



Motori elettrici per aree classificate
Electric motors for classified areas
Moteurs électriques pour zones classées
Elektromotoren für klassifizierte Zonen
Motores eléctricos para áreas clasificadas



II 3G, II 3D • Ex nA • Ex tD • A22

istruzioni di sicurezza
safety instructions
consignes de sécurité
Sichereitsanweisungen
instrucciones de seguridad

cemp

Flameproof
Motors



Atav - Les Ateliers de l'Avre

is a Cemp srl trademark

cemp

Flameproof
Motors

	Page
1. Introduction	14
2. Installation of motors for classified areas	14
2.1 Suitability of the motor to the place of installation	14
2.2 Nameplate safety data	15
2.3 Mains	17
2.4 Auxiliary connections	17
2.5 Cable entries	18
2.6 Earthing connection	18
2.7 Further warnings for the installation ...	18
3. Motors without terminals with cable leading out of plate	19
3.1 Motor with plate, armoured cable and cable gland	19
4. Motors without fan	19
4.1 Cooling method IC 418	19
4.2 Cooling method IC 410	19
5. Motors with forced ventilation	20
5.1 Cooling method IC 416	20
6. Motors suitable for frequency converter drive	20
7. Inspection and maintenance of motors for classified areas	21
8. Repairs on motors for classified areas	21

Number: SN-1
Edition: 01-08
Replaces: 03-07

1. Introduction

These safety instructions refer to the installation, operation and maintenance of motors suitable for use in the following classified areas:

- Zone 2, with potentially explosive atmospheres due to the presence of gas, vapours or mists;
- Zone 22, with potentially explosive atmospheres due to the presence of non-conductive dust.

The motors to which these instructions apply have the following protection types against the risk of explosion:

- Ex nA II T3: Non Sparking motor, for Zone 2, normal safety according to the EN 60079-0; IEC 60079-15 norms.
- tD A22, IP55 or IP65, T125°C; T150°C: Closed motor, for Zone 22, according to norms EN 61241-0, EN 61241-1

Motors in both categories indicated above guarantee the level of protection required during ordinary operation.

These instructions must be followed in addition to those provided in the instruction manual.

2. Installation of motors for classified areas

2.1 Suitability of the motor to the place of installation

Check the motor is suitable to the area classification and the characteristics of the flammable substances present.

European directives 94/9/EC dated 23 March 1994 (relating to equipment) and 1999/92/EC dated 16 December 1999 (relating to plants) establish the essential safety requirements against the risk of explosion in classified areas.

2.1.1 Places subject to the presence of inflammable gas, fumes or mists

The classification criteria for areas subject to the risk of explosion are laid down in the EN 60079-10 standard.

The technical requirements for electrical plants located in classified areas are established by the EN 60079-14 standard.

The choice of the type of motor, according to these technical and legislative provisions, must take into account the following factors:

- type of plant. mines (group I), above ground plants (group II)
- zone classification: 0, 1, 2 (for which equipment of category 1G, 2G, 3G, respectively are suitable)
- characteristics of the flammable substances present in the form of gases, vapours or fumes:
- sub-group: IIA, IIB, IIC
- temperature class T1, T2, T3, T4, T5, T6 (defines the ignition temperature of the gases)

2.1.2 Places subject to the presence of combustible dust

The criteria for classifying areas at risk of explosion are given in the EN 61241-10 standard.

The criteria for choosing and installing equipment in classified areas subject to dust are given in the EN 61241-14 standard.

On the basis of these technical and legislative requirements, the type of motor must be chosen, taking the following factors into account:

- Classification of the area: 20, 21, 22 (equipment of category 1D, 2D, and 3D is suitable respectively).

GB

- Characteristics of inflammable substances in the form of clouds or layers of dust:
- Level of mechanical protection required (IP5x or IP6x).
- Maximum surface temperature allowed.

2.2 Nameplate safety data

In addition to operating data, the information provided on the nameplate, includes:

- information necessary to select the appropriate type of motor and for the correct installation of the motor itself.
- references to the notified bodies responsible for certification.

