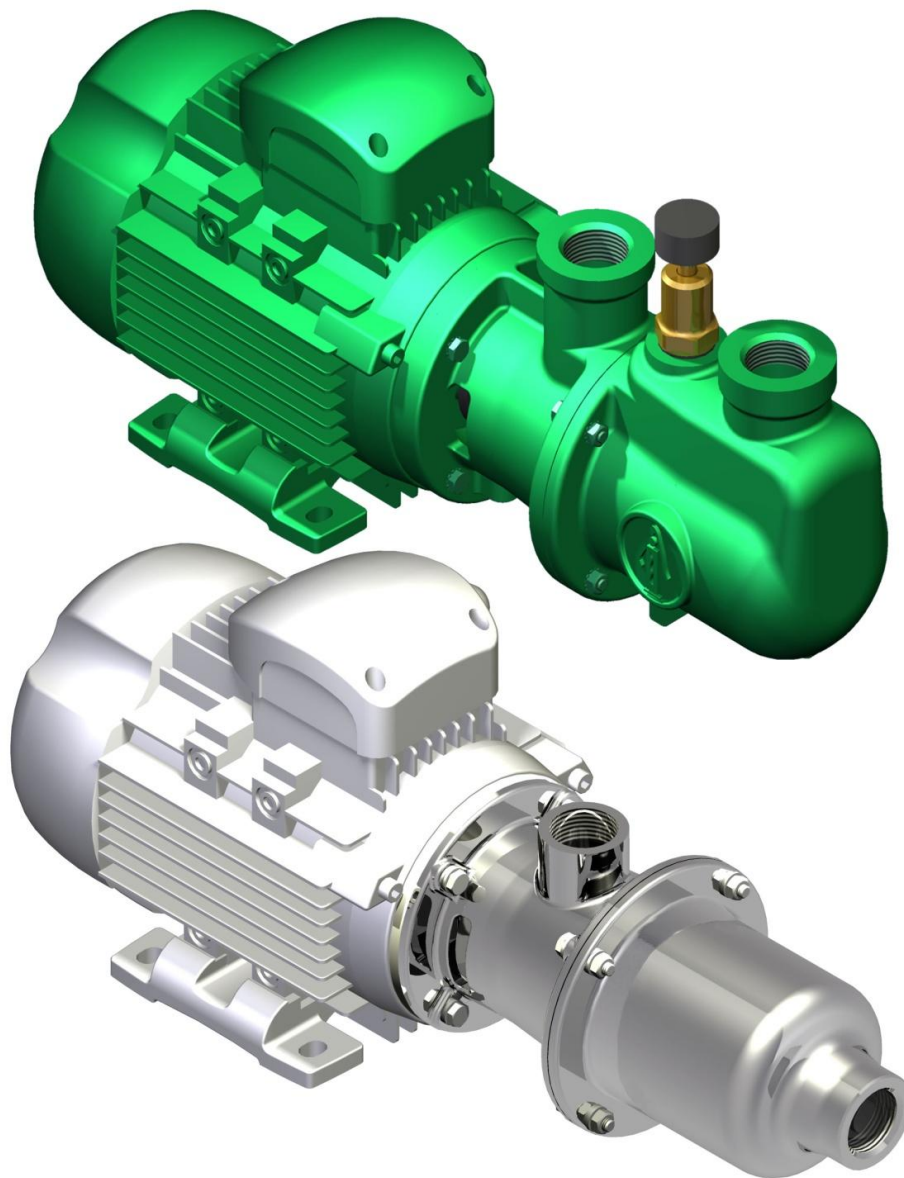




NOVA ROTORS[®] srl
Progressing cavity pumps

WOBBLE PUMPS



OPERATING USE AND MAINTENANCE MANUAL

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1. INTRODUCTION

1.1 Concerning this manual

This manual includes the instructions concerning the use and maintenance of the Nova Rotors pump type:

Wobble pump

Being the pump a machinery such the art. 1 of the Italian law D.Lgs. n.17/2010 this manual was made to comply with the basic safety requirements set out in these applicable directives point. 1.7 of the above mentioned law:.

1.2 User's manual recipients

This manual is intended for users of the pump, namely:

- workers who use it;
- maintenance to ensure the conservation of its functionality;
- workers involved in its transportation and its storage;
- workers who are responsible for its installation at the site of use;
- workers involved in its transfer to another site, again for use;
- workers involved in its removal for disposal of all its parts.
- All users of the wobble pump must be able to consult this manual at any time.

The information included in the manual apply to the user, who must read and fully understand it before using the pumps. This instruction manual must always be available to the user for reference.

1.3 Preservation of the user manual

The manual is an integral part of each pump; therefore, it must be kept and equip the pump also in the event that the pump may be made available to a different user.

The manual is part of the machine, therefore, must accompany him in case of sale, rental or concession use for other users.

If this manual is lost or irreparably damaged, in the ten years following the date on the declaration of conformity, you can ask for a copy to the Nova Rotors Ltd, which reserves the right to seek reimbursement of the costs of printing and delivery of the copy the original CE Warranty limitation and use instruction

1.4 CE Warranty limitation and use instruction

The manual contains instructions for use and safe maintenance of floating pump stator maintained in its original setting.

The ordinary and extraordinary maintenance that do not affect safety-related parts can be performed without affecting the validity of the CE marking machine, and then this manual, provided only that they are used parts and / or original spare parts, or they are declared compatible by Nova Rotors srl.

If the pump is affected by changes in excess of the extraordinary maintenance, replacement, removal and / or addition of parts not supplied by the Nova Rotors srl, the author of the amendment goes directly to replace the Nova Rotors srl in the role of Manufacturer. The machine thus modified is no longer guaranteed by the

Nova Rotors srl and can be used only after the author of the amendment has completed the procedure for placing the new machine on the market fulfilling all the obligations incumbent on the manufacturer.

