caps to bearing housing.</p>		

## Remko RA Series 5 - Auto Prime Pump

### Fitting the Impeller

Step 1	Step 2	Step 3	Step 4
			
Apply Loctite 641 on the shaft taper	Loctite 641 should be applied as shown in the above picture (Use Sparingly)	Apply Loctite 263 on the shaft thread (Use Sparingly) and place Mechanical Seal spring in place	Place the Impeller on the Shaft Taper
Step 5	Step 6	Step 7	Step 8
			
Clean Tapered stainless steel Custom designed Nuts and Nord-Lock Washers	Place the Lock-washer and Impeller nut on the shaft	Tighten nut to the specified torque.	Clean up excess loctite around the nut and shaft

### General guide to using Adhesives, Sealants and Lubricants during Pump Assembly



**La-Co SlicTite Pipe Thread Compound**  
 OR  
**567 - Master Pipe Sealant** (when fast setting required)

**641 - Low Strength Retaining Compound**  
 Note: Use sparingly

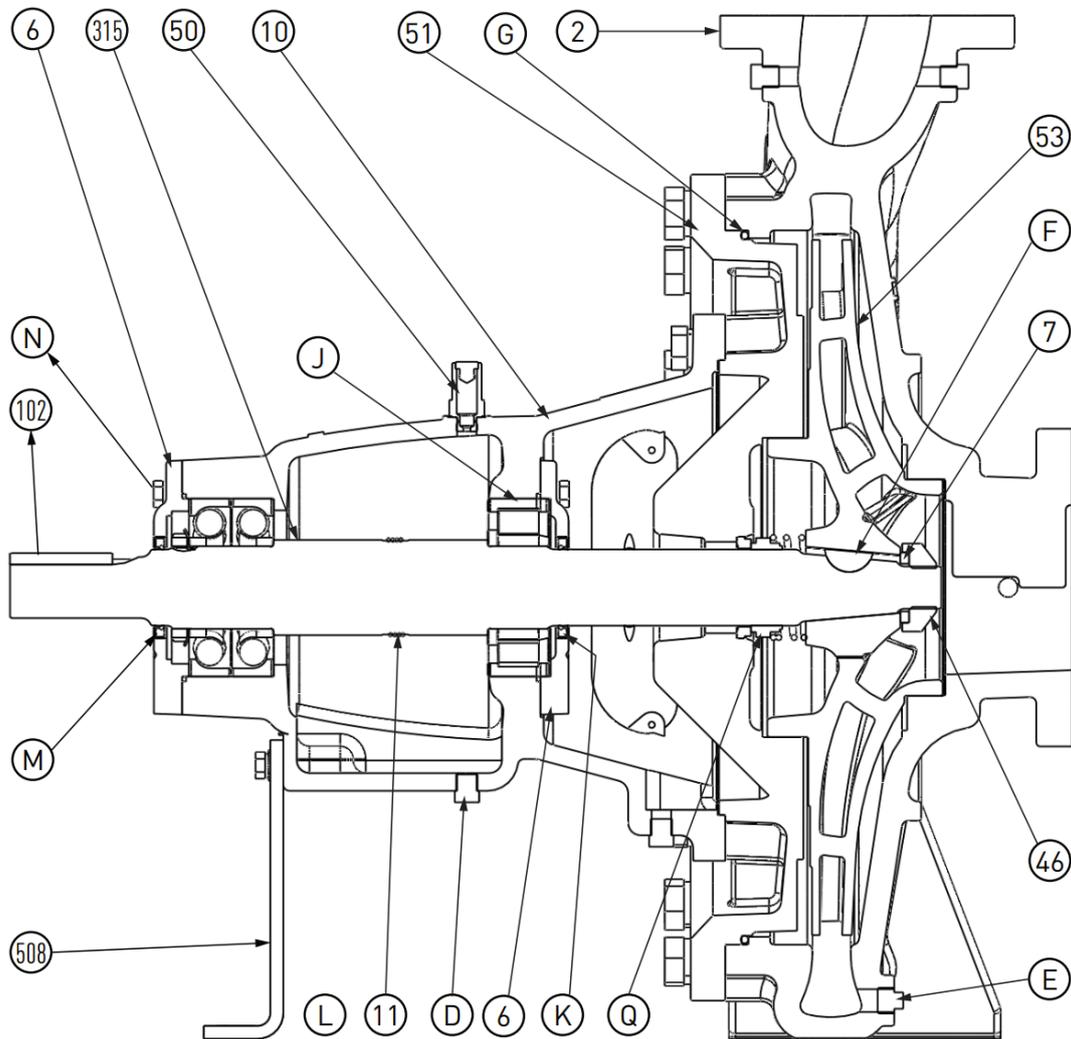
**263 - High Strength Thread Locker**  
 Note: Use sparingly

