



SEW
EURODRIVE



ATEX, IECEX
Inquiry Form and Checklist for Explosion-Proof Gearmotors





1 Inquiry form and checklist for explosion-proof gearmotors

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

Observe the possible options within the individual categories or EPL.

1.1 Explosion-protection designation

The following tables are to provide an overview of the used explosion-protection designation.

Equipment groups:

Equipment group	Description
I	Equipment for use in mine openings with a risk of firedamp (underground mining)
II	Equipment for use in areas with potentially explosive gas/air mixtures
III	Equipment for use in areas with potentially explosive dust/air mixtures

In addition, the new equipment group III has been split up into three subgroups "A", "B" and "C" depending on the type of dust. The following table shows this division.

Equipment group	Suitable for atmospheres with	Required minimum IP rating
IIIA	Inflammable fluffing	IP5x
IIIB	Non-conducting dust	IP5x
IIIC	Conducting dust	IP6x

Zone division:

Zone		Probability of a potentially explosive atmosphere occurring
Gas	Dust	
1	21	Occasional, in normal operation
2	22	Seldom, short-term

Protection types

Unit type	Protection type	Standard	Description:
Motors (electrical units)	d	EN 60079-0 and -1	Flameproof enclosure
	e	EN 60079-0 and -7	Increased safety
	n / nA	EN 60079-0 and -15	Non-sparking
	t	EN 60079-0 and -31	Dust explosion protection
Gear units (mechanical units)	c	EN 13463-1 and -5	Constructional safety
	k	EN 13463-1 and -8	Liquid immersion



Inquiry form and checklist for explosion-proof gearmotors

Inquiry form for explosion-proof gearmotors

1.2 Inquiry form for explosion-proof gearmotors

Customer data									
Company					Customer no.:				
Department:					Phone number:				
Name:					Fax number:				
Street/P.O. box:					Email:				
Zip code/city:									
Technical data									
Catalog designation:									
Quantity					Desired delivery date:				
Gear unit type/motor data									
Helical gear unit <input type="checkbox"/>	Parallel-shaft helical gear unit <input type="checkbox"/>	Helical-bevel gear unit <input type="checkbox"/>		Helical worm gear unit <input type="checkbox"/>		SPIROPLAN® <input type="checkbox"/>		Double gear unit <input type="checkbox"/>	
Power: kW		Output speed: rpm			Output torque: Nm		Cycles/hour: c/h		
1-shift operation <input type="checkbox"/>	2-shift operation <input type="checkbox"/>	3-shift operation <input type="checkbox"/>		Regular <input type="checkbox"/>		Irregular <input type="checkbox"/>		Very irregular <input type="checkbox"/>	
Mounting position	M1 <input type="checkbox"/>	M2 <input type="checkbox"/>	M3 <input type="checkbox"/>	M4 <input type="checkbox"/>	M5 <input type="checkbox"/>	M6 <input type="checkbox"/>	Pivot <input type="checkbox"/>		
Housing	Foot mounting <input type="checkbox"/>		Flange (bore) <input type="checkbox"/>		Flange (thread) <input type="checkbox"/>		Torque arm <input type="checkbox"/>		Misc <input type="checkbox"/>
Shaft type	Solid shaft with key <input type="checkbox"/>			Shrink disk <input type="checkbox"/>				Shaft-/hollow shaft Ø: mm	
	Solid shaft with key <input type="checkbox"/>			TorqLOC® <input type="checkbox"/>				FlangeØ: mm	
Shaft position (right-angle gear unit)	A <input type="checkbox"/>	B <input type="checkbox"/>	AB <input type="checkbox"/>						
Terminal box position	0° (R) <input type="checkbox"/>			90° (B) <input type="checkbox"/>		180° (L) <input type="checkbox"/>		270° (T) <input type="checkbox"/>	
Cable entry	X <input type="checkbox"/>	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>					
Degree of protection	IP54 <input type="checkbox"/>	IP56 <input type="checkbox"/>	IP65 <input type="checkbox"/>						
Thermal class	130 (B) <input type="checkbox"/>			155 (F) <input type="checkbox"/>					
Surface protection	OS1 <input type="checkbox"/>	OS2 <input type="checkbox"/>	OS3 <input type="checkbox"/>	OS4 <input type="checkbox"/>					
Corrosion protection	OS4 <input type="checkbox"/>								
Supply voltage: V	Line frequency: 50 Hz <input type="checkbox"/>			60 Hz <input type="checkbox"/>					
Connection type:	Δ <input type="checkbox"/>	\sphericalangle <input type="checkbox"/>	Required max. speed: rpm						
Inverter operation <input type="checkbox"/>	Max. frequency: Hz			Setting range:					
Inquiry regarding the typical application (when using the drive in potentially explosive atmospheres)									
	Typical application					Deviations from the typical application:			
Supply voltage:	400 V ± 5 %								
Installation:	Without line filter, choke, without sine filter								
Frequency inverter:	MOVITRAC® B, MOVIDRIVE® B								
Motor cable/permitted:	100 m / max. 10 V								
Rated motor voltage:	230 V / 400 V, 50 Hz								
Required options									
Brake <input type="checkbox"/>	Brake voltage: V			Braking torque: Nm					
Manual brake release	HR <input type="checkbox"/>	HF <input type="checkbox"/>	Forced cooling fan <input type="checkbox"/>	Forced cooling fan voltage: V					
Motor protection	TF <input type="checkbox"/>	Encoder <input type="checkbox"/>	Inverter <input type="checkbox"/>						
RAL7031 <input type="checkbox"/>	RAL <input type="checkbox"/>	Further options:							
Special ambient conditions									
Temperature from °C		to °C		Operation outdoors <input type="checkbox"/>					
Installation altitude > 1000m	<input type="checkbox"/>			m Other specifics:					
Misc:									