Note: When motors are suitable for use in areas classified Zone 2 and Zone 22, they are provided with two distinctly visible plates that clearly state the specific characteristics of the two different protection modes.

MARKING MOTORS FOR GASES	
	Mark of conformity to the applicable European directives
	Community mark specifically indicating explosion protection
II 3G	Motor suitable for above ground plants with the presence of category 3G gases or vapours
Ex nA	“Non sparking” motor with standard safety class
II	Container appropriate for substances (gases) in group II
T3	Motor temperature class (maximum surface temperature)
XYZW xx ATEX yyy	XYZW: laboratory that issued the CE certificate type xx: year in which the certificate was issued yyy: type certificate number *

* This information is present only on the plates on the motors in the AN, AP, AQ series, because they also have INERIS 06 Atex 3037X certification. Instead, the N, ND, CD series motors are certified directly by the producer, and as a result, do not have this information on the plate.

MARKING MOTORS FOR DUST

	Mark of conformity to the applicable European directives
	Community mark specifically indicating explosion protection
II 3D	Motor suitable for above ground plants with the presence of category 3D dust
Ex tD	Motor with protective enclosure against dust penetration
A22	Motor suitable according to method A, for Zone 22 with non-conductive dust
T125 °C (T150 °C)	Maximum motor surface temperature
IP55 or IP65	Mechanical protection level of motor and terminal box
XYZW xx ATEX yyy	XYZW: laboratory that issued the CE type certificate xx: year the certificate was issued yyy: type certificate number

*

* This information is present only on the plates on the motors in the AN, AP, AQ series, because they also have INERIS 06 Atex 3037X certification. Instead, the N, ND, CD series motors are certified directly by the producer, and as a result, do not have this information on the plate.

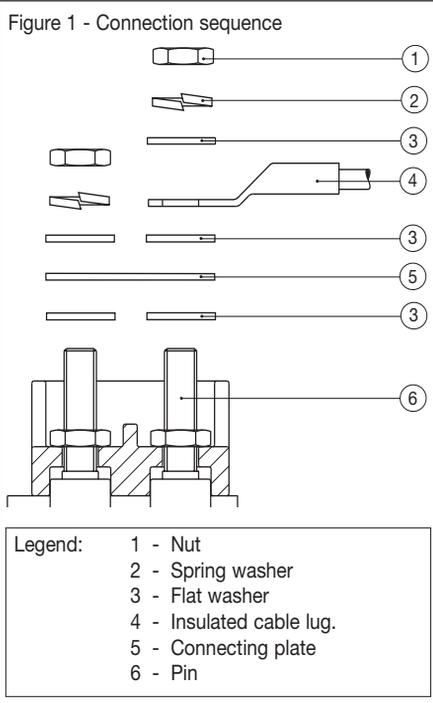
Notes:

- Motors with a given temperature class are also suitable for all substances with a higher temperature class (for example: T3 motors are suitable for substances with a T2, T1 temperature class).
- If the certificate number indicated on the nameplate is followed by an "X", the user must follow specific conditions of use described in this manual.
- Motors for classified areas are normally made to be used at an ambient temperature in the range of $-20\text{ °C} \div +40\text{ °C}$. If the motor has to be employed for operations outside these ambient temperature range, the temperature values must be specified at the time the order is issued and indicated on the nameplate.
- The motor has been designed to operate at the speeds indicated on the identification plate. The information provided in our catalogues must be observed to prevent the motor from overheating.

2.3 Mains

Connections to the mains must be performed as shown in the wiring diagrams supplied with the motor.

Connection to the power terminal is to be performed following the instructions indicated in the figure below.



