

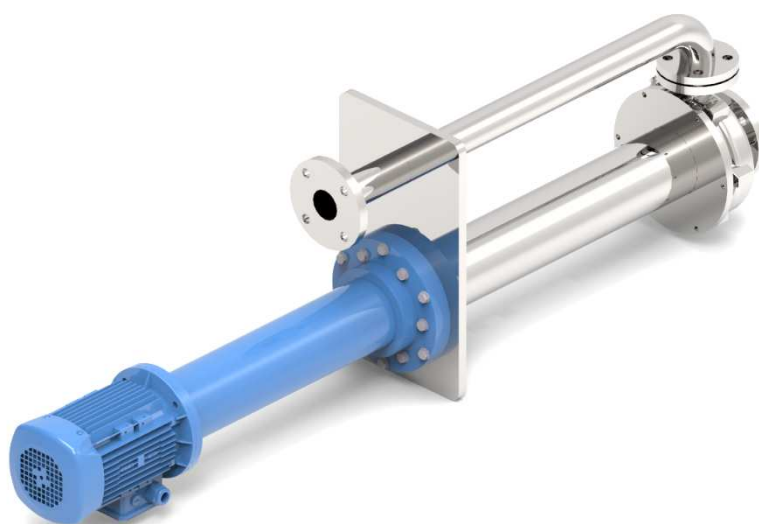


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VERTICAL PUMPS

R0-R1-R14



INSTRUCTION MANUAL FOR INSTALLATION, OPERATION AND MAINTENANCE



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I GENERAL

This pump has been manufactured according to proven techniques, guaranteeing a reliable machine in compliance with the 2006/42 / EC machine directive. The condition of a good functioning and a long use resides in the strict observation of this note.

It is imperative to ensure, prior to installation, that all service conditions meet its specification.



This manual contains information for installation, service and maintenance, as well as the essential conditions to be met for safe and reliable use of the pump. This manual, as well as any accessories supplied with the unit, must be read carefully before proceeding with the installation and start-up of the pump.

This manual contains instructions for the installation, operation and maintenance of R0-R1-R14 pumps, mainly with regard to the safety of people and property. However, since it is not possible to provide an exhaustive list of all incidents that may occur on all installations, it is mandatory that the staff be appropriate, specialized and expert in the tasks mentioned below, both in terms of installation and operation. The said staff should have the opportunity to read this manual carefully, and to contact the company **POMPES GROSCLAUDE** for any particular problem that is not addressed in this manual, or for more detailed explanations or additional. For these contacts, it is absolutely necessary to indicate the serial number of the pump concerned.

In accordance with the Labor Code, the employer must inform, in an appropriate manner, the workers in charge of the implementation and maintenance of the work equipment. Communication to the end operator of the instruction manual can help the user to comply with the Labor Code.

The pump must be used in the correct service conditions for which it was purchased and as described in the technical specifications of the technical file supplied with the pump. Any change in the physical or chemical characteristics of the pumped liquid or conditions of use shall be evaluated in cooperation with the manufacturer.

The pump has not been designed to exceed the performance (*flow, head, rotational speed, temperature, pressure, etc.*) indicated in the sales documents and / or on the nameplate or be used in the presence of ionizing radiation.



An additional leaflet concerning the protection for use in an Atex environment is attached to this manual and contains important warnings when the pump is installed in an explosive environment according to EU Directive 2014/34 EU: 2014; it is imperative to respect them in order to avoid all dangers. This does not take into account the safety regulations in force at the place of installation. The responsibility for their respect lies with the operator itself in the matter of the personnel to which it has called.

The company **POMPES GROSCLAUDE cannot be held responsible for any malfunction, deterioration due to conditions of service, use or liquid not consistent with that for which the equipment was designed.**

I-1 Warranty

Our equipment is guaranteed 12 months after commissioning, limited to 18 months delivery date against any manufacturing defect or material defect. The guarantee is limited to the replacement or reparation, in our workshops, of the part recognized as defective.

The warranty does not apply to replacements or repairs that would result from normal wear and tear of equipment, damage or accidents due to negligence, lack of supervision or maintenance, faulty installation or any other reason beyond to our control.

Our warranty is void immediately and completely if the supplied material has been modified or repaired without our agreement. Repair, modification or replacement of parts during the warranty period cannot have the effect of extending the original warranty period. We do not accept any return of material without prior agreement from us.

In case of return to our factories, shipping and packing are the responsibility of the sender.

In any case, our contractual warranty does not replace the legal warranty that requires the professional seller to guarantee the buyer against all defects or hidden defects of the thing sold. However,

the contractual guarantee does not in any way imply the possibility of a claim for damages or indemnities. We are not responsible in case of particular destination of the material or subjection not declared by the purchaser in the order form.

I-2 Liability limitation

The responsibility of **POMPES GROSCLAUDE** for recourse of any kind does not exceed in any case the purchase price of the equipment and / or installation at the origin of the recourse. It ceases at the end of the guarantee period defined in *Chap I-1*. "Recourse of any kind" means any loss or damage arising out of or in connection with, including negligence, performance, design, manufacture, operation, use or even possibly, at the installation, to the decisions of technical direction of the installation, the visit, the maintenance or the repair of any equipment and / or any installation delivered.

Under no circumstances, either as a result of a breach of the **POMPES GROSCLAUDE** warranty, or by negligence, **POMPES GROSCLAUDE** will not be liable for any particular and consequential immaterial damage including, but not limited to:

- loss of profit and income,
- loss of use of equipment, installations or ancillary tools,
- the cost of capital, the cost of equipment, or replacement facilities,
- services and equipment they require
- costs of downtime or recourse of the buyer's customers for these damages

II SAFETY

As a manufacturer, we allow you to remember the following recommendations

- Internal instructions and safety legislation must be followed and respected.
- Only suitable tools and handling equipment should be used.
- The pump must be used in the correct operating conditions for which it was purchased and as described in the technical specifications of the technical file supplied with the pump. Any change in the physical or chemical characteristics of the fluid carried or conditions of use shall be evaluated in cooperation with the manufacturer.
- All safety standards specific to electrical equipment and those specified by the manufacturer must be respected.

II-1 Meaning of symbols used in this manual

The instructions to be complied with to prevent any danger to persons are indicated by the symbol:



Electric current risks are indicated by the symbol:



Machine integrity risks are indicated by the symbol:



Explosion-proof protection instructions are indicated by the symbol (see Appendix):



Markings placed directly on the machine such as the arrow indicating the direction of rotation or the arrows indicating the suction or discharge ports or the necessary operations before / after start must be respected and must remain legible.

II-2 Personnel qualifications and training



The personnel responsible for installing, operating and maintaining the equipment must be competent, authorized and informed about the rules of the art and have this manual in their possession. Before proceeding with any operation, the pump purchaser must verify and ensure that the personnel authorized to perform these tasks have read and understand the contents of this manual.

In the event where the personnel would not be competent, the operator must be trained accordingly. Personnel incompetent to perform assembling / disassembling operations could cause risk to:

- Operator lives (*effects of an explosion*)
- The pump and its environment
- Characteristics normally obtained from the pump

The company **POMPES GROSCLAUDE** will be relieved of all responsibility in event of accident.

When the unit is installed in an explosive environment, the appendix of this notice marked must be particularly respected:



(NCPAE 19b-02)

II-3 Accident prevention

You the pump purchaser agree to respect all the safety instructions mentioned in this manual.



In potentially explosive areas, the operator is responsible for ensuring the proper operation of the equipment and for preventing any failure leading to an unacceptable mode of operation for the equipment.

