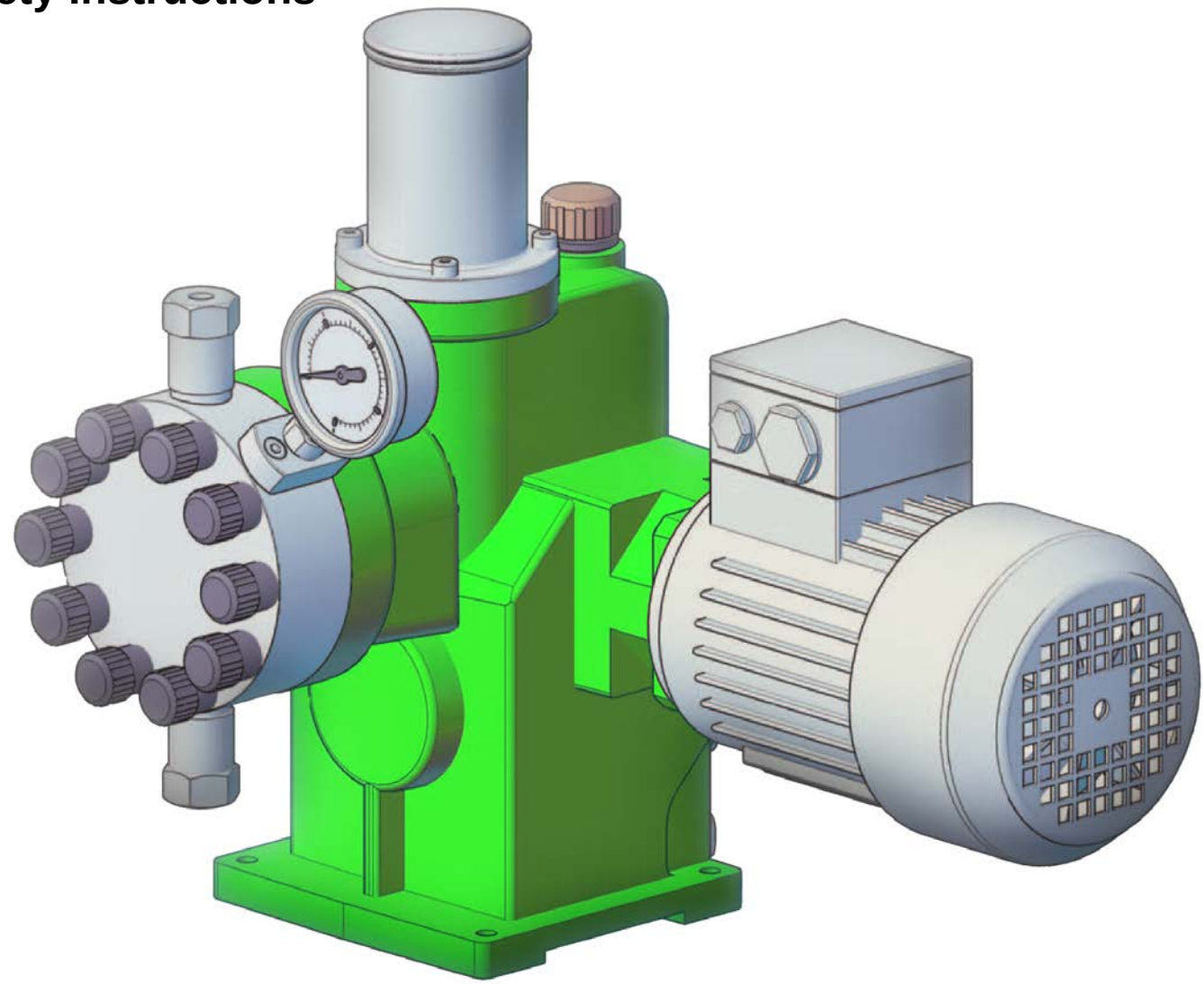
PULSAFEEDER®
ENGINEERED PRODUCTS

Metering Pumps for Potentially Explosive Atmospheres

ATEX: CE Ex II 2/3 GD ck

Safety Instructions



PULSA® 6130

PROCESS HYDRAULIC DIAPHRAGM METERING PUMPS

CONTENTS

1. FOREWORD

The pumps to which these "instructions" refer to are **designed for use in industrial areas** and therefore cannot be treated as retail products. The present documentation gives instructions to be used by qualified personnel only. **It must be used in compliance with the regulations, laws and technical standards in force** and cannot, under any circumstances, take the place of plant standard or additional regulations, including any which are not legally enforceable, which have been issued with the scope of ensuring safety.
Equipment with special manufacturing or constructive variances may differ in details with respect to this description.