**GA50 - Molybond Anti Seize Lubricant or Equivalent**  
 (Used during stainless steel pump assembly only)

**680 - High Strength Retaining Compound**  
 (For press fitting wear-rings/neck-rings)

**La-Co SlicTite Pipe Thread Compound**  
 OR  
**567 - Master Pipe Sealant** (when fast setting required)

Cross Section and Parts List



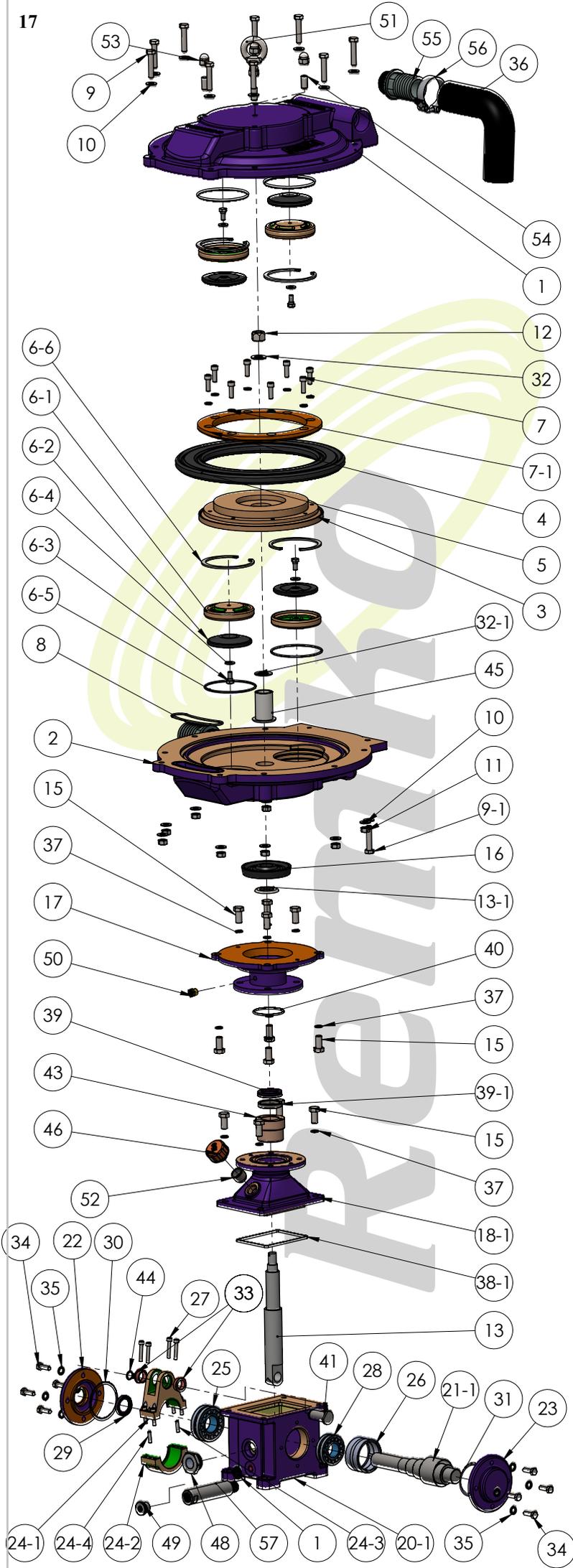
ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
2	Volute Casing	102	Shaft Key	J	Bearing - Impeller End
6	Bearing Cover	301	Bearing Housing	K	Dust Seal - Impeller End
7	Impeller Lock Washer	315	Shaft	L	Oil Level Plug (NS)
11	Oil Thrower	508	Support Foot	M	Dust Seal - Pulley End
14	Water Slinger	D	Oil Drain Plug	N	Bearing - Pulley End
46	Impeller Nut	E	Casing Plug	P	Gland Flushing Plug (NS)
50	Oil Breather	F	Impeller Key	Q	Mechanical Seal
51	Backplate	G	Casing O-Ring	R	Packed Gland (NS)
53	Impeller			(NS)	Part Not Shown