1.5 General Warning



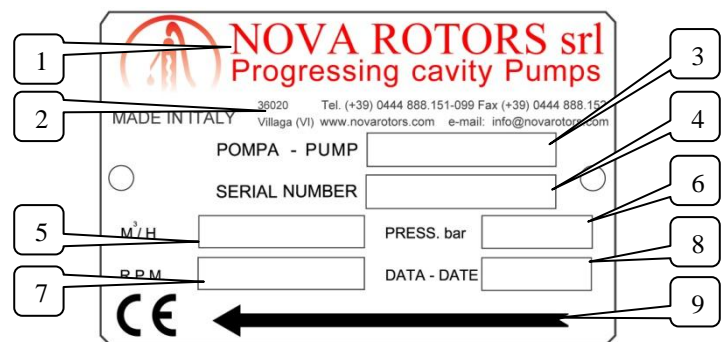
WARNING! – The manufacturer is not held accountable for any improper use of the pump should the manual be read in part or not read at all.

NOVA ROTORS S.r.l. is entitled to alter the specifications included in this manual or the features of every pump. Some pictures in this manual may show parts that might be slightly different from the ones assembled on the pump.

2. STANDARD DATA PLATE

2.1 Manufacturer

- 1) Company : **Nova Rotors S.r.l.**
- 2) Address: Via Villa, 29
Town: 36020 Villaga (VI)
Tel +39. 444. 888151
Fax +39. 444. 888152



2.2 Designazione della macchina

- 3) POMPA - PUMP: Identifies the pump model and version
- 4) SERIAL NUMBER : Identifies the pump serial number
- 5) M³/H: Identifies the pump flow rate
- 6) PRESS. Bar: Identifies the pump pressure
- 7) R.P.M.: Identifies the pump speed
- 8) Date: Identifies the year of manufacture of the pump
- 9) Arrow: Identifies the direction of rotation sense

2.3 Identifies the pump speed Manufacturer

Build year 20...

2.4 Compliance of pump with CE

Each progressing cavity pump is provided with a CE-compliance certificate issued by NOVA ROTORS™ S.r.l.

The pump was made to comply with the basic safety requirements set out in these applicable directives:

- Directive on machinery: 2006/42/CE.
- Directive on low tension: 2006/95/CE
- Directive 2004/108/CE (Electromagnetic Compatibility Directive, implemented in Italy law D.L. n. 194/2007).

A copy of this manual can be requested to the manufacturer.

3. CAUTIONS AND GENERAL SAFETY RULES

3.1 Definitions.

The definitions below are taken from the normative UNI EN ISO 12100-1.

- **Harm:** Physical injury or damage to health.
- **Hazard:** potential source of damage.
- **Specific hazard:** danger that is defined as present in the machine or associated with the same.
- **Dangerous situation:** circumstance in which a person is exposed to at least a danger. The exposure can result in damage immediately or after a period of time.
- **Risk:** combination of the probability of occurrence of harm and the severity of that harm.
- **Residual risk:** risk that remains after taking protective measures.
- **Fixed cover:** shield fixed in such a way (for example with screws, nuts, welding) can be opened or removed only through the use of tools or by the destruction of the fixing means.
- **Removable cover:** Protection that can be moved without use of tools.
- **Adjustable casing:** Fixed or removable cover that can be Adjustable whole, or where a big part of it is adjustable . The adjustment remains fixed during a particular operation.
- **Protection device:** fixed system protection different than a cover.

3.2 Safety guidelines relating to maintenance inspection and assembly works

In this manual there are used different types of warning, see below:

- **HAZARD!** This warning is always accompanied by a triangular symbol black on a yellow background and a caption. The symbol can be of danger, or can be referred to a specific hazard. In both cases, the caption specifies the nature of the hazard to which the warning refers. Finding the words "Danger!" The user is warned that if the danger is manifest in the caption specified, all subjects are exposed to the same dangerous situation.
- **CAUTION!** This warning is always accompanied by a triangular symbol black on a yellow background with an exclamation mark with a caption. Caption specifies the precaution type to be taken to prevent the onset of certain dangerous situations. After discovering the "Warning!" The user is warned that the omission of precaution can result specified by the caption, more or less rapidly, can lead to a dangerous situation.
- **FORBIDDEN!** This warning is always accompanied by round symbol with a diagonal lane red and a caption. This symbol can be to ban general or specific prohibition, in which case, the white background is the object of the prohibition. In both cases the caption specifies the type of prohibition about the warning refers. After discovering the indication "No!" The user is warned that if he violates this indication, the result will personally answer for his actions.
- **NOTE!** The warning was accompanied by a caption without symbol. The caption specifies the position about the warning is reported, and describes the actions to be taken to preserve the normal and safe operation of the machine.

3.3 Use prohibited and reasonably foreseeable misuse

The wobble pump should be used only for the application specified in chapter § 4.1.



ATTENTION! Any use of the machine other than the one provided at chapter § 4.1 is prohibited!

Nova Rotors S.r.l., in designing the machine has identified the following possible misuses, all strictly prohibited:

- use of the machine by unauthorized personnel, not informed, or correctly formed and trained;
- use against the law and regulation in the country where the pump is sold;
- use of the machine not installed correctly according such specifications;
- use of the installed machine with wrong voltage or phase and Hz ;
- Using of the machine in bad conditions of maintenance, out of order or because they have been used parts unsuitable or because the interventions were performed by unqualified personnel..



WARNING! Failure to comply with the safety standards described in this manual and those relating to common sense can cause danger to people and the environment and damage the machine.

3.4 Symbols and description



IS FORBIDDEN TO USE THE WOBBLE PUMP WHEN THE PROTECTION DEVICES ARE SHOOTING AND / OR ARE DISABLED OR BROKEN.



DON'T REMOVE THE PROTECTION COVER! While the pump is being used the safety devices provided must be present and correctly installed on the machine. Do not carry out any operation on the safety devices while the pump is operating. The system must be inspected regularly to check for damage and to ensure that all safety devices are in good working order.



IS FORBIDDEN LUBRICATE THE PUMP WITH PARTS IN MOTION! The gears, shafts and joints for the transmission of the motion must never be approached during operation of the pump. The covers installed to prevent contact with moving parts, can be removed only by authorized personnel to perform maintenance. At the end of each maintenance the casing must be repositioned and secured properly.



Additional Information.



WARNING IS FORBIDDEN TO WORK ON THE PUMP IF CONNECTED ON THE POWER SUPPLY! Before beginning maintenance on the pump remember to disconnect the power supply by means of the circuit breakers. All the devices must be secured against automatic or accidental restart. (Where possible turn the main switch to OFF or unplug the power). In particular situations where you need to run the pump while servicing at least 2 persons must be present so that in the event of danger one person will be able to disconnect the power supply or raise the alarm. Once maintenance has been completed remember to restore the safety devices and check that they are in good working order.