When making connections between conductors having different potential, the air insulation distances must be maintained as specified in the following table must be maintained:

RATED VOLTAGE - U [V]	MINIMUM DISTANCE IN AIR - L_m [mm]
$200 < U \leq 250$	5
$250 < U \leq 320$	6
$320 < U \leq 400$	6
$400 < U \leq 500$	8
$500 < U \leq 630$	10
$630 < U \leq 800$	12
$800 < U \leq 1000$	14

Connections to the main terminals must be executed using the tightening torques indicated below:

SCREW SIZE	TIGHTENING TORQUE [Nm]
M4	1,2
M5	2
M6	3
M8	6
M10	10
M12	15,5

GB

2.4 Auxiliary connections

2.4.1 Thermal protection

With PTC or PT 100 thermistors used for controlling temperature class, the user, in compliance with the essential safety requirements provided for under point 1.5 of the European Directive 94/9EC, must alternatively use:

- use a cut-out in compliance with IEC 61508 standard
- use a cut-out that automatically switches to safety position in case of a failure (fail-safe)
- use a dual protection circuit.

2.4.2 Anti-condensation heater

The anticondensation heaters must be fed from a different line from the motor power supply one. Check that the power voltage matches the one indicated on the nameplate. The heaters must not operate when the motor is powered.

Check the type of auxiliary present on the motor by looking at the "auxiliaries marking diagram".

2.5 Cable entries

Connections must be made via cable or conductor entries in a conduit conforming to the EN 60079-14 standard.

When the cable entry is made using a cable gland, the type of cable gland must be selected correctly in relation to the type of plant and the type of cable.

The cable gland must be tightened fully until the seal rings ensure the necessary pressure:

- to prevent transmission of mechanical stress to the motor terminals
- to ensure the mechanical protection (degree) of the terminal box.

Cable entries for terminal boxes must be made with blocking fittings or cable clamps compliant with the norms EN 60079-0, EN 60079-15 and the ATEX Directive (94/9/EC). Furthermore, they must have a minimum IP55 or IP65 protection class according to the norms EN 61241-0, EN 61241-1.

Unused cable entries must be closed with caps certified in compliance with the EN 60079-0 norm.

2.6 Earthing connection

Motors described in these safety instructions are provided with two earthing terminals: one inside the terminal box and the other on the motor frame. Depending on the cross-section of the line conductor, the earthing conductor cross-section must be:

LINE CONDUCTOR SECTION	EARTH CONDUCTOR SECTION
Less than or equal to 16 mm ²	Same section
Between 16 mm ² and 35 mm ²	16
Greater than 35 mm ²	Greater than or equal to 50% of the section

2.7 Further warnings for the installation

For connections, use a suitable cable that is approved to withstand weather conditions and the operating temperature of the motor.

The motors described in these safety instructions must be protected against overloads with automatic power supply disconnection by using a countdown protection device or by using a device to control directly the temperature by means of temperature sensors inserted in the windings.

It is necessary to ensure that the motor ventilation is not impaired by obstacles positioned in the surrounding area when flameproof motors are installed. For this purpose a minimum distance must be maintained between the motor and any device that is not part of the motor, according to the following table:

SIZE	MINIMUM DISTANCE FROM OTHER DEVICES [mm]
up to 160	40
from 180 to 225	85
≥ 250	125

3. Motors without terminal box with cable leading out of plate

When the motor comes without a terminal box, the motor's enclosure is closed with a plate with the power supply cable leading out of it. To install correctly, the user must follow the instructions below.

3.1 Motor with plate, armoured cable and cable gland

An armoured cable leads out of the motor plate clamped by an appropriate cable gland.

Free cables lead out of the motor plate featuring the clamping coupling, and are used to supply the motor. The user must protect power supply cables from potential damage arising from mechanical stress, and must connect ends of cables according to one of the safety methods provided for by standards EN 60079-0, EN 60079-15, EN 61241-0, in conformity with engineering rules in force for the place where the motor is to be used.

Alternatively, it is possible to connect the ends of the cable in a safe area.

Should the motor come complete with coupling and flexible tube, the user must connect the end of the wires directly onto the terminals located in the relevant box.

4. Motors without fan

4.1 Cooling method IC 418

Ventilation is supplied by a fan directly coupled to the motor. Ensure that the motor ventilation is not impaired in all operating conditions and that the temperature limits allowed by the insulation category B are complied with.

