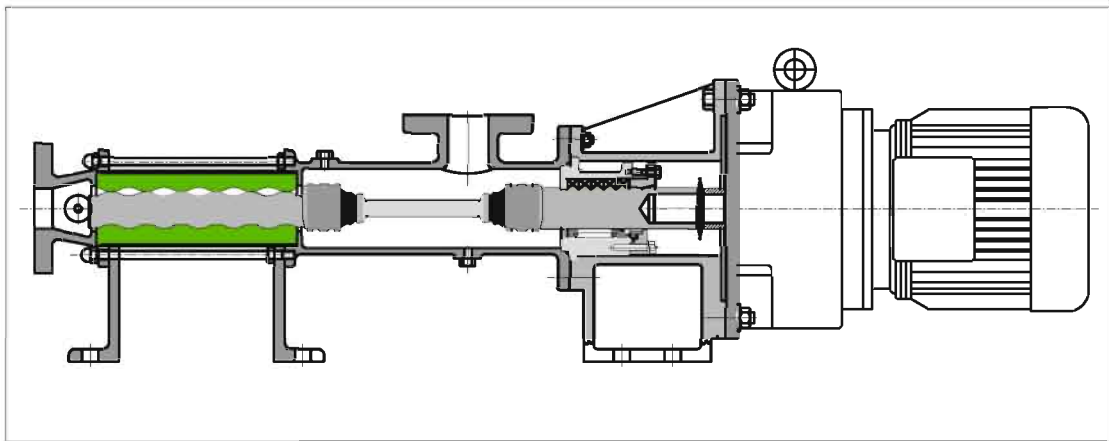


ROTOMAC PROGRESSIVE CAVITY PUMPS
INSTALLATION, OPERATION AND MAINTENANCE MANUAL

SERIES : SDCP/SDCA/SDCM/SDCN



ROTOMAC INDUSTRIES PVT. LTD.

WORKS, HEAD & REGISTERED OFFICE

D-4A, PANKI INDUSTRIAL AREA, SITE-1,

KANPUR-208 022

PHONES : 2691704 / 2691705, FAX : 0512 - 2691706

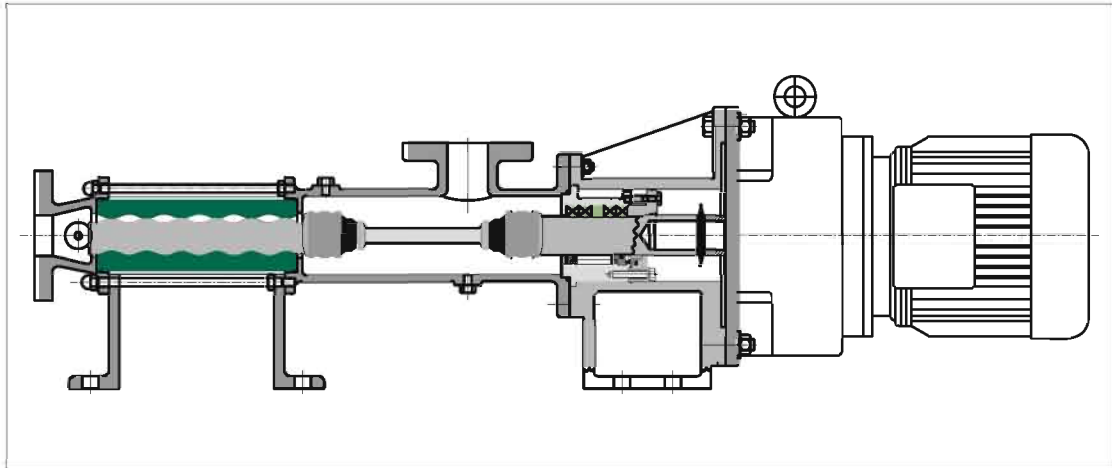
E-Mail : contact@rotomac.org; marketing@rotomac.org; rotomac@vsnl.net

ROTOMAC PROGRESSIVE CAVITY PUMPS ::: THE FINE ART OF PUMPOLOGY

ROTOMAC PROGRESSIVE CAVITY PUMPS

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

'SDCP/SDCA/SDCM/SDCN' SERIES PUMPS



Sl. No.	Table of Contents	Page
1.	SPECIFICATION	1
2.	IMPORTANT NOTES	2
3.	INSTALLATION & SAFETY RECOMMENDATIONS	2
4.	PRE-OPERATIVE CAUTIONS	2
5.	STARTUP AND ROTATION	3
6.	GENERAL INFORMATION ON GLAND PACKING YOKE SHAFT & COUPLING ROD	3
7.	DISMANTLING	4
8.	REASSEMBLY	5-6
9.	MECHANICAL SEAL & ASSEMBLY	7-8
10.	MAINTENANCE AND SERVICE	9
11.	FAULT FINDING & REMEDYING	10-11
12.	EXPLODED VIEW OF PUMP ASSEMBLY & PARTS LIST	12-13
13.	STANDARD PARTS DETAILS	14
14.	RECOMMENDED SPARES	15

1. SPECIFICATION

1.1 **BASICS:** Screw Pumps are a special type of Positive Displacement Pumps in which flow through the Pumping elements is truly axial. The liquid is carried between screw threads on one or more rotors and is displaced axially as the screws rotate & mesh. In all other rotary pumps the liquid is forced to travel circumferentially, thus giving the screw pump with its unique axial flow pattern and low internal velocities, a number of advantages in many application where liquid agitation or churning is objectionable. The Single Screw Pump exists only in a limited number of configurations. The rotor thread is eccentric to the axis of rotation and meshes with internal threads of the stator (rotor housing), alternatively the stator is made to wobble along the pump centerline.