WARNING! Before of the use of the pump check the perfect condition of the electrical wires system and connection. Check devices and electric actuators that must be maintained in a perfect state of efficiency and conservation. In case of failure or damage to the electrical components of the machine, the same must be secured in the shortest time. The damaged component must be replaced before the use of the machine.



FORBIDDEN! before connecting the power supply, it is absolutely necessary to have completed the installation of the pump . All maintenance work must be carried out with the machine shut off from the power supply.



CAUTION! The structure of the pump must be connected to ground present at the installation site so that it is satisfied the relation : $R_E \times I_{dn} \leq U_L$, where: R_E is the resistance of the earth plate measured in ohm,

I_{dn} is nominal electrical supply of the differential protection of the installed power, in amperes,
 $U_L = 50$ is the contact Volt measure.



CAUTION! *The user must ensure that all installation, maintenance, inspection and assembly operations related to the wobble pumps are carried out by qualified technicians.*

Technicians must carefully read this instruction manual before acting on the pump. Only authorised and trained personnel are permitted to work on the progressing cavity pump.



HAZARD ! The wobble pump was designed and built to be used under operating conditions specified in § 4.7. Exceeding the specified limits is not permitted under any circumstances and voids the warranty.



CAUTION! The wobble pump never run dry! Only few turn of the rotor without fluid can produce a fatal damage of the pump !

4. GENERAL PUMP DESCRIPTION

4.1 Proper use

The wobble pump can be used for the transfer and the dosage of liquids with a viscosity medium - high, even non-Newtonian, generally not homogeneous in which are also dissolved gas, solid fragments and / or fragments fibrosis.

4.2 Pump operating principle

The wobble pump is a volumetric rotary machine. The theoretical flow rate is directly proportional to the number of revolutions .

This particular type of volumetric pump, can transfer the pumped fluid in condition of movement strictly laminate, without unrest within the fluid stream. The rotor, rotating within the stator, is forced to perform a hypocycloid roto-translational movement. This coupling of the two elements always creates a line of contact along the profile that guarantees the seal between them. This movement creates an chamber that shifts with a helical movement, from the suction casing to the delivery casing. Without having suction and discharge valves, the pump delivers a flow rate thus uniform and proportional to the number of revolutions.

4.3 Machine composition

The wobble pump is composed from a motorization, a body pump composed by Suction inlet and pressing body (body pump), single mechanical seal, joint (transmission) rotor and stator. The rotor, normally made of metal (stainless steel), is a single-start screw with round thread, extremely large pitch, considerable height and high eccentricity in relation to the core diameter.

The stator, normally made of elastic material, vulcanized, is impressed with a cavity in the shape of a 2-start screw, double thread compared to the rotor and with the same eccentricity.

4.4 Wobble stator

The stator type is defined wobble. This technology gives to the wobble pump a series of advantages, which:

- After the expansion of the stator due to the temperature of the fluid being pumped, the required torque from the pump remains practically constant;
- the pumping pressure ensures the maintenance of tolerance of coupling between the rotor and stator;
- the emission of sound and vibration are minimized thanks to the possibility that the stator has to settle to the axis of free rotation of the rotor;
- in definitive the machine construction is very compact.

4.5 Noise

Has been measured near the machine of emission sound pressure level according to the weighting curve A. The level does not exceed 70 dB (A).

4.6 Technical data

The wobble pumps are available with electric drive 3F 230/400V- 50 Hz and 230V single phase drive - 50 Hz. The maximum allowable head pumps with cast iron and stainless steel is 7 bar.


size R44F - R48F - R64F - R68F can be mounted with drive in B3-B5 type such as in the follows table or with mechanical motovariator.

R44F-R48F motor kW 0,75 / 4P - 0.55/ 6 Poles – 1.1 /2 Poles

R64F-R68F drive kW 1,1/4P- 1.5/4Poles – 1.5/ 2P – 1.1/6 Poles

Supply voltage 230/400V – 50 HZ (STD)

4.7 Electrical pumps data

Pump type	Power kW	Pole	Rpm	Pump type	Power kW	Pole	Rpm		
R28	3/4"	0,25	4	1400	R64	1" 1/4	1,1	4	1400
R28	3/4"	0,18	6	930	R64	1" 1/4	0,75	6	900
R24	3/4"	0,25	4	1400	R64	1" 1/4	0,55	8	700
R24	3/4"	0,18	6	930	R88	1" 1/2	2,2	4	1400
R48	1"	0,55	4	1400	R88	1" 1/2	1,5	6	900
R48	1"	0,55	6	930	R88	1" 1/2	0,75	8	700
R48	1"	0,25	8	680	R84	1" 1/2	2,2	4	1400
R44	1"	0,55	4	1400	R84	1" 1/2	1,5	6	900
R44	1"	0,55	6	930	R84	1" 1/2	0,75	8	700
R44	1"	0,25	8	700	 Refer to the attached specifications and the manufacturer's manual. Check the degree of protection (IP..) The drive protection is standard IP-55 (protection against dust and water jets).				
R68	1" 1/4	1,1	4	1400					
R68	1" 1/4	0,75	6	930					
R68	1" 1/4	0,55	8	700					

5. INSTALLATION AND ASSEMBLY

5.1 Delivery of the wobble pump

Wobble pumps are packed in specific containers (boxes on pallets, crates) unless the user/ buyer specifies a different system and delivered directly to the buyer or such as agree in the order. The time and date of delivery is corresponding to the moment of unloading by the forwarder .

The packages are marked and useful handling information is applied to them. Upon receipt check for damages incurred in transit. All damages incurred during transit must be reported immediately to the carrier.

Use suitable transportation and storage equipment and ensure that appropriate safety measures are observed.

Depending on the weight, the machine can be moved manually or with suitable transport or lifting equipment.

Remove the protection and safety elements used in the packaging and any screws used to secure the packaging to the machine. Check and remove any plugs from the suction flange and the delivery flange.

This pump was designed in compliance with pre-determined operating condition. The specifications related to pump operation are to be meant as maximum values and cannot be exceeded in any case.

5.2 Predispositions by the user

The Nova Rotors S.r.l. pump supply include only the wobble pump. All other components of the plant, must be provided by the user.

