

INSTRUCTIONS MANUAL: EXPLOSION PROOF MOTORS

INTRODUCTION

An explosion-proof, and in particular a flameproof motor, is one that is inherently safe when working in potentially explosive atmospheres.

This means that its construction and assembly are designed so that ingress of explosive gases or dusts is rendered harmless for the environment.

In the event of accidental ignition, provoking an explosion inside the motor housing, the motor shell and brackets are strong enough to resist the internal pressure created by this explosion.

Moreover, assembly joints and shaft clearance must be long enough and offer minimum play, so that hot gases or dusts resulting from an explosion will be cooled sufficiently to create no possibility of an explosion outside the motor.

The outside temperature of the motor enclosure must also be kept well below the flash point of the gases or dusts present in the hazardous atmosphere, both in normal and abnormal working conditions.

Finally, it is the manufacturer's concern that components inside the motor should be able to withstand an occasional explosion without being adversely affected.

The degree of risk is dependant on the constituents of the hazardous atmosphere: even combustible dust can become explosive when spread in the air in the right proportion.

Therefore, existing risks have been divided into categories, depending on the temperature at which the gas, dust or vapour mixtures become flammable, and also on their explosive energy.

For each of these, specific safety rules have been evolved on a European level.

Compliance with these rules is verified by an Ex notified body, approved for certification in accordance with article 9 of the European Community Council directive, no 94/9/CEE of 23 march 1994.

Certification delivered by any of the notified bodies is automatically valid in all CEE countries. It is recognised by all European adherent countries and also very seriously considered in many countries overseas, U.S.A. included.

In Belgium, it is the "Institut Scientifique de Service Public", in short ISSeP, which has been chosen for its long experience in problems of safety in mining industries.

As explosion proof motors are constructed with special materials and technologies that comply with the legal regulations concerning potentially explosive atmospheres, a wrong connection or a minor modification of the motor destroys the compliance with security regulations. The rules concerning explosion proof apparatus must be observed unconditionally. Note that our motors are approved for a specific group of hazardous areas and temperature classes.

USE OF Ex d II B MOTORS

The user is responsible for the choice of the type of explosion proof motor. He has to take into account the explosion risks area in which the motor will run (classification of hazardous areas, temperature class,...).

Before installation, the user has to check if the group and protection class, marked on the motor label, corresponds with the requested conditions.

INCOMING INSPECTION

Inspect the motor to detect any signs of damage during the transport.

Check that the motor nameplate data complies with your order or specification. In the unlikely event of a claim, please contact our Sales Office.

STORAGE

The motor should be stored in a clean, dry and vibrations free environment. . If the motor is to be stored for a long period of time, the machined surfaces protected with anti-rust coating should be checked and "touched up" if necessary.

If the motor is fitted with anti-condensation heaters, these should be connected during the storage period.

MOUNTING AND START UP

Electric data of the motor, valid for the rated power, can be found on the nameplate.

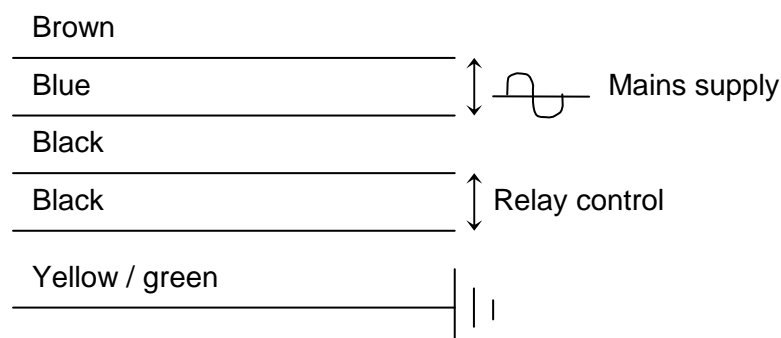
It is the responsibility of the user to ensure that the motor nameplate voltage and frequency are the same as the mains supply.

Connection to the mains supply should only be executed by a recognised professional, respecting local demands and regulations.

The user must ensure that the diameter of the cable is adequate for the voltage and current involved. (See nameplate data of motor)

The connection of the wires must be done as described in the connection diagram that is delivered with the motor. The connection diagram is usually located inside the cover of the terminal box. If the motor does not have a terminal box, it is located on the housing or attached to the cable.

The connection diagram is structured as follows: (see example)



The leads can be coloured or numbered. Each line represents one lead. The given connection diagram is an example only.

The motor must be protected against overloads and short-circuits.

When installing the motor, always connect the earth, using the earthing screw in the terminal box or on the motor frame. Always check local regulations and demands.

The manufacturer cannot be held responsible for damage due to incorrect installation or use.

Free circulation of fresh air for cooling the motor must be guaranteed

The maximum ambient temperature must not exceed the given value that is indicated on the nameplate and in the motor certificate.

To guarantee the explosion proof protection, certified explosion proof cable glands with sealing joints adapted to the cable diameters, must be used.

