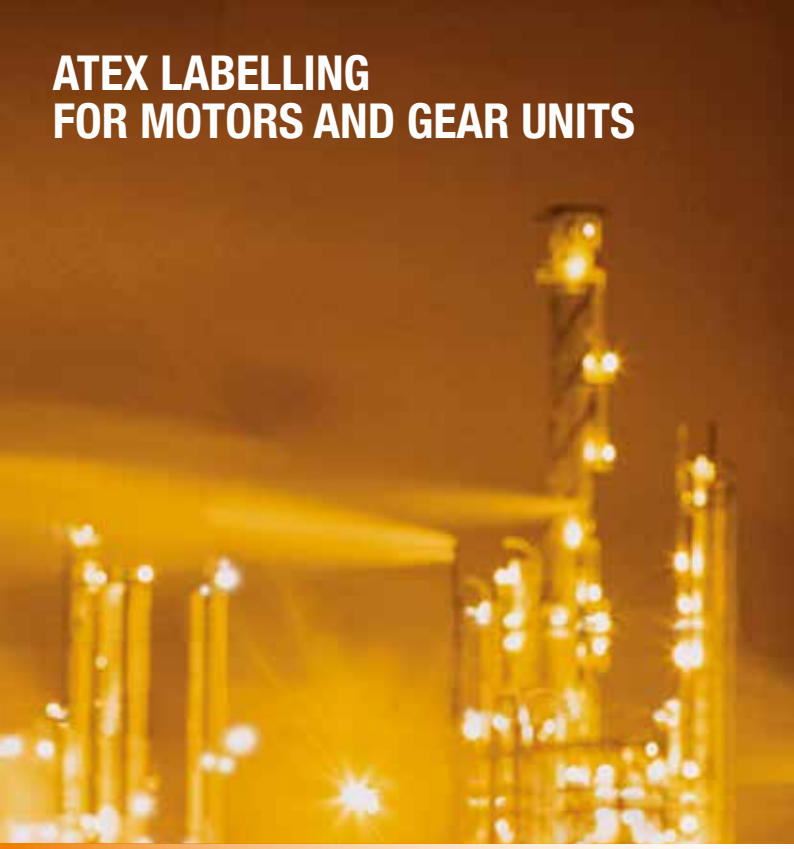
ATEX LABELLING FOR MOTORS AND GEAR UNITS



(EN)

ATEX INFORMATION
GAS AND DUST

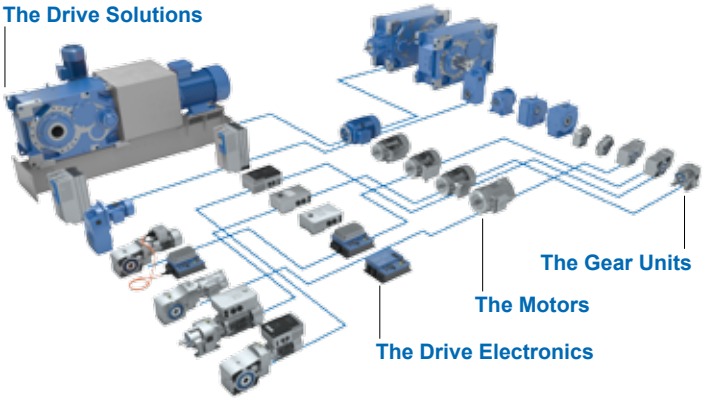
NORD DRIVESYSTEMS

COMPLETE DRIVE SOLUTIONS
FROM A SINGLE SOURCE

RELIABLE
- Reliable products
- Coordinated components
- NORD's own development and design

FLEXIBLE
- Modular products
- Configurable
- Wide range of drive units
- Complete drive solutions
- Integrated customer logistics

GLOBAL
- Globally linked organisation
- Localised technical, assembly and aftermarket support



CONTENTS

ATEX COMPLIANT
PRODUCTS FROM NORD

ATEX drive solutions compliant with standards since 2003

NORD DRIVESYSTEMS has long since been a certified manufacturer and can look back on several decades of expertise in explosion protected drive technology. Explosion protected drives by NORD are used in almost all industry sectors and beyond.