The connections for the power to the pump and one for his connection to the grounding must be performed by the user.

5.3 Mounting the pump

The pump must be horizontally installed, with an approx. 30-cm space all around it so as to leave room for maintenance work and enable the motor to cool easily.

Pipes must be the same size as the suction and delivery pump ports. Delivery is located on the central port, close to electric motor; suction is opposed respect to the electric motor (see Fig.1 and Fig.2).

Make sure that the direction of motor rotation must be clockwise and never counterclockwise, as shown by the arrow on the name plates in the pump. The pipes must have the same diameter of the inlet and outlet of the pump. The discharge is located approximately in the center of the pump, close to the electric drive, while the suction mouth is to the right (see the diagram below).

The suction pipe must be free of sharp bends and must be as short as possible.

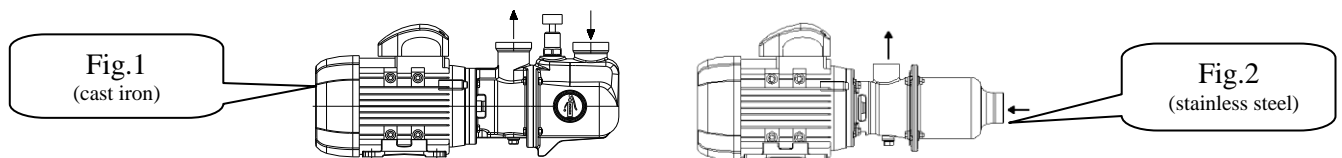
The two pipes, suction and discharge, must be fixed to a supporting structure so that they do not rest on the body of the pump. To facilitate installation and removal is necessary to provide grafts flanged joints or three pieces on the suction and discharge.

When the prevalence of the downstream circuit exceed 10 meters of water column, it is appropriate to install a check valve on the discharge pipe in order to prevent the weight of the fluid column serious constantly on the pump.

To limit the propagation of vibrations produced by the pump along the inlet pipes and discharge may be appropriate to install the dampers.



CAUTION! If on the delivery pipe is installed an on-off valve, between body pump and on-off valve is necessary to install a safety valve capable of limiting the discharge pressure (with by-pass). In this case, is necessary prevent the switch on of the pump until the valve is closed.



5.4 Electrical connections



See the attached specifications and the manual supplied by the drive manufacturer attached to the drive (for the brand name refer to confirmation order).

All the electrical connections must be made by authorized and qualified personnel. The electrical connection of machines fitted with electrical motors must be made by the user in compliance with the guidelines contained in the standard CEI EN 60204-1:2005.

Ensure that the voltage and frequency correspond to the information on the data plate provided by the manufacturer of the drive. Carefully read the motor manufacturer's instructions in the user's guide.

The electrical connection must include a thermal-switch for safe the drive, or a thermal fuse and must be connected to ground as shown in the above standard.

The electrical cable must be of the type with double insulation and self-extinguishing with a suitable section for each phase. The neutral connection must be consistent with the protection system in the place of installation (TT - TN etc..).

Before switch-on the pump, Particular care should be taken:

- Voltage, line frequency and number of phases must be as specified on the electric motor.
- when selecting the section of the conductors
- when connecting the conductive parts of the pump to the earth circuit,
- to comply with the data on the drive plate,
- with the star/delta connection of the drive,
- with the phase connection, in order to obtain the rotating direction indicated on the pump.

6. USE INSTRUCTION

6.1 Preparation for start up

6.1.1 Direction of rotation

Run the pump motor for a few seconds. Make sure that the pumping direction is correct. Check the direction of rotation (see the arrow in the plate affixed to the pump). If the sense of rotation is the inverse of the one shown by the arrow, then reverse the electrical connection of the two phases.

Running the pump in the wrong direction could result in damage to the pump itself. The direction of rotation of the pump determines the fluid flow direction.



IT IS FORBIDDEN TO TURN THE PUMP IN THE OPPOSITE DIRECTION OF ROTATION TO THAT INDICATED BY ARROW.



**THE WOBBLE PUMP NEVER RUN DRY!!!
Few turns without fluid may damage the stators !!!!**

6.1.2 Filling the pump

Before start up, the pump must be filled with liquid. This initial procedure is not needed for priming purposes, but serves to provide the necessary lubrication for the stator until the pump primes the process fluid.

Dry running increases friction between the rotor and the stator thereby generating unacceptable high temperatures. This heat develops rapidly and completely ruins the contact surfaces between the rotor and the stator with possible breaking of the pump.

6.2 Starting

After performing the preliminary checks described in the two preceding paragraphs the pump can be started. To this end it is sufficient to power the electric motor.

6.3 Prolonged stop



ATTENTION! If the pump remains inactive for a long period of time rotate the shaft once a month. In other case After stopping the pump, in the cases described below the pump should be drained and cleaned if necessary:

If the fluid is subject to environment temperature may solidify or freeze, especially if the pump is used to cold weather outside;

If the pumped fluid may cause scaling on seals and mechanical parts.

6.4 Storage.

The machine must be stored in a safe, dry place sheltered from weather conditions.



Warning: warehousing and incorrect storage can lead to damage.

Sometimes prolonged storage can lead to problems with various pump parts:

- **Stator:** if inactive for a prolonged period, the rotor can permanently warp the stator surfaces. So it is advisable to remove the stator, pack it so that it is protected from light and air and store it in a cool, dry place.

- **Rotor:** avoid damaging the rotor by protecting it from knocks and blunt instruments.
Stainless steel pump parts: do not require protection. Other unpainted pump parts: grease the parts.
Drive: follow the manufacturer's instructions.

7. MAINTENANCE

7.1 Introduction operations



ATTENTION! All operations must be carried out with the pump shut off and disconnected from the electrical power supply..

Before any intervention on the pump:

- wait until the temperature of the pumped fluid has lowered (ambience temperature is better!);
- discharge the plant pressure and check if it is without pressure;
- close the valves and/or stop suction/discharge valves;
- disconnecting the suction and discharge pipes.