Fans must comply with the EN 1127-1 standard and any possible product standards referring to fans.

In areas with combustible dusts, the provisions of the EN 61241-0 standard must be observed.

4.2 Cooling method IC 410

The motor is without a fan. The following limitations must be observed:

- For "S1" operation, the motor power output is derated by 50% to comply with the limits allowed by insulation class B.
- For "S2" operation, regular power output can be used provided the motor does not work long enough for it to reach the temperature limits of insulation class B. Said time limits are indicated on the plate.

GB

5. Motors with forced ventilation

5.1 Cooling method IC 416

Cooling is assured by ventilation provided by an auxiliary motor with the same protection degree as the main motor.

The user must have a safety device fitted enabling the main motor to be started only once the auxiliary motor is running.

In addition, motors are equipped with PTC or PT100 thermal probes, which must be connected with a cut-out disconnecting the motor's power supply. This cut-out must not have a manual reset.

6. Motors suitable for frequency converter drive

For operation with an inverter, motors are equipped with PTC or PT100 thermistors inserted in the winding to ensure compliance with the limits of the temperature class.

The user must connect the PTC or PT100 terminals to a tripping relay ensuring that the power supply is cut off whenever a dangerous temperature is reached. The reset of said cut-out must be performed manually only, and not automatically.

The user, in compliance with the essential safety requirements provided for under point 1.5 of European Directive 94/96 EC, must:

- use a cut-out in compliance with IEC 61508 standard

or

- use a cut-out that automatically switches to safety position in case of a failure (fail-safe)

or

- use a dual protection circuit. As an alternative, the user can employ a dual device such as that indicated in section 5 for forced ventilation.

Rated performance relating to operation at mains power frequency cannot be maintained if powered by an inverter. In particular, power output could be significantly reduced to maintain the assigned temperature class and to avoid damage caused by overheating.

Inverter motors have an auxiliary plate. Before starting the motor, check the ratings (kW – Hz – torque) indicated on the auxiliary plate. The user must contact the manufacturer if this information is not provided.

Induction motors supplied from the mains conform to the immunity and emission limits relating to electromagnetic compatibility as foreseen by the standards.

When power is supplied by a frequency converter, the installer bears responsibility for checks and any measures required to comply with immunity and emission limits as laid down by the standards. The choice of the type of frequency converter must be made taking into account that the motor must not be subjected to voltage peaks exceeding 1100V, which would significantly reduce the life of the windings insulation.

It is necessary to consider in this respect that the voltage peaks value is also influenced by the length of the power supply cable.

For motors with protection mode Ex nA, the use with an inverter is possible only if agreed at the time the order is placed. In particular (and also to define the temperature class) it is necessary to carry out thermal tests on the motor, with the power being supplied by an inverter similar to the one that will be used for the system, under the different load conditions and at the different speeds that the motor will be subject to.

7. Inspection and maintenance of motors for classified areas

The inspections and maintenance of the motors described in these safety instructions shall be executed in compliance with the criteria of the EN 60079-17 standard.

The electrical connection terminals must be tightened fully to avoid high contact resistances and consequential overheating.

Care must be taken to ensure that the insulation distances in air and on the surfaces between the conductors are maintained, as established by the standards.

All bolts used to secure both motor and terminal box must be tightened using the torque values. All screws utilised to seal the motor and the terminal board shall be tightened fully.

Replacement of gaskets and cable entry parts shall be executed using components that are identical to the components supplied by the manufacturer to ensure the protection degree is maintained.

8. Repairs on motors for classified areas

Repairs made to motors for classified areas shall be executed in compliance with the criteria specified in the IEC 60079-19 standard.

If repairs are not executed by the manufacturer, they must be carried out at workshops which have the necessary equipment and with adequate technical expertise concerning the motor protection types.

If repair work has to be performed on parts that influence the flameproof protection characteristics, the motor construction data must not be changed (for example: dimensions of air gaps, windings characteristics, etc.) and the repaired parts must be tested.