1.2 **THEORY:** In screw pumps, it is the intermeshing of the threads & close fit of the surrounding housing which create one or more sets of moving seals between pump inlet & outlet. These sets of seals act as a labyrinth & provide the screw pump with its positive pressure capability. The successive sets of seals form fully enclosed cavities, which move continuously from inlet to outlet. These cavities trap liquid at the inlet & carry it along to the outlet, providing a smooth flow.

1.3 **DESIGN CONCEPTS:** The pressure gradient in the pump element of all types of screw pumps produces various hydraulic reaction forces. The mechanical and hydraulic techniques employed for absorbing these reaction forces are among the fundamental differences in the type of screw pumps produced by various manufacturers. Another fundamental difference lies in the method of engaging or meshing the rotors and maintaining the running clearances between them.

1.4 SCOPE

1.4.1 **'SDCP/SDCA/SDCM/SDCN' Series 'ROTOMAC' Pumps** are used for handling viscous / non viscous fluids, and pulped material in suspension. It is an ideal pump for metering and dosing. This series of pumps are deployed in various industries, like, bulk explosives & emulsions, chemical & process, canning, edible oils, effluent & sewage treatment, electronics, engineering, fertilizer, paper, paint & varnish, petrochemical, soap & detergent, sugar mills & distilleries, starch factories, etc.

1.4.2 These type of **'ROTOMAC' Pumps** are constructed in good quality gray cast iron and the rotating parts generally of Nickel Chrome Steel, hardened and hard chrome plated to withstand wear and abrasion. Stainless Steel rotating as well as housing parts are used for normal corrosive fluids and the rotor scroll as well as the shaft under gland are being hard chrome plated for abrasive duties.

1.5 DUTY CONDITIONS:

'SDCP/SDCA/SDCM/SDCN' Series 'ROTOMAC' Pumps should be installed only on specific duties for which they have been supplied. In case pumps are required to be used for other applications, manufacturer's prior recommendation should be sought in the interest of safety, plant efficiency and the pump life.

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.:
Released	01.09..2014	A.G.	Sd.	RIPL : O & MM : 12

2 IMPORTANT NOTES

- 2.1 In order to achieve reliable performance and long service life, the pump must be checked and maintained at regular intervals, strictly according to the instructions.
- 2.2 These instructions should be placed at the disposal of operating and maintenance staff and should be carefully followed.
- 2.3 The manufacturer do not take any responsibility for damage occurring due to non-observance of these operating instructions.
- 2.4 Warning Plates on the pump showing correct direction of rotation, warning against Dry Running, must always be observed and kept completely legible.

3 INSTALLATION AND SAFETY RECOMMENDATIONS

- 3.1 **'SDCP/SDCA/SDCM/SDCN'** Series **'ROTOMAC'** Pumps must be installed with their base plates mounted on a flat surface, grouted and bolted, thus ensuring firm fixing and reduction in noise and vibration. Sufficient space is to be left for removal of the stator during the maintenance work.
- 3.2 All pipe works should be independently supported to avoid any load on the pump.
- 3.3 To eliminate vibration, the pump must be checked for proper alignment with the drive unit before and after the pipe fittings. Maximum permitted misalignment tolerances for a standard installation are – Radial Shift: 1 % of the largest external diameter in the pump assembly and the Angular Misalignment: $\pm 1^{\circ} 30'$

It is recommended that a vacuum gauge be fitted to the pump suction branch and a pressure gauge fitted to the delivery branch to facilitate continuous monitoring of the pump operating conditions.

- 3.4 When motor is being wired and checked for direction of rotation, it must be decoupled from the pump to prevent dry running. Wiring works of all electrical equipments should be carried out by qualified personnel and complied with the relevant national regulations.
- 3.5 Care must be taken to protect all electrical items from oil and water.
- 3.6 Pump Safety Devices are to be ensured in place before starting the pump.

4 PRE-OPERATIVE CAUTIONS

- 4.1 THE **'ROTOMAC'** PROGRESSIVE CAVITY PUMPS SHOULD NEVER BE RUN IN A DRY CONDITION, EVEN FOR A FEW REVOLUTIONS AS THIS WILL DAMAGE THE RUBBER STATOR.
- 4.2 AS THE PUMP REQUIRES HIGH STARTING TORQUE, USE OF ONLY DIRECT-ON-LINE STARTER IS RECOMMENDED WITH SQUIRREL CAGE INDUCTION MOTOR.
- 4.3 **'ROTOMAC'** PROGRESSIVE CAVITY PUMPS SHOULD NEVER BE STARTED AGAINST CLOSED VALVES.

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.:
Released	01.09..2014	A.G.	Sd.	RIPL : O & MM : 12

5. START-UP AND ROTATION

- 5.1 The Pump Housing (01) must be filled with the relevant pumping media before starting. In case of high viscosity media, fill with a liquid. This initial filling is not for priming purpose; but to provide the necessary lubrication to the rubber stator until the pump primes itself.
- 5.2 When the pump is stopped, sufficient product is trapped in, to provide lubrication for the next starting, but if the pump is lying idle or it has been dismantled for servicing / relocation, the pump must be filled with relevant product and given a few turns by hand before starting.
- 5.3 **'SDCP/SDCA/SDCM/SDCN' Series 'ROTOMAC' Pumps** are normally arranged for counterclockwise rotation (viewing from the driving end) which results in the flange nearer to the driving end, being the suction. Pumps fitted with direction dependent seals should never be run in the opposite direction of the rotation arrow. In case where necessary, it is advisable to contact the Factory, to run the pump in the reverse direction so as to bring the delivery at the driving end.
- 5.4 Open the valves before starting the pump. Never run the pump against a closed outlet or inlet valve!
- 5.5 If the pump is having Mechanical Seal shaft sealing arrangement, connect the supply lines for the flushing and quenching fluids before the pump is put into operation.