7.2 Stator disassembly/reassembly

In base at type and pump size see the figure pages 14/16/17 for the stator substitution as follow:

1. Unloose from suction outlet (51) connecting suction to plant
2. Unloose hexagonal – head screws (81) and nuts (80) connecting suction outlet (51) to pressing body (52).
3. Remove stator (31) from the rotor (11).
4. It's important to check that the rotor is not scratched or excessively worn, in order to prevent damage to the stator rubber.
5. Rectangular slot on the stator, if present, must be inserted to match the niche on the suction outlet.
6. To facilitate mounting rotor on stator using exclusively a lubricant compatible with the stator rubber. (See note below).
7. Refit the components proceeding in the reverse order than above.

NOTE! for NBR, FKM stators not food grade rubbers is suggested to use Vaseline, but for alimentary rubbers is mandatory to use exclusively alimentary grease. For every type of EPDM rubbers use only liquid neutral soap.

7.3 Substitution of Rotor and connection joint

In base at type and pump size see the figure pages 14/16/17 for the substitution as follow:

1. Unloose from suction outlet (51) connecting suction to plant;
2. Unloose hexagonal – head screws (81) and nuts (80) connecting suction outlet (51) to pressing body (52).
3. Remove stator (31) from the rotor (11).
4. Locking shaft motor: making a little rotation with a polygonal key on the screw positioned in the rotor head, till to insert a fork key into the loophole of pressing body (# 12 for R24 - 28, # 17 for R 44 - 48, wrench 20 for R64 – 68, # 24 R 84 – 88); turn the drive shaft until feel the notch on the shaft;
5. Working with a polygonal key on the screw positioned in the rotor head (# 13 for R24 - 28, # 19 for R44 - 48, R64 - 68, R 84 - 88) unloose rotor (11) from transmission joint (13);

6. If the transmission joint has to be replaced, screw the nut and lock nut on to the thread of the rotor joint and unloose from motor shaft. In the thread of transmission joint is important to use Thread-stop (Loctite) before tighten.

NOTE FOR R84-R88 MODELS: in these models transmission use a Transmission joint kit (page 16). It is composed by two single joint and one spacer made of brass or stainless steel stopped with two conic point grub screw. To unloose the Transmission joint kit insert a fork key into the loophole of pressing body (#12 for R24-R28, #17 for R44-R48, #20 for R64-R68, #24 for R84-R88) and feel the notch on the shaft; so, with a fork key (#22) on the spacer unloose the transmission. In order to replace just one single joint, unloose the two grub screw and remove it. Before mounting joints on the spacer remember to use Thread-stop (Loctite[®] 243) before tighten.

7. Assembly the new components proceeding in the reverse order than above.

7.4 Mechanical seal replacement

In base at type and pump size see the figure pages 14/16/17 for the substitution as follow:

1. Unloose from suction outlet (51) connecting suction to plant.
2. Unloose hexagonal – head screws (81) and nuts (80) connecting suction outlet (51) to pressing body (52).
3. Remove stator (31) from rotor (11).
4. Locking shaft motor: making a little rotation with a polygonal key on the screw positioned in the rotor head, till to insert a fork key into the loophole of pressing body (#12 for R24-R28, #17 for R44-R48, #20 for R64-R68, #24 for R84-R88) and feel the notch on the shaft.
5. Working with a polygonal key on the screw positioned in the rotor head (#13 for R24-R28, #19 for R44-48, R64-68, R84-R88), unloose rotor (11) from transmission joint (13).
6. Proceeding as for replacement rotor and transmission joint.
7. Remove rotating part (with spring) of mechanical seal.
8. Remove pressing body (52) from electric motor (39) unloosing hexagonal head screw (81.1).
9. Remove fixed part of mechanical seal from pressing body (52).
10. Cleaning carefully mechanical seal seat located on the pressing body. It is important to check that motor shaft is smooth and clean, with no sharp edges. In case, smooth shaft in seal area with a very light abrasive paper.

In case of a big consumption of electric motor it's important grinding the surface before mounting a new mechanical seal.

11. Insert fixed part of seal using a bush made of soft material, like Teflon, to allow uniform pressure without damages.
12. Replace pressing body (52) on the electric motor and fixing the hexagonal head screws (81.1).
13. Insert rotating part on shaft with a gently rotating movement in the direction of rotation till the two parts of seal come in contact.
14. Remount pump proceeding in the reverse order than above.

8. PUMP PARTS AND SPARE PARTS

8.1 Exploded view drawing: cast iron wobble pump R24/R28 R44/R48 R64/R68
(see parts list detail at page 15)

R24/R28 – R44/R48 – R64/R68 CAST IRON
R44/R48 BRONZE

Replacement by: _____

Drawn : CB Weight: _____

Date: 09/03/12 Scale: _____

Check: _____ Sheet 1 of 1

Date: _____

General Tolerances: ISO 2768 mK
Geometrical tolerances and roughness ISO 1302

NOVA ROTORS srl
Progressing Cavity Pumps

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(VICENZA) ITALY

DATE	REV	DESCRIPTION	NAME

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8.2 Spare part list for R24/R28 R44/R48 R64/R68 Cast iron wobble pump

KEY

R = RECOMMENDED REPLACEMENT FOR HIGH WEAR PART

r = RECOMMENDED REPLACEMENT FOR PART NOT SUBJECT TO WEAR OR HIGH WEAR

POS.	Qty	Descrizione\Description	R24/28 R44/48	R64/68	NOTE/NOTES
11	1	ROTORE / ROTOR			R
13	1	SNODO / JOINT			R
31	1	STATORE / STATOR			R
39	1	MOTORE ELETTRICO / ELECTIC MOTOR			
51	1	BOCCHETTONE ASPIRANTE / SUCTION INLET			
52	1	CORPO PREMENTE / PRESSING BODY			
75	1	TAPPO DI SCARICO / SCREWED PLUG			
77	1	VALVOLA BY PASS / BY PASS VALVE			2 r
79	4 / 6	RONDELLA / WASHER	Ø M6	Ø M8	1
79.1	4	RONDELLA / WASHER	Ø M6	Ø M8	
80	4 / 6	DADO ESAGONALE / HEX NUT	M6	M8	1
81	4 / 6	VITE TESTA ESAGONALE / HEXAGONAL HEAD SCREW	M6x25	M8x35	1
81.1	4	VITE TESTA ESAGONALE / HEXAGONAL HEAD SCREW	M6x25	M8x25	
95	1	ANELLO ANTI TRAFILAMENTO / SLINGER RING			
23	1	TENUTA MECCANICA / MECHANICAL SEAL			R