II-4 Safety instructions for users

This pump has been manufactured in accordance with the standards for pump safety, in a temperature classification T1 to T5 European Directive 2014/34 EU: 2014



- Parts subject to temperature fluctuations ($T^{\circ}C > 65^{\circ}C$ or $T^{\circ}C < -20^{\circ}C$ present a risk of burning by hot or cold) and whose contact can be hazardous must be protected by appropriate systems. Sudden changes in liquid temperature cause thermal shock and may cause damage or destruction of some pump components. They must be specially avoided when the pump construction materials have not been selected for this eventuality and / or the manufacturer has not been informed that this is the case.
- Protections against accidental contact of moving parts (*coupling guard, for example*) should only be removed when the machine is switched off and off. The pump should never be started without a coupling guard or any other protection provided with the pump. Starting in the wrong direction of rotation can damage the pump and must be checked according to the rules of the art. The maximum rotation speed is indicated on the nameplate or it is indicated in the technical specifications of the technical file provided with the pump.
- To protect people and the environment according to the regulations in force considering the temperature, the toxicity, the harmfulness, the flammability, the corrosivity etc. of the conveyed fluid, protection, filling and emptying devices must be provided for both normal leaks and accidental leaks that may result from failures.
- **The discharge valve will never be closed and it must allow the passage to at least 8% of the nominal flow. Adjustments are made using the discharge valve by checking the pressure using pressure gauge or safety device and making sure not to exceed the power consumption indicated on the motor nameplate.**
- **Any operation of the pump with suction valve closed and / or discharge valve closed is not allowed.**



- The pump must operate without excessive vibration. If this is not the case, check the alignment and wear of the coupling elastic element (*see Section VI-9 Lineage*) and if this does not solve the problem, contact the manufacturer.
- A backup pump should start at least once a month, make sure that it is full of liquid and follow the instructions given in *Chap. VI & VII*.
- To ensure correct lubrication and to avoid overheating of the bearings, it is necessary to observe the appropriate oil level and the recommended intervals between two maintenance operations or the service life of the bearings greased for life (*see also Chapter VIII - Interview*)




THIS PUMP MUST NEVER RUN DRY EVEN A SHORT INSTANT

- The use of the pump without liquid causes the seizure of rotating parts resulting in the destruction of shaft seals and consequently liquid leaks endangering people and the environment. It is imperative to ensure that all installed safety devices are in use.
- Dispose of all electrical risks, consult the specific regulations of the country of installation, as well as those of local services if applicable.



II-5 Safety instructions for application in explosive atmospheres.



When the unit is installed in an explosive environment, it is particularly important to comply with the appendix of this manual  and the special dedicated notice provides in addition (NCPAE 19b-02).

II-6 Safety instructions for the maintenance, disassembly and assembly of the pump

The operator must ensure that all actions concerning the installation, maintenance and inspection of the equipment are carried out by competent and qualified persons who have read this manual.

It must be remembered that pumps carrying dangerous liquids must undergo decontamination.

After the end of the interventions all protections and safety devices must be immediately reinstalled and immediately reactivated.



II-7 Pump modification and spare parts



The attention of the user is particularly drawn to the fact that the use or installation of spare parts and / or accessories not supplied, not approved by the manufacturer and which are not subject to a control or approval may impair the proper functioning of the pump and / or render it unfit for the purpose for which it was designed. The company **POMPES GROSCLAUDE** declines any responsibility for damages resulting from the use of spare parts other than the original parts or the use of non-approved accessories.

III - NAMEPLATE

Identification: Each pump has a company identification plate in one of the following models:

III-1 Standards Pumps



POMPES GROSCLAUDE 29 Rue du 35e Régiment d'Aviation 69500 BRON - France	
CE	
Type	EX215/3X-xxx-4-2I
N°	30123
An./Y.	2019
H	8 m
Qv	50 m ³ /h
n	2 900 min ⁻¹
Tag	CD-400-B01-P01
www.pompes-grosclaude.com (33) 4 72 37 94 00	

ou

POMPES GROSCLAUDE 29 Rue du 35e Régiment d'Aviation 69500 BRON - France	
CE	
Type	MX215/3X H 8 m
N°	30123
Qv	50 m ³ /h
An./Y.	2019
Tag	CD-400-B0
www.pompes-grosclaude.com (33) 4 72 37 94 00	

Fig 1a

III-2 Atex Pumps

POMPES GROSCLAUDE 29 Rue du 35e Régiment d'Aviation 69500 BRON - France	
CE	
Type	EX215/3X-xxx-4-2A
N°	30123
An./Y.	2019
H	8 m
Qv	50 m ³ /h
n	2 900 min ⁻¹
Tag	CD-400-B01-P01
II 2 G Ex h IIB T 4 Gb INERIS 19 ATEX 0000 X	

ou

POMPES GROSCLAUDE 29 Rue du 35e Régiment d'Aviation 69500 BRON - France	
CE	
Type	MX215/3X H 8 m
N°	30123
Qv	50 m ³ /h
An./Y.	2019
Tag	CD-400-B0
II 2 G Ex h IIB T 4 Gb INERIS 19 ATEX 0000 X	

Fig 1b

The parts in **red** are adapted according to the needs and the selected material



IV - UNPACKING, HANDLING, STORAGE

IV-1 Unpacking

Upon receipt of the equipment and before unpacking, check that the packaging of the pump shows no damage, if not indicate it on the waybill and set up the necessary actions with the carrier to make a claim. If a claim has not been made with the carrier, the company **POMPES GROSCLAUDE** reserves the right to decline any liability for damage sustained during transport.

IV-2 Handling

Material handling must absolutely be done in the following way:

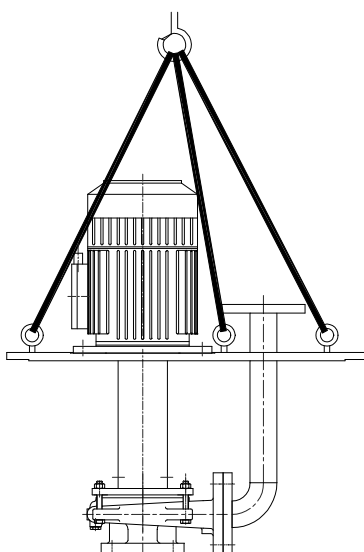


Fig 2



IV-3 Intermediate storage

To allow intermediate storage under good conditions the following instructions are applicable:

- Store in a closed and dry place, free from vibrations.
- Do not remove the protective caps from the pump flanges.
- Periodically operate the rotating part of the pump to avoid marking the ball bearing and gluing the friction faces of the mechanical seal.
- Contact the company **POMPES GROSCLAUDE** to agree on the recommended and adapted products for your application for storage longer than 3 months.
- Maximum storage time:
 - for pumps made of stainless materials: 3 years
 - for oxidizable materials (*cast iron, steel*): 1 year

For prolonged and predictable storage, under different conditions, thank you to inform the company **POMPES GROSCLAUDE** for the implementation of protections and appropriate packaging.

V - PRODUCT DESCRIPTION AND ACCESSORIES

V-1 General Description

Horizontal or multi-stage centrifugal pump with radial sealing surface with axial or radial suction flange and radial discharge flange for pumping fluids for industrial use.

V-2 Identification - Type

R0	109	/2	X	95/90	0,37	2	A
Famille	Orifices E/S	Nombre de roues	Matière en contact avec le liquide	Diamètre des roues	Moteur		
R0 Economique	106	1 roue	X Inox 316L		Puissance en kW	2 2 pôles (# 2900 tr/mn)	Protection
R1 Arbre long	109	/2 2 roues	F Fonte GS			4 2 pôles (# 1450 tr/mn)	A ATEX
R14 Produit chargé	209	/3 3 roues	U Uranus B6				I IP55
	...		C Hastelloy C276				
	614		Ti Titane				
	619						
	827						