1.3 Checklist for explosion-proof gearmotors according to ATEX and IECEx

Step	Criterion	Condition	Decision	Continue with step
1	Underlying standards	ATEX		2
		IECEx		2
2	Potentially explosive mixture of air and	Gas		3
		Dust		8
For gas				
3	Drive will be installed in	Zone 1		4
		Zone 2 (nA)		6
4	In the case of zone 1, the protection type of the motor is prescribed by the customer as	Flameproof enclosure (d)		5
		Increased safety (e)		6
5	In the case of motors with flameproof enclosure, design of the terminal box (TB)	TB with flameproof enclosure (d)		6
		TB with increased safety (e)		
6	Group specification	IIA		7
		IIB		
		IIC		
7	Temperature class (for gas/air mixtures)	T3		10
		T4		
		T5 (only with flameproof enclosure)		
		T6 (only with flameproof enclosure)		
For dust				
8	site of operation zone 21 Protection type tb	IIIA (flammable lint)		9
		IIIB (non-conducting dust)		
		IIIC (conducting dust)		
8	site of operation zone 22 Protection type tc	IIIA (flammable lint)		9
		IIIB (non-conducting dust)		
		IIIC (conducting dust)		
9	Maximum permitted surface temperature (for dust/air mixtures)	T120 °C		10
		T140 °C		
		T150 °C (only for synchronous servo gearmotors)		
Operating mode				
10	Line operation S1			
	Line operation S1, S4 50% – only category 2 / EPL b			
	Inverter operation VFC			
	Inverter operation CFC – only category 3 / EPL c			



Inquiry form and checklist for explosion-proof gearmotors

Checklist for explosion-proof gearmotors according to ATEX and IECEx

Notes on the individual items:

Step 1

Standard reference ATEX: Directive 1999/92/EG with EN 60079 as well as other local plant- and country-specific regulations.

Standard reference IECEx: IEC 60079 as well as other local plant- and country-specific regulations.

Zone categorization according to the installation location of the drive. The operator is responsible for the zone categorization.

Assistance is available in

- IEC/EN 60079-10 for gas
- IEC/EN 60079-10-2 for dust (replaces IEC 61241-10) as well as expert offices, in Germany also (German Technical Control Board), German Institutions for Statutory Accident Insurance and Prevention.

Step 2

Categorization of the potentially explosive atmosphere into gas or dust.