## TROUBLESHOOTING

Problem	Probable Causes	Corrective Action
Pump will not prime	Blockages on suction pipe	Inspect strainers and other potential sources of blockage on suction piping. Open or, preferably, eliminate valves on suction piping.
	Priming chamber valve is closed	Open ball valve on top of priming chamber.
	System is leaking	Inspect suction piping, priming system, and discharge check valve for leaks. Tighten flanges as needed. Replace worn gaskets or piping as needed.
	Volute case drain ball valve open	Close the drain ball valve.
	Priming system is not operating properly	Inspect the vacuum priming system, including pump and vacuum chamber. Use vacuum plate with gauge to verify proper operation of vacuum pump.
	Insufficient NPSHA (Noise may not be present)	Recalculate NPSH available. It must be greater than the NPSH required by pump at desired flow.
Pump is carrying over	Flooded suction	Close ball valve on top of priming chamber.
	Priming Valve is compromised	Inspect priming valve and linkage. Replace worn parts.
	Pump is running off curve	Replace with different pump or model or adjust flow to within limits.
Inadequate flow	Insufficient NPSHA (Noise may not be present)	Recalculate NPSH available. It must be greater than the NPSH required by pump at desired flow.
	System is leaking	Inspect suction piping, priming system, and discharge check valve for leaks. Tighten flanges as needed. Replace worn gaskets or piping as needed.
	Worn pump internals, such as cutwater, wear ring, etc.	Inspect pump volute cutwater and wear ring. Replace as needed.
	Blockage in the system	Inspect impeller for ragging, fouling, or blockage. Clean as needed.
	Impeller trim is wearing out	Replace impeller.
	Closed discharge valves	Check and open all valves completely.
Inadequate pressure	System is leaking	Repair or tighten piping.
	Wear ring is worn	Check wear ring clearance. Replace wear ring parts as necessary.
	Worn pump internals, such as cutwater, wear ring, etc.	Inspect pump volute cutwater and wear ring. Replace as needed.
	Insufficient NPSHA (Noise may not be present)	Recalculate NPSH available. It must be greater than the NPSH required by pump at desired flow.
	Impeller trim is wearing out	Replace impeller.
Pump is making strange noises	Pump is running off curve	Replace with different pump.
	Suction is blocked	Make sure water level is deep enough and strainer and piping is clean.
	Impeller and/or wear ring is rubbing	Inspect components for rub marks.
	Insufficient NPSHA	Recalculate NPSH available. It must be greater than the NPSH required by pump at desired flow.
Mechanical seal is failing	Fluid temperature is too high	Make sure pumped fluid is less than 350 °F (177 °C) for standard centrifugal pumps. Make sure pumped fluid is less than 200 °F (93 °C) for pumps with Remko Priming System.
	Fluid is incompatible with pump	Refer to the pump owner's manual for fluid compatibility.
	Casing pressure is too high	Make sure casing pressure is no more than 250 PSI (17.23 BAR).
	Fluid is too abrasive	Check fluid composition and percent of solids. Refer to the pump's specifications.

