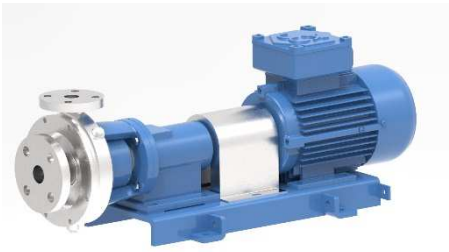
POMPES GROSCLAUDE
Parc du chêne - 29, rue du 35ème régiment d'aviation
69 500 BRON – France APE 2813Z - RCS Lyon
Siret : 50966640000023 TVA : FR46 509 666 400
Tel : (33) 4 72 37 94 00 Fax : (33) 4 72 37 94 01
www.pompes-grosclaude.fr info@pompes-grosclaude.fr

ADDITIONAL INSTRUCTIONS FOR EXPLOSIVE ATMOSPHERE



In accordance with the European ATEX Directive 2014/34 EU

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I GENERAL

These instructions contain important warnings for when the pump is installed in an explosive environment according to EU Directive 2014/34 EU and must be accompanied by the pump manual. It is imperative to follow these warnings to avoid any danger. 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.

This pump has been manufactured using proven techniques, guaranteeing a reliable machine. The condition of a good functioning and a long use resides in the strict observation of this note.

It is imperative to ensure, before installation, that all service conditions correspond to its specification.

This manual, as well as any accessories supplied with the unit, must be read carefully before proceeding to the installation and the start-up of the pump.

However, as it is not possible to anticipate all incidents that may occur on all installations, it is mandatory that the appropriate personnel be specialized and expert in the tasks mentioned below, both in terms of installation than exploitation. 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 respect 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.

POMPES GROSCLAUDE shall not be considered as responsible for any malfunctions, or any damaging due to using conditions which were not anticipated at the same time.

II SAFETY

We as the manufacturer of your pump want to remind you of the following recommendations:

- Internal instructions and laws and regulations related to safety must be followed and respected.
- Only appropriate handling resources and tools must be used.
- The improper use of the equipment, outside the operating limits *(operating conditions)* defined by the company **POMPES GROSCLAUDE** may cause risks for the operators, the installation, the pump and its characteristics listed on the nameplate of the pump and the technical specifications of the technical file supplied with the pump.
- All safety standards specific to electrical equipment and those indicated by the manufacturer must be respected.
- It is the operator's responsibility to ensure compliance with Directive 1999/92 / EC on the protection of the health and safety of employees in potentially explosive atmospheres.

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 your pump such as an arrow indicating the rotating direction or arrows indicating the inlet or outlet holes must be respected and maintained in good reading condition.

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, you the operator must inform them 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** shall be relieved of all responsibility in event of accident.

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.

Similarly, in an explosive zone, it is imperative to respect the paragraphs marked with the following Atex symbol:

II-4 Terms of use

For the record, the standard atmospheric conditions (defined in ISO 80079-36: 2016) are as follows:

- Temperature from - 20 ° C to + 40 ° C
- Pressure from 80 kPa (0.8 bar) to 110 kPa (1.1 bar)
- Air with normal oxygen content, typically 21% v / v

If this is not the case, thank you to validate the possibility of using the equipment under the new conditions. Otherwise, the company POMPES GROSCLAUDE disclaims any liability in case of accident.

III NAMEPLATE

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

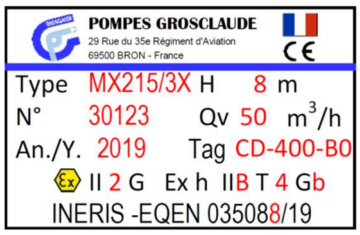


Fig 1a

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

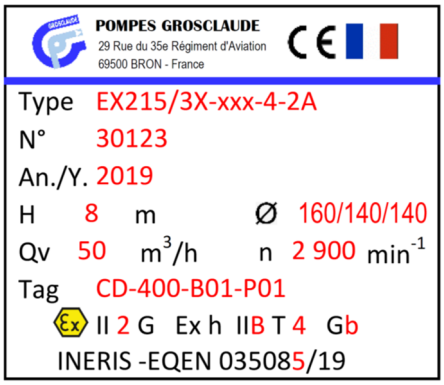


Fig 1b

IV INSTRUCTIONS CONCERNING THE PRODUCT AND ACCESSORIES

IV-1 Hydraulic casing

The pump casing is made out of a ductile material of which the magnesium content does not exceed 7.5%.