Step 3

The standard reference must be checked, ATEX or IECEx as well as other local plant- and country-specific regulations.

Zone categorization according to the installation location of the drive. The operator is responsible for the zone categorization.

- Zone 1: Potentially explosive gas mixtures are to be expected in normal operation.
- Zone 2: Potentially explosive gas mixtures are not to be expected in normal operation and if they occur at all, then only briefly.

Step 4

Protection types of the motor for use in zone 1.

- Flameproof enclosure (d)

Potentially explosive mixtures can penetrate the equipment, the mixture inside the housing can be ignited → Design measures prevent ignition of the external atmosphere

- Increased safety (e)

Potentially explosive mixtures can penetrate the equipment, no sources of combustion in or on the equipment → No ignition of the gas mixture.



Step 5

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

- Flameproof enclosure (d)

When this terminal box version is selected, it is essential to take account of the permitted cable bushings (conduit system, cable glands, etc.). In addition, the thread type of the screw fitting (ISO or NPT) must be specified.

- Increased safety (e)

When this terminal box version is selected, the cable entry design can be simpler. It is merely necessary to use an Ex-certified screw fitting.

Step 6

Group II is divided into 3 subgroups according to substance.

- All protection types

Electrostatic requirements for plastic surfaces (including paint). As a consequence, the EX designation of protection types "e" and "nA" (previously II) is changed to IIA, IIB or IIC, depending on the plastic surfaces or paint used.

- Additionally for flameproof enclosure (d)

Here, the subgroup determines the parameters of the ignition gap.

Also observe the country-specific literature:

- Germany: Nabert/Schön, "Kennzahlen brennbarer Gase und Dämpfe" ("Classifications of flammable gases and vapors"), Deutscher Eichverlag GmbH, D-38102 Braunschweig, Germany

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Step 7

Each of the temperature classes represents the assured maximum surface temperatures of the drive. For information about the temperature classes of the hazardous materials, refer to step 5:

- T3: Max. permitted surface temperature: 200 °C
- T4: Max. permitted surface temperature: 135 °C
- T5: Max. permitted surface temperature: 100 °C
- T6: Max. permitted surface temperature: 85 °C



Inquiry form and checklist for explosion-proof gearmotors

Checklist for explosion-proof gearmotors according to ATEX and IECEx

Step 8

The standard reference must be checked, ATEX or IECEx as well as other local plant- and country-specific regulations.

Zone categorization according to the installation location of the drive. The operator is responsible for the zone categorization.

- Zone 21: Potentially explosive dust/air mixtures are to be expected in normal operation.
- Zone 22: Potentially explosive dust/air mixtures are not to be expected in normal operation and if they occur at all, then only briefly.

Group III is divided into 3 subgroups according to substance.

Group	Suitable for atmospheres with	tb	tc
		Zone 21	Zone 22
Minimum degree of protection IP			
IIIA	Inflammable fluffing	5x	5x
IIIB	Non-conducting dust	6x (65)	5x (54)
IIIC	Conducting dust	6x (65)	6x (65)

Values in brackets: SEW standard

Step 9

The maximum surface temperature of a drive in dust/air mixtures. The value is specified in °C. The maximum surface temperature of synchronous servo gearmotors is 150 °C.