1 Qty 4 per/for R24/R28 - R44/R48. Qty 6 per/for R64/R68

2 Available only for the model R24/28 - R 44/48

8.3 Spare part list for R84-R88 Cast iron wobble pump

KEY

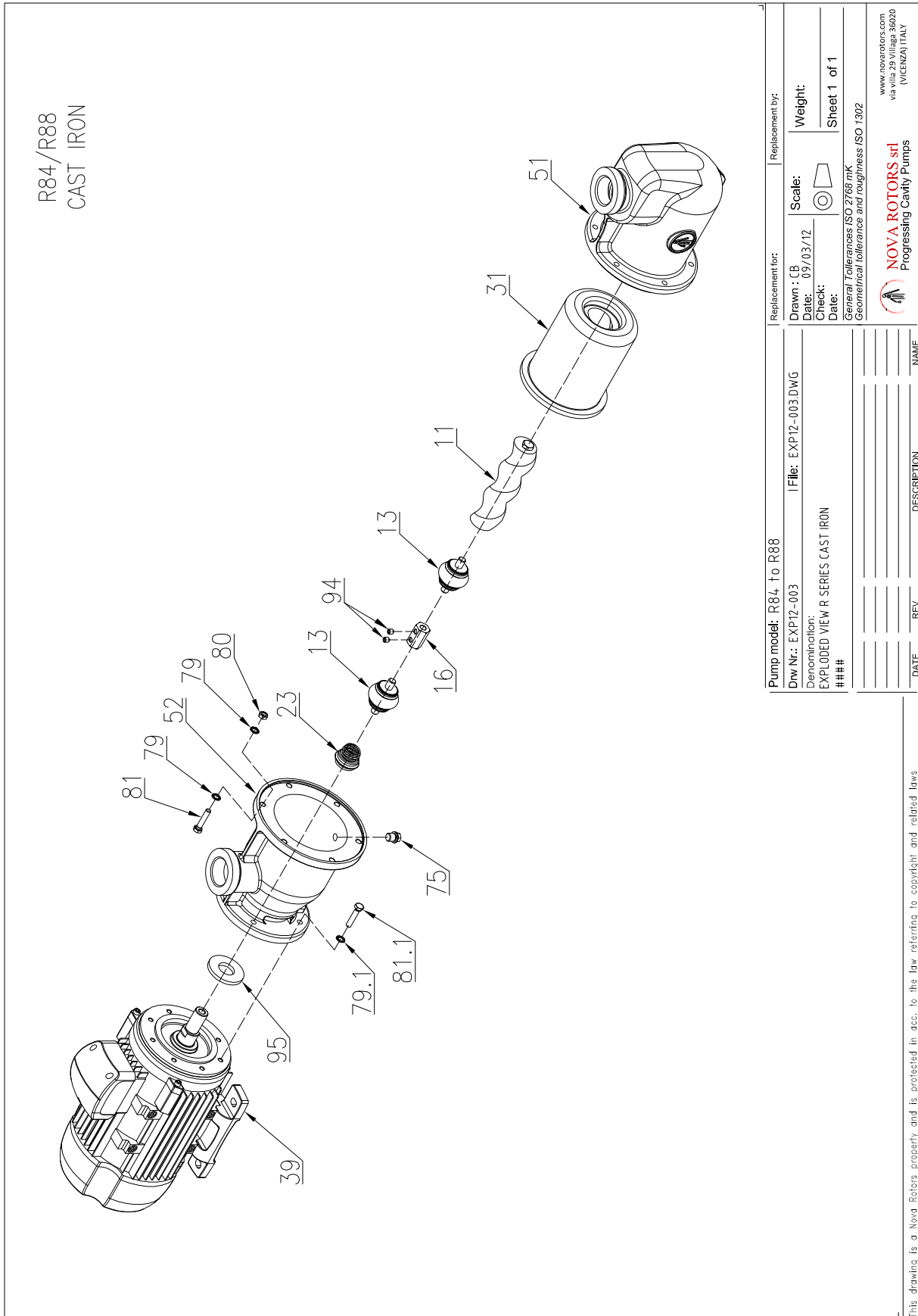
R = RECOMMENDED REPLACEMENT FOR HIGH WEAR PART

