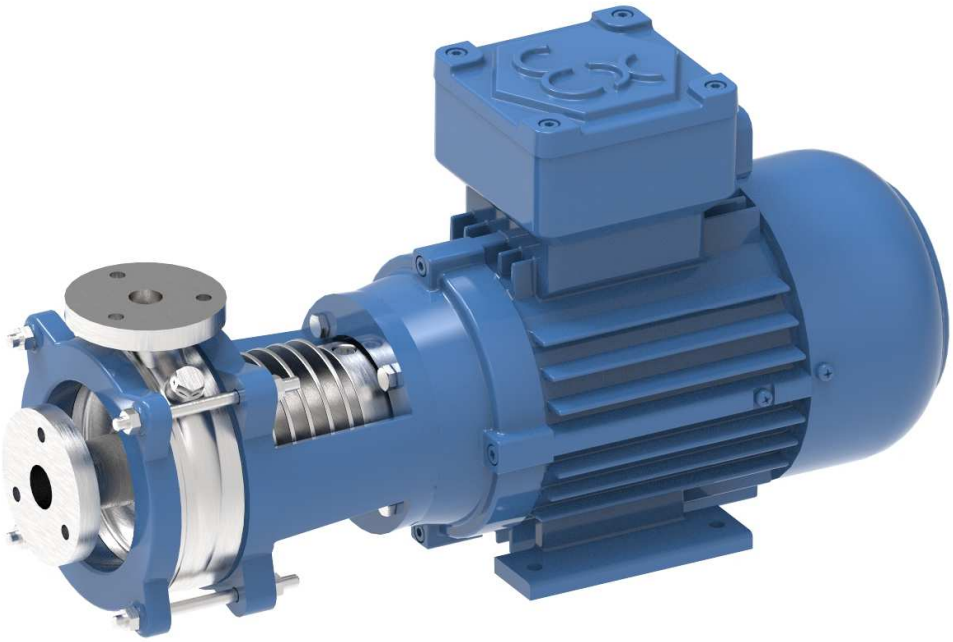
POMPES GROSCLAUDE
Parc du chêne - 29, rue du 35ème régiment d'aviation
69 500 BRON – France APE 2813Z - RCS Lyon
Siret : 50966640000023 TVA : FR46 509 666 400
Tel : (33) 4 72 37 94 00 Fax : (33) 4 72 37 94 01
www.pompes-grosclaude.fr info@pompes-grosclaude.fr

HEAT-TRANSFER PUMP

MR-LR



INSTRUCTION MANUAL FOR INSTALLATION, OPERATION AND MAINTENANCE

SUMMARY

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 MR-LR 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 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 respect:

(NCPAE 19b-02)

II-3 Accident prevention

You the pump purchaser agree to respect all the safety instructions mentioned in this manual and in the manual of pump, as well as national and international prescription concerning safety instructions.

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 ° C> 65 ° C or T ° C <-20 ° 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 source, 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 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.

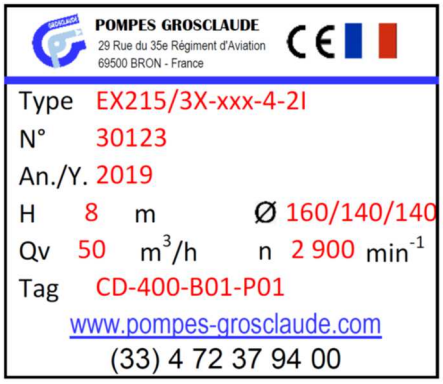
II-7 Pump modification and spare parts

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



or

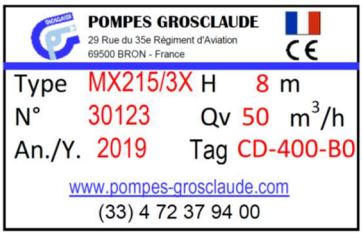
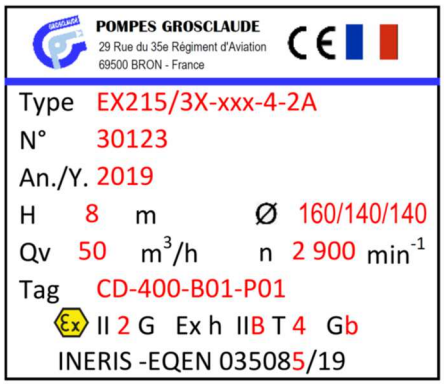