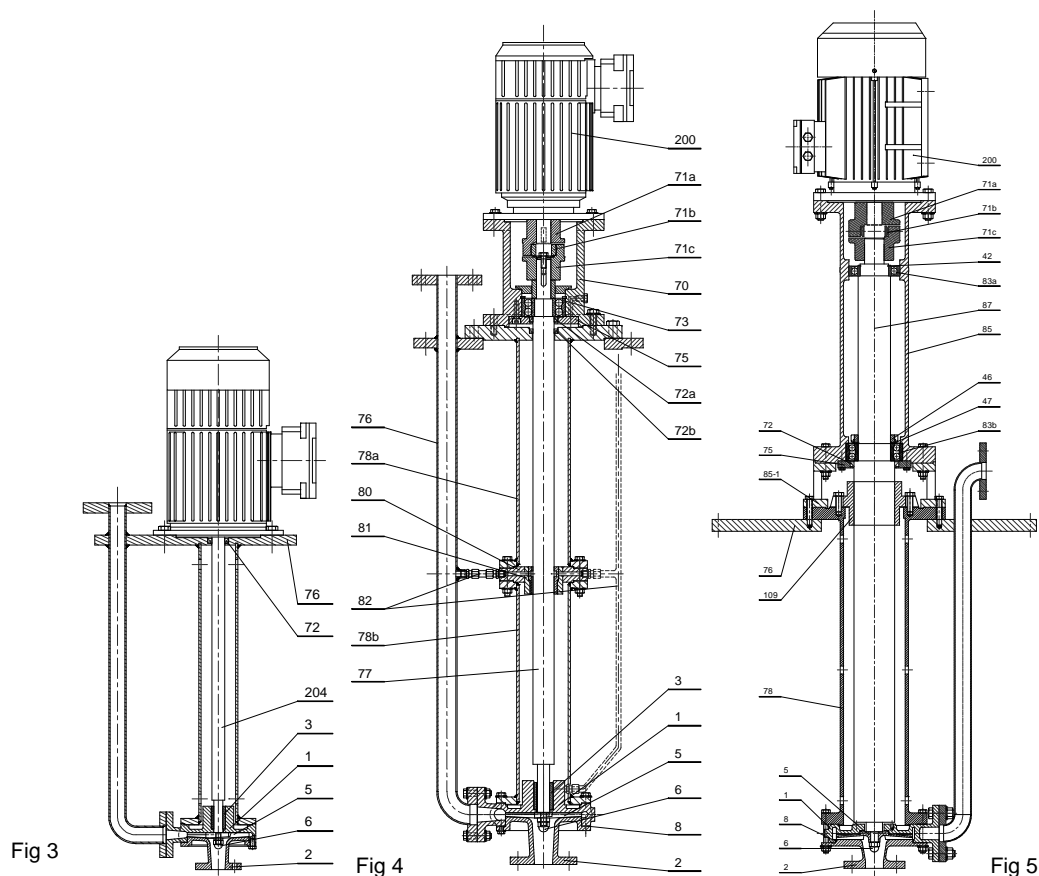
V-3 Design and function

The R0 pump has no ball bearing, the motor is long shaft, it is guided by a foot bushing. This bushing is lubricated by the pumped liquid. (Fig 3)

The R1 pump with a ball bearing, foot bushing and intermediate; depending on the height under the plate, the central tube may consist of several parts. These bushing can be lubricated either by the pumped liquid or by external liquide. (Fig 4)

The R14 pump has a double ball bearing, without bushing. (Fig 5)

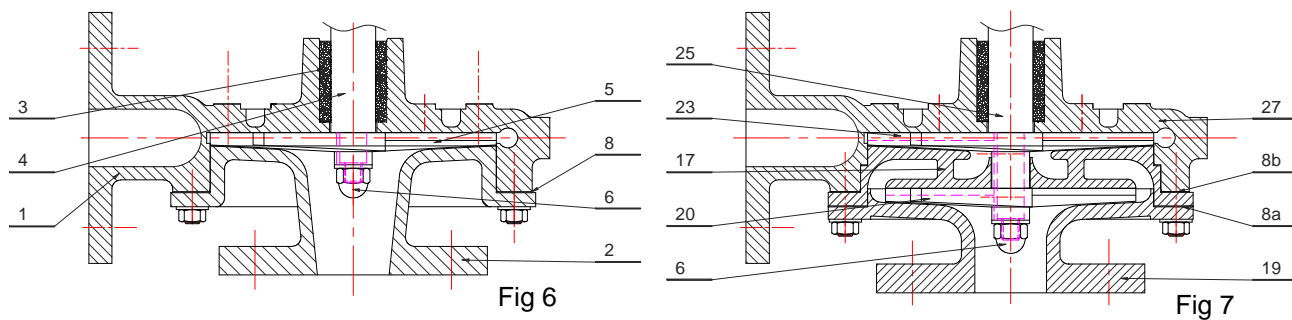
All three pump models can be equipped with a suction extension and / or strainer on request. As standard, lip rings seal the shaft and the base plate, on request sealing can be provided by double mechanical seal.



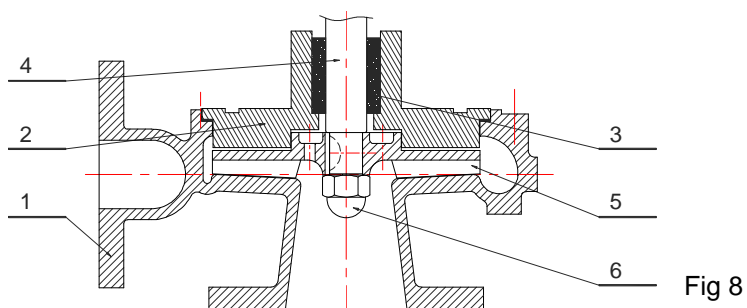
V-3-1 Pump casing

The pump bodies come in three versions:

The 109-212-215-315 pumps can be mounted either in single or multiple impellers, according to fig 6 and 7



The Pumps 106-209-210-216-312-316-414-516-522-614-619-827 pumps can be mounted in single impeller only fig 8



The pumps R0-N / R1-N / R14-N can be mounted only in single cell fig 9

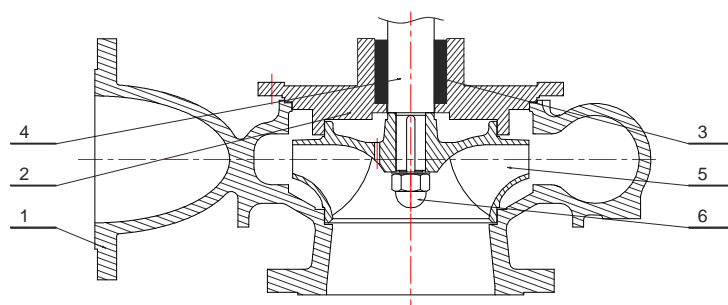


Fig 9

V-3-2 Impellers

Open impellers 109-212-215-216-312-315 according to fig 10

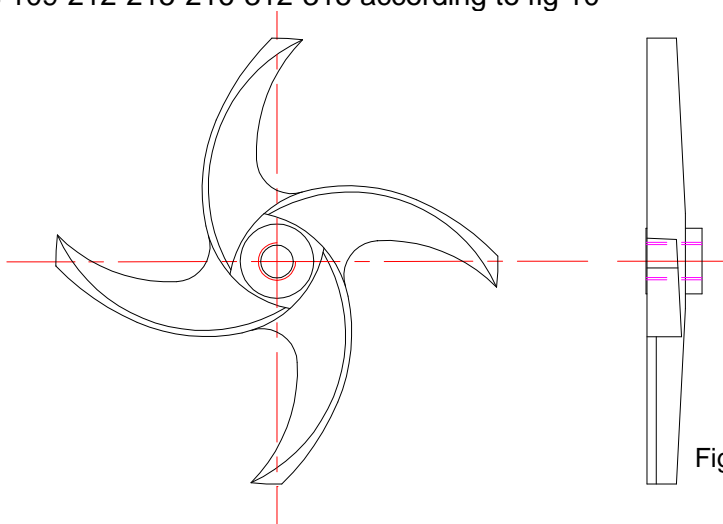


Fig 10

Semi-open impellers 209-210-316-414-516-522-614-619-827 fig 11 with hydraulic holes for axial thrust balancing.

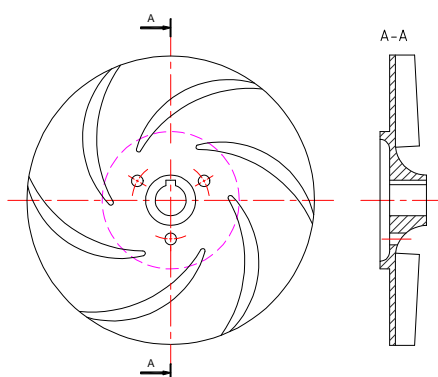


Fig 11

Closed for R0-N / R1-N / R14-N pumps. fig 12

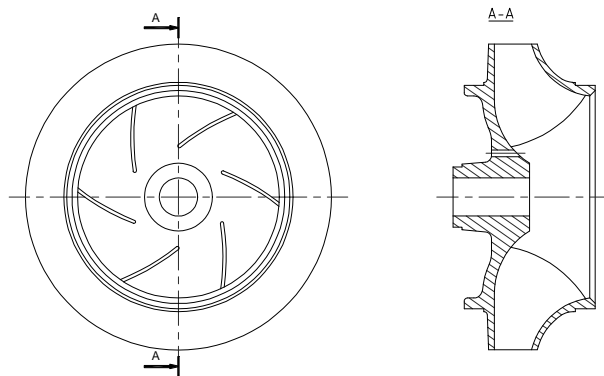


Fig 12

V-3-3 Bearings

The shaft is guided by ball bearings in a cast iron or steel bearing, the axial displacement is limited by circlips and / or steel flanges.

V-3-4 Sealing

In the standard version the seal is achieved with lip rings compatible with the pumped product.

On request or according to need and / or in the case of dangerous product the sealing is ensured by the sliding of a rotating ring on a static part (*mechanical seal*) according to standard EN 12756: 2001. Pumps R0-R1-R14 may be equipped with single or double mechanical seal, back to back, tandem, with or without cooling, lubricated by the liquid carried, an external liquid or a gas or alternatively by a magnetic coupling.