The different variants of metal compositions offered by **POMPES GROSCLAUDE** comply with these requirements.

IV-2 Coupling / Coupling Garde

Only operate the pump with a **spark-proof coupling guard**. Chap. II-4 of the instructions for the pump supplied by **POMPES GROSCLAUDE**. The latter declines any responsibility for damage resulting from the use of spare parts other than the original or non-approved parts.

V - INSTRUCTIONS FOR COMISSIONING

V-1 Coupling

Make sure that the sleeve is correctly tightened on the shaft **and that the coupling is still in line Chap. VI-9 and VII-5 of the pump manual**. A bad lineage can involve high temperatures at the level of the bearings and the coupling ... It is therefore imperative to respect the rules of the art for the lineage of the pump and to refer to **the instructions of the manufacturer** for a good operation, maintenance operation, commissioning and shutdown.

V-2 Grounding

To avoid the danger of a static charge, it is imperative to ground the base, the motor and the pump.

In the case of pulleys / belts, these must be made of conductive materials.

V-3 Electrical connection

Electrical connection should only be performed by an authorized electrician. It is imperative to compare the AC network voltage with the information on the motor data plate.

Motors should be connected to networks of which the nominal voltage tolerances are compliant with applicable standards, or to other networks or power systems of which the maximum voltage tolerances are plus or minus 10%.

Current limitation control is provided by a protection relay or a contact breaker switch *(for nominal current, refer to the data plate)*

When the electric pump unit is connected to a frequency variator, the motor should be fitted with a temperature probe in the coil to protect it and has to be absolutely connected.

In potentially explosive atmospheres, the requirements of EN 60079-14: 2014 of the motor manufacturer's manual must be observed for the connection and the cable entries. More generally, the motor must comply with IEC 60079-0: 2013

To avoid any **danger of electrostatic charge, the unit must be grounded according to the rules of the art.**

V-4 Connection to pipes

When using conveyed liquids with an electrical conductivity of less than 10-8 S / m:

- Ensure that the flow velocity is well below 1 m / s
- Connect the hydraulic part of the pump to a grounding

It is also imperative to respect the allowable stresses on the I/O flanges *(chapter VI-6 of the manual)* including the installation of compensator sleeve type devices.

VI INSTRUCTIONS FOR OPERATIONAL RUNNING

Safe operation of the pump is only certain if it is operated in compliance with the instructions

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 must be evaluated in cooperation with the manufacturer, operation outside the limits of use may cause excessive temperatures.

The company POMPES GROSCLAUDE cannot be held responsible for any malfunctions, damage due to conditions of service, use or liquid not consistent with those for which the equipment was designed and as described in the technical specifications of the technical file provided with the pump**.**

If the unit is installed in an explosive atmosphere, the provisions of European directives 2014/34EU & 1999/92/EC must be observed.

VI-1 Filling the unit

The operation of the pump and auxiliary circuits in high-risk environments is only permitted **if the pump, auxiliary circuits and sealing units are filled with pumped liquid, to prevent the formation of an explosive atmosphere**. If this cannot be done, then the filling level must be checked with appropriate supervisory devices that ensure that the pump is completely filled before it is started up.

If heating/Cooling on shutdown is anticipated (dual-skin heating system for casing), then make sure that the surface temperatures do not exceed the temperature rating specified on the data plate.

In the event of insufficient suction pressure, **the pump draws air at the seal, gas bubbles form in the pump and can potentially form an explosive atmosphere**. In addition, this can lead to dry running and in this case, it is essential to provide the appropriate monitoring devices to stop the installation to prevent this risk.