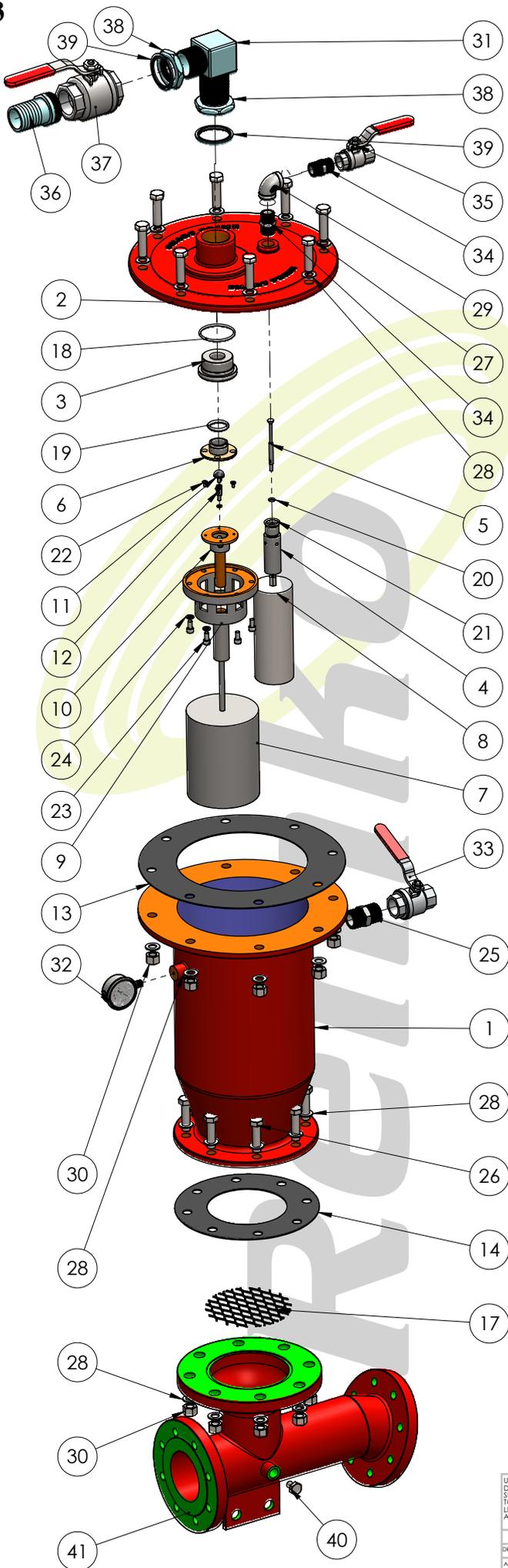
## TROUBLESHOOTING (continued..)

Problem	Probable Causes	Corrective Action
Pitting of impeller and / or casing	Pump is cavitating	Reduce suction head and suction pipeline friction losses by increasing the pipe sizes
Pump Jammed	Flow is too low	Increase the flow of the pump through throttle valve or increase pump speed
	Foot valve or check valve or strainer is blocked	Clean valves and strainer
Bearing is getting hotter	Bearing temperature rise	Test bearing temperature on a regular basis to ensure that bearing remains within normal temperature range
	Insufficient bearing lubrication	Check and fill sufficient oil
	Engine / motor vibration	Eliminate vibration / or relocate pump.
	Presence of water in pump bearing housing	Contact Remko or authorized service contractor.
Increase in power absorbed (engine struggling)	Rotary speed is too high	Check engine speed and reset the design speed.
	Head is too low (flow is too high)	Throttle the discharge valve to reduce flow.
	Pumped liquid is too thick	Dilute liquid if necessary
	Bearing failure	Check and replace bearing