6. GENERAL INFORMATION

6.1 STUFFING BOX/GLAND PACKING:

The packing is provided to arrest the entry of air in the system when the pump is under suction, and leakage of the product when the pump is under pressure. The Gland (04) should be tightened sufficiently with the help of the gland nuts (30) just to prevent the entry of air / leak when the pump is in operation. A slight drip from the gland (04) when the gland is working under pressure does not harm; but ensures lubrication of the packing. The Gland packing is not to be over tightened.

6.2 YOKE SHAFT:

Yoke Shaft (07) is manufactured as one solid piece with yoke head, to carry the Universal Joint, which ensures a true concentric motion and does not disturb the gland packing/mechanical seal during operation.

6.3 COUPLING ROD/AUGER CUM COUPLING ROD:

Extra long Coupling Rod/Auger Cum Coupling Rod/Auger cum Coupling Rod/Auger Cum Coupling Rod (09), connecting shaft to the rotor, minimize the wear and tear of the universal joints and increase the life of the pumps.

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.: RIPL : O & MM : 12
Released	01. 09. 2014	A.G.	Sd.	

- 7. DISMANTLING:**
- 7.1 Unscrew the 4 domed nuts (25) fitted to the Tie Rods (22) and remove the End Cover (02). Unscrew the Hex. Head Bolts clamping the Support Plate (41) to the Base Plate and remove. Unscrew the Tie Rods (22) from the Pump Housing (01). {For selected sizes, after loosening the Hex. Nuts (42&43) unscrew the Hex. Nuts (42) and loosen the middle Support Plate (*41). Unscrew the Tie Rods (22) from the Pump Housing (01). Withdraw the Support Plate (41)}
- 7.2 Hold the Yoke Shaft (07) and unscrew the Bonded Stator (14). If the stator offers some resistance, pour a little water through the opening to ease out this stiffness.
- 7.3 Unscrew the 4 Hex. nuts (24 &25) holding the Pump Housing (01) to the Body (37) and withdraw the Pump Housing (01).
- 7.4 Slip back the both the Boot Seal Retainer (13) from the Boot Seal over the Coupling Rod/Auger Cum Coupling Rod (09). Slip back the Pin Retainer Sleeve (12) and the Boot Seal (18) from its groove and slide them over the Coupling Rod/Auger Cum Coupling Rod (09) from the rotor end. Knock out the Coupling Rod Pin (10) and withdraw the Rotor (08). Remove the 'O' Rings (17) from the rotor head.
- 7.5 Execute the above procedures as applicable at the other end of the Coupling Rod/Auger Cum Coupling Rod and withdraw the Coupling Rod/Auger Cum Coupling Rod (09) from the Yoke Shaft (07) head. Remove the Pin Retainer Sleeve (12), Boot Seal (18) and the Boot Seal Retainer (13) from the Coupling Rod/Auger Cum Coupling Rod (09). Remove the O-Rings (16) for Coupling Rod/Auger Cum Coupling Rod for possible replacement.
- 7.6 Slide the Water Thrower (19) from the groove and knock out the Yoke Pin (28) from the Yoke Shaft (07) holding the Prime Mover Shaft. Draw out the Yoke Shaft (07) from the Prime Mover Shaft alongwith the Stuffing Box (03), Gland (04) and the Water Thrower (19).
- 7.7 Slip out the Water Thrower (19) and draw out the Stuffing Box (03) alongwith the Gland (04) from the Yoke Shaft (07). Remove the O Ring (15) from the face of the Stuffing Box (03) to replace the same .
- 7.8 **OPTIONAL:** Slide the Water Thrower (19) from the groove and knock out the Yoke Pin (28) from the Yoke Shaft (07) holding the Prime Mover Shaft. Draw out the Yoke Shaft (07) from the Prime Mover Shaft alongwith the Mech. Seal Housing (05), Mech. Seal (21), O-Ring for Seal Clamping Plate (33), Seal Clamping Plate (06) and the Water Thrower (19). Slip out the Water Thrower (19) and unscrew the 4 Hex Head Bolts (32) from the Seal Clamping Plate (06). Unscrew the grub screws holding the Mech. Seal (20) at the preset distance to the Yoke Shaft (07) and slide out the Mech. Seal (21) alongwith the Seal Clamping Plate (06).
- 7.9 Remove the O Rings (16&17) from the Coupling Rod/Auger Cum Coupling Rod (09), Rotor (14) head and Yoke Shaft (07) head for possible replacement while assembling.
- 7.10 If only the Prime Mover (44) is to be removed for servicing, the same can be dismantled without dismantling the pump. Slide the Water Thrower (19) from the groove and knock out the Yoke Pin (28) from the Yoke Shaft (07) holding the Prime Mover Shaft. and unscrew the 4 hex head bolts, nuts & spring washers (38,39&40) assembling the Body (37) to the Prime Mover (44) flange. Draw the Prime Mover from the Yoke Shaft (07) for servicing. Reverse the procedure for assembling.
- 7.11 Unscrew the Hex Nuts (30&31) holding the Gland (04) and remove the same from the Stuffing Box (03). Remove the Gland Packing (20) from inside the Stuffing Box (03) for replacement while assembling.

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.:
Released	01. 09. 2014	A.G.	Sd.	RIPL : O & MM : 12

8. REASSEMBLY: To reassemble the pump, please follow the procedure as detailed below:

8.1 Assemble the Body (37) to the Prime Mover (40) flange with the 4 hex head bolts, nuts & spring washers (38,39&40) ensuring right position of the Motor connection terminal in relation to the base of the Body (37).