Fig 1a

III-2 Atex Pumps

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



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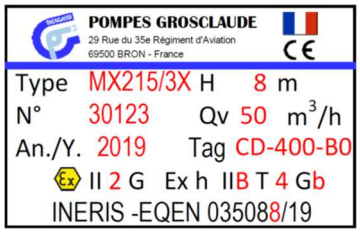

Fig 1b

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:

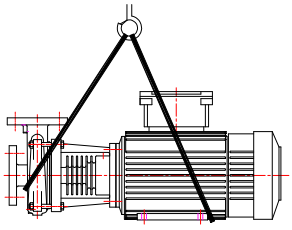

Fig 2

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 - DESCRIPTION OF THE PRODUCT AND ACCESSORIES

V-1 General Description

Horizontal or radial multi-stage centrifugal pump, with radial sealing surface with axial suction flange and radial discharge flange or IN LINE version with in-line flange fig 5. These pumps are equipped with a finned radiator which allows the cooling of the pump sealing. They are intended for pumping for pumping fluids for industrial use.

V-2 Identification - Type

Série MR

MR	109	/2	F	-	95/90	-	0,37	-	2	A
	Orifices E/S	Nombre de roues	Matière en contact avec le liquide		Diamétre des roues		Moteur			
	109 215 … 619 Voir ci-dessu	1 roue /2 2 roues /3 3 roues	F Fonte GS A Acier au carbone				Puissance en kW		2 2 pôles (# 2900 tr/mn) 4 4 pôles (# 1450 tr/mn)	Protection A ATEX I non ATEX

Série MRX

MRX	109	/2	X	-	95/90	-	0,37	-	2	A
	Orifices E/S	Nombre de roues	Matière en contact avec le liquide		Diamétre des roues		Moteur			
	109 215 … 619 Voir ci-dessu	1 roue /2 2 roues /3 3 roues	X Inox 316L XG Inox 304				Puissance en kW		2 2 pôles (# 2900 tr/mn) 4 4 pôles (# 1450 tr/mn)	Protection A ATEX I non ATEX

Série LR

LR	317		F	-	165	-	2,2	-	2	I
	Orifices E/S	Nombre de roues	Matière en contact avec le liquide		Diamétre des roues		Moteur			
	317 517 613/34 Voir ci-dessus	1 roue	F Fonte GS A Acier au carbonne				Puissance en kW		2 2 pôles (# 2900 tr/mn) 4 4 pôles (# 1450 tr/mn)	Protection A ATEX I non ATEX