In case of any difficulty, please contact PULSAFEEDER, INC. Technical Service, keeping the following information found on the pump nameplate, at hand:

- Metering pump model (complete)
- Metering pump serial number
- PULSAFEEDER, INC. Order Number (as an alternative to serial number)

1.1 PUMPS FOR ZONED AREAS

These safety instructions refer to installation, operation, servicing and cleaning of metering pumps suitable to be operated in areas with potentially explosive atmosphere.

Pumps referred to in these instructions conform to the specifications relating to instruments and protection systems to operate in potentially explosive atmospheres conforming to European directive 94/9/EC dated 23/03/94, known as ATEX directive.

Warning: These pumps are not suitable for operation in hazardous areas 0/20.

If pumps are operated in an improper condition or modified in any way their safety may be compromised.

Metering pumps hereby treated, in accordance with attachment 1 of the aforementioned directive, are classified under the following categories:

- **Group II category 2:**

Suitable for operation in hazardous area 1/21. Fulfilling protection requirements against any explosion hazard even after foreseeable failures during operation.

- **Group II category 3:**

Suitable for operation in hazardous area 2/22. Fulfilling protection requirements against any explosion hazard during normal operation.
WARNING: Stick to these instructions in addition to any warning reported in the standard operating manual of the metering pump.

2. SAFETY INFORMATION

Metering pumps are not electrical equipment and are subject to ATEX Directive because they may generate sparking hazards due to mechanical failure or surface temperature of their components. Give due care to:

- **Assure proper lubrication of mechanisms**
- **Execute preventive maintenance of parts subject to wear**
- **With adjustment set to 100%, NEVER exceed maximum rating pressure or flow rate**
- **NEVER exceed maximum rating temperature for handled fluid**
- **NEVER exceed maximum rating temperature for heating jacket fluid**

2.1 DANGER

Metering pumps have dangerous parts. Therefore:

- **Incorrect operation,**
- **Removal of protections** and disconnection of protection devices, may cause serious damage to people and objects.
- **Lack of inspections and maintenance,** may cause serious damage to people and objects.

In particular **personnel must be informed of the danger deriving from:**

- **Live parts**

- **Rotating or moving parts**

- **Pressurised and/or corrosive handled fluid**

- **Hot surfaces**

The safety manager must oversee and guarantee that:

- Equipment must be moved, installed, put in service, inspected, serviced and repaired **exclusively by qualified personnel,** who shall have obtained:
- Specific technical training
- Training on technical specifications and applicable regulations
- Sessions of national, local and plant general safety requirements
- Experience and ability to foresee and avoid each eventual danger.

3. PUMP SUITABILITY TO SITE OF INSTALLATION

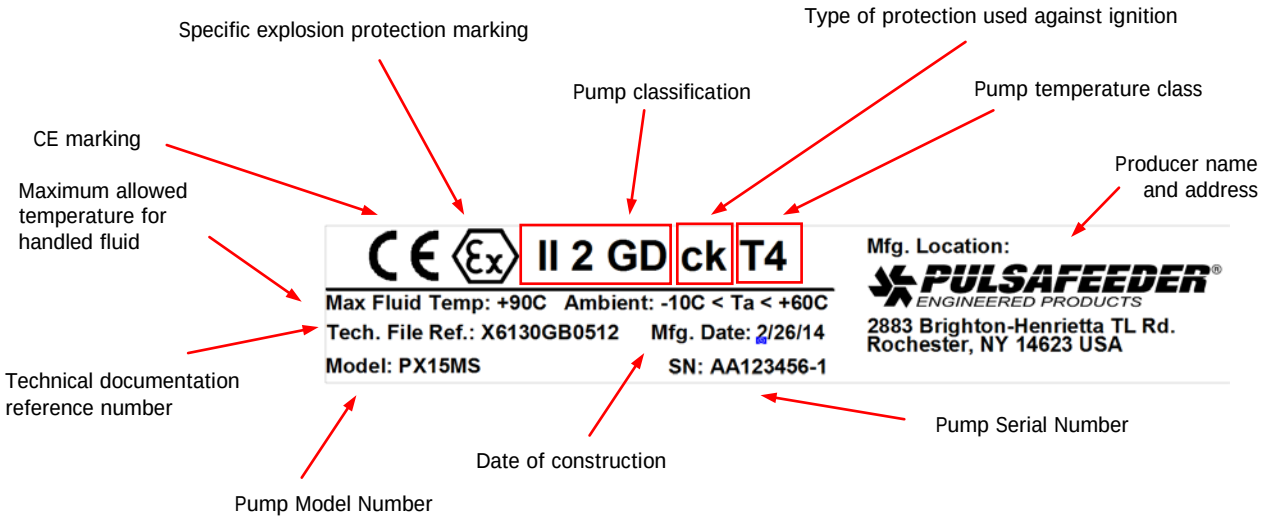
Essential safety requirements against explosion hazard in dangerous areas are regulated by European directives 94/9/CE dated 23rd of March 1994 (concerning equipment and devices) and 1999/92/CE, dated 16th of December 1999 (concerning plants).