- Drives, motors, inverters and drive systems in line with EU Directive 2014/34/EU (in force since April 2016)
- Motors and drive systems in line with IEC Ex
- Certification by Physikalisch-Technische Bundesanstalt (PTB)
- Certification by DEKRA EXAM GmbH

ATEX-compliant modular system

- Complex combinations of products and options
- Mapped in SAP
- Monitored by ISO9001 verified processes
- Motors
- Gear units

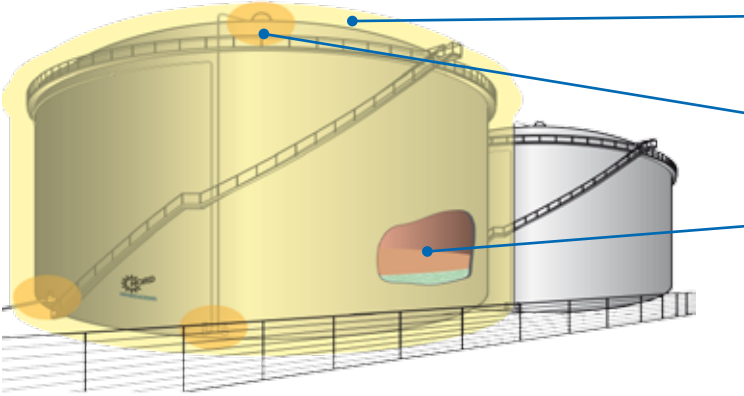
ATEX

- Abbreviation of ATmosphères EXplosibles
- Directive 2014/34/EU for the harmonisation of statutory regulations of member states for devices and protective systems for proper use in explosion hazard areas.
  It describes the requirements to devices and equipment that pose an ignition hazard.

IECEx

- The IECEx system is a directive based on international (IEC) standards. It describes the voluntary test procedure for devices intended for use in explosive environments. The test reports issued by the accredited IECEx “Certification Bodies” are accepted mutually, which speeds up the process of obtaining a national certification considerably. A complete IECEx certification comprises a design assessment and/or testing of a sample, an initial assessment of the manufacturer’s quality management system, and continued monitoring of this system. The objective of the IECEx system is to facilitate international trade with devices and services for use in explosion hazard areas and at the same time to ensure the required level of security.

ATEX
GAS INFORMATION



1G or Ga is uncommon for electric motors

EPL IEC 60067-0	Device category 2014/34/EC	Can be used in zones	
Gc	3G	2	
Gb	2G	1.2	
Ga	1G	0, 1, 2	

Zone 2:
Rare occurrence of explosive atmospheres

Zone 1:
Occasional occurrence of explosive atmospheres

Zone 0:
Constant or frequent occurrence of explosive atmospheres

	Presence of EX atmospheres	Avoidance of sources of ignition
	Rare/brief periods	In normal operation
	Occasional	Including with normal malfunctions
	Continuous or frequent	Even with rare malfunctions

ATEX LABELLING
GAS FOR MOTORS

II 2G Exe IIC T3 Gb

Labelling and categorisation of explosive environment					
Type of material	Frequency of occurrence of flammable material	Categorisation of explosive environment	Labelling of equipment		EPL - Equipment protection level
			Equipment group	Device category	
Gas (vapours, mist, etc.)	Continuously or frequently present	Zone 0	II	1G	Ga
	Occasionally present	Zone 1	II	2G	Gb
	Rarely present (short periods)	Zone 2	II	3G	Gc

Type of ignition protection for electrical devices				
Protection principle	Type of ignition protection	Identification	Use in zone	Standard
Pressure-resistant encapsulation	Contains explosion within motor housing	de or d	1 and 2	EN60079-1
Increased safety	Avoidance of high temperatures and sparks	e	1 and 2	EN60079-7
“Non Sparking“	Non-sparking equipment	n	2	EN60079-15