Lip rings

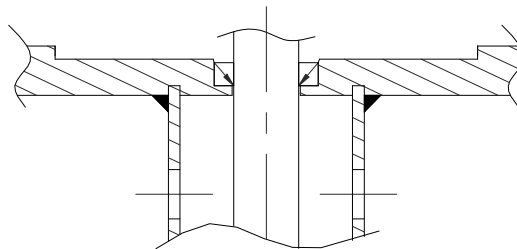


Fig 13

Mechanical seal

The perfect inherent flatness of the mechanical seal surfaces and their high degree of finish make possible exceptional leakage-free tightness.

Dry operation even for a short time damages the friction faces and causes heating.

Depending on the characteristics of the fluid being conveyed and the operating conditions, different types of fittings, suitable materials, and different types of fixtures are adopted. The replacement period takes these criteria into account. Only the mechanical seals supplied and approved by the manufacturer will ensure operating conditions in accordance with those for which the equipment was designed.

The company **POMPES GROSCLAUDE** declines any responsibility for the damages resulting from the use of spare parts other than the parts of origin or the use of accessories not approved.

Gas mechanical seal

Gas seals or non-contact dry seals work by creating a very thin film of gas between the two faces of grooved seals. They generate neither torque nor calorie (*total absence of friction*).

The company **POMPES GROSCLAUDE** declines any responsibility for the damages resulting from the use of spare parts other than the parts of origin or the use of accessories not approved.

V-3-4-1 Simple Mounting

The fittings in simple assembly are lubricated either by an external source with a compatible buffer fluid (Fig 14), or by the pumped fluid (Fig15), in the latter case, check that the pump is full of liquid so that the seal is lubricated and does not cause overheating.

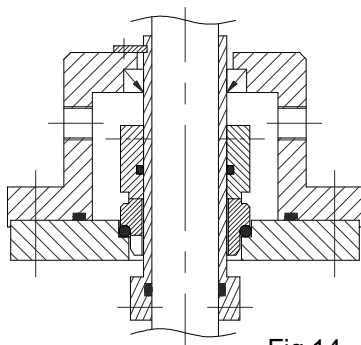


Fig 14

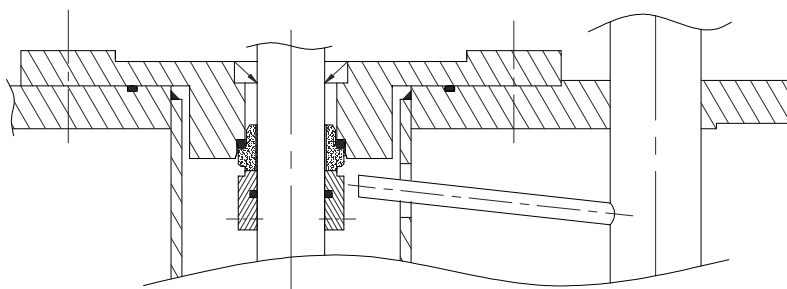


Fig 15

V-3-4-2 Double Mounting

MOUNTING PLAN 54 (Pressurized – Back-to-back)

Lubrication from an external source with a buffer fluid compatible with the fluid conveyed, a pressure greater than 1 to 1.5 Bar at the discharge pressure of the pump. This lubrication must start before the pump and stop after it (if the pump is running with hot liquids, the Lubrification will have to stop after the temperature of the pump at a standstill has dropped below 70 ° C).

In order to ensure the monitoring of the mechanical seal, an instrumentation must be installed on the lubrication pot; at a minimum, a visible level and a manometer monitored by the operator. Additional instrumentation with high- and low-level contact, and pressure is often used, to trigger an alarm or a shutdown system, to signal a lack of circulation of the buffer fluid and / or a pressure drop.

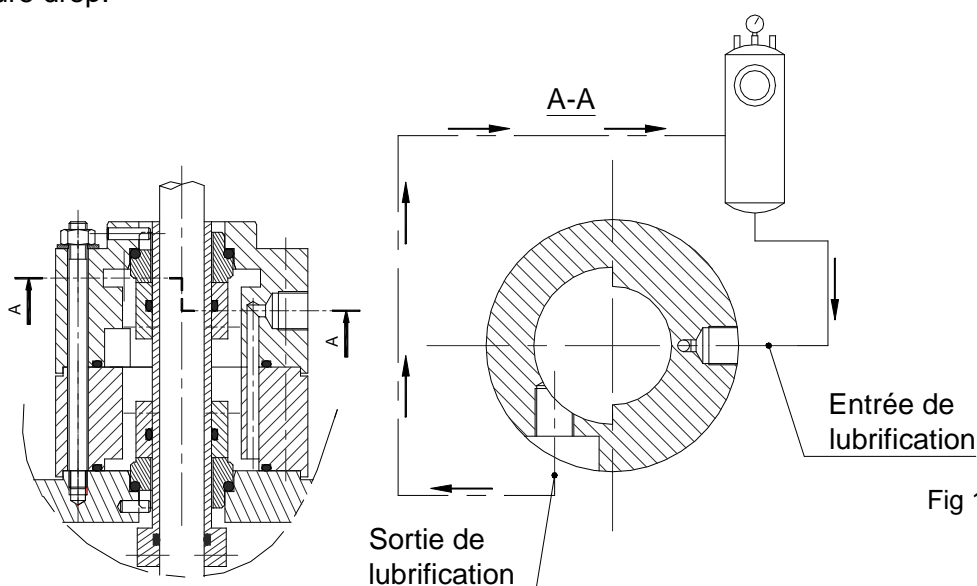


Fig 16

MOUNTING PLAN 52 (without pressure - Tandem)

Lubrication from an external source with a buffer fluid compatible with the fluid conveyed, **without** pressure. This Lubrication must start before the pump and stop after it (if the pump is running with hot liquids, the Lubrication will have to stop after the temperature of the pump at a standstill has dropped below 70 °C).

To ensure the monitoring of the mechanical seal, an instrumentation has to be installed on the lubricating pot; at least a visible level and a manometer monitored by the operator are required. Additional instrumentation with level and pressure contact is often used to trigger an alarm and / or shutdown system.

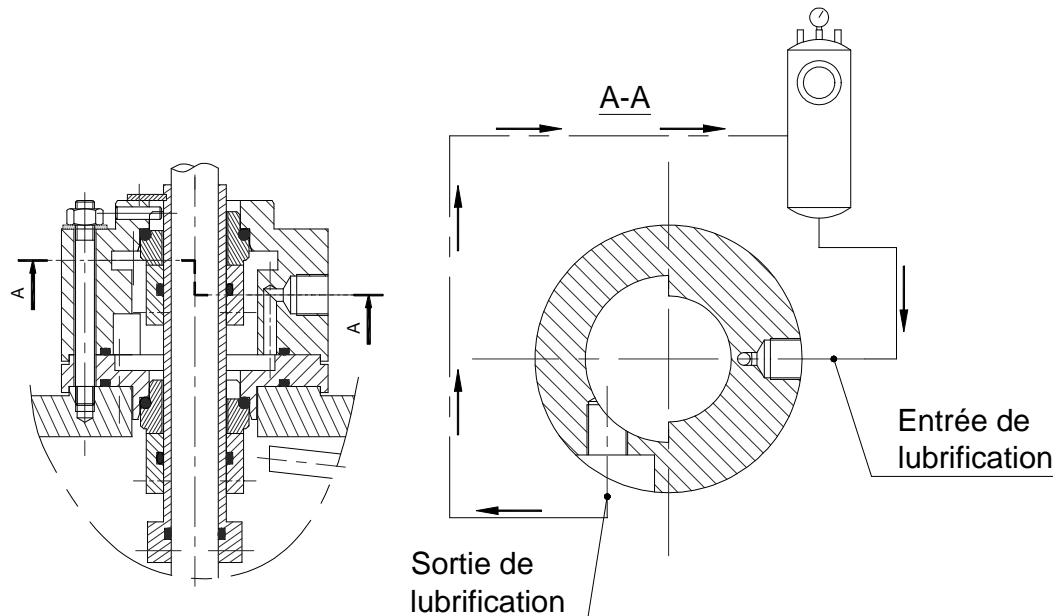
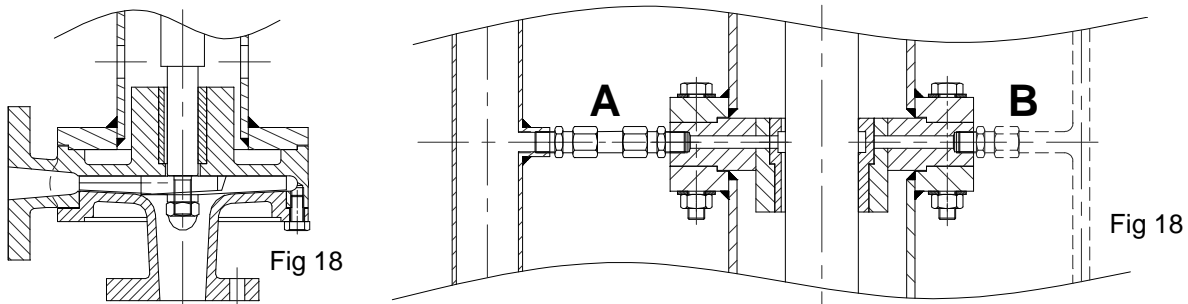


Fig 17

V-3-4-3 Bearings



Vertical pumps have bushings (foot Fig 18, or intermediate Fig 19) which can be lubricated either by the pumped liquid (A) or by an external coolant (B), in latest case a lubrication check must be made. If the lubrication is carried out by the pumped liquid, a level detector must be installed on the tank so that the hydraulics is never running dry.