A written report must be prepared with the detailed indication of the work carried out.

If after the repair work has been completed, the motor complies entirely with the standard and with the certificate, an additional nameplate shall be affixed to the motor (without removing the original nameplate) showing the following marks:

- Symbol **R**
- name or trademark of the repairer
- serial number given to the repair operation by the repairer
- date of repair

If following a repair that modifies relevant aspects concerning protection against explosions, the motor does not comply with the certificate, the original nameplate must be removed and the motor can no longer be considered suitable for use in areas where there is danger of explosion.

In order to be utilised in such areas the motor must be examined again by a competent certification body.

GB

Programma di vendita	Sales programme	Programme	Lieferprogramm	Programa de venta
Motori antideflagranti Ex d - Ex de <ul style="list-style-type: none"> • gruppo I-IIA-IIB-IIC • categoria M2, 2G, 2D, 2GD • classe T3-T4-T5-T6 • trifasi, monofasi • con freno 	Flameproof motors Ex d - Ex de <ul style="list-style-type: none"> • group I-IIA-IIB-IIC • category M2, 2G, 2D, 2GD • class T3-T4-T5-T6 • threephase, singlephase • with brake 	Moteurs antidéflagrants Ex d - Ex de <ul style="list-style-type: none"> • groupe I-IIA-IIB-IIC • catégorie M2, 2G, 2D, 2GD • classes de température T3-T4-T5-T6 • triphasés, monophasés • avec frein 	Explosionsgeschützte Motoren Ex d - Ex de <ul style="list-style-type: none"> • Gruppe I-IIA-IIB-IIC • Kategorie M2, 2G, 2D, 2GD • Klasse T3-T4-T5-T6 • Dreiphasen- und Einphasen-Ausführung • mit Bremse 	Motores antideflagrantes Ex d - Ex de <ul style="list-style-type: none"> • grupo I-IIA-IIB-IIC • categoría M2, 2G, 2D, 2GD • classe T3-T4-T5-T6 • trifásicos, monofásicos • con freno
Motori a sicurezza aumentata Ex e <ul style="list-style-type: none"> • gruppo II • categoria 2G • classe T1-T2-T3 	Increased safety motors Ex e <ul style="list-style-type: none"> • group II • category 2G • class T1-T2-T3 	Moteurs à sécurité augmentée Ex e <ul style="list-style-type: none"> • groupe II • catégorie 2G • classes de température T1-T2-T3 	Motoren in Schutzart "erhöhte Sicherheit" Ex e <ul style="list-style-type: none"> • Gruppe II • Kategorie 2G • Klasse T1-T2-T3 	Motores de seguridad aumentada Ex e <ul style="list-style-type: none"> • grupo II • categoría 2G • clase T1-T2-T3
Motori non sparking Ex nA <ul style="list-style-type: none"> • gruppo II • categoria 3G, 3GD 	Non sparking motors Ex nA <ul style="list-style-type: none"> • group II • category 3G, 3GD 	Moteurs anti-étincelle Ex nA (non sparking) <ul style="list-style-type: none"> • groupe II • catégorie 3G, 3GD 	Funkenfremde Motoren Ex nA <ul style="list-style-type: none"> • Gruppe II • Kategorie 3G, 3GD 	Motores no sparking Ex nA <ul style="list-style-type: none"> • grupo II • categoría 3G, 3GD
Motori chiusi con ventilazione esterna IEC <ul style="list-style-type: none"> • trifasi, monofasi • categoria 3D 	Totally enclosed fan cooled IEC motors <ul style="list-style-type: none"> • threephase, singlephase • category 3D 	Moteurs IP 55 IEC avec ventilation extérieure <ul style="list-style-type: none"> • triphasés, monophasés • catégorie 3D 	Vollgekapselte luftgekühlte Motoren nach IEC <ul style="list-style-type: none"> • Dreiphasen- und Einphasen-Ausführung • Kategorie 3D 	Motores cerrados con ventilación exterior IP 55 IEC <ul style="list-style-type: none"> • trifásicos, monofásicos • categoría 3D
Elettropompe centrifughe antideflagranti per macchine da stampa Ex d - Ex de	Centrifugal flameproof electric pumps for printing machines Ex d - Ex de	Elettropompes centrifuges antideflagrantes pour machines d'imprimerie Ex d - Ex de	Explosionsgeschützte Zentrifugal-Zentrifugen für Druckmaschinen Ex d - Ex de	Electrobombas centrifugas para máquinas de impresión Ex d - Ex de
Elettropompe centrifughe per macchine utensili	Centrifugal electric pumps for machine tools	Elettropompes centrifuges pour machines-outils	Elettropumpen für Werkzeugmaschinen	Electrobombas centrifugas para máquinas herramientas