Sl.No.	DESCRIPTION	MATERIAL	QTY
1	UPPER BODY CASING	ALUMINIUM	1
2	LOWER BODY CASING	ALUMINIUM	1
3	MAIN DIAPHRAGM DISC	ALUMINIUM	1
4	DIAPHRAGM LOCKING RING	ALUMINIUM	1
5	MAIN DIAPHRAGM	BUTA N RUBBER	1
6	VALVE ASSEMBLY		4
6-1	VALVE BODY	ALUMINIUM	4
6-2	VALVE RUBBER	BUTA N RUBBER	4
6-3	SUPPORT BOLT-M8X15	SS-304	4
6-4	SUPPORT FLAT WASHER- 10.5*20*2	304 STAINLESS STEEL	4
6-5	O-RING - 101.34*1.78 (BS 045)	BUTA N RUBBER	4
6-6	INTERNAL CIRCLIP	SPRING STEEL	4
7	CAP HEAD BOLTS	SS-304	8
7-1	SPRING WASHER-M8	SS-304	8
8	O-RING - 92*3.53 (BS 239)	BUTA N RUBBER	1
9	CASING BOLT-M10X50	ZINC BLUE	8
9-1	CASING BOLT-M10X40	ZINC BLUE	2
10	CASING FLAT WASHER(FW10)	ZINC BLUE	18
10-1	CASING SPRING WASHER(SW10)	ZINC BLUE	10
11	CASING NUT(N10)	ZINC BLUE	8
12	PREVAILING TORQUE M16 NUT	ZINC BLUE	1
13	UPPER SHAFT	16MnCr5/20MnCr5	1
13-1	UPPER SHAFT WASHER	SS 304	1
15	BOLT-M12X25	ZINC BLUE	12
16	UPPER SHAFT SEALING RUBBER	BUTA N RUBBER	1
17	SHAFT HOUSING	CS En-SGS-500/7	1
18	CONNECTION HOUSING SINGLE UNIT ON SINGLE BASE	CS En-SGS-500/7	1
20-1	BEARING HOUSING-SINGLE CAM SHAFT	CS En-SGS-500/7	1
21-1	CAM SHAFT-SINGLE CAM SHAFT	16MnCr5/20MnCr5	1
22	FRONT BEARING COVER	CS En-SGS-500/7	1
23	BACK BEARING COVER	CS En-SGS-500/7	1
24	CONROD ASSEMBLY		1
24-1	UPPER BODY CASING	SS304	1
24-2	LOWER BODY CASING	SS304	1
24-3	DOWEL PIN 6x25	En-31	2
25	FRONT SHAFT BEARING	SPHERICAL ROLLER BEARING	1
26	CAM SHAFT BEARING	NEEDLE ROLLER BEARING	1
27	CAP HEAD SCREW M6X30	Unbreakable black finish	4
28	BACK SHAFT BEARING	SPHERICAL ROLLER BEARING	1
29	LIP SEAL - 40*30*7	BUTA N RUBBER	1
30	O-RING FOR FRONT COVER-71.12*2.62	BUTA N RUBBER	1
31	O-RING FOR BACK COVER - 61.91*2.62 (BS 143)	BUTA N RUBBER	1
32	SHAFT SLEEVE WASHER-35*20*2	SS 304	1
32-1	TORQUE NUT WASHER-30*16.5*2	SS 304	1
33	CONNECTING ROD BUSH	BRONZE	2
34	COVER BOLT-M8X25	ZINC BLUE	8
35	SPRING WASHER (SW8)	ZINC BLUE	12
36	RUBBER HOSE	RUBBER	1
37	SPRING WASHER(SW12)	ZINC BLUE	12
38-1	O-RING FOR CONNECTION HOUSING COVER-SINGLE CAM - 119.06*2.62 (BS157)	BUTA N RUBBER	1
39	U-SEAL - 48*35*8	BUTA N RUBBER	1
39-1	U-SEAL LOCKING RING 48*38*8mm	En-8	1
40	O-RING FOR CONNECTION HOUSING COVER - 55.25*2.62 (BS139)	BUTA N RUBBER	1
41	GUIDEON PIN	16MnCr5/20MnCr5	1
43	2" BSP WEAR BUSH	BRONZE	1
44	EXTERNAL CIRCLIP 20mmX 1.5mm	SPRING STEEL	1
45	UPPER SHAFT SLEEVE	16MnCr5/20MnCr5	1
46	BREATHER CAP - 1/2"BSP		1
48	OIL SIGHT GLASS -1"BSP	704s11	1
49	SOCKET HEAD OIL DRAIN CAP - 1/2"BSP WITH RUBBER GASKET INSERT TYPE	ZINC BLUE	1
50	PNEUMATIC SILENCER-1/4"	BRASS	1
51	EYE BOLT M12	ZINC BLUE	1
52	EXTENSION FOR BREATHER CAP	SS304	1
53	DOMED NUT M12	En-31	4
54	M12*25mm GURB SCREW	ZINC BLUE	4
55	M45*1.5mm Inlet/outlet Nipple	ZINC BLUE	2
56	HOSE CLAMP	SS	1
57	OIL DRAIN EXTENSION	EN8	1
58	1/2" GASKET METAL & RUBBER MOLUDED		1