V-3-4-4 Mounting with magnetic coupling

Please refer to the specific instructions for magnetic drive pumps
MG-LG 19b-02.

V-3-5 Accessories

Accessories that can be provided as an option:

- Lube lubrication pot
- Gauge

- Level detection
- Pressure detection
- Temperature sensor (especially on pumps equipped with a magnetic drive)
- PTC probe on motor (pump equipped with a speed variator)
- Dry running detection
- Frequency inverter (recommended frequency range 20 to 60 Hz)
- Lubrication pot

Pot de lubrification et ses accessoires

Permettant une circulation par effet thermosiphon du liquide de barrage

Ensemble pré-monté et pré-raccordé pour groupe motopompe avec potence Inox

Code article : **KIT TS1020/A002**

Conditions de conception

Legislations applicables : **DESP 97.23-CE & ATEX 94/9/CE**
 Température de conception : **-30 à +200°C**
 Pression Maxi d'utilisation : **20 barg** (une version est disponible en 7 barg (DESP - Ac 3.3))
 Volume interne : **7 litres**

Matériaux en contact avec le fluide

Réservoir : **Inox 304/316 Ti**
 Hublot de lecture : **Verre**
 Flexible de raccordement : **Inox revêtu NBR (ex: Nitrile)**
 Modifiable sur simple demande (voir...)

Type de connexions

Entrée/Sorte thermosiphon : **1/2" GAZ Femelle**
 Serpente de refroidissement : **3/8" GAZ Femelle**
 Sur demande du client : **Utilisation recommandée du serpentin pour des fluides de lubrification avec une température > 70°C**
 Raccordement disponible : **2" GAZ Femelle**

Éléments inclus dans la fourniture

Liaisons équipotential : **Tresses de mise à la terre**
 Manomètre (0-10 barg) : **Type WKA Diam.63 en Inox**
 Documentation incluse dans la fourniture : **Notice de mise en service et de maintenance**
Certificat matière 3.1

Options

Pressostat

Pour s'assurer du bon fonctionnement des pots de lubrification, il est nécessaire de suivre sa pression afin d'identifier un problème potentiel. Ce suivi peut être fait manuellement, par l'intermédiaire du manomètre ou en automatique, par l'intermédiaire d'un pressostat.

Pressostat - EEx ia IIC T6

avec sécurité intrinsèque (limitation de l'énergie présente dans le circuit électrique)

Pressostat - EEx d IIC T6

avec enveloppe antidéflagrante (en cas d'inflammation à l'intérieur de l'enveloppe, le boîtier résiste à la pression, l'explosion n'est donc pas transmise à l'extérieur)

Détecteur de niveau bas

Pour s'assurer du bon fonctionnement des pots de lubrification, il est nécessaire de vérifier que le pot de lubrification conserve du liquide pour lubrifier les garnitures mécaniques. Ce suivi peut être fait manuellement par l'intermédiaire du hublot de lecture ou en automatique, par détection de niveau minimum bas

Détecteur Niveau Bas - EEx ia IIC T6

avec sécurité intrinsèque (limitation de l'énergie présente dans le circuit électrique)

Détecteur Niveau Bas - EEx d IIC T6

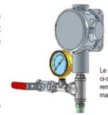
avec enveloppe antidéflagrante (en cas d'inflammation à l'intérieur de l'enveloppe, le boîtier résiste à la pression, l'explosion n'est donc pas transmise à l'extérieur)

KIT-Accessoires-Pot-Lub

Pour s'assurer du bon fonctionnement des pots de lubrification et afin que ces derniers remplissent leur rôle de lubrification des montages des garnitures mécaniques doubles, il est nécessaire de les :

- Remplir avec un liquide de barrage compatible avec votre application
- Pressuriser à une pression au-dessus de la pression de refoulement de la pompe avec un gaz compatible avec votre application. Une valeur plus précise peut être obtenue grâce à l'outil mis en ligne sur notre site internet :

www.pompes-procluide.com/fr/outils



We draw attention to the fact that under certain operating conditions, the surface temperature of the pot may exceed 65 ° C, it is then recommended to cool the contents of the pot with the cooling coil (if it is equipped) or with external means but in any case to protect operators from the risk of contact with its surface.

VI INSTALLATION PREPARATION

VI-1 Personnel

The pump must be installed by qualified and authorized people.

VI-2 Tools

No special tools are required.

VI-3 Safety

Before starting up the pump:

- Check that the flange caps are removed.
- Check that the flanges are properly connected to prevent leaks.
- Make sure that the inlet and outlet valves are closed.
- Make sure that all the electrical conductors are not supplied with power.
- Ensure that the pump is filled with the liquid to be conveyed.



VI-4 Implantation, environment

The pump or the unit must be placed on a flat or horizontal non-deformable support or support, machined at the sides of the outline and must not be exposed to external vibrations. The whole group occupying the desired position, the fixing plate will be fixed.

Check that the space surrounding the unit is sufficient and in particular, above the motor, provide a distance X to the wall at least equal to the diameter D of the engine cooling air intake.

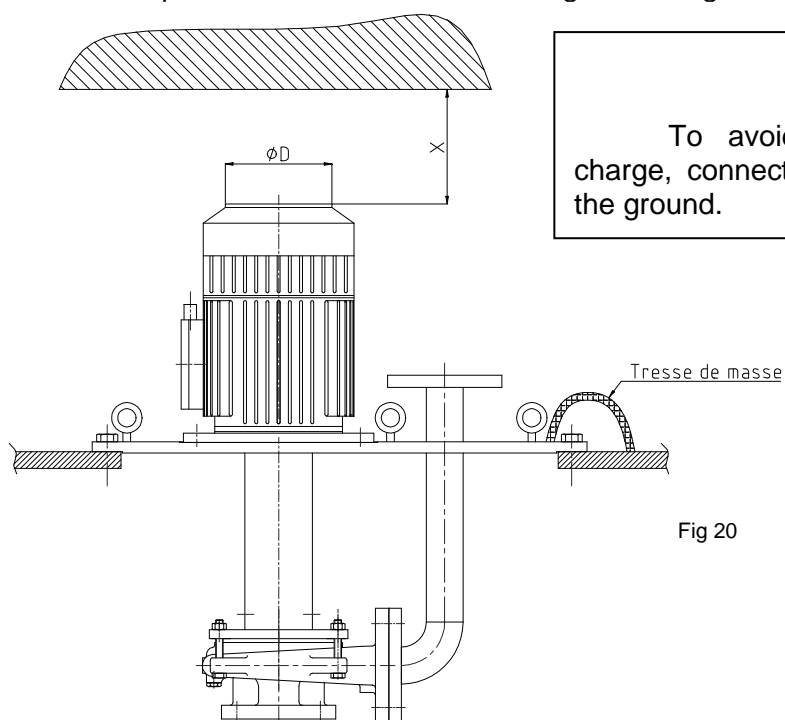


Fig 20

The pump must be implanted in such a way that it is not subjected to climatic constraints and in particular the risk of lightning. In addition, it is important to avoid any risk of falling objects on the pump or it can fall from the support where it will have been permanently fixed or in a subset to avoid any risk of falling.

VI-5 Pipes

Check that the cleaning of the installation has been carried out correctly before any operation of setting up the pump (to avoid contamination of the inside of the pump and in particular the sealing of the pump with particles, unwanted fluids ...).

Please observe the flow direction of the fluid (if necessary adjust the direction of rotation of the motor).

The piping must be at least equal in diameter to the I / O ports of the pump. If necessary, use convergent / divergent to adjust the diameters.

The flange seals must not protrude inside the pipes and be put in place according to the recommendations of the suppliers.

