



INSTRUCTIONS 1075 e

Section	
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Original instructions

***Additional instructions
for ATEX certified equipment
Pumps and pumping units
All series***

EPL : Equipment Protection Level



Z.I. La Plaine des Isles - F 89000 AUXERRE - FRANCE
Tel. : +33 (0)3.86.49.86.30 - Fax : +33 (0)3.86.49.87.17
contact.mouvex@psgdover.com - www.mouvex.com

Your distributor :

ECCENTRIC PISTON PUMPS

MOUVEX PRINCIPLE

ADDITIONAL INSTRUCTIONS FOR ATEX CERTIFIED PUMPS AND PUMPING UNITS

MODELS : Pumps and pumping units All Series

The following instructions must be read at the same time as:

1. standard NF C 15 100,
2. standard NF EN 60 079-14 (electric installations in explosive gaseous atmospheres),
3. standard NF EN 60 079-17 (inspection and maintenance in dangerous locations),
4. rulings, orders, laws, directives, circulars for application, standards, professional practices and any other document related to its place of installation.

We disclaim any responsibility in the case of non-conformity with these documents.

This manual is an addition to our general manual.

For equipment other than the pump (probe, motor, etc.), the instructions in this manual are intended to help during assembly, but shall in no way replace the specific instruction manuals of equipment manufacturers. These specific instruction manuals must be read before assembling the equipment.

The equipment must be installed by qualified, skilled and authorised personnel.

Our equipment is labelled CE by virtue of directive ATEX 2014/34/EU.

It is designed for use in explosive atmospheres from 0,8 bar to 1,1 bar and temperatures from -20°C to +40°C and for the gas groups and zones below :

- gas group IIA, IIB or IIC
- Equipment-group : II
- Equipment Protection Level (EPL) = Gb and Gc

Check the compatibility between the informations on the rating plate, the explosive atmosphere present, the area of use and the ambient and surface temperatures.

According to the directive 2014/34/EU, the accessories or (and) components assembled and equipping the motors of our pumps must have a standard CE declaration of inspection.

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1. MOUVEX PUMPS AND UNITS CERTIFICATION

MOUVEX pumps and units carry EPL Gb (2G) certification (high level of protection). They are, therefore, obviously suited to EPL Gc (3G) uses (standard level of protection).

Unless otherwise indicated, the recommendations contained in these Instructions apply to the equipment with EPL Gb and Gc (2G and 3G).

2. TABLE OF PUMP CHARACTERISTICS

All series pump	A6 A	A12 A	A18 A	A31 A	A55 A
Acceptable continuous max. speed (tr.min ⁻¹)	600	500	450	400	350
Maximum suction pressure acceptable (bar)	9	9	9	9	9
Acceptable maximal differential pressure (bar)					
Carbon bushings	10	10	10	10	10
Bronze bushings.....	5	5	5	5	5
Maximum discharge pressure acceptable (bar)	12	12	12	12	12

Other characteristics : See pump Instructions manual.

NOTICE :

Maximum temperature of pumped product is highly dependent on the operating conditions (pressure, speed, viscosity ...). Please contact our technical department to set the maximum allowable temperature for your application.

Above a pumped fluid / heating temperature of 40°C, pump operation without having temperature control device switching off pump power supply cannot be guaranteed for all applications parameters (pressure, viscosity, rotation speed...).

Please contact our technical department to check the definition of your application.

3. MAINTENANCE OPERATIONS

All operations on MOUVEX ATEX equipment must be carried out by MOUVEX personnel or by personnel specifically authorised to carry out such operations.

A particular attention must be given to interventions carried out in ATEX zone (ex : choosing tools, not possibly creating sparks).

3.1 Pumps

MOUVEX pumps parts can only be replaced by MOUVEX parts corresponding to the original configuration of the pump.

When commercial standard equipment are mounted with the pump (ex : standard mechanical seal, temperature probes...), they should only be replaced by equipment with a level of protection at least equivalent to that of the pump, operating conditions being taken into account.

Non-conformity with these rules will result in the loss of the MOUVEX ATEX pump certification.

3.2 Pumping units

MOUVEX pumping unit equipment must only be replaced by equipment with a level of protection that is at least equivalent to that of the pumping unit, operating conditions being taken into account.