r = RECOMMENDED REPLACEMENT FOR PART NOT SUBJECT TO WEAR OR HIGH WEAR

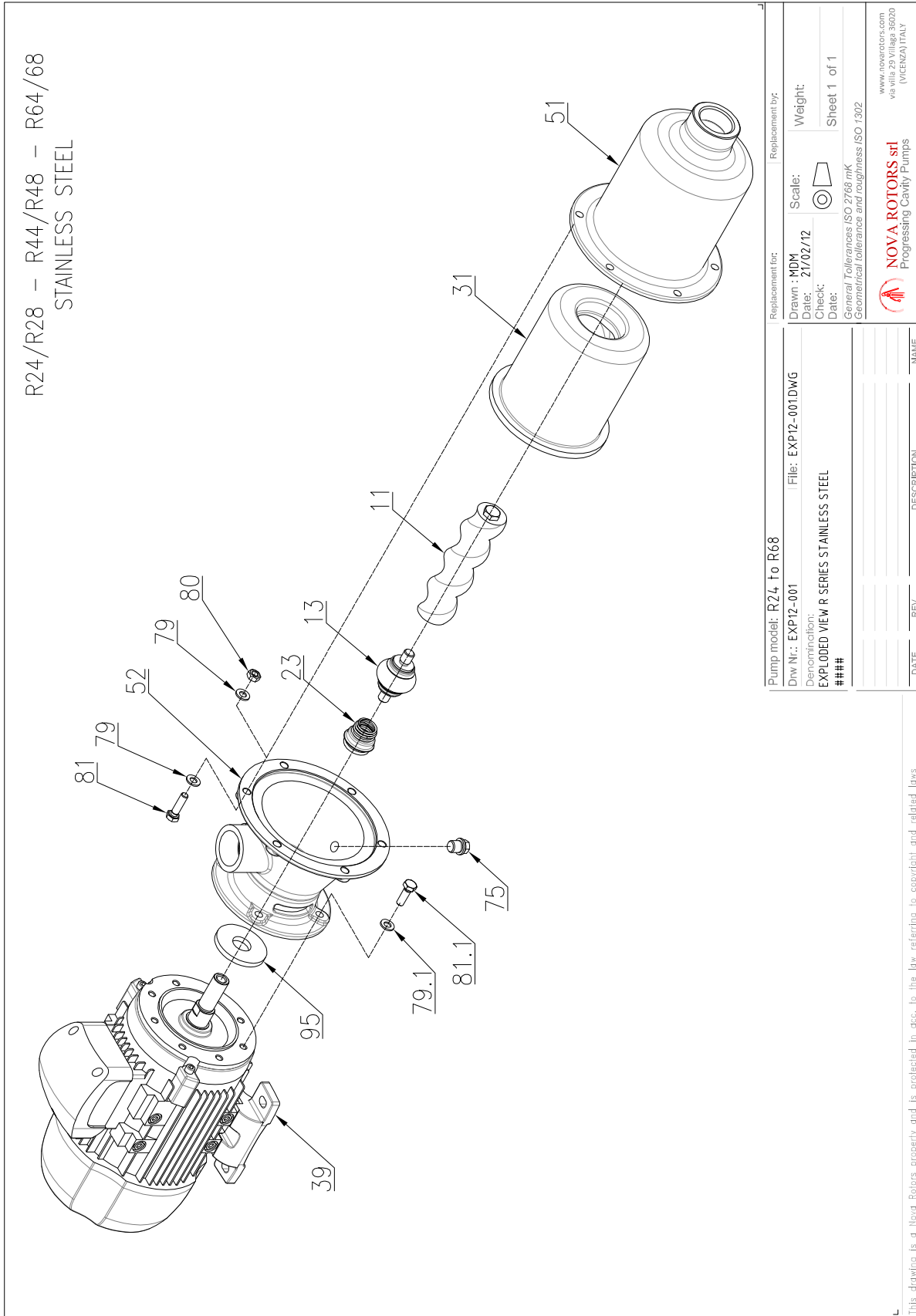
POS.	Qty	Descrizione\Description	R84/88	NOTE/NOTES
11	1	ROTORE / ROTOR		R
13	2	SNODO / JOINT		R
16	1	DISTANZIALE /SPACER		
31	1	STATORE / STATOR		R
39	1	MOTORE ELETTRICO / ELECTIC MOTOR		
51	1	BOCCHETTONE ASPIRANTE / SUCTION INLET		
52	1	CORPO PREMENTE / PRESSING BODY		
75	1	TAPPO DI SCARICO / SCREWED PLUG		
79	6	RONDELLA / WASHER	Ø M8	
79.1	4	RONDELLA / WASHER	Ø M8	
80	6	DADO ESAGONALE / HEX NUT	M8	
81	6	VITE TESTA ESAGONALE / HEXAGONAL HEAD SCREW	M8x35	
81.1	4	VITE TESTA ESAGONALE / HEXAGONAL HEAD SCREW	M8x25	
94	2	GRANO / GRUB SCREW	M8x8	
95	1	ANELLO ANTI TRAFILAMENTO / SLINGER RING		
23	1	TENUTA MECCANICA / MECHANICAL SEAL		R

The wobble pump series R84/88 differ from those listed above (8.2) only for the presence of the transmission joint kit see page16 (pos. 13-16-94).

8.4 Exploded view drawing: cast iron wobble pump: R84-R88
(see parts list detail at page 15)



8.5 Exploded view drawing: Stainless steel wobble pump: R24/R28 R44/R48 R64/R68
(see parts list detail at page 18)



8.6 Spare parts list for R24/R28 R44/R48 R64/R68 Stainless steel wobble pump

KEY

R = RECOMMENDED REPLACEMENT FOR HIGH WEAR PART

r = RECOMMENDED REPLACEMENT FOR PART NOT SUBJECT TO WEAR OR HIGH WEAR

POS.	Qty	Descrizione\Description	R24/28 R44/48	R64/68	NOTE/NOTES
11	1	ROTORE / ROTOR			R
13	1	SNODO / JOINT			R
31	1	STATORE / STATOR			R
39	1	MOTORE ELETTRICO / ELECTIC MOTOR			
51	1	BOCCHETTONE ASPIRANTE / SUCTION INLET			
52	1	CORPO PREMENTE / PRESSING BODY			
75	1	TAPPO DI SCARICO / SCREWED PLUG			
79	4 / 6	RONDELLA / WASHER	Ø M6	Ø M8	①
79.1	4	RONDELLA / WASHER	Ø M6	Ø M8	
80	4 / 6	DADO ESAGONALE / HEX NUT	M6	M8	①
81	4 / 6	VITE TESTA ESAGONALE / HEXAGONAL HEAD SCREW	M6x20	M8x35	①
81.1	4	VITE TESTA ESAGONALE / HEXAGONAL HEAD SCREW	M6x20	M8x25	
95	1	ANELLO ANTI TRAFILAMENTO / SLINGER RING			
23	1	TENUTA MECCANICA / MECHANICAL SEAL			R

① Qty 4 per R24/R28 - R44/R48

Qty 6 per R64/R68

9. TRANSPORT PACKING AND STORAGE

9.1 Transport and packing

Wobble pumps are packed in specific containers (boxes on pallets, crates) unless the user/ buyer specifies a different system.

The packages are marked and useful handling information is applied to them. Upon receipt check for damages incurred in transit. All damages incurred during transit must be reported immediately to the carrier.

Damage due to transport are excluded from the warranty.

Use suitable transportation and storage equipment and ensure that appropriate safety measures are observed. Depending on the weight, the machine can be moved manually or with suitable transport or lifting equipment.

Bring the packaged pump as close as possible to the installation site and leave it packaged for as long as possible.

Remove the protection and safety elements used in the packaging and any screws used to secure the packaging to the machine. Check and remove any plugs from the suction flange and the delivery flange.

If the machine is not supplied with a base or lifting lugs, use ropes. The ropes must be placed around the machine and positioned in such a way as to ensure a balanced lift.



WARNING! Do not lift the machine with more weight at the head (that is, with centre of gravity not immediately below the lifting point). Make sure that the pump does not overturn and that it is handled in safety and in a stable position.

Vertical axis pumps must never be left in an upright position without adequate fixing!