8.2 Assemble Stuffing Box with Gland (03 & 04) / Mechanical Seal with Housing/Seal Clamping Plate (05 & 06) over the Yoke Shaft (07) close to the shaft head. Slide the Water Thrower (19) over the Yoke Shaft (07) after the Gland (04)

OPTIONAL: In case of shaft sealing by Mechanical Seal, reverse the procedure explained in 7.8

8.3 Fill-in the required size & rings of Gland Packing (20) inside the Stuffing Box (03). Assemble the Gland (04) on to the Stuffing Box Studs (29) and tighten the Gland (04) as required with the Hex Nuts placing the Spring Washer in between (30&31).

8.4 Slide the Yoke Shaft, Stuffing Box/Mech Seal Housing, Gland/Seal Clamping Plate & Water Thrower (07,03/05,04/06 & 19) assembly onto the Prime Mover (44) shaft till the Yoke Shaft (07) butts to the step of the Prime Mover shaft. Align the holes of the Yoke Shaft (07) and the Prime Mover shaft. Insert the Yoke Pin (28) and slide the Water Thrower (19) over the Yoke Shaft (07) groove to retain the Yoke Pin (28).

8.5 First place 2 Nos. Boot Seal Retainers (13) and then 2 Nos. Boot Seals (18) facing away each other onto the Coupling Rod/Auger Cum Coupling Rod (09) body.

8.6 Place 2 Nos. O Rings (16) on the neck of the Coupling Rod/Auger Cum Coupling Rod (09) on both the ends.

8.7 Place the small side of the Boot Seals (18) in their respective grooves on both ends of the Coupling Rod (09) and place the Boot Seal Retainers (13) in place one each over the Boot Seals (18) to retain the Boot Seals (18) in their grooves. Fold the bigger end of the Boot Seals (17) to their back and keep.

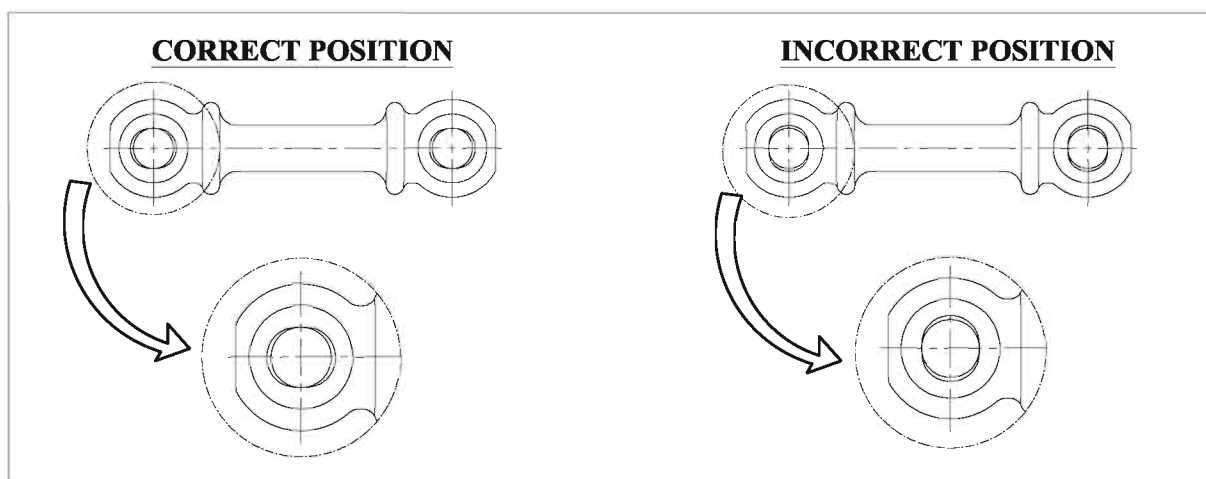
8.8 Place 2 O-Rings (17) for Pin Retainer Sleeve in their grooves on the head of the Yoke Shaft (07). Place some Grease in the bore of the yoke shaft head

8.9 Place 2 Nos. Pin Retainer Sleeves (12) over the body of the Coupling Rod/Auger Cum Coupling Rod (09) and offer one end of the Coupling Rod/Auger Cum Coupling Rod (09) to the Yoke Shaft (07) head. Aligning the holes on the Coupling Rod/Auger Cum Coupling Rod (09) and the Yoke Shaft (07) insert the Coupling Rod Pin (10) in place.

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.:
Released	01. 09. 2014	A.G.	Sd.	RIPL : O & MM : 12

8. REASSEMBLY (Contd.)

- 8.10 Unfold the bigger of the Boot Seal (18) and mount the same in the front groove on the Yoke Shaft (07) head. Slide the Pin Retainer Sleeve (12) over the Yoke Shaft (07) head.
- 8.11 Connect the other end of the Coupling Rod/Auger cum Coupling Rod (09) to the Rotor (08)head adopting the same procedures as applicable/described in 8.8, 8.9 & 8.10.
- 8.12 Keeping the Suction Port on top, offer the Pump Housing (01) with 'O' Ring (15) in its position on the face of the Stuffing Box (03) to the Body (37) and assemble the Pump Housing (01) with the 4 Studs, Hex Nuts and Spring Washers (23, 24 & 25).
- 8.13 Wet the Bonded Stator (14) and thread it over the Rotor (08). Home the Bonded Stator in position in the Pump Housing (01) .
- 8.14 Screw the 4 Tie Rods (22) in the Pump Housing (01)
- 8.15 Insert the Spring Washers (43) after the Hex. Nuts (42) was placed in position on the bottom 2 Tie Rods (22), insert the Support (41) and the End Cover (02) over the Tie Rod end (22) and secure them with the Domed Nuts/Sp. Washers (26/27).
- 8.16 Insure that the positions of the Pump Housing (01) and Body (37), the Stator With the Pump Housing (01), and the End Cover (02) with the Stator(14) are correct.
- 8.17 Recheck that all the fasteners are fully tightened and completeness of the parts as per exploded view of the Pump assembly drawing of ' SDCP/SDCA/SDCM/SDCN' series of 'ROTOMAC' Progressive Cavity Pumps.
- 8.18 Care should be taken while replacing the Coupling Rod Bushes. The elongated holes in the bushes must face each other and fall-in line with the length of the Coupling Rod. The right method of fitting / pressing the Coupling Rod Bushes in the Coupling Rod is shown as below:



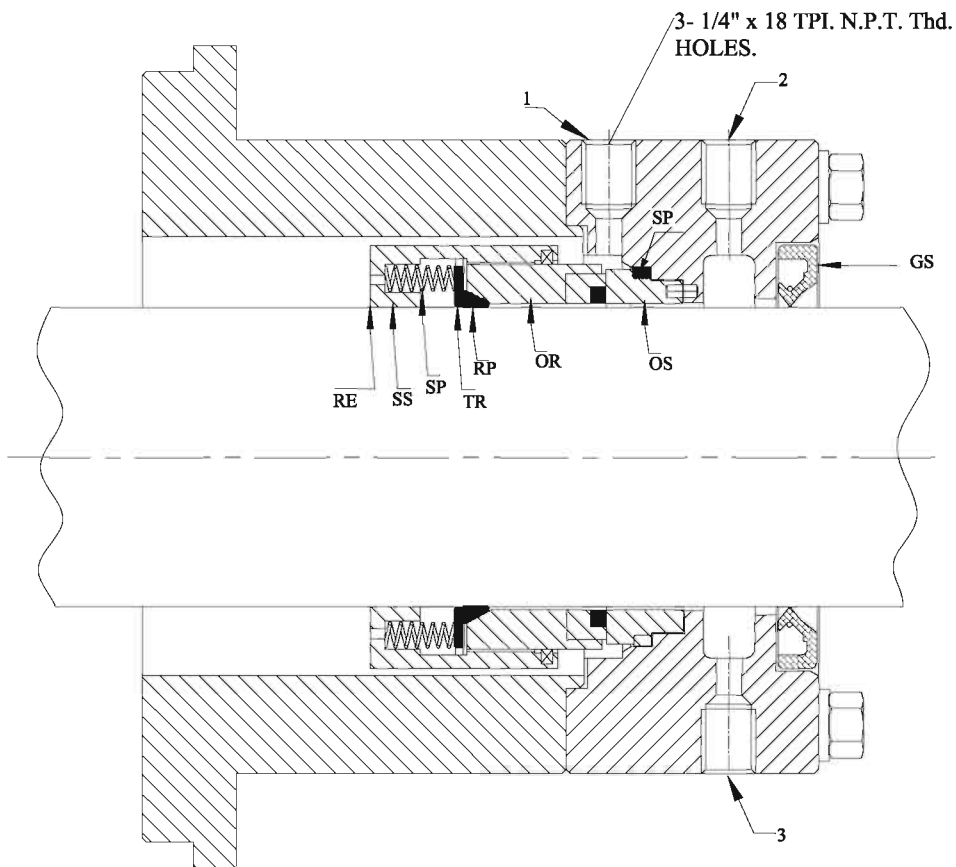
Approvals	Date	Name	Signature	Revision :01
Approved	01/09/2014	A.G.	Sd.	Document No. :
Released	01/09/2014	A.G.	Sd.	RIPL : O & MM : 12

9. MECHANICAL SEAL (OPTIONAL)

- 9.1 Mechanical Seal (21) is fitted over the Yoke Shaft (07) encased in the Mech. Seal Housing (05) and the static seal ring (lapped face facing forward) in the recess of the Seal Clamping Plate(06).
- 9.2 Mechanical seal gives a perfect leak-proof joint. The seals are pre-loaded and assembled to give maximum efficiency. Care should be taken not to drop or scratch the lapped faces as this will render them incapable of forming a perfect seal.
- 9.3 Single Mechanical Seals work without additional equipments except for operating them with a rinsing or cooling system as required for the pumping medium.
- 9.4 **RINSING:** In case of rinsing as per API 610, Appendix D, Plan 32, where the media is having solids a clear rinse is fed in near the area of sliding surface which keeps the medium away from the seals. The pressure of the rinse is greater than that of the medium and sufficient in quantity.
- 9.5 **QUENCHING:** In case of quenching as per API 610, Appendix D, Plan 62, Quenching is commonly used in sealing engineering that applies a non pressurized external fluid to the atmospheric side of a mechanical seal. The quenching is applied when a single mechanical seal will not work or only to a limited extent without auxiliary measures.
- 9.6 **FITTING & REMOVAL OF MECHANICAL SEALS:** Remove the bolts holding the seal clamping plate to the mechanical seal housing. Withdraw the seal housing and unscrew the grub screw holding the Mechanical Seal to the shaft. Slide out the seal clamping plate and carefully push out the seal face.
- 9.7 Assembling of the seal is reversal of the above said procedure. Care is to be exercised for cleanliness and avoiding of foreign bodies in between the seal faces sliding surfaces. While assembling the seal on the shaft, apply some glycerine to the Yoke Shaft.