Incorporation and use in the pumping unit must not change the compliance thereof with the essential requirements of Directive 2014/34/EU.

Non-conformity with these rules will result in the loss of ATEX MOUVEX certification for the pumping unit.

4. TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS

4.1 Protection by limiting the temperature of the pumped product

Pumps are devices whose surface temperatures greatly depend on the products they pump.

ATEX MOUVEX certification defines the temperature class of the pump according to the temperature controller device setting threshold that is responsible for controlling the surface temperature of the pump (and, if applicable, of controlling that of the relief valve surface temperature ; see § DISCHARGE PRESSURE RELIEF).

A temperature limiter device is necessary to respect the temperature classification.

This device must :

- be installed in emplacement provided for this purpose,
- cut the power supply to the pump and controlling any safety measures required by the installation,
- be conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...),
- have a level of protection against explosions equivalent or higher than that of the pump,
- have a minimum level of integrated safety adapted to equipment category (see table below).

Pump category	3	2
Level integrated security required	neither	SIL1

The activation threshold of the temperature limiter device should be selected to ensure that the temperatures at controlled locations do not exceed the values given below.

Setting of the activation threshold should take into account the precision of the temperature limiter device.

Example : to a precision of $\pm 5K$, activation threshold in temperature class T4 should be set to $125 - 5 = 120^{\circ}C$.

Temperature class	Maximum detection threshold of the temperature limiter devices
T4	125°C
T3	190°C

4.2 Pumping units

The temperature classification of the pumping units depends on the temperature classification of all equipment making up the pumping unit ; the one enforced is that of the element with the most restrictive classification.

Example : A pumping unit with T3 motor, a T6 pressure switch and a T4 pump will have a T3 temperature classification.

^a See overall dimensions in the pump's Instructions.

5. OPERATION WITHOUT ANY PUMPED PRODUCT

Pumps using the MOUVEX principle, All series, can be run dry, without any pumped product in the pump, throughout the pump priming time without causing the temperature to exceed the temperature classification (for example during the priming or emptying of pipes). However, this is allowed only on condition that the following restrictions are complied with :

5.1 Operation on a product that does not generate its own explosive atmosphere or generate an explosive atmosphere with an ignition temperature that is higher than 160°C

- Temperature of the external surfaces of the pump at start-up less than 40°C ^b,
- Differential pressure when the pump works without the pumped liquid not exceeding the value defined below.

Maximal differential pressure during operation without any pumped product

Bushings	Differential pressure (bar)
Carbon	3
Bronze	1

- Operating time without pumped product (dry running) not exceeding the value defined below.

Maximum running time without any pumped product

Temperature class	Time (min)
T4	6
T3	6

This duration may be spread over several operating periods spaced at least 15 minutes apart. Any operation for longer than this period will entail detailed inspection of the equipment and possibly disassembly of it to ensure that the previous operation did not lead to any additional ignition risks (particular attention will be paid to the fact that even though the external temperatures of the pump comply with the limits defined above, the inside surfaces can nonetheless be at high temperatures).

5.2 Operation on a product that generates its own explosible atmosphere and with an ignition temperature of less than 160°C

It is forbidden to operate without the pumped liquid.

5.3 Presumed pump failure

When the behaviour of the pump indicates that an equipment failure has occurred (drop in flow rate / pressure, abnormal noise, etc.), the pump must not operate without pumped product.

Consequently, the pipe must not be drained by the pump.

It is strictly forbidden to operate the pump without observing these recommendations.

The user must evaluate his installation and list all possible situations in which it functions without pumped product and take the necessary steps to ensure compliance with the operating limits.

The situations involving operation without pumped fluid can for example be the following :

- priming of the pump,
- draining the pipes,
- interruption of pump feed (tank empty),
- suction pipe blocked (valve, filter fouled, etc.),
- air block at suction,
- ...

This can for example be checked by an operator ensuring that the applications dependent on the pump are working or that the physical values dependent on the presence of liquid (flow, pressure, torque, etc.) correspond to those expected.

These control measures can be automated by using a pump shutdown control device.

This device must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...). The choice of its characteristics (temperature resistance, category, etc.) must guarantee a level of protection at least equal to that of the pump.