V-3 Design and function

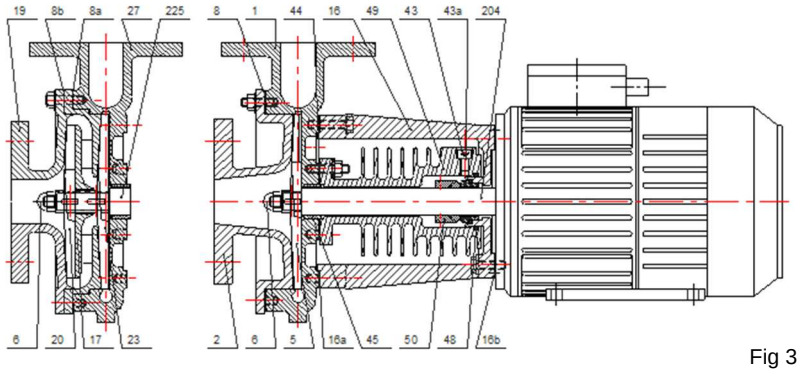

Fig 3

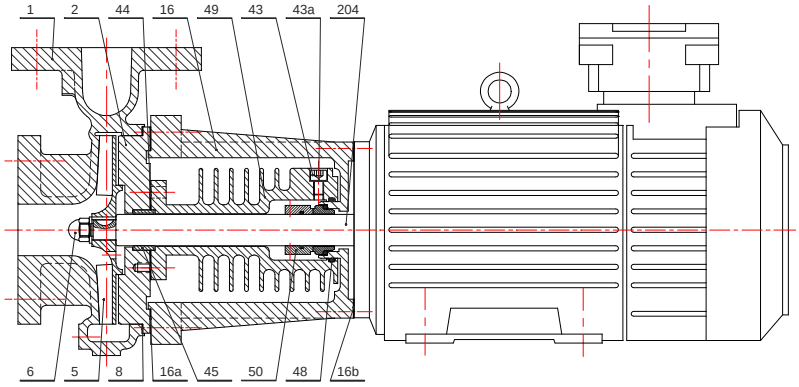

Fig 4

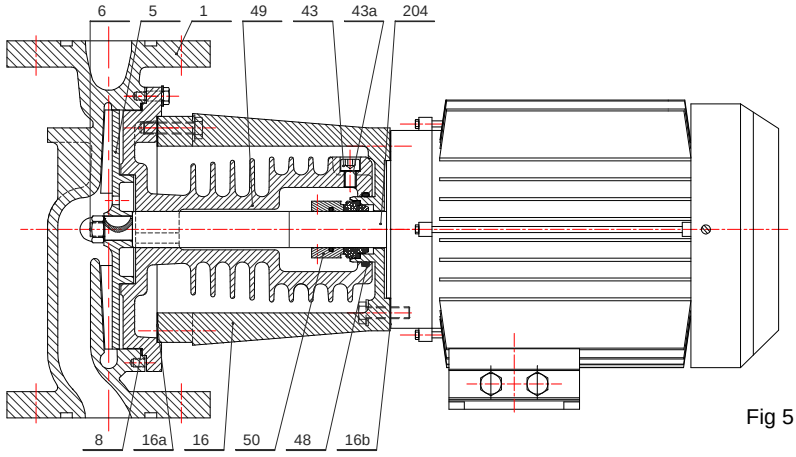

Fig 5

THE PURGE SCREW MARK 43 MUST ALWAYS BE ON THE TOP OF THE PUMP

Where the wheels are mounted on a rotor shaft.

The conveyed liquid ensures the essential functions of lubrication and cooling of the seal.

V-3-1 Pump casing

The MR and LR pump bodies come in three versions:

- The 109-212-215-315 pumps can be mounted either in single cell or multicellular, according to fig 3
- 106-209-210-216-312-316-414-516-522-614-619-827 pumps can be mounted in single cell only fig 4
- 317, 517 and 613 pumps are online pumps fig.5

MR pump bodies can be mounted in 4 orientations (*to be specified when ordering*):

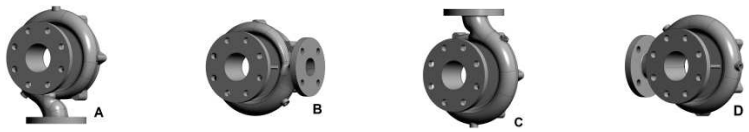

Fig 6a

Les corps de pompe LR peuvent être montés suivant 4 positions (*à préciser à la commande*) :

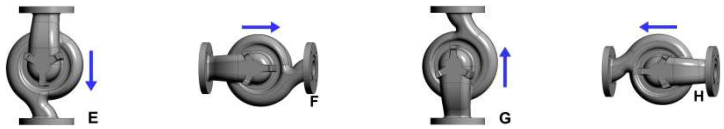

Fig 6b

Les moteurs des pompes MR et LR peuvent être montés suivant 4 positions (*à préciser à la commande*) :

Fig 6c

V-3-2 Impellers

MR and LR pump wheels come in two versions:

- Open impellers 109-212-215-216-312-315 according to fig.7

Fig 7

- Semi-open impellers 209-210-316-414-516-522-614-619-827 fig.8 with balanced axial thrust by a hydraulic seal.

Fig 8

V-3-3 Sealing

The seal is ensured by the sliding of a rotating ring on a static part (*mechanical seal*) according to EN 12756: 2001 standard. The MR and LR pumps can be equipped with single or double mechanical seal, back to back, tandem, with or without cooling, lubricated by the conveyed liquid, an external liquid or a gas or alternatively by a magnetic coupling.

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

This type of mechanical seal without any contact between friction areas is based on a very narrow layer of gas between the two parts of the mechanical seal, as a result no friction is created (*no generation of heat*).

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.