Directive 1999/92/CE states that verification, before installation and following start-up, that the pump is actually suitable for the area classification and for the characteristics of inflammable substances present in the plant, is a customers' responsibility.

Upon equipment receipt, verify that pumps have not received any damage due to transportation and are complete with every eventual accessory. In case anomalies or damages are discovered prior to installation, please contact PULSAFEEDER, INC. Technical Service.

3.1 ATEX NAMEPLATE AND MARKING

All pumps bear a standard rating nameplate on which it is possible to read, apart from functional data, all data required for universal identification. ATEX pumps are then provided with a second nameplate with specific markings of data required by the directive:



Key to nameplate data:

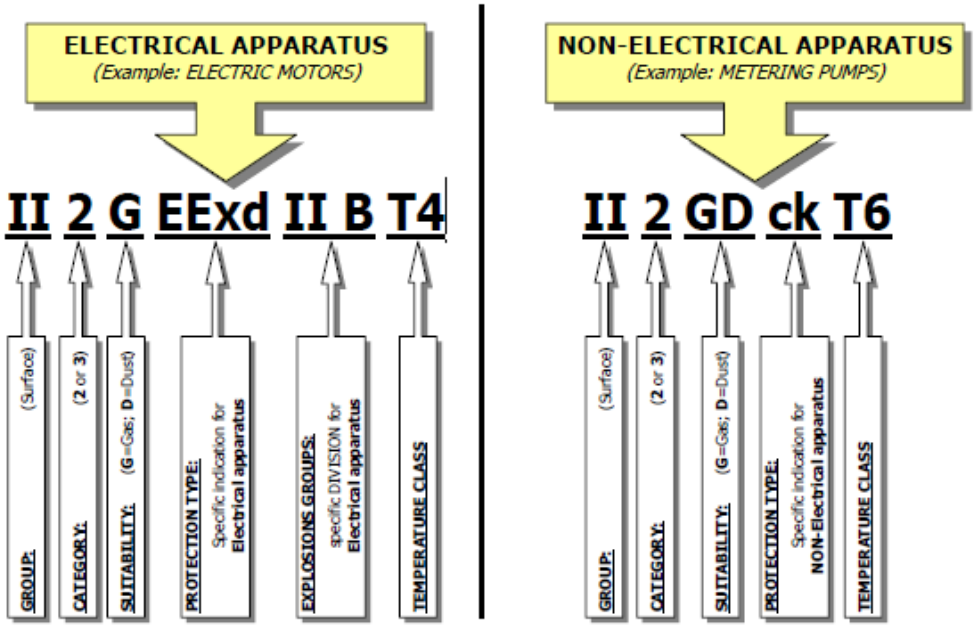
- ***Pump classification:***
  II 2 GD: Pump classified under group II category 2 for surface plants with presence of explosive atmosphere caused by gases, vapours or mists and dusts in clouds or stratocumulus. Suitable for zone 1/21 zone and (consequently) for zone 2/22.
  II 3 GD: Pump classified under group II category 3 for surface plants with presence of explosive atmosphere caused by gases vapours or mists and dusts in clouds or stratocumulus. Suitable for zone 2/22.