When a specific Instructions is provided for mechanical seals, please read it to know the usual precautions recommended by the manufacturer.

^b Special arrangements have to be made for cases where the pumped product requires that the pump be reheated before it is started up. Please contact our Technical department for more information.

6. DISCHARGE PRESSURE RELIEF

Any overshoot of the maximum allowable pressures is considered to be abnormal pump / pumping unit operation which can lead to surface temperatures in excess of the pump / pumping unit temperature classification, as well as risks to the user and/or the installation.

To avoid these risks, the user must equip the pump / pumping unit with a pressure limiter with a threshold chosen according to the lowest allowable maximum pressure for the circuit components (including head losses).

6.1 Pumps and pumping units equipped with an integrated relief valve

Since the pressure relief is incorporated in the pump / in the elements of the pumping unit, the product is recirculated directly from the discharge port to the suction port / from the discharge pipe to the suction pipe.

The short length of the recirculation circuit means that if the pump operates with a blocked discharge port, the outer surfaces of the relief valve can reach very high temperatures in a short time.

For these reasons, a temperature limiter device can be necessary to respect the temperature classification, depending on equipment category and its use (see board below).

The temperature limiter device has to :

- be installed in emplacement provided for this purpose ^c,
- cut the power supply to the pump and control any safety measures required by the installation,
- be conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...),
- have a level of protection against explosions equivalent or higher than that of the pump / pumping unit,
- have a level of integrated safety adapted to the material category and the type of the relief valve using (see board below).

Type of the relief valve using ^d	Protection		Regulation	
Pump / pumping unit category	3	2	3	2
Temperature limiter device required	no	yes ^e	yes ^e	yes ^e
Level integrated security required	-	neither	neither	SIL 1

The activation threshold of the temperature limiter device should be selected to ensure that the temperatures at controlled locations do not exceed the values given below.

Setting of the activation threshold should take into account the precision of the temperature limiter device.

Example : to a precision of $\pm 5K$, activation threshold in temperature class T4 should be set to $125 - 5 = 120^{\circ}C$.

Temperature class	Maximum detection threshold of the temperature limiter device
T4	125°C
T3	190°C

NOTICE :

The temperature limiter device installed on the integrated relief valve is not designed to control pump surfaces temperature as required in the section TEMPERATURE CLASS OF PUMPS AND PUMPING UNITS, but to be triggered when a malfunction could raise the temperature of the relief valve surfaces to a level higher than what is acceptable for the ATEX area. The temperature of pump surfaces must be checked using a device that is separate from the temperature limiter device installed on the relief valve.

6.2 Pumps and pumping units without an integrated relief valve

6.2.1 Protection by pressure switch

Protection may be provided by installing a pressure switch that stops the equipment in the event of over-pressure.

This device must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...). The choice of its characteristics (temperature resistance, category, etc.) must guarantee a level of protection at least equal to that of the pump / pumping unit.

6.2.2 Protection by external relief valve

Over-pressure protection can be provided by installing an external relief valve with return to the tank / suction pipe.

In this case, the user must ensure that the circuit complies with the recommendations of § CLOSED-CIRCUIT OPERATION.

We also recommend checking that heating on the relief valve remains compatible with the temperature classification of the zone in which it is installed.

^c See pump / pumping unit overall dimensions.

^d Types of the relief valve using :

Protection : protection of the pump against accidental and non-repetitive over pressures. The relief valve cannot also fulfil a control role.

Pressure control : controlling the pressure / flow on the application (e.g. : control of the flow of the pump without returning to the tank or speed control). The relief valve can also fulfil a protective role.

^e **Single relief valve** : only one temperature limiter device.

Double relief valve : two temperature limiter devices.

7. CONTROLLING THE ROTATION SPEED

Any overshoot of the maximum allowable speed is considered to be abnormal pump operation which can lead to surface temperatures in excess of the pump temperature classification, as well as risks to the user and / or the installation.

At first start-up or after any modification to the pumping unit or its settings, the pump rotation speed must be checked to ensure that it remains below or equal to that defined for the application.

8. CLOSED-CIRCUIT OPERATION

Closed-circuit operation with small volumes of pumped product can lead to significant heating of the pumped product.

