



SEW
EURODRIVE



Inquiry Forms for Explosion-Protected Gearmotors



1 Inquiry forms for explosion-protected gearmotors

The following inquiry forms will help you to determine the necessary information for specifying the equipment properties and equipment categories of gearmotors that are used in potentially explosive atmospheres.

Observe the possible options within the individual categories or EPL (Equipment Protection Level).

To ensure optimal processing of your request, SEW-EURODRIVE asks you to fill out both forms.

You can find detailed information on products from SEW-EURODRIVE and on explosion protection at sew.eurodrive.com

Inquiry/order



Customer data:

Company: _____ Customer no.: _____
 Department: _____
 Name: _____ Tel.: _____
 Street/P.O. box: _____ Fax: _____
 _____ E-mail: _____
 Zip code/city: _____
 Contact at SEW:
 Name: _____ Tel.: _____
 Technical office: _____ Fax: _____

Technical data:

Quantity: _____ Desired delivery date: _____
 Catalog designation: _____

Gear unit variant:

☐ Helical gear unit ☐ Parallel-shaft helical gear unit ☐ Helical-bevel gear unit ☐ Helical-worm gear unit
☐ SPIROPLAN® gear unit ☐ Double gear unit ☐ Servo gear unit ☐ Variable-speed gear unit
☐ Other: _____

Power: _____ kW Output speed: _____ 1/min Output torque: _____ Nm

Cycles/hour: _____ c/h Cyclic duration factor: S _____ / _____ %cdf

☐ 1-shift operation ☐ 2-shift operation ☐ 3-shift operation
☐ Regular ☐ Irregular ☐ Very irregular

Mounting position 1):

M1 M2 M3 M4 M5 M6 Pivoting ☐ Foot-mounted ☐ Flange (bore) ☐ Flange (thread) Torque
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ arm ☐ Other: _____

Shaft design:

☐ Solid shaft with key ☐ Shrink disk Shaft/hollow shaft \varnothing : _____ mm
☐ Hollow shaft with key ☐ TorqLOC® Flange \varnothing : _____ mm

Shaft position (for right-angle gear units):

☐ A ☐ B ☐ AB Terminal box position: ☐ 0°(R) ☐ 90°(B) ☐ 180°(L) ☐ 270°(T) Cable bushing: ☐ X ☐ 1 ☐ 2 ☐ 3

Degree of protection:

IP54 IP55 IP56 IP65 IP66 Thermal class: 130(B) 155(F) Surface/corrosion protection: KS OS1 OS2 OS3 OS4
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Line voltage: _____ V

Line frequency: ☐ 50 Hz ☐ 60 Hz

Connection type:

☐ Δ ☐ Y ☐ YY ☐ Y/Y

☐ For inverter operation:

☐ Typical application

Control range: _____

Required options:

☐ Brake: Voltage _____ V Braking torque: _____ Nm
☐ Manual brake release: ☐ HR or ☐ HF
☐ Forced cooling fan: Forced cooling fan voltage: _____ V
☐ Motor protection: ☐ TF
☐ Encoder: _____

☐ Inverter:

☐ RAL 7031

or

☐ RAL

Deviations from the typical application:

Special ambient conditions:

Temperature: From _____ °C to _____ °C ☐ Operation outdoors ☐ Installation altitude >1000 m above sea level

Other ambient conditions:

Other: _____

1) see back

Place, date _____

Signature: _____

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1.1 Specifications for the design of explosion-protected gearmotors according to ATEX and IECEx