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.:
Released	01. 09. 2014	A.G.	Sd.	RIPL : O & MM : 12

09. MECHANICAL SEAL ASSEMBLY



GS	GREASE SEAL
SP	STATIONARY PKG.
OS	STATIONARY RING
OR	ROTARY RING
RP	ROTARY PKG.
TR	THRUST RING
SP	SPRING
SS	SET SCREW
RE	RETAINER

NOTE:-

1-PORT 1 FOR API PLAN 11 (FLUSHING).
2-PORT 2 & 3 INLET & OUTLET RESPECTIVELY
FOR API PLAN 62 (QUENCH)

Approvals	Date	Name	Signature	Revision :01
Approved	01/09/2014	A.G.	Sd.	Document No. :
Released	01/09/2014	A.G.	Sd.	RIPL : O & MM : 12

10. MAINTENANCE AND SERVICE

Due to a simple assembly design of the Progressive Cavity Pumps, they need a little attention and replacements but as per the Maintenance & Service practice, the following are attended at regular intervals:

- Cleaning:** The pump should be regularly rinsed or cleaned where sedimentation deposits of medium is likely.
- Temporary Shutdown:** If the pump is stopped temporarily for some time, the pump should be rinsed /cleaned if the medium tends to solidify/ harden and glue up the Mechanical Seal.
- Stator:** When stopped for a long period, the elastomer along the contact line between the rotor and stator may become permanently distorted and this will increase the breakaway torque. It is advised to remove the stator from the pump and the same is stored in air-tight package in a cool/dry place away from light.
- This case applies to Standby Pumps as well and they are to be operated from time to time otherwise the pump may seize when being started up.
- Rotor:** When stored for a long period, support on wooden blocks and cover to protect from damage.
- Bearings:** The Pump is not having bearings of its own and as the Motor is directly coupled to the pump, the bearings of the motor are to be taken care of. Periodical servicing of the motor is to be carried out as per the maintenance schedule for the Electrical Motors.
- Gland Packing:** As a regular maintenance practice, the Gland Packing (20) might be changed by simply unscrewing the Hex. Nuts (30) and sliding back the Gland (04) over the Yoke Shaft (07). Fill-in the required size & rings of Gland Packing (20) and replace the Gland (04) to the stuffing box Studs (29). Tighten the Gland (04) as required with the Hex. Nuts placing the Spring Washer in between (30&31).
- Lubrication:** ‘SDCP/SDCA/SDCM/SDCN’SERIES ‘ROTOMAC’ Pump Yoke Shafts (07) are directly mounted on to the Prime Mover Shafts eliminating the bearings to support the Yoke Shaft (07) and as such, the bearings of the Prime Movers shall be lubricated with grease during the service of the same. Also, if the Prime Mover is a geared motor; oil level should be maintained in the gear box. .

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.: RIPL : O & MM : 12
Released	01. 09. 2014	A.G.	Sd.	

11. FAULT FINDING & REMEDYING

Possible Problems

The ROTOMAC pump is a well established product which was thoroughly tested before leaving the factory. If you use the pump in keeping with your Order specification and treat it in accordance with our operating and Maintenance Instructions, it will run satisfactorily for a long period of time.

Possible Causes (Remedy overleaf)

The pump is no longer starting	The pump is no longer sucking	The pumped medium is too little	The pressure is too low	The pumped medium is unstable	The pump is running loudly	The pump is stuck	The drive is overload	The stator life time is too short	The rotor life time is too short	The shaft seal is leaking	Failure to deliver liquid	Pump looses liquid after starting	Vibration	Stuffing box over-heats	Bearing over-heat	Bearing wear rapidly	
*						*											In new pumps or stators : the static friction is too great.
*	*	*				*											The pump electrical equipment is not compatible with the electrical supply.
	*	*				*	*	*									The pressure is too high.
*						*	*										There are foreign bodies in the pump.
*						*	*	*	*								The temperature of the liquid medium is too high, the stator is too ductile.
*						*	*	*									The stator has swollen, the elastomer is not compatible with the medium.
*						*	*	*									The solids content of the medium is too high and leads to blockages.
*						*	*	*	*								The liquid medium sediments or hardens when left to stand.
	*	*	*	*							*	*	*				There is air or vapour in the suction pipe.
	*	*	*	*							*	*					The suction pipe is leaking.
	*	*	*	*							*	*					The shaft seal is leaking.
	*	*									*						The rpm is too low.
	*	*	*								*						With reduced diameter rotor : operating temperature has not been reached.
	*	*	*	*			*	*					*				The suction is too great or pressure too low (cavitation).
	*	*	*	*	*	*	*	*					*				The pump is running dry.
	*	*	*	*	*				*	*			*	*			The stator is worn out, or temperature of liquid is too low.
	*	*	*	*	*			*	*	*	*	*	*				The stator material is brittle.
	*	*	*	*	*			*		*	*	*	*				The rotor is worn out.
					*								*				The joints are worn out.
					*								*	*	*		The pump and drive are not axially aligned.
					*								*				The elastic element of the coupling is worn out.
					*			*			*	*	*				The bearings are destroyed.
					*											*	The rpm is too high.
					*												The viscosity is too high.
					*												The specific weight of the medium is too high.
					*		*			*			*				The stuffing box is incorrectly tightened.
					*			*		*							The packing is not suited to the liquid medium.
*								*	*								Mechanical seal : rotation is incorrect.
								*		*							Mechanical seal : mechanical seal and mating ring have failed.
								*		*							Mechanical seal : elastomers damaged, swollen or brittle.
										*	*	*					NPSH available, too low.
														*	*		Insufficient lubrication of bearings.
													*	*			Excessive tension of the drive belts.