Explosion groups and temperature classes				
Explosion group Gas	Examples (not complete) for gases, depending on explosion group and temperature class			
IIA, IIB, IIC	Acetone, ethane, benzene, methane, propane	Ethyl alcohol, n-butane	Heating oil, petrol and diesel fuels	Acetaldehyde, ethyl ether
IIB, IIC	Town gas (natural gas)	Ethylene	Hydrogen sulphide	
IIC	Hydrogen	Acetylene		
	T1 <450 °C			
	T2 <300 °C			
	T3 <200 °C			
	T4 <135 °C			

ATEX LABELLING
GAS FOR GEAR UNITS

II 2G c IIC T4 X

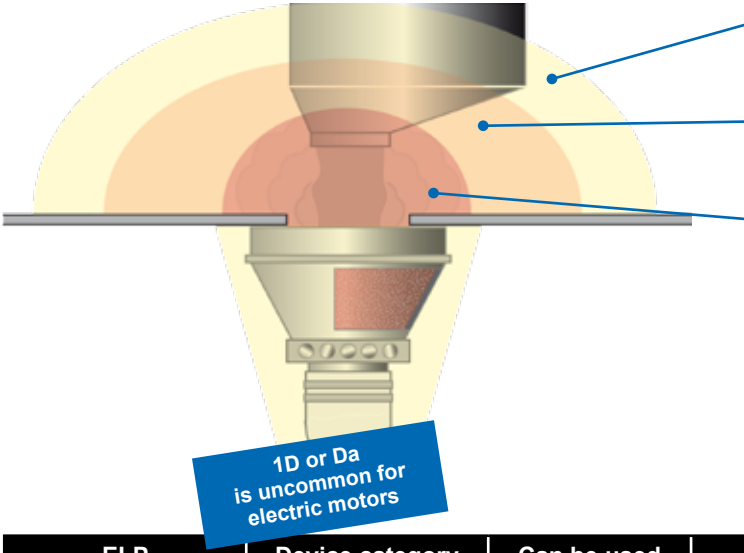
Labelling and categorisation of explosive environment				
Type of material	Frequency of occurrence of flammable material	Categorisation of explosive environment	Labelling of equipment	
			Equipment group	Device category
Gas (vapours, mist, etc.)	Continuously or frequently present	Zone 0	II	1G
	Occasionally present	Zone 1	II	2G
	Rarely present (short periods)	Zone 2	II	3G

Type of ignition protection for mechanical devices				
Protection principle	Type of ignition protection	Identification	Use in zone	Standard
Constructional safety	The design of the equipment prevents sparks and high temperatures	c	1 and 2	EN13463-5

Explosion groups and temperature classes				
Explosion group Gas	Examples (not complete) for gases, depending on explosion group and temperature class			
IIA, IIB, IIC	Acetone, ethane, benzene, methane, propane	Ethyl alcohol, n-butane	Heating oil, petrol and diesel fuels	Acetaldehyde, ethyl ether
	Town gas (natural gas)	Ethylene	Hydrogen sulphide	
	Hydrogen	Acetylene		
	T1 <450 °C			
	T2 <300 °C			
	T3 <200 °C			
	T4 <135 °C			

Additional information	
X	Note any special conditions or restrictions - refer to the documentation

ATEX
DUST INFORMATION



ELP IEC 60067-0	Device category 2014/34/EC	Can be used in zones
Dc	3D	22
Db	2D	21, 22
Da	1D	20, 21, 22