Nel redigere questa documentazione è stata posta ogni cura al fine di assicurare la correttezza delle informazioni contenute.

Tuttavia, anche in conseguenza della politica di continuo sviluppo e miglioramento della qualità del prodotto perseguita da **Cemp**, la società si riserva il diritto e la facoltà di apportare modifiche di qualsiasi genere, in qualsiasi momento e senza preavviso, sia a questo documento sia ai propri prodotti.

Le descrizioni e le caratteristiche tecniche della presente pubblicazione non sono quindi impegnative e i dati riportati non costituiscono, in nessun caso, impegno contrattuale.

Every care has been taken to ensure the accuracy of the information contained in this publication.

Due to **Cemp's** policy of continuous development and improvement, the company reserves the right to supply products which may differ slightly from those illustrated and described in this publication.

Descriptions and technical features listed in this brochure may not be considered as binding. Under no circumstances should data in this publication be considered as a contractual obligation.

Dans la préparation de cette documentation nous avons pris le soin d'y intégrer les informations les plus exactes possibles.

Néanmoins, compte tenu de notre politique de développement et d'amélioration continue des produits, la Société **Cemp** se réserve le droit et la faculté d'apporter toute modification sur la documentation et sur les produits, à tout moment et sans préavis.

Les descriptifs et les caractéristiques techniques contenus dans ce catalogue n'engagent pas la Société. Par conséquent, ces données ne constituent en aucun cas un engagement contractuel.

Die Ausführungen und technischen Eigenschaften, die in dieser Broschüre angegeben sind, dürfen nicht als verbindlich angesehen werden.

In keinem Fall können jedoch die in diesem Dokument aufgeführten technischen Daten als rechtlich verbindlich angesehen werden.

Cemp behält sich das Recht vor, ohne Mitteilung, jegliche Abweichungen und Änderungen jederzeit vorzunehmen, sowohl in diesem Dokument als auch bei den Produkten, die hier beschrieben sind.

La presente documentación se ha redactado de manera muy atenta para poder asegurar que las informaciones que contiene son correctas.

No obstante, como consecuencia de la política de continuo desarrollo y mejora de la calidad del producto que **Cemp** pone en práctica, la sociedad se reserva el derecho y la facultad de modificar en lo que fuera necesario, en cualquier momento y sin que ello medie preaviso alguno, tanto este documento como sus productos.

Por lo tanto, las descripciones y las características técnicas indicadas en el presente documento no son vinculantes, y los datos que contiene no constituyen en ningún caso, vínculo contractual.

Cemp srl

Via Piemonte, 16
I 20030 SENAGO (MI)
Tel. +39 02 94 43 54 01
Fax +39 02 99 89 177
cemp@cemp.eu
www.cemp.eu

Cemp France sa

6 et 8, avenue Victor Hugo
F 27320 NONANCOURT
Tél. +33 (0)2 32 58 03 81
Fax +33 (0)2 32 32 12 98
cemp-france@cemp.eu
www.cemp.eu

Cemp International GmbH

Am Mollnhof 2
D 94036 PASSAU
Tel. +49 (0)851 96 62 320
Fax +49 (0)851 96 62 32 13
cemp-deutschland@cemp.eu
www.cemp.eu

Overall sales network at www.cemp.eu