Warning! Suspended load! The machines must always, and only, be placed horizontally.

Do not lift the complete wobble pump by means of the motor or reduction unit lugs. The lugs are intended solely for transporting the motor or the reduction unit.

As the machine configurations are all very different the instructions given here are of a general nature but they do provide sufficient guidelines to ensure that qualified personnel handle the pump correctly.

If in doubt contact the supplier or request more detailed information concerning your specific machine.

When handling trailer-mounted pumps:

Before moving the machine, make sure that the motor is locked out and that it cannot be started accidentally.

Move the unit slowly and with care, particularly on uneven or sloping ground.

9.2 Storage

Follow indication at chapter 6.4 page 11

10. DISPOSAL OF THE MACHINE

When the life cycle of the machine is finished, proceed with separating scrap metal parts from plastic parts, the electric / electronic parts, following closely the law of the country where the pump is used.

11. TROUBLESHOOTING

Trouble	Possible cause	Adjustment
Pump won't start.	<ol style="list-style-type: none"> 1) Motor wired incorrectly. 2) Obstruction in pump. 3) Swollen stator; elastomer cannot withstand the product being pumped. 4) Product settled and hardened in pump. 5) Excessive temperature of product; stator expands excessively. 6) Adhesion between rotor and stator even if new or in perfect condition due to prolonged inactivity. 	<ol style="list-style-type: none"> 1) Check order specifications. Check motor wiring. 2) Disassemble pump, clean and repair any possible damage. 3) Check that the fluid being pumped is up to order specifications. Replace stator material if necessary. 4) Clean and rinse pump out at each delivery. 5) If temperature cannot be lowered, ask NOVA ROTORS technical staff for support. 6) Lubricate and move the stator with the special tool.
Failure to suction.	<ol style="list-style-type: none"> 1) Suction pipe leakage. 2) Stator worn. 3) Stator material becoming brittle. 4) Rotor worn. 5) Mechanical seal leakage. 	<ol style="list-style-type: none"> 1) Check gaskets, tighten outlet flange and mounting screws. 2) Replace stator. 3) Install new stator. Check that the liquid being delivered is up to order specifications. Replace stator material if necessary. 4) Replace rotor; find out the cause: wear, corrosion, cavitation; choose a different material if necessary. 5) Replace seal.
Insufficient flow and/or pressure too low.	<ol style="list-style-type: none"> 1) Motor wired incorrectly. 2) Excessive flow pressure. 3) Air in suction pipe. 4) Mechanical seal leakage. 5) Pump running dry. 6) Stator worn. 7) Rotor worn. 8) Suction lift too high or hydrostatic head too low (cavitation). 	<ol style="list-style-type: none"> 1) Check order specifications. Check motor wiring. 2) Use a manometer to check pressure level and see if it is up to order specifications. 3) Prevent air from entering the pump; prevent turbulence on inlet side. 4) Replace seal. 5) Fill pump body with fluid; install dry running preventing device; place pipes differently. 6) Replace stator. 7) Replace rotor. 8) Reduce obstruction on suction side; install pump to lower base.
Noisy operation.	<ol style="list-style-type: none"> 1) Stator worn. 2) Rotor worn. 3) Joint worn. 4) Air inside pipes. 	<ol style="list-style-type: none"> 1) Replace stator. 2) Replace rotor. 3) Replace joint. 4) Increase fluid level on suction side. Prevent air from entering the pump; prevent turbulence on inlet side.

<p>Diminished stator/rotor life.</p>	<ol style="list-style-type: none"> 1) Excessive pressure. 2) Excessive temperature of product. 3) Product settled and hardened in pump. 4) Stator material becoming brittle. 5) Pump running dry. 	<ol style="list-style-type: none"> 1) Use a manometer to check pressure and see if it is up to order specifications. 2) If temperature cannot be lowered, ask NOVA ROTORS technical staff for support. 3) Clean and rinse pump out at each delivery. 4) Install new stator. Check that the liquid being delivered is up to order specifications. Replace stator material if necessary. 5) Fill pump body with fluid; install dry running preventing device; place pipes differently.
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12. WARRANTY AND CONTRACTUAL CONDITIONS

The company warrants the pump for a period of one year from the date of shipment. This warranty only applies to manufacturing defects in the product made by NOVA ROTORS.

The warranty covers the replacement or repair in our workshop - done by us at our works - of the pump or part deemed as defective. However, you are not entitled to any claim for damages under any circumstances.

The warranty does not cover any failure due to incorrect wiring, lack of adequate protection, faulty assembly, improper use or negligence in performing the operations related to the pump system.

Furthermore, the warranty does not cover any of the following:

- failures in materials due to any kind of corrosion or abrasion caused by the fluid being pumped; to this purpose, reference will be made to the specifications provided by the customer upon offering and ordering the pump;
- bad functioning caused by unworkmanlike installation work;
- poor, unsuitable or excessive use of pump;
- customer not up to date with payments.

NOVA ROTORS accepts no responsibility for any material or physical damages which may be caused by our pumps.

Also, the warranty does not cover any material which is dismantled, repaired or mishandled by anyone who is not explicitly authorised by us to do so.

Any defective material must be returned to our works carriage free and once it is deemed that the company is accountable for the defect, it is returned as warranty replacement according to contractual conditions.

13. TESTING

Testing is done at our works before the delivery for every pumps. The customer may attend the testing upon his request. The certificate of internal testing is sent to you any time by making reference to the code number on the plate.

Please note that the standard internal testing is done by using water; other products may be used upon the customer's request.

14. DISPUTES

The COURT OF LAW IN VICENZA will settle any dispute which may arise, also in the event of payment by draft.

ATTENZIONE! – Questo manuale deve accompagnare la macchina durante tutta la sua vita.

WARNING!– This owner’s manual must stay with the machine for all its life.

ATTENTION! – Le manuel doit accompagner la machine pour toute sa vie.

ACHTUNG! - Dieses Anweisungsheft muß das Gerät während seiner gesamten Lebensdauer begleiten.

¡ATENCIÓN! - Este manual debe acompañar a la máquina durante toda su vida útil.



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OHSAS 18001:2007
CERTIFICATE
No: 2010/915-A/1



ISO 9001: 2008
CERTIFICATE
No: FM 551921

CEC 07
ATEX 110-Rev.1