Approvals	Date	Name	Signature	Revision :01
Approved	01/09/2014	A.G.	Sd.	Document No. :
Released	01/09/2014	A.G.	Sd.	RIPL : O & MM : 12

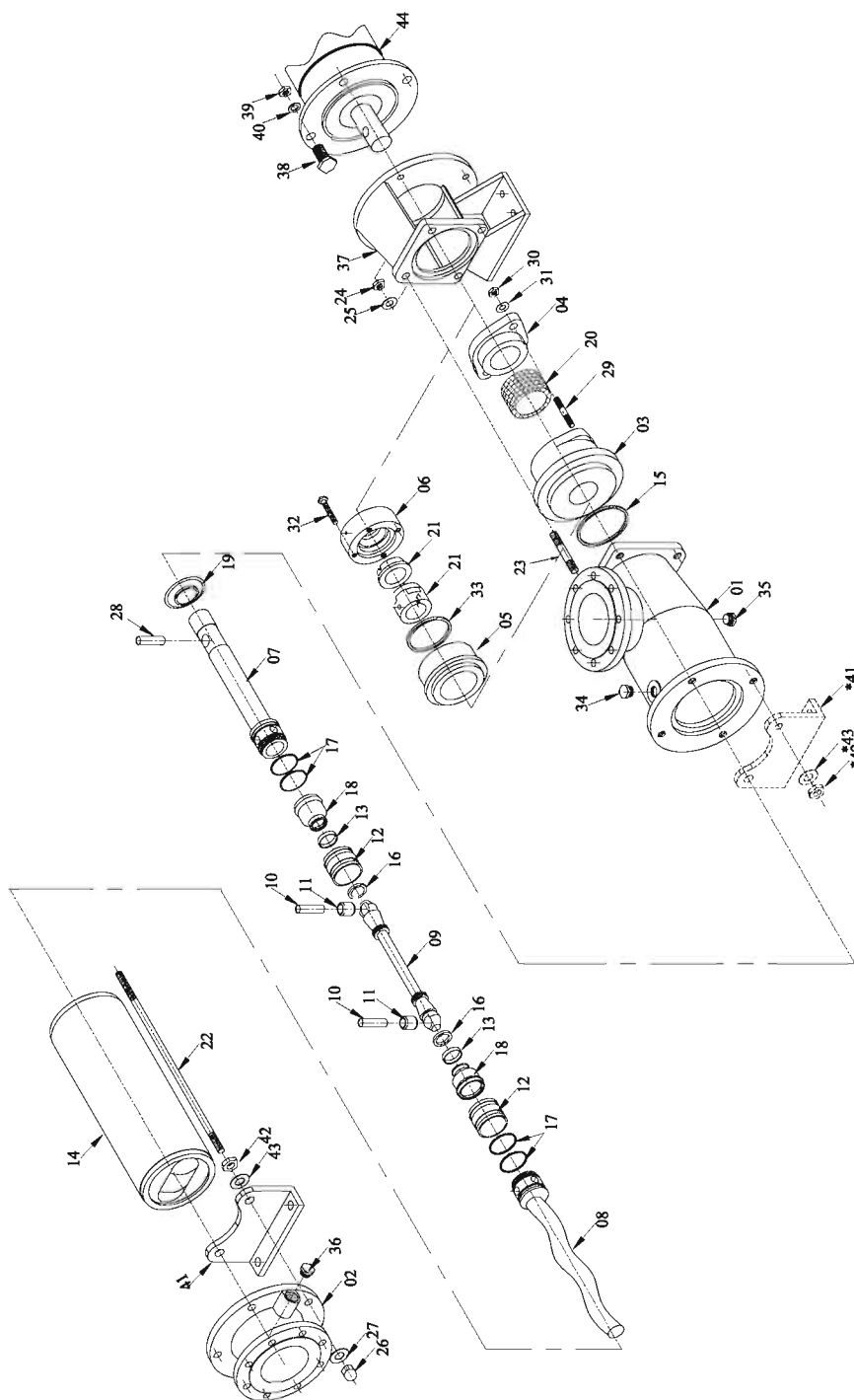
11. FAULT FINDING & REMEDYING

Remedy

- Fill the pump up, then pump through manually using a suitable appliance; if necessary use glycerine as lubricant in the stator.
- Check order information. Examine electrical installation (possibly 2 phase operation).
- Measure the pressure with a manometer and check against order details. Reduce the pressure or change the drive.
- Remove foreign bodies and eliminate possible damage.
- If the liquid medium temperature cannot be lowered, use a reduced diameter rotor.
- Check whether the liquid medium agrees with the order requirements. Possibly change stator material.
- Increase the liquid part of the medium.
- Clean the pump and rinse through after each run.
- Increase the suction liquid level, prevent turbulence and air bubble at the inlet.
- Check seal and tighten pipe connections.
- Stuffing box : tighten or renew. Mechanical seal : renew seals, eliminate solid deposits.
- In the case of adjustable drives : increase the rpm. If necessary change the drive.
- Warm up the pump (stator) to operating temperature first of all.
- Decrease suction resistance, lower the temperature of the liquid medium, install the pump at a lower location.
- Fill up the pump, provide for dry running protection, move the pipes.
- Replace with a new stator or ensure correct liquid temperature.
- Fit a new stator. Check the liquid medium agrees with order details; if necessary change the stator material.
- Change rotor, establish the cause. Wear and tear, corrosion, cavitation; if necessary change to a different material or coating.
- Replace relevant parts, carefully reseal and lubricate.
- Re-align the unit.
- Use a new connection and re-align the pump.
- Replace bearing, lubricate, reseal. At higher temperatures observe the lubricant and the bearing.
- In the case of adjustable drives : lower the rpm.
- Measure the viscosity and compare with order details. If necessary adjust viscosity or change the drive.
- Measure specific weight and compare with order details. If necessary adjust specific weight or change the drive.
- Service stuffing box according to page 3 (6.1), if necessary renew worn shaft.
- Replace fitted packing with another packing type.
- Change electrical connection.
- Replace relevant rings with new ones.
- Replace elastomers. Check whether the liquid medium agrees with order details, if necessary change material.
- Make necessary arrangement to meet the NPSH(r) of the pump.
- Inspect and re-grease the bearings sufficiently.
- Re-adjust the drive belts tension only to requirement without over tightening.

Approvals	Date	Name	Signature	Revision :01
Approved	01/09/2014	A.G.	Sd.	Document No. : RIPL : O & MM : 12
Released	01/09/2014	A.G.	Sd.	