Adjust the pipe fasteners so that they do not cause any stress on the pump flanges (the pump must be removable from its location without the piping moving). The stresses due to the expansion can be compensated by expansion sleeves.

Avoid sudden changes in diameter (use asymmetrical convergents) as well as short radius bends near the pump I / O connections.

Provide for suction a straight length equal to at least 10 times the nominal diameter of the pump suction and discharge 5 times the nominal discharge diameter of the pump.

The flow velocity of the fluid will be between 1 to 2 m/s at the suction and 2 to 3 m/s at the discharge

Provide for the installation of control and security devices::

- Gauge
- Mano-vacuum gauge
- Thermal relays
- Emergency stop devices on malfunction detector following :
 - No liquid carried or auxiliary fluid (*heating, cooling*), checking the presence of liquid and / or the minimum pressure.
 - Heating due to mechanical seizure.
- ...

During the installation of the pump or the group, it is important to keep in mind, the materiality and the liquid conveyed.

The pump must be started full of liquid.

The pump must not be used as a fixed point for pipings

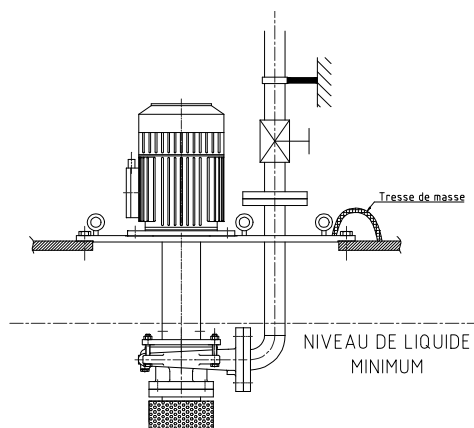


Fig 21

Support must be installed within 0,5 m of the I / O flanges of the pump.

If there are auxiliary connections and accessories, they must be mounted and connected according to plan. They are essential for the proper functioning of the group.

VI-6 Stress forces on flanges



Exceeding the permissible forces and moments causes leaks on the pump and therefore a danger if the liquids conveyed are toxic or hot.

VI-7 Direction of rotation of pump

Rotation direction of the pump directly depends on the rotation direction of the motor

To verify the direction in which the motor turns (*clockwise seen from motor fan side*), the pump and the motor must be uncoupled in order to avoid any damaging of the pump.

- The reversing of the rotation direction can only be made by the reversing of phase
- An arrow on the pump indicates the direction of rotation



VI-8 Coupling

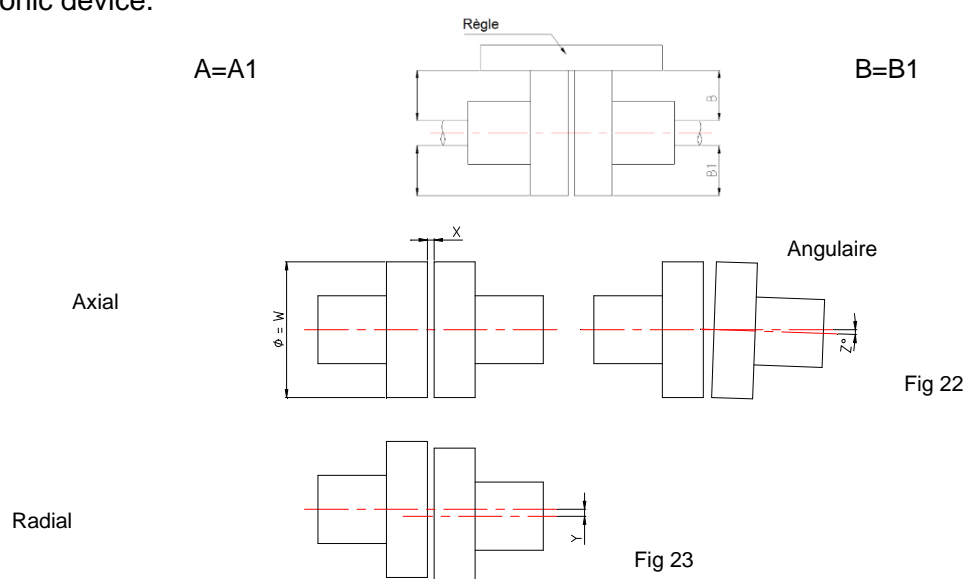
The coupling sleeves will be mounted on the shafts without shocks. It may be necessary, if necessary, to heat them to facilitate the operation.

VI-9 Alignment

The pump and the motor must be aligned at ambient temperature after fixing the base and connecting the pipes, then, after start-up, the alignment must be corrected after reaching the operating temperature (*differential expansions*), see VII.6

Align the motor relative to the pump by adding shims under the motor feet.

To check the alignment, use a comparator or an appropriate device (*metal ruler*) or alternatively with an electronic device.



Refer to the recommendations of the supplier of the coupling to validate the conformity of the assembly

VI-10 Level control

For pumps with lubricated bearings in oil or grease refer to VIII-2.

VI-11 Electrical Connection

The electrical connection must be made only by a certified electrician.

The motors are calculated for power line voltage tolerances of + or – 10%. The power line's characteristics must comply with the pump or pump/motor unit identification plate. The motor must be connected in compliance with the electrical wiring diagram located in the terminal box in direct start-up.

When the electric pump unit is connected to a frequency converter (*recommended frequency ranges 20 to 60 Hz*), the motor is equipped with a temperature sensor in the winding to ensure its protection and we recommend that you connect it.

When the unit is installed in an explosive environment, it is particularly important to comply with the appendix of this manual marked (NCPAE 19b-02).

VI-12 Last check-up before start-up



The last checks should cover the following points:

- No one should be endangered by starting
- The pipes are well connected
- Verification of the tightness of the joints
- The pump body is completely flooded.
- The discharge side valve is partially closed to allow the passage of at least 8% of the nominal flow
- The tightness and functionality of auxiliary piping.
- The tightness of the shaft is not too tight and the shaft rotates freely by hand
- The shaft turns freely by hand.
- Check the supply voltage and the connection of the motor terminal box correspond to the said voltage
- The direction of rotation of the motor is correct.
- Clamping and sealing of flange connections.
- The tightening of the anchor bolts.
- The good lineage of the engine and hydraulic assembly
- Parallelism and concordance of the pipe flanges with those of the pump.
- If a starter filter is fitted to protect the pump against dirt and impurities from the installation; the fouling of the latter must be controlled by the differential pressure measurement, in order to avoid cavitation.

VII START UP

VII-1 Safety constructions

The electrical connections and protections must be made according to the rules of the art and by trained, qualified and qualified personnel in accordance with the prescriptions and standards in force. See in particular the recommendations of the engine manufacturer's manual

In potentially explosive atmospheres comply with the requirements of EN 60079-14: 2008



The pump must be filled or submerged in liquid to avoid deterioration see the destruction of the shaft seal

The flow rate will be adjusted with the outlet valve.

The inlet side valve should always be open to prevent cavitation.

The pumps of the R0-R1-R14 series must not be used as a reactor (*place of reaction between two chemical compounds*) and must be washed / rinsed / neutralized when used on several chemicals that could potentially / possibly interact.

VII-2 Priming

The volute of the pump casing must be completely submerged.

VII-3 Verification before start-up

Verifications should include the following:

(See last checks before commissioning Chat VI-12)

VII-4 Start-up

To start the pump or group, follow these instructions:


- Close almost completely the one to the repression.

- Start the engine.
- Purge the stuffing box, if applicable (see chapter V-3-4-3)
- Check the pressure gauge on the discharge side; if the pressure does not increase gradually with the speed of rotation, stop the engine and carry out a new degassing of the pump.

When the motor has reached its speed, set the operating point using the discharge valve (*closed valve operation is only possible if a by-pass ensures a minimum flow*) or using the frequency converter (*recommended frequency 20 to 60 hz*).

VII-5 Operating control

During the first few minutes of operation, check the following:

- The mechanical seal ensures a good seal (*a slight leak is possible during the first start-up, allow 30 minutes for the elements to take up their positions*) **ATTENTION** in case the leak persists and if it is important stop the pump as soon as possible and contact **POMPES GROSCLAUDE**.
- The intensity absorbed by the motor does not exceed the intensity indicated on the motor plate (*the power absorbed by the pump increases proportionally to the density of the liquid carried*)
- The rotation speed and the discharge pressure.
- Monitor that the pump runs smoothly.
- Check the fluid levels in the suction tank.
- Check the temperature at the pump bearing (*maximum 80 °C*) and at the surface of the pump casing, it must not be higher than that indicated on the rating plate. Chap III.
- Observe the appendix of this marked insert  (NCPAE 19b-02).
- The permissible operating limits (*pressure, temperature, speed of rotation*) are indicated on the technical specifications of the technical file supplied with the pump.