Before the first start-up and after each filling, bleed the radiator with the aid of the marking screw 43

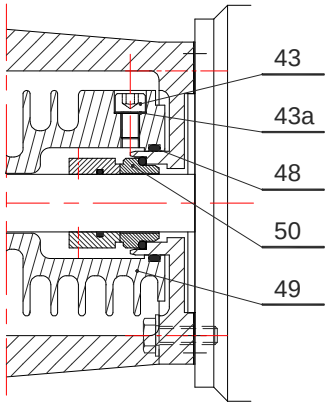

Fig 8

V-3-4 Accessories

Optional accessory provided:
- o dry running detection

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

VI-4 Installation, environment

The pump or the pump/motor unit should be placed on a flat concrete floor and should not be exposed to external vibrations. 3 to 10 mm shims will be carefully selected so that the pump/motor unit is installed in a perfectly horizontal position. Fill in the mortar holes. Wait until the mortar is hard before tightening nuts. The mechanically welded bases will be filled in with mortar having an epoxy binder in order to prevent its contraction during hardening.

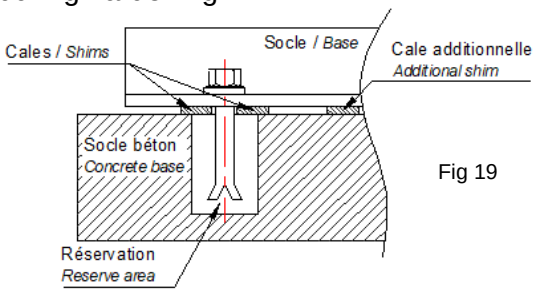

Fig 19

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

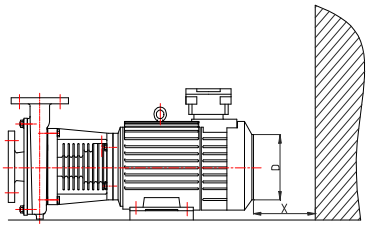

Fig 9

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 that it can fall from the support where it will have been installed permanently attached to the ground or in a subset to avoid any risk of fall (*with the appropriate mechanical protection to prevent shocks in the transport (pedestal or support of higher dimensions for example ...*).

Possible mounting position for LG pump:

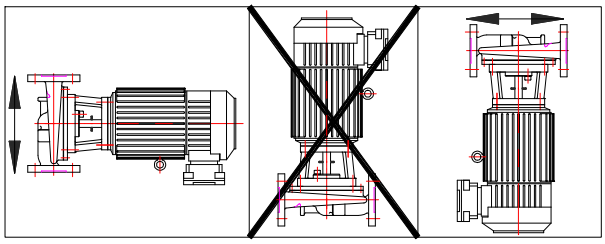

Fig 10

For the motor position at the top, consult us as it requires a modification of the construction of the pump.

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 2m / 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 the important 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 piping.

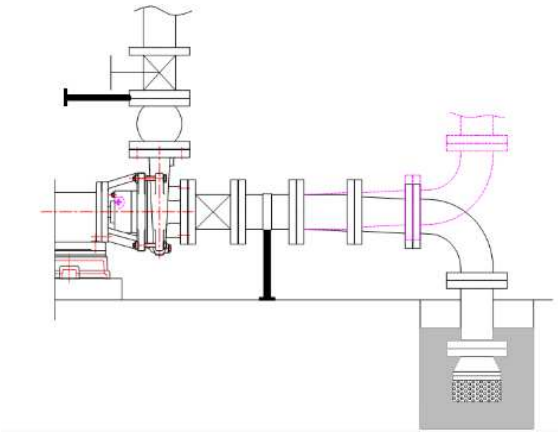

Fig 11

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.