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:	DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION B
DRAWN A.A.		SIGN	DATE 29-02-20	<b>REMKO</b> <b>PAGE 36</b> TITLE: <b>DIAPHRAGM PUMP 50CFM</b>	
CHK'D A.A.			DATE 29-02-20		
APP'VD S.P.					
MFG Q.A.					
MATERIAL:		WEIGHT:		DWG NO.	SHEET 1 OF 1
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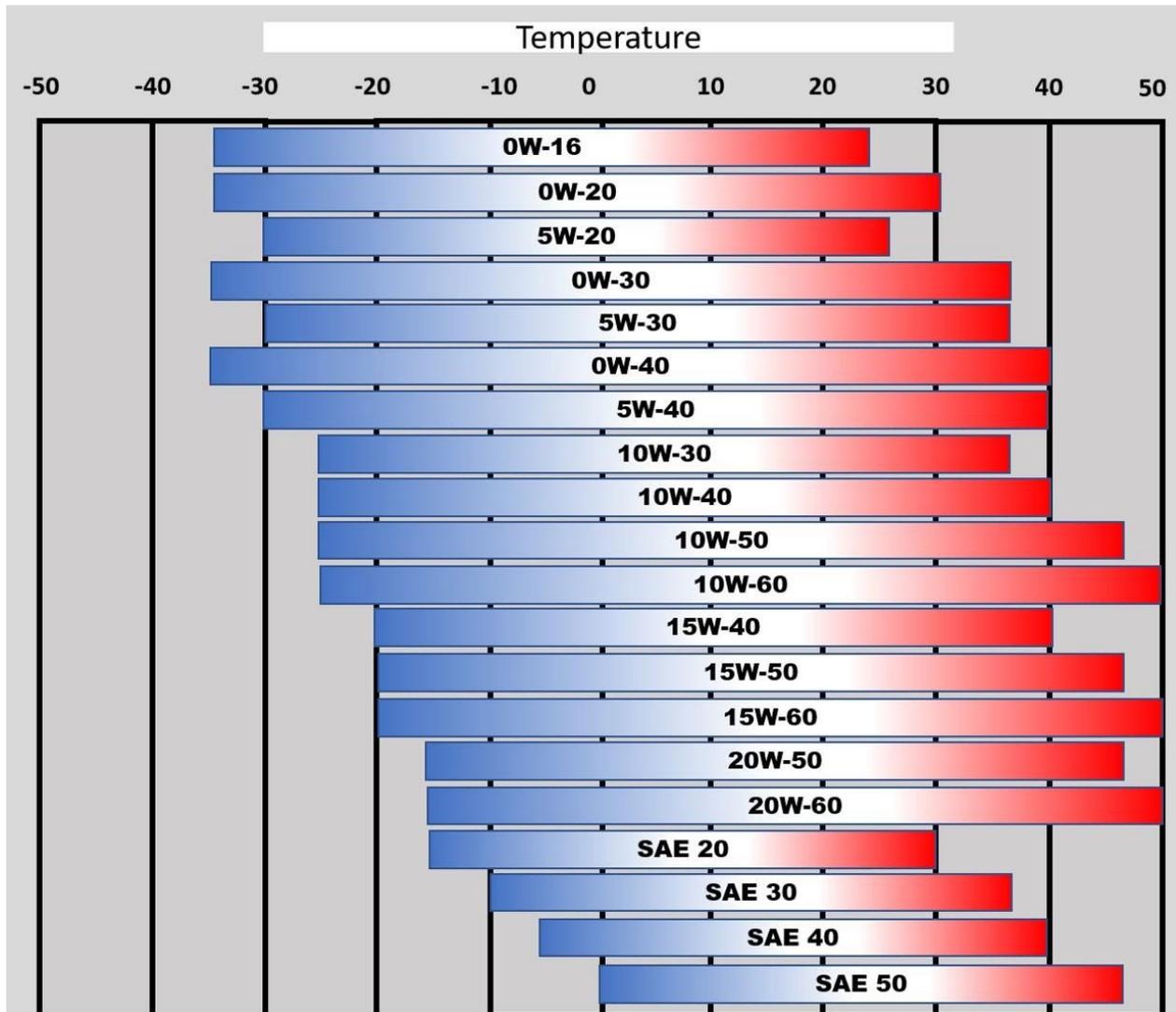