The user must check that the recirculation circuit is large enough to ensure that the pumped product temperature rise remains below the temperature limits of all circuit elements.

This check can for example be carried out by installing a temperature sensor controlling shutdown of the installation if the maximum allowable values are exceeded.

This equipment must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere (EN 50495...). The choice of its characteristics (temperature resistance, category, etc.) must guarantee a level of protection at least equal to that required by the area where it will be installed.

9. SOLVENTS NOT COMPATIBLE WITH SEALS

The user must ensure that the seals equipping the pump / pumping unit are compatible with the product pumped and products used to clean the pump.

10. RISKS OF EXOTHERMIC REACTION

When the pump / pumping unit is operated successively on different products, the user must make the necessary arrangements to avoid heating through an exothermic reaction between the various products pumped.

11. PROTECTION AGAINST FOREIGN BODIES

The user will take the necessary steps to protect the installation against ingress of any foreign bodies that could damage the pump / pumping unit, for example by ensuring that neither the pumped product nor the piping contain foreign bodies liable to damage the pump / pumping unit, or by installing an appropriate suction filter.

If the pump is operated without pumped product, particular attention must be given to the risk of sparks and hot surfaces generated by friction between foreign bodies and the inner surfaces of the pump / pumping unit. This must be assessed prior to any use of the pump without pumped product.

12. MAINTENANCE

12.1 Pump

Excessive wear of pump parts is considered to be abnormal pump operation which can lead to surface temperatures in excess of the pump temperature classification, as well as risks to the user and / or the installation.

12.1.1 Lubrication

Using a pump with a bearing grease that has exceeded its allowable limits is considered to be abnormal pump operation, liable to generate surface temperatures in excess of the pump temperature classification.

The user must follow the oil change intervals recommended by the manufacturer and stated in the pump Instructions.

12.1.2 Friction parts

Inspection intervals of friction parts are highly dependent on conditions of service, they should be defined according to the application.

12.1.2.1 Friction bushings, sleeve and piston bearing

The user must check that the wears on friction bushings, sleeve and piston bearing remain below the maximum allowable values defined in the Instructions supplied with the pump.

12.1.2.2 Slide block, slide block pads, slide block bushing

The user must check that the wears on slide block, slide block pads, slide block bushing remain below the maximum allowable values defined in the Instructions supplied with the pump.

12.1.2.3 Cylinder and piston

The user must check that the wears on cylinder and piston remain below the maximum allowable values defined in the Instructions supplied with the pump.

12.1.3 Bearing

The user must follow the preventive maintenance recommendations defined in the Instructions supplied with the pump.

12.1.4 Alignment

After any maintenance on the pump, pump and gear motor alignment must be controlled.

12.2 Pumping unit

12.2.1 General

Maintenance of the equipment making up the pumping unit will be carried out in accordance with instructions provided by the manufacturer.

12.2.2 Maintenance of electrical equipment

Before performing any maintenance on electrical components (engine, control box, safety elements, control and protection of the pump, etc.) you should :

- Refer to the technical documentation accompanying the equipment,
- Respect the safety instructions and, especially, do not open when live.

During maintenance operations :

- Check the cable glands, tighten the glands, terminals and other connections,
- When closing electrical components, check the lubrication and cleanliness of the mating surface(s).

12.2.3 Alignment

After any maintenance on the pumping unit, pump and gear motor alignment must be controlled.

13. POSSIBLE LEAKS OF THE PUMPED PRODUCT

Possible leaks of liquid via the pump / pumping unit seals or mechanical seals do not lead to additional risks of fire provided that the explosive atmosphere surrounding the equipment corresponds exactly to the type of atmosphere for which it was selected.

Make sure to check that when coming into contact with the atmosphere surrounding the pump or with material located near the pump / pumping unit, the pumped products do not risk to modify the classification of the area where the equipment is located.

14. PAINT

14.1 Pumps

If the painting on the pumps is retouched, the user must make sure that the recommendations of standard ISO 80079-36 are being complied with regard to non-conductive coatings on metal surfaces (total thickness of non-conductive coating not exceeding 2 mm for group IIA and IIB gas and vapours or 0,2 mm in the case of group IIC gas and vapours).

To do this, it may be necessary to sand the pump before doing any paint retouches.