12. EXPLODED VIEW OF PUMP ASSEMBLY



Approvals	Date	Name	Signature	Revision :01
Approved	01/09/2014	A.G.	Sd.	Document No. : RIPL : O & MM : 12
Released	01/09/2014	A.G.	Sd.	

12. PARTS LIST OF PUMP

ID No.	Item	No. Off	Part No.
01	PUMP HOUSING	01	003
02	END COVER	01	004
03	STUFFING BOX	01	006
04	GLAND	01	007
05	MECH. SEAL HOUSING	01	008
06	SEAL CLAMPING PLATE	01	009
07	YOKE SHAFT	01	149
08	ROTOR	01	023
09	COUPLING ROD	01	014
10	COUPLING ROD PIN	02	015
11	COUPLING ROD BUSH	02	016
12	PIN RETAINER SLEEVE	02	017
13	BOOT SEAL RETAINER	02	018
14	BONDED STATOR	01	025
15	"O" RING for Pump Housing	01	026
16	"O" RING for Coupling Rod	02	028
17	"O" RING for Pin Retainer Sleeve	04	029
18	BOOT SEAL	02	024
19	WATER THROWER	01	030
20	GLAND PACKING	SET	033
21	MECH SEAL	01	034
22	TIE ROD	04	036
23	STUD for Pump Housing	04	037
24	HEX. NUT for Pump Housing Stud	04	038
25	SPRING WASHER for Pump Housing Stud	04	039
26	DOME NUT for Tie Rod	04	040
27	SPRING WASHER for Tie Rod Dome Nut	04	041
28	YOKE PIN	01	150
29	STUD for Stuffing Box	02	046
30	HEX. NUT for Stuffing Box Stud	02	047
31	SPRING WASHER for Stuffing Box Stud	02	048
32	HEX. BOLT for Mech. Seal Housing	04	049
33	O RING for Seal Clamping Plate	01	050
34	FILLING PLUG for Pump Housing	01	053
35	DRAIN PLUG for Pump Hsg.	01	051
36	DRAIN PLUG for End Cover	01	052
37	BODY	01	073
38	HEX. BOLT for PRIME MOVER & Body	04	078
39	HEX. NUT for 38	04	079
40	SPRING WASHER for 39	04	080
41	SUPPORT PLATE	01	216
42	HEX. NUT FOR SUPPORT PLATE	02	042
43	SPRING WASHER FOR 42	02	043
44	PRIME MOVER	01	300

NOTE :-

~ WHEN PUMP SUPPLIED WITH MECHANICAL SEAL.

* FOR SELECTED SIZES.

Approvals	Date	Name	Signature	Revision :01
Approved	01/09/2014	A.G.	Sd.	Document No. : RIPL : O & MM : 12
Released	01/09/2014	A.G.	Sd.	

13. STANDARD PARTS DETAILS

Pump Type & Size SDC		Gland Packing (Sq.mm)	Mech. Seal Size (mm) (DIN 24960)
Variation	Size		
P	01561	6	28
P	01562		
P	02081		
P	02082		
P	01601		
P	01602		
M	02101		
M	02102		
P	01564	6	28
P	01604		
P	02084		
P	02104		
P	02301		
P	02302		
P	02501		
P	02502		
P	03501		
N	02304	10	38
P	03121		
P	03122		
M	03841		
N	03842		
N	04301		
P	03124	10	45
P	04301		
P	04161		
P	04162		
P	03206		
M	05201		
P	05201	10	53
P	05202		
P	05381		
P	04164		
M	06241		
M	06501		
P	05004	12	60
P	05204		
P	06241		
P	06242		
P	06501		
P	06502		
P	07281		
P	07282		
P	07301		
M	08321		
P	06244	16	70
P	07284		
P	08321		
P	08322		
P	09361		
P	09362		
P	09881		
P	09882		
P	08324	16	90
P	10401		
P	10402		
P	13521		
P	13522		

Note: Variation SDCA denotes Auger cum Coupling Rod.

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.:
Released	01.09..2014	A.G.	Sd.	RIPL : O & MM : 12

USE ONLY GENUINE "ROTOMAC" SPARE PARTS FOR REPLACEMENTS

14.RECOMMENDED STOCK OF WEAR PARTS FOR 2 YEARS TROUBLE FREE OPERATION
(Under Normal Operating Conditions)

Part I D No.	Description of Spare Parts	No. off / Pump Large set	No. off / Pump Small set
14	Bonded Stator	2	1
08	Rotor	1	-
09	Coupling Rod/Auger Cum Coupling Rod	1	-
10	Coupling Rod Pin	4	2
11	Coupling Rod Bush	4	2
12	Pin Retainer Sleeve	2	-
13	Boot Seal Retainer	2	-
21	Mechanical Seal (If applicable)	1	-
18	Boot Seal	4	-
20	Gland Packing Set	2	1
15,16&17	'O' Ring set	2	1

When sending enquiries for spares, please mention the following clearly:

Pump Sl. No.	Pump Type	Code
Part No.	Description of Spare Parts	Quantity

Address to:

ROTOMAC INDUSTRIES PVT. LTD.
D-4A, PANKI INDUSTRIAL AREA, SITE-1,
KANPUR – 208 022 (U.P) INDIA
Tel: 2691704, 2691705 Fax: +91 (0512) 2691706
E-mail: contact@rotomac.org; marketing@rotomac.org; rotomac@vsnl.net
Website: www.rotomacpump.com, www.rotomac.org

Approvals	Date	Name	Signature	Revision No.: 01
Approved	01. 09. 2014	A.G.	Sd.	Document No.:
Released	01.09..2014	A.G.	Sd.	RIPL : O & MM : 12