SL.NO	DESCRIPTION	MATERIAL	QTY
1	PRIMING TANK	SGI500/7	1
2	TOP FLANGE	SGI500/7	1
3	MAIN VALVE INSERT	SS304	1
4	SAFETY VALVE BODY	SS304	1
5	SAFETY VALVE	SS304	1
6	VALVE BODY	SS304	1
7	MAIN FLOAT	SS304	1
8	SAFETY FLOAT	SS304	1
9	LARGE VALVE HOUSING	SS304	1
10	SMALL VALVE HOUSING	SS304	1
11	SMALL VALVE RUBBER WITH SCREW ON THREAD	SS304	1
12	MAIN FLOAT EXTENSION	SS304	1
13	PRIMING TANK TOP FLANGE GASKET	RUBBER	1
14	PRIMING TANK BOTTOM FLANGE GASKET	SS304	1
17	STAINLESS STEEL MESH GRATE 166mm DIAMETERx2mm THICK	SS304	1
18	O-RING - BS230 (63.5*3.53)	NBR	1
19	O-RING - (28*6)	NBR	1
20	O-RING - BS109 (7.94*2.62)	NBR	1
21	O-RING - BS213 (23.81*3.53)	NBR	1
22	M5 COUNTERSUNK SCREW X 10mm LONG	SS304	4
23	CAP HEAD SCREWS	SS304	6
24	M8 SPRING WASHER	SS304	6
25	1" HEX EXTENSION CONNECTOR	SS304	1
26	M16 BOLTx60mm LONG	ZINC BLUE	8
27	M16 BOLTx50mm LONG	ZINC BLUE	8
28	M16 FLAT WASHER	ZINC BLUE	32
29	3/4" BSP ELBOW	SS304	1
30	M16 NUT	ZINC BLUE	16
31	2" BSP M&F ELBOW	SS304	1
32	VACUUM GAUGE	A79	1
33	1" BALL VALVE	SS304	1
34	3/4" 1" HEX EXTENSION CONNECTOR	SS304	2
35	3/4" BSP BALL VALVE	SS304	1
36	2" BSP NIPPLE	En8 Zinc Blue	1
37	2" BSP BALL VALVE	SS304	1
38	2" BSP NUT	ZINC BLUE	2
39	2" RUBBER INSERT WASHER	ZINC BLUE	2
40	DRAIN CAP - 1/2" BSP	ZINC BLUE	1
41	T-CONNECTOR		
41-1	TEE CONNECTOR 100mm	SGI500/7	1
41-2	TEE CONNECTOR 125mm	SGI500/7	1
41-3	TEE CONNECTOR 150mm	SGI500/7	1
41-4	TEE CONNECTOR 200mm	SGI500/7	1
41-5	TEE CONNECTOR 250mm	SGI500/7	1

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DRAWN A.A			SIGNATURE	DATE 05/08/21	TITLE: <b>REMKO PRIMING TANK ASSEMBLY</b>		
APP'D A.A				DATE 05/08/21	DWG NO. <b>PRIMING TANK</b>		
MFG					A3		
Q.A					SCALE:1:20		
					SHEET 1 OF 1		

## LUBRICATION OIL SELECTION CHART

All systems use a SAE15W-40 motor oil as it can withstand the higher operating temperatures. However, if the pump is used in temperatures below freezing point, refer to the chart below for alternative oil types. Make sure that the oil is replaced every 2000 operating hours. Do not overfill as this could lead to overheating of the system.



### Oil Capacities

Compartment	Lube Specification	Capacity (mL)
Priming Pump / Vacuum Pump (50cfm)	SAE15W-40	350 mL
Priming Pump / Vacuum Pump (100cfm)		600 mL
Bearing Frame Housing		1800 – 2000 mL
Run-Dry Seal Gland and Reservoir (Mechanical Seal Cooling System)		1900 mL

## MAINTENANCE SCHEDULE

The following regular maintenance schedule is recommended as a minimum to keep your pump in top condition. The maintenance should be undertaken by suitably qualified staff. \*\* If you are unsure about how to undertake the maintenance, we suggest that you get in contact with your dealer or Remko. It is important to use original spare parts to maintain the unit in a safe working order and also to maintain your warranty. \*\*

	Daily**	Weekly**	Every 500 hours**	Every 2000 hours**	Every 4000 hours**
Check hose and water connections for leaks	*	Replace any leaking seals or gaskets			
Check and clean inlet water strainer	*	*	*	*	*
Check bearing temperatures on the main pump and diaphragm pump bearing housing		*	*	*	*
Inspect the pump casing for leaks	*	*	*	*	*
Inspect and retention the priming pump belts	Retention belts after first 100 hours operation		*		
Inspect the condition of wear on the impeller (measure wear gap)					*
Inspect the condition of priming system to check the suction—see page 8	*	*	*	*	*
Replace the diaphragm pump check valves if required.				*	*
Replace the two diaphragm pump diaphragm rubbers					*
Guide / wear bush and oil seal:					*
Replace mechanical seal	When water is leaking from the cooling system				

Note: Remko's standard warranty may be void if not complied with.





**www.remko.com.au  
Australia**

**1800 333 424**

*This Remko product is supplied by:*

A large, empty rectangular box with a dashed black border, intended for the name of the supplier.