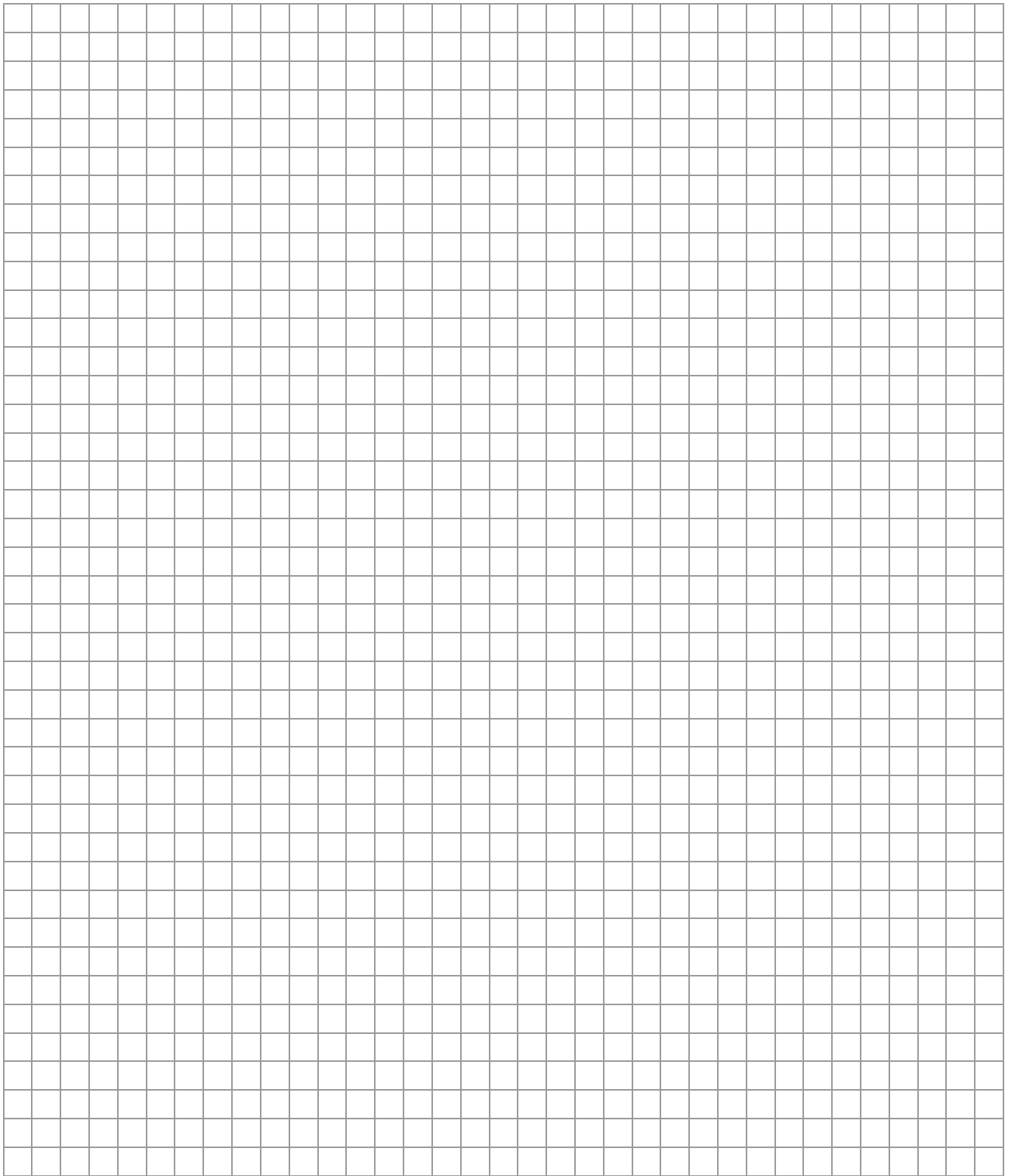
Also observe further country-specific information:

- Germany: BIA-Report "Brenn- und Explosionskenngößen von Stäuben" (Report no. 3051 of BG Institute for Occupational Safety, "Combustion and explosion characteristics of dusts"), Hauptverband der gewerbl. Berufsgenossenschaften, D-53757 St. Augustin, Germany
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Step 10

The operating modes differ as follows:

1. Line operation
 - S1 mode: Continuous duty, unlimited operation with constant load permitted
 - S1, S4-50% mode (only ATEX in category 2): Continuous duty, unlimited operation with constant load permitted; in intermittent duty, the start-up affects the temperature
2. Inverter operation
 - VFC mode
 - CFC mode – only with encoder for zone 2 and 22 in category 3





SEW-EURODRIVE
Driving the world

SEW
EURODRIVE

SEW-EURODRIVE GmbH & Co KG
P.O. Box 3023
D-76642 Bruchsal/Germany
Phone +49 7251 75-0
Fax +49 7251 75-1970
sew@sew-eurodrive.com

→ www.sew-eurodrive.com