Zone 22:
Rare occurrence of explosive atmospheres

Zone 21:
Occasional occurrence of explosive atmospheres

Zone 20:
Constant or frequent occurrence of explosive atmospheres

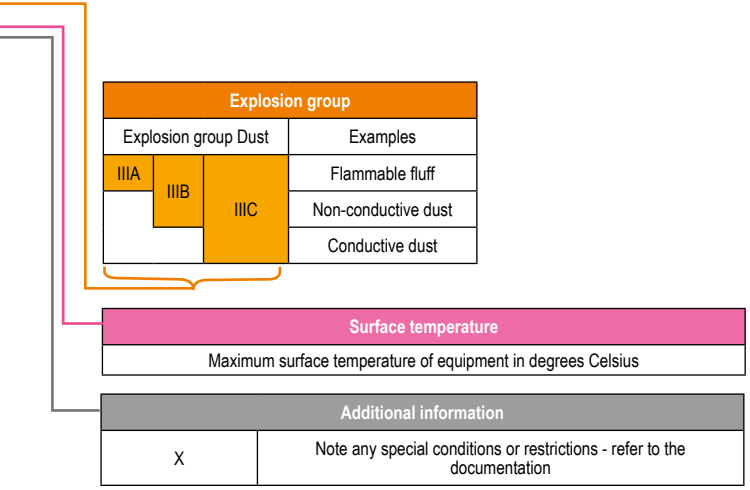
	Presence of EX atmospheres	Avoidance of sources of ignition
	Rare/brief periods	In normal operation
	Occasional	Even with normal malfunctions
	Continuous or frequent	Even with rare malfunctions

ATEX LABELLING
DUST FOR MOTORS

II 3D Ex tc IIIB T125°C Dc X

Labelling and categorisation of explosive environment					
Type of material	Frequency of occurrence of flammable material	Categorisation of explosive environment	Labelling of equipment		EPL - Equipment protection level
			Equipment group	Device category	
Dusts	Continuously or frequently present	Zone 20	II	1D	Da
	Occasionally present	Zone 21	II	2D	Db
	Rarely present (short periods)	Zone 22	II	3D	Dc

Type of ignition protection for electrical devices				
Protection principle	Type of ignition protection	Identification	Use in zone	Standard
Protection with housing	Dust explosion protection	ta tb tc	20 21 22	EN60079-31


Explosion group
Explosion group Dust
Examples
IIIA
IIIB
IIIC
Flammable fluff
Non-conductive dust
Conductive dust
Surface temperature
Maximum surface temperature of equipment in degrees Celsius
Additional information
X
Note any special conditions or restrictions - refer to the documentation

ATEX LABELLING
DUST FOR GEAR UNITS

II 2D c 125°C X

Labelling and categorisation of explosive environment					
Type of material	Frequency of occurrence of flammable material	Categorisation of explosive environment	Labelling of equipment		
			Equipment group	Device category	
Dusts	Continuously or frequently present	Zone 20	II	1D	
	Occasionally present	Zone 21	II		2D
	Rarely present (short periods)	Zone 22	II		3D

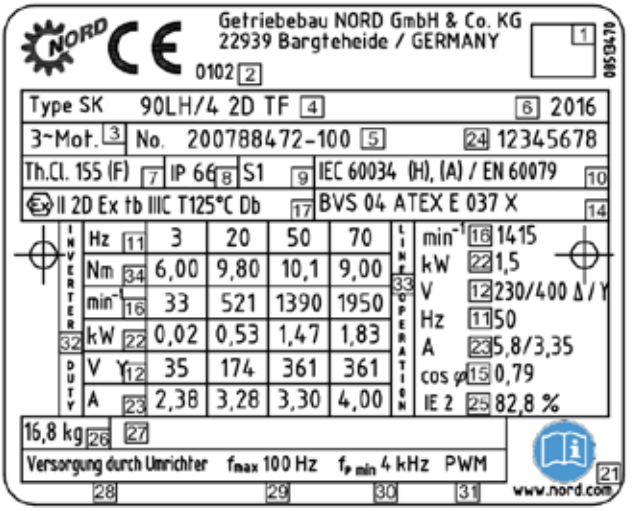
Type of ignition protection for mechanical devices				
Protection principle	Type of ignition protection	Identification	Use in zone	Standard
Constructional safety	The design of the equipment prevents sparks and high temperatures	c	21 and 22	EN13463-5

Surface temperature
Maximum surface temperature of equipment in degrees Celsius

Additional information	
X	Note any special conditions or restrictions - refer to the documentation

MOTOR TYPE PLATE EXAMPLE
FOR ZONE 21 – CATEGORY 2D

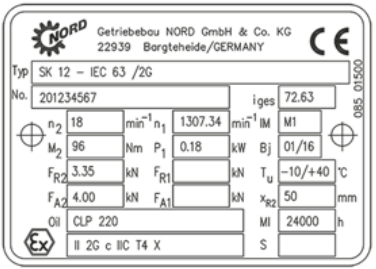
NORD Ex motor type plate (Ex tb, EX tc) according to EN 60079 for operation with a frequency inverter