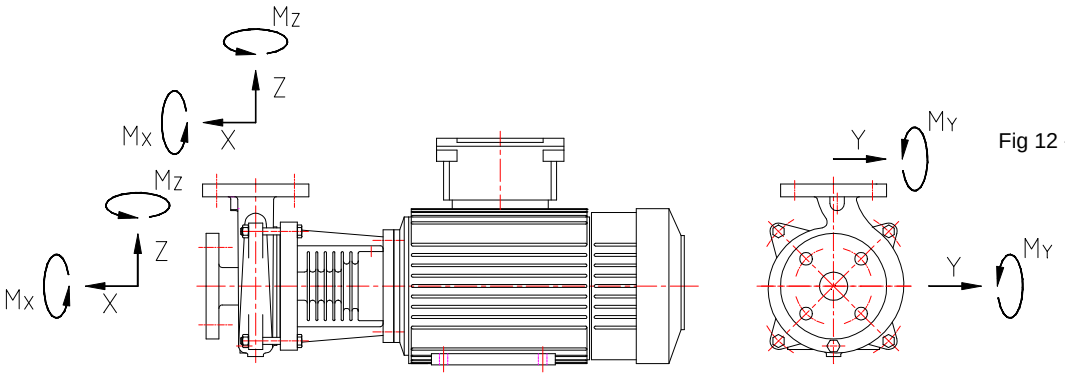

Fig 12 - MR

INLET FLANGE

Pump	DN	FORCE (daN)			MOMENT (m.daN)		
		FX	FY	FZ	MX	MY	MZ
109	20	18,4	6,4	4,0	0,364	0,7	0,7
210	20	17,6	7,2	5,6	0,678	0,9	0,9
212	25	25,6	12,8	9,6	1,30	1,5	1,5
215	32	25,6	12,8	11,2	1,40	1,5	1,5
216	25	21,6	8,8	9,6	1,00	1,3	1,3
312	32	25,6	12,8	11,2	1,70	1,8	1,8
315	40	25,6	12,8	11,2	1,80	1,8	1,8
316	50	28,0	12,8	12,8	2,10	2,3	2,3
318	40	25,6	12,8	11,2	1,80	2,4	2,4
414	40	24,0	10,4	9,6	1,50	1,9	1,9
516	80	30,4	15,2	14,4	2,96	3,0	3,0
522	65	30,4	14,4	16,0	2,80	2,8	2,8
614	65	28,0	14,4	15,2	2,80	2,6	2,6
619	80	30,4	14,4	15,2	3,00	3,0	3,0
827	100	32,0	15,2	21,6	4,00	3,5	3,5

OUTLET FLANGE

Pump	DN	FORCE (daN)			MOMENT (m.daN)		
		FX	FY	FZ	MX	MY	MZ
109	15	9,6	9,6	7,2	0,25	0,25	0,70
210	20	10,4	11,2	8,8	0,50	0,50	1,15
212	20	12,8	17,6	14,4	0,76	0,76	1,60
215	25	12,8	17,6	16,0	0,85	0,85	1,60
216	25	11,2	16,0	13,6	0,72	0,72	1,45
312	32	12,8	18,4	16,0	1,12	1,12	2,20
315	32	12,8	18,4	16,0	1,12	1,12	2,20
316	32	16,8	22,4	20,0	1,40	1,40	2,75
318	32	14,4	14,4	14.4	1,00	1,00	2,00
414	40	11,2	12,6	11,2	0,84	0,84	1,80
516	50	20,8	20,8	18,4	1,50	1,50	3,45
522	50	22,4	21,6	18,4	1,50	1,50	3,60
614	65	19,2	18,4	17,6	1,64	1,64	3,50
619	65	21,6	20,8	19,2	1,80	1,80	4,00
827	80	28,0	28,0	20,0	2,00	2,00	5,60

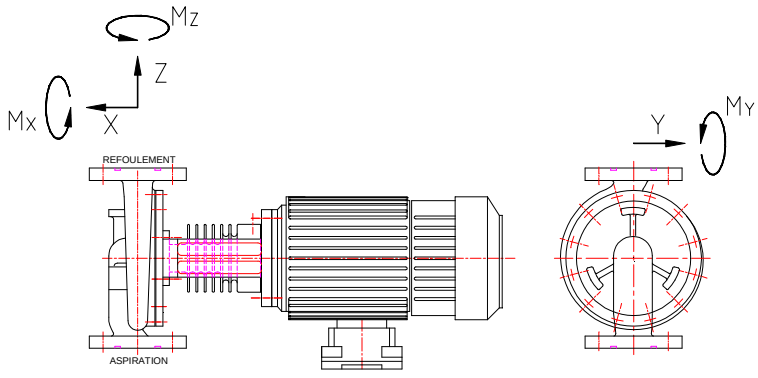

Fig 13 - LR

INLET FLANGE

Pump	DN	FORCE (daN)			MOMENT (m.daN)		
		FX	FY	FZ	MX	MY	MZ
317	32	16,8	22,4	20,0	2,0	2,35	2,0
517	50	20,8	20,8	18,4	4,0	4,35	4,0
613	65	21,6	20,8	19,2	5,4	6,0	5,4

OUTLET FLANGE

Pump	DN	FORCE (daN)			MOMENT (m.daN)		
		FX	FY	FZ	MX	MY	MZ
317	32	16,8	22,4	20,0	2,0	2,35	2,0
517	50	20,8	20,8	18,4	4,0	4,35	4,0
613	65	21,6	20,8	19,2	5,4	6,0	5,4

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 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 Ex (*NCPAE 19b-02*).