Key to symbols:

II	**=**	**Pump Group**
2	**=**	**Pump Category**
G	**=**	**Suitability for ambient with GAS (G)**
D	**=**	**Suitability for ambient with Dust (D)**
C	**=**	**Protection type against ignition**
		Protection by constructional safety "c"

K = Protection type against ignition
Protection by liquid immersion "k"
T5, T ... = Pump Class Temperature
Max. allowable external temperature
File Ref. = Technical Dossier number sent by OBL to Notified Body

THE VARIOUS "ATEX" MARKINGS



- ***Design ambient temperature range "Ta"***
  Unless differently agreed with the customer, can be:
  -10°C ≤ Ta ≤ +40°C: STD temperature range for all type of pumps
  10°C ≤ Ta ≤ +60°C: Temperature ranges suitable for some pump types only

⚠ **NOTE: Temperature class of these pumps is defined by fluid warming temperature. For safety reasons DO NOT USE higher temperature warming fluids.**

4. STORING AND INSTALLATION

4.1 STORAGE CONDITIONS

If pumps are not to be used for a long time, store them in a dry, cool, clean, non-vibrating and sheltered area. If pumps are stored below 0 °C ambient, drain the oil fully then store in temperatures never below –20 °C. Before start up, leave pumps in the ambient operating temperature to stabilize them prior to start-up.

4.2 LIFTING

Make sure that lifting lugs are completely screwed-in. In a –20 °C ambient temperature, be careful in using lifting lugs, because low temperature might cause breaking of the same with damages to operators and equipment.

⚠ **Lifting lugs on the pump are sized to bear one-headed pump weight, DO NOT use them to lift multi-headed pumps. To do so sling base-plate and use lifting ropes. Before removing ropes fix pumps safely to base-plate. Tilting danger!**

4.3 INSTALLATION (see pump IOM manual)

Because pump check valves work by gravity, it is essential that the housing valve axis must be perfectly vertical for proper pump operation (also to prevent abnormal wear of the valves). Arrange suitable clearance all around the pump for checks and/or maintenance, especially by hydraulic side, adjustment and motor fan side.

For a safety and proper operation install the following accessories:

- **An external pressure relief valve** by discharge side connection and before the isolating valve, to protect both pump and plant against overpressures.

On mechanical diaphragm pumps an external pressure relief valve needs to be installed. Opening pressure must not exceed the max operating pressure indicated on pump nameplate.

NOTE: Hydraulic diaphragm pumps are equipped with a built-in relief valve to protect pump only, NOT to protect plant.

- **A pressure gauge** by the pump. Installed upstream to any accessory on the pump discharge line. It is necessary to check actual operating pressure
- **A suitable thermal overload device**. It protects motor from overloads and/or short circuits

It is absolutely necessary to protect the pump from possible leaks from the pipelines and/or corrosion. Do not arrange pipelines or accessories right above the pump. Do not install pump in a non-ventilated ambient corrosive.

In the case of pump installation outdoors, always protect the pump from direct rain, wind, dust and moisture.

4.4 ELECTRIC MOTOR INSTALLATION

When pumps are supplied bare-shaft, it is end user's responsibility to check and install a motor suitable to the zone classification and to the explosive gases/vapours/dusts present in the plant.

PULSAFEEDER, INC. TAKES NO RESPONSIBILITY for damages to people and things due to installation of an unsuitable motor. End user is to install motor with nominal power, rpm, frame and size fully conforming to PULSAFEEDER, INC.'s technical documentation/indication.

4.4.1 Elastic coupling

Pump/motor connection via elastic coupling. Clean motor shaft, lubricate it with oil, then carefully key coupling half on it, coupling half should slip fit to shaft.

4.4.2 Direct connection

Motor shaft is directly keyed on pump worm shaft. Clean motor shaft, lubricate it with oil, then carefully key coupling half on the worm shaft, coupling half should slip fit to shaft. **Imprecise alignment may cause vibrations with bearing balls damaging and shaft breaking.**

4.4.3 Connection to power grid

Before electrical connection read motor safety instructions and follow relevant indications.

PULSAFEEDER, INC. metering pumps always come with IOM manual, ATEX safety instructions, certification and declaration of conformity of both pump and electrical motor.

NOTE: For ATEX pumps connect ground tap located on the casing.

4.4.4 Power supply through inverter

Pumps are to be ordered specifically intended for frequency inverter driven motor use. If not, before utilization, end user MUST contact PULSAFEEDER, INC. to set new operation range (Hz, pressure and capacity), that will be guaranteed by PULSAFEEDER, INC. only after a new nameplate is provided.