Care must be taken to completely and correctly fill the sealing housings, the bell of the magnetic coupling and the auxiliary circuits.

Starting the pump in the vertical position is forbidden; the packing cannot be bled.

VI-2 Checking the direction of motor's rotation

It is forbidden to check the direction of operation by briefly starting the pump when it is not filled.

On industrial pumps, to check the direction of operation, you should uncouple the motor from the pump.

VII OPERATING INSTRUCTIONS

Operation with closed suction valve and / or closed discharge valve is prohibited. In such a case, the surface temperatures on the pump body can rise very rapidly and exceed the specified temperature class. In addition, the mechanical stresses increase with the consequence of the possibility of rupture of sealing and the creation of a potentially explosive atmosphere.

If the operator cannot guarantee it, adequate monitoring devices must be put in place. These devices must comply with European Directive 2014/34 / EU.

For proper operation the pump must always have a minimum flow rate see Chap. II-4 of the pump manual *(in the case of a liquid whose physical characteristics are different from those of water, it is necessary to check whether there is a risk of additional heating, which would require increasing this minimum flow).*

VII-1 Temperature limit

At normal operating regime, the highest temperatures occur at the surface of the pump, at the shaft and bearing seal.

The temperature measured at the surface of the pump casing matches the temperature of the liquid pumped, unless the pump has a heating casing. This is because there is unrestricted contact between the surface and the atmosphere.

In all cases, the operator of the installation must comply with the temperature rating. The maximum permissible temperature for the pumped liquid depends on the specified temperature rating

Flammable gases and vapors are divided into temperature classes according to their flammability in contact with hot surfaces and therefore the temperature limits of the pumped liquid are indicated in the following table. These temperatures take into account a possible rise in temperature at the shaft seal, a reduced flow operation ... which explains the differences *(see also the guide Europump - Atex Guideline - Part I - 6.2 April 2019).*

Classification of maximum surface temperatures
for group II G devices

Class temperature	Maximum surface temperature	Limit temperature of the pumped liquid (°C)
T1	≤ 450	350*
T2	≤ 300	280
T3	≤ 200	180
T4	≤ 135	120
T5	≤ 100	85

** his value can be changed depending on the construction material of the pump*

To find out the permissible working temperature for the pump, refer to the name plate of the pump and the technical specifications of the technical file supplied with the pump. If operating at a higher or lower temperature, consult the pump manufacturer to determine the maximum / minimum working temperature permissible by the pump manufacturer.

Temperature class T4 is provided at the bearings for an ambient temperature of -20 to 40 ° C. If the ambient temperature is different, thank you to validate the possibility of using the equipment under the new conditions. Otherwise, the company **POMPES GROSCLAUDE** disclaims any liability in case of accident.

At regular intervals it is necessary to check the sound level and temperature of the bearings, the condition and the level of the lubricants. *(See pump manual)*.

VII-2 Additional requirements

Pumps in group II D have to be established on the basis of the true and marked maximum surface temperature.

The maximum surface temperature should be established with no deposit of dust on the pump.

When the motor is installed in a dusty environment, you should prevent the formation of dangerous dust deposits on the surfaces of the electric pump unit. For this, provide adequate protection on hot parts, or dust them regularly.

(*Note: the relationship between the device's maximum surface temperature and the minimum inflammation temperature of dust and dust clouds is specified in EN 1127-1: 2019*)

Regardless of the sealing system employed at the shaft entry point, the maximum permissible temperatures can be exceeded in the event of dry running

- If the packing casing is not fully filled with liquid
- If there is an excessive quantity of gas in the liquid pumped (intake filter obstructed or pressure too low)
- If the pump operates outside the authorized operating range
- If the seal is too tight *(a leak must always be visible)*. **This seal is only allowed if the temperature is monitored by an appropriate device and the generated leak is considered and processed.**

Regularly check the mechanical seals *(possible leaks)*. Also, make sure the auxiliary circuits and the casings are filled properly. Where needed, provide appropriate supervisory devices.