VI-9 Last check before start-up

Final inspection/control operations must involve the following points:

- No one should be endangered by starting
- The pipes are well connected
- Verification of the tightness of the joints
- The pump is filled with the fluid to be conveyed as well as the pipes
- The discharge side valve is partially closed to allow the passage of at least 8% of the nominal flow
- The suction side valve is fully open.
- The tightness and functionality of auxiliary piping.
- The tightness of the shaft is not too tight (*when using braided sealing*)
- 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 clogging 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 with 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 MR-LR 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 pump and the inlet pipes must always be completely filled.

BEFORE FIRST START UP AND AFTER EACH FILLING, PURGE THE RADIATOR WITH THE SCREW MARK 43

VII-3 Checking before getting started

Verifications should include the following.

(*See last checks before commissioning Chat VI-9*)

VII-4 Start-up

To start the pump or group, follow these instructions:

- Open the suction valve completely.
- Unscrew a few revolutions of the purge screw ref 43 located on the top of the radiator so as to fill the radiator with liquid by letting out the air, then screw the screw.
- 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 proceed to 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 in operation, check the following points:

- 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.
- Contrôler les niveaux de liquide dans le réservoir à l'aspiration.
- 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, rotation speed*) 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.

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 Monobloc electric pump unit

Keep the group clean (external surfaces and ventilation grid)

Do not grease the bearings, they are greased for life with a high temperature grease (*frequently check the condition of the ball bearings*)

VIII-3 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.

IX DISSASEMBLING

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 Disassembling

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.

Wait until the temperature of the body allows its handling without risk and in comfort.

Drain the pump by removing the plug. 15.

The oil or any other liquid 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

Unfasten the coupling and motor protection mounting screws and slide it so that there is sufficient space to disassemble the hydraulic block

Before dismantling, it is advisable to locate the parts.

For pumps equipped with a magnetic drive, refer to the instructions for magnetic drive pumps MG-LG 19b-02.

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 plate rep 2 and the radiator rep 49

Unscrew the radiator from the tray

Raise the shim rating of the mechanical seal

Unscrew the screws from the packing stop, remove it from the shaft.

Remove the rotating ring from the shaft

Unscrew the motor spacer and remove it with the fixed grain inside

Remove the fixed grain from the spacer

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*)

XI RE-ASSEMBLING

The pump is reassembled by reversing the order in which it was dismounted, 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 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 tree 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 grain in the spacer.
- 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 pad in the tray
- Reassemble the radiator on the plate, screw braking at the high temperature "Loctite".
- Reassemble the assembly on the shaft (*pay attention to the O-ring on the spacer*)

L3 compression dimension of the mechanical seal:

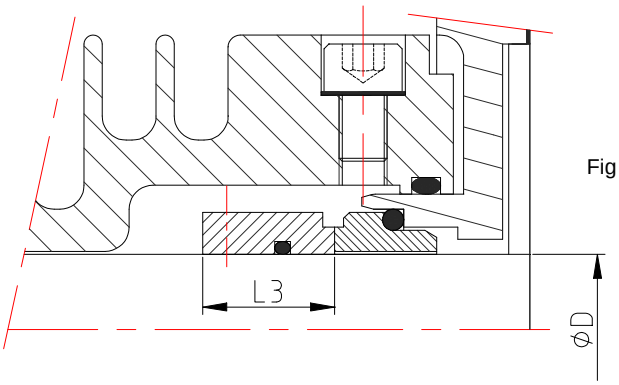

Fig 15

øD	L3 sdt
14	30
25	34,5
30	34,5
35	36,5

XI-2 Re-assembling the impeller

- Engage the impeller on the shaft (*screw or pin*); reinstall the impeller nut and apply a few drops of locking compound to lock it in place.
- Check the CLEARANCES in front and behind the impeller (*see Fig. 32*).