Step	Criterion	Condition	Decision	Continue with step
1	Underlying standards	ATEX IECEx		2
2	Additional certification	Local certificate Country of use		3
3	Potentially explosive mixture of air and	Gas Dust		4 9
For gas				
4	Drive will be installed in	Zone 1 Zone 2		5 7
5	Protection type	Flameproof enclosure Increased safety		6 7
6	Terminal box design	Flameproof enclosure Increased safety		7
7	Group specification	IIA IIB IIC		8
8	Temperature class	T1 T2 T3 T4 T5 T6		12
For dust				
9	Drive will be installed in	Zone 21 Zone 22		10
10	Group specification	IIIA IIIB IIIC		11
11	Maximum permitted surface temperature	T120°C T140°C T150°C (Servo)		12
Operating mode				
12	Line operation SEW-EURODRIVE motor	S1 S4 50% (Cat. 2)		13
	Line operation Flameproof motor	S1 S1 – S7		
	Frequency inverter operation SEW-EURODRIVE motor	VFC (min. 5 Hz) VFCE (min. from 0.3 Hz) CFC (Servo)		
	Frequency inverter operation Flameproof motor	S1 – S7, S9 (min. 5 Hz)		
	Frequency inverter operation maximum speed in min ⁻¹			
Contact details				
13	Name:	Company:		
	Department:	Tel.:		
	Place, date:	Signature:		

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Step 1 – Underlying standards

A distinction is made between the ATEX rule set of the European Union and the world-wide IECEx certification scheme:

- ATEX: Directive 2014/34/EU and the EN 60079 series of standards as well as other local system- and country-specific regulations.
- IECEx: IEC 60079 series of standards as well as other local system- and country-specific regulations.

Always observe country- and customer-specific specifications when selecting the unit design, particularly if outside of Europe. This means that the final design is always specified in consultation with the system operator because he knows the local regulations and can assess the acceptance of the designs.

Step 2 – Additional certification

Some countries only accept the IECEx certification in combination with an additional local certification (for example INMETRO in Brazil, KOSHA in South Korea, CCOE in India, Ex EAC in the Eurasian Custom Union, UA.TR in Ukraine, etc.).

You can find an up-to-date overview at www.sew-eurodrive.de.

Step 3 – Categorization of the potentially explosive atmosphere

Categorization of the potentially explosive atmosphere into gas/air or dust/air mixtures.

Hybrid mixtures: If potentially explosive dusts and combustible gases or vapors occur at the same time, this is called hybrid mixtures. Explosion-protected products from SEW-EURODRIVE must not be used if hybrid mixtures are present.

Step 4 – Zone categorization for gas/air mixtures

The system operator is responsible for the zone categorization. Potentially-explosive atmospheres are divided into zones depending on the frequency and duration of the occurrence of explosive atmospheres:

- Zone 1: Area in which a potentially explosive atmosphere can occur occasionally during normal operation as a mixture of air and combustible gases, vapors or mist.
- Zone 2: Area in which a potentially explosive atmosphere does not normally occur during normal operation, or only for short periods as a mixture of gases, vapors or mist.

Comment: Normal operation refers to the condition in which systems are used within their selection parameters.

Step 5 – Protection type for zone 1

For zone 1, the protection type of the motor has to be specified by the customer.

- Flameproof enclosure "Ex db":

Protection type in which the parts that can ignite a potentially explosive atmosphere are arranged in a housing that withstands the pressure of an explosive mixture exploding inside the housing and prevents the transmission of the explosion to the atmosphere surrounding the housing.

- Increased safety "Ex eb":

Protection type used for electrical operating resources in which additional measures are applied to increase the level of safety, thus preventing the possibility of high temperatures and the occurrence of sparks or electric arcs during proper operation or under specified special conditions.

Step 6 – Terminal box design

Design of the terminal box in the case of motors with flameproof enclosure with protection type:

- Flameproof enclosure "Ex db":

In the standard design, the wiring space contains a tapped hole in accordance with DIN-ISO-13. On request, other connection threads can be delivered as well (e.g. NPT). Cable entries in housings of protection type (Ex db) must comply with EN 60079-1 and must be certified.

- Increased safety "Ex eb":

When this terminal box design is selected, the cable entry is simpler. Use only a cable gland approved for "Ex eb."