For proper operation, end user is to respect the Hz range set by PULSAFEEDER, INC. (30 to 80 Hz), moreover MUST NOT EXCEED max operating pressure shown in the pump nameplate. This value is derated calculating the maximum operating conditions at max allowable frequency (80Hz). End user is to follow extra instruction provided by frequency inverter manufacturer and respect plant electromagnetic compatibility requirements (EMC).

5. START UP

Once plant danger characteristics are analyzed in full compliance with existing laws and safety standards, it is customer's/end user's responsibility **to comply**.

5.1 PRELIMINARY CHECKS

Before pump start up following points are to be checked:

a) **Pump is to be filled up with lubricating oil.** PULSAFEEDER, INC. pumps are supplied with lubricating oil (6130 is supplied with both lubricating and hydraulic oils).

b) Installation is properly carried out

c) All accessories supplied loose (e.g. pressure relief valve, pressure gauge) are properly installed

d) Pump base-plate is to be robust and anchoring bolts fully fixed

e) Design data are to match those indicated in pump nameplates and technical documentation.

5.2 DESIGN DATA CHECK

Make sure that pump is suitable for actual operating conditions. Check the following:

5.2.1 Environmental conditions

a) Ambient temperature: check that actual ambient temperature complies with nameplate data.

b) Altitude: pump suction performances could be influenced by atmospheric pressure. Check NPIP available (of the plant) in relation to the NPIP required of the pump.

c) Make sure pump is protected against sand, corrosion, dusts and/fibers, water, mechanical shocks and vibrations.

d) Make sure pump is installed indoors or, if outdoor consider likely damages due to temperature variations, atmospheric conditions and moisture formation.

5.2.2 Installation conditions

a) Pump installation and operation must comply with conditions agreed upon placing purchase order.

b) Pump classification (ATEX group and category) and temperature class must comply with installation area classification.

5.2.3 Other check before operation

a) In case of power supply through frequency inverter, make sure pump was purchased for such application and Hz range (30 to 80 Hz as defined by PULSAFEEDER, INC.) is respected.

b) Make sure motor is protected as required by law.

c) Check status of accessories (if any)

5.3 OPERATING CONDITIONS

5.3.1 Operating features

Once the pump has been started check that operating conditions are within scheduled limits, in particular check:

a) pump working pressure;

b) electrical motor input current

c) handled fluid temperature, if different from ambient temperature;

d) warming fluid temperature, for pumps with warming jacket;

e) efficiency of cooling system, for pumps with flushing;

f) maximum surface temperature for the whole pump.

Please check that the pump is suitable for the conditions in which it was purchased, when operating conditions change, such as:

- modification of one or more process variables (e.g. operating pressure and/or flow rate)
- moving the pump into a different environment (e.g. from indoor to outdoor)
- change of dosed chemical (change of application)
- moving the pump form a low temperature environment to a high temperature environment
- change of season or different climatic conditions.

5.3.2 Prolonged interruptions

If a long shut down is scheduled, make sure to preserve pump integrity (dry and clean wetted parts from chemical product, protect it from atmospheric agents, etc.).

5.3.3 Non-standard conditions

Pump must be operated only within operating conditions defined in the order process. In case of non-expected operating conditions (high current input, excessive surface temperature, loud noise and/or strong vibrations) promptly alert maintenance personnel.

PULSAFEEDER, INC. TAKES NO RESPONSIBILITY FOR ANY DAMAGE CAUSED BY DETERIORATION IF NOT PROMPTLY REPORTED TO PULSAFEEDER, INC.

6. MAINTENANCE

Any maintenance on the metering pump must be carried out upon authorization by the maintenance manager, after assessing:

a) That the motor is switched off and cut out from the power lines, and that no part of the pump is live, auxiliary equipment included.

b) That accidental pump start-up is eliminated

c) That the handled fluid in the pump head or in the piping is not pressurised

d) That **with pump switched off**, suction and discharge isolating valves are closed

Since we refer to pumps to be operated in industrial areas, **additional protection measures must be carried out and guaranteed by the installation manager (in case such measures are required).**

 **Any maintenance on the pump must be carried out only after steps a – d above. (auxiliary circuits included). Pump performance prior to maintenance must be checked and guaranteed by an inspection and maintenance program, set up and operated by qualified technicians, which considers both the service and the actual environment conditions in which the pump is operated.**

6.1 TECHNICAL DOCUMENTATION CONSULTATION

Maintenance of the metering pump must be executed following safety regulations and respecting strictly all safety information.