VII-6 Shutdown

Before shutting down, it is advisable to close the outlet valve.

As soon as the pump is stopped, close all the valves.

The starting frequency depends on the maximum permitted temperature rise of the motor (*motor <100 kW, 10 starts per hour ... for more details refer to the instructions supplied with the motor*)

If there is a risk of frost and / or prolonged shutdown, drain the pump and the cooling / heating envelopes.

The installed standby pumps must be started regularly to ensure their good condition (*ideally once a month*).

BEFORE PROCEEDING WITH ANY OPERATIONS, MAKE SURE THE ELECTRICAL POWER SUPPLY IS TURNED OFF.



Alignment



For high temperature pumps it is necessary to operate them at their operating temperature, to stop them and to check their alignment immediately.

- a) Make sure that the half couplings are not in contact
- b) Check the tightening of the set screws

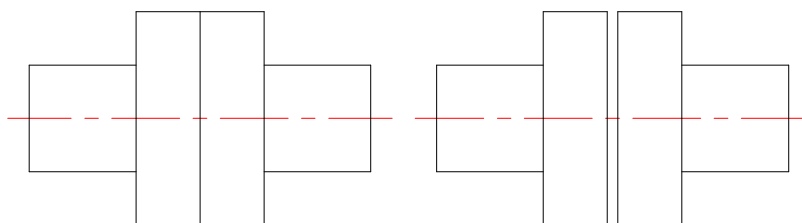


Fig 24

Non

Oui

c) For re-lineage after operation refer to *Chap. VI-9 lineage*

VIII MAINTENANCE

VIII-1 Safety



All work on the unit should only be undertaken after disconnecting it from the power grid. Take all necessary measures to prevent accidental engagement.

All work mentioned below must be carried out by competent and authorized personnel.



Pumps carrying products that are harmful to health must be decontaminated.

Please respect the legal provisions in force, so as not to endanger the health of the workers.

VIII-2 Bearing lubrication

The pump is equipped with ball bearings lubricated for life, or with a grease nipple, it will be renewed using the grease fitting mounted on a bearing:

- Every 1000 hours for a pump at 2900 rpm.
- Every 2500 hours for a 1450 rpm pump.

LUBED-FOR-LIFE BEARINGS

These bearings are maintenance-free and must be replaced according to the table below.

		1500 min-1	3000 min-1
Bearing R1	109	20 000 hours	15 000 hours
Bearing R1	80	10 000 hours	8 000 hours
Bearing R1	35	8 000 hours	3 000 hours
Bearing R14		10 000 hours	8 000 hours

OIL LUBRICATED BEARINGS (if requested only)

On delivery, the pumps equipped with oil level indicator are filled with oil, a level control is required at start-up by the indicator light.

Pumps equipped with an oiler are delivered empty bearing. The filling is done through the hole rep. R fig26. The level is reached when the oil appears in the bowl of the threaded end. Fill the tank by tilting it on its articulation, repeat the operation until a stable level is reached. In use ensure that the tank is never empty, it automatically restores the level as part of its normal consumption, or leaks.

The operating temperature of the bearings should never be higher than 85 ° C.

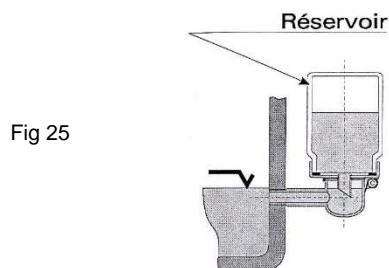


Fig 25

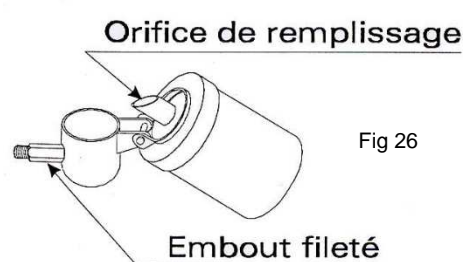


Fig 26

Oil change

Min-1	First Emptying Hours	Following emptying Hours
<1800	200	5 000
1800-3600	200	3 500

More frequent changes are recommended in case of severe working conditions. The removal of the lubricant must be done in compliance with the legal provisions in force.

Oil type

T°C mini for start-up	T°C maxi for start-up	Characteristics	Example
-20°C	+60°C	Kinematic viscosity 67,7 mm²/s	EXTRA68S
-40°C	+85°C	Kinematic viscosity 45,6 mm²/s	RENOLIN EQUIMA ME

Abnormal vibrations or noises often result from wear or damage to the ball bearings; in this case it is imperative to replace them so as not to risk heating or spark inside the bearing or the motor casing.

Continuous temperature monitoring can also be mounted and adjusted to cause the drive to trip at 10 ° C above normal operating temperature.

VIII-2 Electric Motor

Maintenance according to the instructions of the manufacturer's manual.

VIII-4 Mechanical seal

The tightness of the liquid conveyed is obtained by the sliding of 2 perfectly smooth and flat surfaces. Under normal operating conditions (*should only work in the presence of liquid*), this type of seal does not show any leaks. Periodic inspection is necessary, **dry running even for a short time damages the friction faces**. If the mechanical seal leaks, stop the pump immediately to replace the mechanical seal.



VIII-5 Magnetic coupling

The maintenance of the shaft is ensured by a smooth bearing lubricated by the fluid conveyed. Under normal operating conditions (*should only work in the presence of liquid*), periodic inspection is necessary, **dry running even for a short time damages the plain bearing**. If the bearing makes noise or causes vibrations, stop the pump immediately for maintenance work on the internal bearing and refer to the instructions for magnetic drive pumps MG-LG 19b-02.



VIII-7 Coupling and coupling protection

Check the wear of the elastic element and the tightening of the coupling sleeve on the shaft.



In potentially explosive atmospheres, the coupling guard is made of anti-spark material.

IX DISSASSEMBLING

IX-1 Safety

Repairs must only be performed by qualified personnel.

The pump must be at room temperature, without pressure and drained. The draining of the pumped liquid is done by the plug rep 15 on the pump body, it must be evacuated and collected without presenting a danger for the people and the environment.

In the case of a very toxic liquid, the pump must be rinsed thoroughly due to any residual liquid pumped.

In case of liquid whose residues can become corrosive in contact with the air or ignite on contact with oxygen, it must be rinsed, neutralized, dried, by blowing an inert gas free of water.

Spare parts used must be of manufacturer origin or approved by the latter (see Chapters II-7). Otherwise, the company **POMPES GROSCLAUDE** disclaims any liability for damage resulting from the use of spare parts other than the original or unapproved parts.

The order of disassembly operations can be deduced from the overall plan.

IX-2 DI-SASSEMBLING

Shutting down the pump (see Chapters VII-5)

Close the suction and discharge valves

In the case of work on the motor, observe the instructions and instructions of the motor manufacturer in its instructions.

Take out the pump

Drain the pump by removing the plug. 15.

The oil or any other liquids drained must be recycled or stored according to the rules in force.

If the pump is carrying harmful, toxic or dangerous products, the parts in contact with the fluid being transported must be cleaned and decontaminated before dismantling.

If necessary / applicable, dismantle measuring and control devices

Undo the coupling and engine protection fixing screws and disconnect it from the bearing.

Before dismantling, it is advisable to locate the parts.

Disassemble the pump casing by unscrewing the volute nuts, separate the volute from the rest of the pump.

Loosen the wheel nut, remove the wheel which can be screwed or keyed (see sectional drawing)

Remove the tray 2 with its foot pad.

Unscrew the screws of the inter tube, intermediate bearings, remove them from the shaft

Remove the seat plate (*rep76*).

Remove the coupling by removing the clamping screw.

Remove the bearing flanges, or the bearing flanges (*75 rep*) 4vis.

Remove the circlip (s).

Drive the shaft opposite to the drive with its bearings (*ref 73-83*).

Remove the intermediate bearing bushings and the shaft sleeve (s).

X AFTER-DISASSEMBLING WORK

Perform the following work:

- First, clean all parts, wear rings and joint planes with the appropriate solvent.
- Check the wear, the surface condition of the wheels and the shaft.
- Check the concentricity of the shaft (and shaft sleeve).
- Check the surface condition of the seal surface and the housing of the fixed grains (body, tray, housing)
- Check the frame bores (bearings ball bearings)
- Check the wear of the bearings.

XI RE-ASSEMBLING

The pump is reassembled by reversing the order in which it was dismantled, the assembly drawing and the parts list used for reference.