Step 7 – Specification of the gas group

Electrical equipment of group II is intended for operation in areas in which potentially explosive gas atmospheres are expected. Electrical equipment of group II is subdivided according to the characteristics of the potentially explosive atmosphere that they will be used in:

- IIA, typical gas is propane
- IIB, typical gas is ethylene
- IIC, typical gas is hydrogen

Comment: Equipment labeled with IIB is suitable for applications requiring equipment for group IIA.

Accordingly, equipment labeled with IIC is suitable for applications requiring equipment for group IIA or group IIB.

Step 8 – Temperature classes

Categorization of the maximum surface temperatures into classes for electrical equipment of group II:

Temperature class	Maximum surface temperature in °C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

Step 9 – Zone categorization for dust/air mixtures

The system operator is responsible for the zone categorization. Potentially explosive atmospheres are divided into zones depending on the frequency and duration of the occurrence of explosive atmospheres:

- Zone 21: Area in which a potentially explosive atmosphere can occur occasionally during normal operation in the form of a cloud made up of combustible dust contained in the air.
- Zone 22: Area in which a potentially explosive atmosphere does not usually occur, or only occurs for short periods, during normal operation in the form of a cloud made up of combustible dust contained in the air.

Comment: Observe layers, deposits and accumulations of combustible dust like any other cause for formation of a potentially explosive atmosphere. Normal operation refers to the condition in which systems are used within their selection parameters.

Step 10 – Specification of the dust group

Electrical equipment of group III is intended for operation in areas in which potentially explosive dust atmospheres are expected. Electrical equipment of group III is subdivided according to the characteristics of the potentially explosive atmosphere that they will be used in:

- IIIA, flammable lint
- IIIB, non-conductive dust
- IIIC, conductive dust

Comment: Equipment labeled with IIIB is suitable for applications requiring equipment for group IIIA.

Accordingly, equipment labeled with IIIC is suitable for applications requiring equipment for group IIIA or group IIIB.

Step 11 – Maximum surface temperature

The maximum temperature that a surface of electrical equipment could reach in operation under the least favorable conditions (but within the defined tolerance range).

Comment: In electrical equipment in potentially explosive dust atmospheres, this temperature occurs only on the outer surface of the housing and may occur under defined conditions for a layer of dust.

Depending on the operating mode, explosion-protected motors differ regarding the motor protection, the operating data on the nameplate, and the documentation. For this reason, it is necessary to specify the operating mode during the request.

Line operation:

Explosion-protected motors from SEW-EURODRIVE are designated with S1 operation for continuous duty, and category 2 motors are designated with S4 50% for intermittent duty.

Depending on the requirements, flameproof motors are designated with S1 operation for continuous duty and with S1 – 7 for intermittent duty.

Frequency inverter operation:

The frequency-controlled AC motors from SEW-EURODRIVE are designated with VFC or VFCe operating data.

VFC operating data: min. 5 Hz and $M_{\max} \leq 150\% M_n$

VFCe operating data: min. 0.3 Hz and $M_{\max} > 150\% M_n$

However, the VFCe operating data is only available for motors in category 3 or motors with EPL c.

The explosion-protected synchronous servomotors can only be operated in combination with frequency inverters from SEW-EURODRIVE and the CFC (servo) operating mode.

The flameproof motors are designated for inverter operation with operating mode S9.

Step 13 – Contact details

Please enter your contact details if SEW-EURODRIVE has any questions regarding your request.