Before maintenance it is mandatory to read the operating and maintenance manual of pump to be dismantled, and to obtain all necessary instruments and implements to perform the task.

WARNING: Once the pump has been dismantled, while waiting for reassembling, it is necessary to protect all parts (in particular the internal ones, paying particular attention to working surfaces of seals and gaskets) to avoid any damage caused by oxidation or accidental impacts.

 **Incorrect reassembling of seals, gaskets or bearings may cause early deterioration of the same and yield pump malfunctions and/or overheating.**

6.2 OPERATING PRECAUTIONS

Qualified personnel must carry out all operations only. It is necessary to pay maximum attention to maintain all pump features so as not to alter the suitability to zone classification.

6.3 PERIODIC MAINTENANCE

As a general rule, after the first start-up it is recommended to perform initial frequent checks to define a program for maintenance and determine the required frequency of general inspections and scheduled maintenance. In case of anomalies it is the responsibility of the user to consider the option of anticipating an eventual maintenance intervention.

6.3.1 Check of regular operation

During scheduled inspection, please verify the following conditions:

- Pump working within acceptable standards, without noise or anomalous vibrations
- Functional data are respected (e.g. maximum operating pressure)
- CE protections (safety) are always in place
- No lubricant leaks
- No leaks from tube fittings or from components of pump head

Every anomaly or irregularity noticed during inspections must be promptly eliminated.

 **It is the responsibility of the user to make sure that the eventual fluid leaks from the pump do not cause chemical/physical reactions with other elements in the surroundings that may cause ignition hazards.**

6.3.2 Check power supply cables and ground

Make sure that power supply cables and ground cables do not display any evidence of damage and that connections are securely tight.

6.3.3 Check piping connections

Verify that all connections and coupling (ring nuts, flange screws, nuts and bolts) are firmly tight and all seals and gaskets are effective and in perfect condition. If the pump, during ordinary conditions, transmits vibrations to piping, connections may be loosened, causing fluid leaks. In such case, install a pulsation damper, to smooth flow rate and damp vibrations.

6.3.4 Surface and general cleaning

Dirt accumulation might compromise plugs and oil containment gasket seal in the mechanism, worsening lubrication and heat dissipation, and causing a temperature rise in the pump surface.

Periodically execute the following operations:

- **a)** If the pump is used, batch operation and the handled fluid coagulates, solidifies or crystallises easily, carry out a pump head cleaning right after each stop
- **b)** Prevent/eliminate surface deposits of materials which may yield deposits
- **c)** Remove accidental presence of corrosive materials from the external surface of the pump
- **d)** Make sure that motor ventilation is not obstructed. Remove accidental dust or fiber deposits from fins and fan cover.

6.3.5 Protection against corrosive agents

Dosing aggressive chemical products or operation in exposed environments may cause pump to corrode and to premature seal wear. Verify periodically:

- **a)** That protection covers are always fitted
- **b)** That inspection windows are always shut
- ***c)*** That there is no contamination in the gearbox oil, which may compromise the correct lubrication.

6.3.6 Verification of thermal protections

Make sure that motor overload protection is not excluded and is correctly set. Proper selection and setting of overload protection for ATEX pump motors is vital for guarantee of temperature class and safety against explosion hazards.

6.3.7 Painting check

When the pump is installed in environment with presence of corrosive agents, and each time the necessity arises, it is necessary to repaint the pump, in order to protect the external surface from corrosion.

Contaminated lubricants may cause wear, corrosion and leaks from seals.

6.3.8 Hydraulic oil check

All hydraulic diaphragm pumps are supplied with the hydraulic circuit filled with oil and ready to work. Make sure that the oil reservoir cover is always fitted and shut tight.

Weekly check oil level, checking the oil is clean (free from sludge) and that there is no contamination. Change hydraulic oil according to the pump operation characteristics and base following below table. For quantity and selection of oil, read standard operating manual.

FREQUENCY OF OIL CHANGES IN HOURS	MAXIMUM TEMPERATURE OF HANDLED FLUID				(1) WORKING
	≤ +70 °C	+70 °C - +80 °C	+80 °C - +90 °C	+90 °C - +100 °C	
	20,000	**10,000**	**2,000**	**1,000**	12h / 24h
	20,000	**10,000**	**1,000**	**500**	24h / 24h

(1) Consider as "WORKING" for the pump even a shut down period with warming fluid in pump head.