THE MOTOR WILL LOSE ITS EXPLOSION PROOF CHARACTERISTICS IF THE CABLE AND GLANDS ARE NOT FITTED CORRECTLY!

Note: If a spare opening for a cable gland isn't used, only the use of a certified explosion proof plug retains the explosion proof characteristics.

Particular attention is to be given to the fixing torque of bolts and screws. The motor fixing bolts are factory mounted with the correct torque and should not be touched.

It may be necessary to open the terminal box for connecting the motor. When re-mounting the cover, only use the original screws.

IMPORTANT: Firstly tighten all screws by hand before applying the full torque. Then tighten the screws until the spring ring is flat.

Using a pulley or a coupling device:

Apply only well balanced discs and couplings. Check the alignment after assembling

Take care while mounting of the pulley on the shaft: Hammering on the shaft will damage the motor bearings. Pulleys should only be mounted with appropriate mounting tools that do not stress the motor bearings.

Following these recommendations will greatly increase the expected motor bearing life.

Safety regulations in respect of guarding couplings and belts from being accidentally touched must be applied.

Use of a frequency converter:

In areas with an explosion risk, the use of the motor over a frequency converter is limited.

The frequency converter must in such case be placed outside the explosion-endangered area. If the frequency converter needs to be placed inside the explosion-endangered area, the additional requirements for such an installation must be respected.

It should be verified that the functioning of the motor is not influenced in a way that the requirements for Ex-environments are no longer satisfied.

MOTOR PROTECTION

If the motor is equipped with an automatic reset thermal protection, the motor will in case of thermal cut-out restart automatically and without warning after a certain cooling period. Contact the manufacturer if you need more information on the type of protection that is used.

If the motor is supplied with a thermal protection that is brought out separately, the user must connect the protection in a way that the motor is switched off when the protector switches.

MAINTENANCE

The maintenance of the motor can be limited to periodic inspection of the ventilation circuit, to keep it conveniently unobstructed, and to the replacement of the bearings; this period depends on the working conditions and ambient. Re-greasing is not necessary, the ball bearing are lubricated for life. In the presence of dust, the motor needs to be cleaned on a regular basis.

In the case of DC motors with brushes in continuous contact with the slip rings, the slip rings, the brushes and the brush-holders should be periodically cleaned by vacuum cleaning.

REPAIR

The explosion proof motor must not be opened while the motor is energised.

Qualified persons only may do repair or service of the motor. If the customer himself carries out the operation, he must observe the valid standards. If a repairer treats the motor, he has to hand a certificate of conformity to the user.

The manufacturer is not responsible for motors that are modified or opened without his written agreement.

SPARE PARTS

For each order of spare parts, the type and number of the motor must be given; these data are indicated on the nameplate.

MARKING OF ATEX CERTIFIED MOTORS

The motor marking contains the following information with regards to the Ex protection:

CE xxxx Ex II 2 G ISSeP 08 ATEX yyy X Ex d II B T4

CE CE marking
 xxxx ID of notified body responsible for surveillance
 Ex Community mark for explosion proof equipment
 II Field of application (Group II includes all fields of application except mining)
 2 Category of protection: For group II: 3 (Normal), 2 (High level) or 1 (Very high level)
 G Gas hazardous locations (G)

ISSeP Notified body

08 Year of emission (2007, 2008, 2009, ...)

ATEX ATEX directive

yyy Consecutive number of the year

X Special conditions for safe use (if any)

Ex d Type of protection (flameproof for use in an explosive gas atmosphere)

II Group of equipment

B Gas group (the classification of gases into groups is described in the standard EN600079)

T4 Temperature classification (T3 to T6, see table below)

IP Ingress protection

Temperature Class (Group II)	T3	T4	T5	T6
Maximum surface temperature	200°C	135°C	100°C	85°C

The maximum surface temperature of equipment must always be lower than the ignition temperature of the gas or dust present in the hazardous area.

SAFETY CONSIDERATIONS

During normal use, the motor may get hot. (See above table of surface temperatures.) Precautions may be needed to avoid the risk of burns.

The motor shaft turns at the speed that is indicated on the nameplate, and is potentially dangerous. Precautions may be needed to ensure safe use.

In general, the relevant safety prescriptions for machines must be respected.

EUROPEAN DIRECTIVES:

Description	Directive reference
Directive for explosive atmospheres (ATEX)	94/9/EC, 1999/92/EG
Electromagnetic Compatibility (EMC)	2004/108/EC
Low voltage directive (LVD)	2006/95/EC
Machinery directive	2006/42/EC

EXPLOSION PROOF STANDARDS TAKEN INTO CONSIDERATION DURING MANUFACTURING:

Electrical apparatus for explosive gas atmospheres – part 0: general requirements	EN 60079-0:2006
Electrical apparatus for explosive gas atmospheres – Part 1: Flameproof enclosure 'd'	EN 60079-1:2007

MANUFACTURER INFORMATION:

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This document has been made with the greatest care and is correct at the time of printing. It is meant as a general guideline and it is not meant to be complete. Always check with relevant regulations and guidelines.