Inquiry forms for explosion-protected gearmotors

Specifications for the design of explosion-protected gearmotors according to HazLoc-NA®

1.2 Specifications for the design of explosion-protected gearmotors in accordance with HazLoc-NA®

Step	Criterion	Condition	Decision	Continue with step
1	Country of use	USA Canada		2
2	Potentially explosive mixture of air and	Gas (class I) Dust (class II)		3 5
Class I				
3	Drive will be installed in	Division 2		4
4	Material groups	A B C D		7
Class II				
5	Drive will be installed in	Division 2		6
6	Material groups	F G		7
Temperature class				
7	Temperature class	T3 T3B T3C T4A		8
Operating mode				
8	Line operation FI operation: VFC FI operation: CFC	S1 $n_{\max}: 1800 \text{ min}^{-1}$ $n_{\max}: 3000 \text{ min}^{-1}$ $n_{\max}: 3000 \text{ min}^{-1}$		9
Contact details				
9	Name: Department: Place, date:	Company: Tel.: Signature:		

Step 1 – Country of use of the explosion-protected gearmotors according to HazLoc-NA®

In North America, areas exposed to explosion hazards are called "hazardous locations". In the USA, the "hazardous locations" are described in the National Electrical Code (NFPA 70) and in Canada in the Canadian Electrical Code (C22.1). The classification is distinguished according to class division and zone.

Safety standard and specifications for	USA	Canada
Electrical installation	NFPA 70: National Electrical Code	C22.1: Canadian Electrical Code Part I
Explosion protection	NEC 500	C22.1-15: Appendix J
	Class Division System	Class Division System
	NEC 505/NEC 506	C22.1-15: Section 18
	Zone System	Zone System

At SEW-EURODRIVE, explosion-protected motors for the North American market are listed with the HazLoc-NA® unit design. The company-specific term HazLoc-NA® stands for **H**azardous **L**ocations – **N**orth **A**merica. The traditional North American classification system "Class Division System" is observed during certification.

Step 2 – Categorization of the potentially explosive atmosphere

According to NEC 500.5 and C22.1-15 J18, 3 different classes of potentially explosive atmosphere are generally differentiated.

Class	Potentially-explosive atmosphere
I	Combustible gases, vapors or mist
II	Dusts
III ¹⁾	Fibers and lint

1) Class III is not available for EDR.. motors.

Step 3 and 5 – Categorization of the hazardous locations

Hazardous locations are classified into division 1 and 2 in accordance with NEC 500.5 and C22.1-15 J18. Refer to the respective sections of the safety standards for detailed definitions.

Division 1 are locations where dangerous concentrations of ignitable gases (class I) or potentially explosive dust atmospheres (class II)

- may exist under normal operating conditions
- may exist frequently because of repair or maintenance operations
- may exist because of malfunctions or under fault conditions with simultaneous failure of electrical equipment leading to an ignition source

SEW-EURODRIVE does not have any motors for Division 1 in its range.

Division 2 are locations where dangerous concentrations of ignitable gases (class I) or potentially explosive dust atmospheres (class II) can only be present under fault conditions.

Step 4 – Selection of the material group (gas)

In NEC 500.6(A) and in C22.1-15 J18, the potentially explosive gases (class I) are divided into 4 gas groups.

Gas group	Typical gas
A	Acetylene
B	Hydrogen
C	Ethylene
D	Propane

Step 6 – Selection of the material group (dust)

In NEC 500.6(B) and in C22.1-15 J18, the potentially explosive dusts (class II) are divided into 3 dust groups.

Dust group	Dust
E ¹⁾	Metal dust
F	Coal dust
G	Grain dust

1) Group E is not available for EDR.. motors.

Step 7 – Temperature classes according to NEC.500.8(C) and C22.1-15J18

Temperature class	Maximum permitted surface temperature in °C
T1	450
T2	300
T2A	280
T2B	260
T2C	230
T2D	215
T3	200
T3A	180
T3B	165
T3C	160
T4	135
T4A	120
T5	100
T6	85

Step 8 – Operating mode

Depending on the operating mode, explosion-protected motors differ regarding the motor protection, the operating data on the nameplate and the documentation. For this reason, it is necessary to specify the operating mode during the request.

Step 9 – Contact details

Please enter your contact details if SEW-EURODRIVE has any questions regarding your request.







SEW-EURODRIVE
Driving the world

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