6.4 DISMANTLING, PARTS REPLACEMENT AND REASSEMBLING OF THE PUMP

6.4.1 Disconnection from power supply

Before proceeding with dismantling of the pump the motor must be disconnected from the power supply. Make sure that accidental start-up is eliminated.

6.4.2 Spare parts

When replacing some pump components, always use **original and genuine spare parts.** Required spare parts are listed in the STD IOM manual supplied with pump.

To be sure to receive the correct spares the following data are to be provided:

- Metering pump type (complete model number)
- Pump serial number

NOTE: All these data are engraved on pump nameplates.

6.4.3 Pump reassembling

Before reassembling carefully clean internal parts and all components make sure that contact surfaces of all gaskets and seals have no damages. Reassemble oil gaskets paying particular attention to lips sealing surface integrity. Applied grease, where needed, carry out reassembling.

Before start-up, turn the motor fan manually, to verify free action of mechanism.

6.4.4 Personnel qualification – Customer care

Pump overhaul and repair must be done by experienced personnel who guarantee original pump performances. For further information contact PULSAFEEDER, INC. Technical Service (Fax +1 585-292-8000, proepo_service@idexcorp.com).

7. MANDATORY INSTRUCTION FOR RETURNING GOODS TO PULSAFEEDER, INC.

ATTENTION: PULSAFEEDER, INC. WILL NOT RECEIVE ANY GOODS WITHOUT PREVIOUS AUTHORIZED RETURNED MATERIALS AUTHORIZATION (RMA)!

In the interest of the customer/user, please contact Pulsafeeder, Inc. technical service (Tel +1 585-292-8000, proepo_service@idexcorp.com) to acquire the RMA.

Following directions apply to ANY reasons for returning goods to Pulsafeeder, Inc., e.g.:

- Servicing, maintenance, upgrading, retrofitting;
- Functional/Performance check, checking of Warranty applicability;
- BRAND NEW goods return and application for credit note due to wrong ordering

7.1 MANDATORY DIRECTIONS FOR SENDER

- **BEFORE** shipping anything to PULSAFEEDER, INC., **ALWAYS** contact Pulsafeeder, Inc. customer service (+1 585-292-8000, proepo_service@idexcorp.com) to have **RMA number** (authorization number to return goods to Pulsafeeder, Inc.), returning informations **and related forms**;
- **DIAPHRAGM pumps: Only remove the valve units from the pump head, DO NOT remove the pump head body;**
- **In general: ALWAYS** remove any residual products from each pump. To guarantee safety at work for Pulsafeeder, Inc.'s staff disassemble and clean each individual component wetted and attach them in a separate package;

ATTENTION: Parts considered "hazardous" for improper cleaning will be replaced and quoted as a new spares

- **Insert in the packing** (courier often keep them): a copy of shipping documents and for each equipment, copy of duly fill-in declaration of conformity for shipping and of Material Safety Data Sheet of pumped/handled fluid;
- Pack the good in a proper manner to avoid damage during transit, and clearly indicate **RMA** number on packing;
- Ship goods as instructed on the **RMA number** to: Pulsafeeder, Inc., Inc. 2883 Brighton Henrietta TL Rd. Rochester, NY 14623 USA.

NOTE: The sender is aware of the penalties provided for unfaithful statements and falsity in acts. Is also responsible for damage to persons or property resulting from such actions.

7.2 CLEANING OF EQUIPMENT

Take appropriate and adequate protection measures to ensure and guarantee safety at work for the operator.
In the case of machines working with chemicals product (e.g. acids) pay the greatest attention to the most appropriate choice of liquid to do this operation properly and safely, and also preserve the integrity of the machinery.

Present information does not replace any existing standard or requirement for safety. Pulsafeeder, Inc. declines any responsibility for damages to persons or property.

7.3 GOODS REJECTED FROM SENDER

If Pulsafeeder, Inc. receives the goods:

- Not properly cleaned
- PUMPS: With pump head not properly cleaned and dismantled
- WITHOUT an RMA number (authorization number) on shipping documents and/or on the packing itself
- With chemicals in the packing

They WILL NOT be accepted (no service will be done) and will be sent back at sender's expenses!

8. OVERALL AND SECTIONAL DRAWINGS

Considering the importance of such documents (subject to changes or updates) we believe that they should not be an integral part of the present instructions manual.

PULSAFEEDER®
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IDEX
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