14.2 Pumping units

During any possible paint touch-up operation of the pumping unit's elements, the user must ensure compliance with the recommendations contained in the specific instructions from the equipment manufacturers.

15. DUST

To prevent any risk of dust igniting, the user must check that the layer of dust on the pump / pumping unit is no more than 5 mm thick.

16. PUMP DRIVE

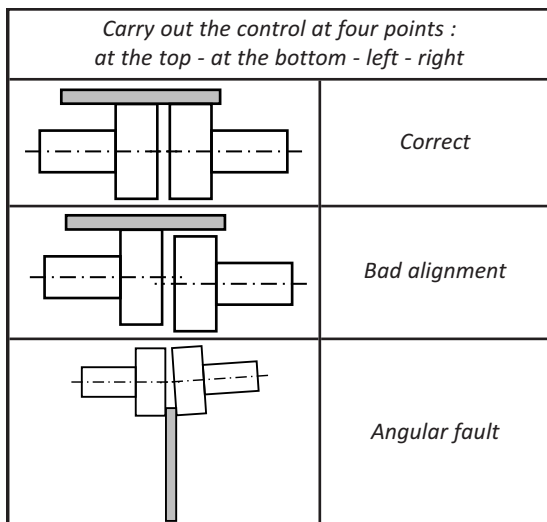
16.1 Alignment of the pump and drive

To carry out alignment of the pump and drive, use a perfectly straight steel rule to control misalignment and feeler gauges for angular misalignment.

It is important to control the alignment of each step of the installation in order to ensure that none of the steps lead to stresses on the unit or the pump :

- after fastening on the foundations,
- after fastening the piping,
- after the pump has operated at normal operating temperature.

An alignment control should be performed every 6 months. The following three figures show the various faults that could be encountered. The allowable misalignment values are stated in the Instructions supplied with the coupling.



REMINDER :

A flexible coupling does not avoid to do a good alignment.

16.2 Elastic coupling

ATEX certified elastic coupling must be used. This coupling must have a level of protection equivalent or better than that of the pumping unit. For mounting the elastic coupling, follow the indications in the specific Instructions of the equipment manufacturer.

16.3 Electric installation of the pump motor or gear motor

Check that the indications on the pump rating plate and the supply voltage match.

Follow the indications in the specific Instructions of the equipment manufacturer to connect the motor to the mains supply.

Refer to the wiring diagram, use wiring adapted to the power and ensure that the contacts are tightened vigorously.

Motors must be protected by circuit breakers and fuses provided in the manufacturer's Instructions.

Connect the regulatory earthing connections.

Start the pump up empty to check that the connections are correct and check that the direction of rotation corresponds well with the direction of suction and discharge of the installation.

16.4 ATEX characteristics of the pump motor or gear motor

The motor or gear motor used must conform to current regulations and standards especially with regulation related to electric equipment in explosive atmosphere.

The level of protection selected has to be equal to or greater than that of the pumping unit. For instructions on maintenance of motor and gear motor, follow the indications in the specific Instructions of the equipment manufacturer.

17. EARTHING CONNECTION

To avoid the risk of ignition due to electrostatic discharge, the pump and the pumping unit must be grounded.

Particular attention should be given to earthing connection for the pumping units mobile or mounted on truck.

18. DIRECT SUNLIGHT EXPOSURE

A direct exposure of the pump / pumping unit to the radiance of the sun is likely to increase the temperature of their surface above ambient temperature.

As a result of fact, the User must take sure that the pump / pumping unit is not displayed in the direct radiance of the sun or the temperature of the external surfaces of the pump is compatible with its level of protection.

19. PUMP MARKING

The marking of the All Series pumps is as follows :

MOUVEX F89 AUXERRE

Ppe All + Short description of the pump

 II 2 G

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

or

 II 3 G

Ex h IIB (or IIC) T4 T2 Gc X

Serial no.

Year of manufacture

X

The marking of the All Series pumping units is as follows :

MOUVEX F89 AUXERRE

Gpe All + Short description of the unit

 II 2 G

Ex h IIB (or IIC) T4 T2 Gb (or Gc) X

or

 II 3 G

Ex h IIB (or IIC) T4 T2 Gc X

Serial no.

Year of manufacture

X