A bag of new seals, joints and gaskets will have to systematically opened and used to replace those in service since the latter items may be used only once.

Replace damaged parts with original manufacturer's spare parts or under the responsibility of the user of the equipment (*as indicated by Euopump Guideline Part II - § 5*). The company **POMPES GROSCLAUDE** declines any responsibility for the damages resulting from the use of spare parts other than the parts of origin or not authorized.

XI-1 Reassembly of bearings

- If the bearings have to be replaced, heat them to 80 ° C before putting them on the shaft
- Reassemble the shaft in the bearing and replace the flanges equipped with lip ring (*observe the position*)

XI-2 Re-assembling the mechanical seal

This operation must be carried out by trained, specialized personnel with knowledge of the fittings.

Damaged mechanical seals must be replaced as a whole.

It is recommended to avoid installing new parts with other used or repaired ones.

Renovations of fittings must be done by the manufacturer alone and only if he deems it possible.

After dismantling the damaged packing and its components (*rotating parts on the shaft and fixed in their housing*) proceed as follows:

- Energetically clean the shaft and fix grain housing
- Check that the faces show no sign of corrosion or erosion and that the surface of the shaft under the lining of the liner is perfectly smooth.
- Unpack the new trim with great care especially at the friction surfaces. Take care not to put them in contact with dirty, greasy or abrasive objects.
- The assembly of fixed and rotating parts should be done without lubricant but with alcohol or soapy water.
- Reassemble the fixed seed (s) in the housing (s).
- Before coming in contact with each other, the friction faces should be clean and dry.
- Reposition the mechanical seals on the shaft to the original ribs (*see disassembly*). Attention, the edge of the tree or the shirt must be perfectly chamfered
- Reassemble the plate, bring the housing into contact, screw.

XI-3 Re-assembling the impeller



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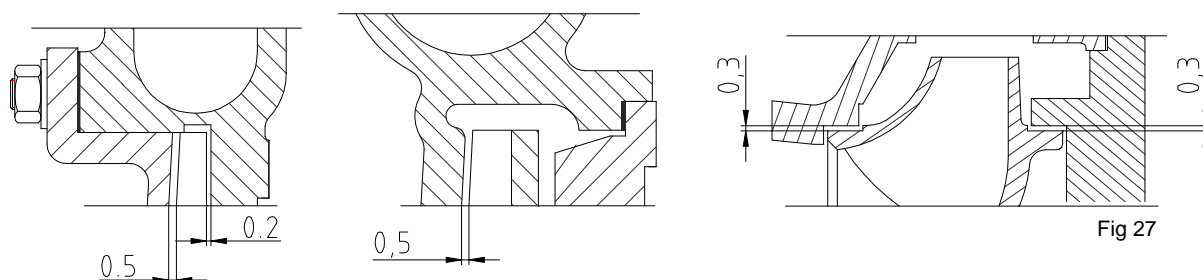


Fig 27

XI-4 Tightening torque

Ø vis	M6	M8	M10	M12
Couple	8 Nm	12 Nm	25 Nm	40 Nm

It is particularly important to pay attention to the respect of the indications above in case of presence of vibration or ultrasonic sources in the installations.

XII ABNORMALITIES (causes and remedies)

XII-1 Malfunctions observed

Défauts	Causes possibles
The pump delivers no liquid	1-2-5-7-9-10-15-33
Insufficient flow	2-3-4-5-6-7-10-13-15-20-33
Inadequate gauge	3-7-9-10-13-15-20
Pump disengages after start	3-5
Heating of the pump	1-2-14-15-18-19-23-24-26-34
The pump vibrates or makes noise	2-4-5-14-17-18-19-20-23-24-26-27-28-29-30-31-32-33-34-35
Leakage of the mechanical seal	17-21-22-23-24-25
Reduced service life of the mechanical seal	5-16-24-22-25



Reduced service life of the bearings	17-18-19-23-24-26-27-28-29-30-31-32-34
Reduced service life of the coupling	34
Absorbed power is excessive	8-9-10-11-12-13-17-18-33-35
Reduced service life of the coupling	46
Absorbed power is excessive	15-16-17-18-19-20-24-25-29-34-45-47

XII-2 Potential causes and remedies

Causes		Remèdes
1	The pump is not primed	Ensure that the pump casing is fully flooded at startup
2	The difference between the suction pressure and the vapor pressure is insufficient	
3	The liquid contains too much air or gas	
4	Shutoff valve is partially obstructed	
5	The suction piping is not sufficiently submerged	
6	Lubrication piping is obstructed	Eliminate deposits
7	The rotation speed is too low	Consult us
8	The rotation speed is too great	Consult us
9	The direction of rotation is not good	Intervert 2 phases of the diet
10	The height required for installation is greater than the height provided by the pump	Adjust the discharge valve
11	The height required for installation is lower than the height provided by the pump	Adjust the discharge valve
12	The density of the pumped liquid is greater than that expected	
13	The viscosity of the pumped liquid is different from that expected	See pump specifications Consult us
14	Flow rate at the operating point of the pump is too low	
15	The pump is not suitable for parallel operation	
16	The quantity or the pressure of the lubricating liquid are insufficient	Complete the lubricant level
17	The shaft is crooked	Replace it
18	Rotating parts come into contact with fixed parts	Stop the group, return to the workshop for dismantling and control
19	The bearings are worn	Replace them
20	The wheel is damaged	Replace it
21	The mechanical seal is worn or damaged	Replace it
22	the mechanical seal is not compatible with the pumped liquid	Replace them
23	The shaft is eccentric because of misalignment of the bearing or because the bearings are worn	Disassembly and control
24	The rotating part is unbalanced because of vibrations	Checking the lineage of the coupling
25	The shaft or liner is worn due to an injection of loaded lubricating fluid	Replace the tree or shirt Clean the lubrication fluid
26	Excessive thrust caused by stress due to mechanical seal or hydraulic balancing system	
27	Heating of the bearings due to excess lubricating oil	
28	Oil leak	
29	Poor mounting or wrong type of bearings (damage during assembly)	
30	Dirty bearings	Replace them
31	Corrosion of bearings due to the presence of water in the bearing	Replace them
32	Excessive cooling of the bearing causing internal condensation	
33	Presence of a foreign body in the wheel	Disassemble the pump
34	Bad alignment	Realign the group
35	Insufficiently rigid supports	



XIII SPARE PARTS LIST

Whenever you order spare parts, please indicate the pump type and the serial number.

Example: Pump type: R1 109X-xxx-0,37-2A
 Serial number: 30100

This information is indicated on the nameplate of the pump.

XIII-1 Recommended spare parts for a 2-year service after start-up.

- A set of joints
- A set of mechanical seal(s)
- A ball bearing set

XIII-2 Recommended spare parts for a service according to ISO

- A set of joints
- A set of mechanical seal (s)
- A wheel
- A shaft
- A ball bearing set



XIII NOMENCLATURE

Repère	Désignation	Quantité
1	Body	1
2	Flange (fig 3) & Plate (fig 4)	1
4	Shaft	1
5	Wheel	1
6	Wheel nut	1
8	Body seals	1
8a	Body seals	1
8b	Body seals	1
8c	Body seals	1
12	Chemise d'arbre	1
14	Lantern	1
16	Spacer	1
18	Lip seal	1
19	Flange	1
20	Wheel	1
21	Intercalaire	1
22	Multicellular wheel	1
23	Multicellular wheel	1
28	Case seal	1
29	GMS Case	1
33	Ring of braid	6
38	Case seal	1
39	GMD Case	1
40	Housing spacer GM	2
42	Retaining Rings	1
46	Nut with notches	1
47	Brake washer	1
51	GM side atmosphere	1
52	GM quoted product	1
56	Irrigation tubing	1
68	Double envelope seal bearing	1
70	Bearing	1
71a	Half coupling on the motor side	1
71b	Flector coupling	1
71c	Half coupling on the pump side	1
72a	Lip seal	1
72b	Lip seal	1
73	Rolling	1
74	Irrigation tubing	1
75	Bearing flange	2
76	Seat plate	1
77	Pump shaft R1	1
78	Inter tube	X
79	Seal	1
80	Intermediate bearing	X
81	Intermediate bearings	X
82	Union Fittings + Irrigation Tubing	X
83	Rolling	2
84	Removable discharge tube	r
85	R14 bearing	1
86	Lubrifcation pot	1
87	Pump shaft R14	1
88	Suction extension	1
89	Protection perforated glass	1
90	Screw seal	1
91	Protection nut	X
93	Strainer seal	1
94	Strainer	1
96	Oil level look	1
98	Greaser	1
99	Deflector	1