For motors operating with a **frequency converter**, it must be equipped with a PTC **thermistor integrated in the stator**. To limit the risk of overheating, it must be connected to a tripping device. As

soon as the limit temperature is reached, the motor supply must be switched off by a device that complies with European Directive 2014/34 EU.

VIII MAINTENANCE

When the unit is installed in a dusty environment, you have to prevent the build-up of dangerous dust deposits on the surfaces of the electric pump unit. For this, you should provide appropriate protection on the hot parts, or dust them regularly.

The choice of the lubricant originally used is in accordance with IEC 60079-20-1: 2010 Article 7 and must be supplemented with a lubricant remaining in accordance with Article 7 according to the temperature class specified on the nameplate of the pump and the technical specifications of the technical file supplied with the pump. Naturally, in the case of using two lubricants of different references or from two different manufacturers, it is imperative to carry out, beforehand, a miscibility test and in case of doubt, it is imperative to drain and clean before the passage from one fluid to another.

Lubricants are marked with the following symbol:

An abnormal operating noise can detect the need for maintenance in time and the same is true for too high temperatures on the bearings.

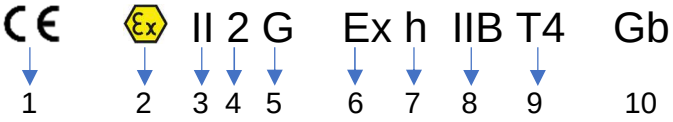
It is imperative to control & regularly:

- The proper functioning of the shaft seal and its auxiliary accessories
- Coupling, coupling protection and rotating parts protections
- Static sealing (joints)

It is recommended to maintain a maintenance schedule

IX MARKING

The following marking has been affixed to the pump



As well as the information related to the registration of our file:

INERIS -EQEN 03508_/19

According to the following table:

Product series	Registration number
Ex-Bx	INERIS-EQEN 035085/19
MG-LG	INERIS-EQEN 035086/19
MR-LR	INERIS-EQEN 035087/19
MX-LF	INERIS-EQEN 035088/19
R0-R1-R14	INERIS-EQEN 035089/19

1 : CE marking

Part concerning the European ATEX Directive 2014/34 / EU

2: Use of equipment in potentially explosive atmospheres

3: Device group in our case surface industries meaning group II

4: Two possibilities in our case:
2 usable in Zone 1 or / and 2
3 usable in Zone 2 only

5: Atex Atmosphere:
G for gas
D for dust

Part concerning the EN ISO 80079-36: 2016 standard

6: Material meeting multiple standard protection modes

7: Protection mode in our case by construction

8: Gas Group defined by the standard:

Group	Reference gas	Characteristic of the gas	
		IEMS (mm)	EMI (mJ)
I	Methane	1,14	0,28
IIA	Propane	0,92	0,25
IIB	Ethylene	0,65	0,07
IIC	Hydrogen/Acetylene	0,37	0,011/0,017

With the following definitions:
IEMS: Maximum Experimental Safety Interstice
EMI: Minimal Inflammation Energy

Dust group defined by the standard:

Group	Dusty explosive atmosphere
IIIA	Combustible dust
IIIB	Combustible and non-conductive dust
IIIC	Combustible, non-conductive and conductive dust

9 : Temperature class

Temperature class	Maximum surface temperature (° C)	Limiting temperature of the fluid conveyed (° C)
T1	≤ 450	350
T2	≤ 300	280
T3	≤ 200	180
T4	≤ 135	120
T5	≤ 100	85

10: Device Protection Levels (EPL) as defined by EN 60079-0: 2013 with hereafter a summary table *(Europump - Atex Guideline - Part I of April 2019)*:

EN 60079-0		Directive 2014/34/EU		EN 60079-10-1 & EN 60079-10-2
EPL	Group	Group	Category	Areas
Ma	I	I	M1	NA
Mb			M2	
Ga	II	II	1G	0
Gb			2G	1
Gc			3G	2
Da	III		1D	20
Db			2D	21
Dc			3D	22