N.B: Too much play will cause a drop in pump performance; a too weak game will cause an increase of the absorbed power and a risk of contact between the fixed parts and rotating parts ... and a warm-up.

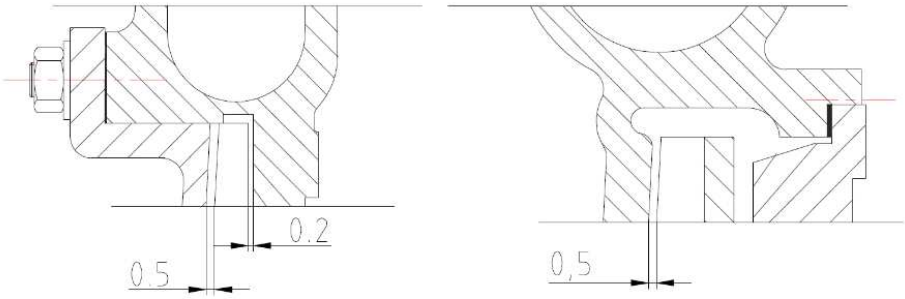

Fig 32

XI-3 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

XII-1 Malfunctions observed

Defaults	Possible causes
Defaults	Possible causes
The pump delivers no liquid	1-2-3-4-6-11-13-14-19-26
Insufficient flow	2-3-4-5-6-7--8-9-10-11-14-17-19-22-26
Inadequate gauge	5-11-13-14-17-19-22
Pump disengages after start	2-3-5-6-7
The pump vibrates or makes noise	2-3-4-8-9-18-20-21-22-24-26
Leakage of the mechanical seal	20-23-24
Reduced service life of the mechanical seal	22-25

XII-2 Potential causes and remedies

	Causes	Remèdes
1	The pump is not primed	Fill the pump
2	Pump or suction piping is not completely filled with liquid	Complete the filling
3	The suction height is excessive	- Correct the level of liquid carried - Open the suction valve in large - Change the suction piping (excessive pressure loss) - Filter control
4	The difference between the suction pressure and the vapor pressure is insufficient	
5	The liquid contains too much air or gas	
6	There are air pockets in the suction piping	Purge the installation
7	The suction pipe is not airtight, there is infiltration	Check all joints
8	The shutoff valve on the suction pipe is too small	
9	Shutoff valve is partially obstructed	
10	Lubrication piping is obstructed	Eliminate deposits
11	The rotation speed is too low	Consult us
12	The rotation speed is too great	Consult us
13	The direction of rotation is not good	Intervert 2 phases of the diet
14	The height required for installation is greater than the height provided by the pump	Adjust the discharge valve
15	The height required for installation is lower than the height provided by the pump	Adjust the discharge valve
16	Pumped density is greater than expected	
17	The viscosity of the pumped liquid is different from that expected	See pump specification Consult us
18	Flow rate at the operating point of the pump is too low	
19	The pump is not suitable for parallel operation	
20	The drive shaft is crooked	Replace it
21	Rotating parts come into contact with fixed parts	Stop the group, return to the workshop for dismantling and control
22	The wheel is damaged	Replace it
23	The mechanical seal is worn or damaged	Replace it
24	The rotating part is unbalanced because of vibrations	Check the group fixation

25	Presence of a foreign body in the wheel	Disassemble the pump
26		

XIII SPARE PARTS LIST

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

Example: Pump type: MR109F-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 gaskets
- A set of mechanical seal(s)
- A set of motor ball bearings
- A pad

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

- A set of gaskets
- A set of mechanical seal (s)
- A wheel
- A set of motor ball bearings
- A pad

XIV NOMENCLATURE

Repère	Désignation
1	Housing
2	Flask (fig 3) Tray (fig4)
6	wheel nut
8	Body seal
8a	Body seal
8b	Body seal
16	Brace
16a	Heat seal
16b	Heat seal
17	Diffuseur
19	Multicellular flask
20	Multicellular wheel
23	Multicellular wheel
27	Multicellular housing
43	Bleed screw
43a	Purge seal
44	Radiator seal
45	Pad
48	O-ring
49	Radiator (fig 3 et 4) Radiator plate (fig 5)
50	Mechanical seal
204	Long shaft motor
225	Multicellular long shaft motor