1	Data Matrix Code
2	Code number of the notified body (only for EX tb)
3	Number of phases
4	Designation of type
5	Order number / motor number
6	Year of manufacture
7	Thermal class of the insulation system
8	IP protection class
9	Operating mode
10	Standard specifications
11	Stator frequencies
12	Stator voltage
14	EC prototype test certificate number
15	Power factor
16	Speed
17	Explosion protection marking
21	Notice! Pay attention to operating instructions B1091
22	Rated power (mechanical power delivered to shaft)
23	Rated current at operating point
24	Individual serial number
25	Efficiency
26	Weight
27	Brake information (option only for Ex tc)
28	Note: Supply by frequency inverter
29	Maximum permissible stator frequency
30	Minimum pulse frequency of frequency inverter
31	Frequency inverter modulation method
32	Data field for frequency inverter operation
33	Data field for mains operation
34	Rated torque on the motor shaft

GEAR UNIT TYPE PLATE EXAMPLE
FOR ZONE 21 – CATEGORY 2D

Gear unit type plate



Abbreviations	Unit	Designation
Type	[-]	NORD gear unit type
No.	[-]	Serial number
i_{ges}	[-]	Overall gear unit ratio
n_2	[rpm]	Rated speed of gear unit output shaft*
n_1	[rpm]	Rated speed of the gear unit drive shaft or the drive motor*
IM	[-]	Version (installation orientation)
M_2	[Nm]	Max. permissible gear unit output shaft torque
P_1	[kW]	Max. permissible drive power or motor power
Bj	[-]	Year of manufacture
F_{R2}	[kN]	Max. permissible transverse force on the gear unit output shaft
F_{R1}	[kN]	Max. permissible transverse force on the gear unit drive shaft for option W
T_u	[°C]	Permissible ambient temperature range
F_{A2}	[kN]	Max. permissible axial force on the gear unit output shaft
F_{A1}	[kN]	Max. permissible axial force on the gear unit drive shaft for option W
MI	[h]	Interval for general overhaul of the gear unit in operating hours or according to the specification of the dimensionless maintenance class CM
x_{R2}	[mm]	Max. dimension for the point of application of the transverse force F_{R2}
Oil	[-]	Gear unit oil type (standard designation)
Symbol for Explosion Protection	[-]	Labelling as per ATEX (DIN EN 13463-1) 1. Group (always II, not for mines) 2. Category (2D, 3D for dust) 3. Max. surface temperature (e.g. 125 °C for dust) 4. Ignition protection type if fitted (c) 5. X is information for users, for temperature measurement during commissioning
S	[-]	Number of the special documentation, consisting of serial no. / year

* The maximum permissible speeds are 10% above the rated speed if the maximum permissible drive power P_1 is not exceeded.

- F_{R1}, F_{R2}, F_{A1} and F_{A2} empty = forces are zero
- x_{R2} empty = force F_{R2} applied to the centre of the output shaft journal

AVAILABLE RANGE

Explosion protected drive solutions by NORD
Drive systems for explosion hazard areas of Zones 1, 2, 21, or 22

NORD supplies customised explosion protected motors and geared motors. Systems based on top quality components are designed according to application in compliance with specific customer requests.

Benefit from the high flexibility

- If desired, a combined dust/gas explosion protection is available (not suited if explosive gases and particles are present simultaneously)
- Motors optionally designed for inverter operation
- Direct mounting of the motor to the gear unit is possible in many cases
- Optional with external fan, backstop, brake
- Systems for ambient temperatures up to +60 °C
- Worldwide shipping with documentation in more than 20 languages

www.nord.com

NOTES

NOTES

Warning! Please note the relevant standards and directives.

This manual contains excerpts and information from the European standards and directives for explosion protection. It is specially tailored to NORD DRIVESYSTEMS products and does not claim to be complete. Knowledge of this document does not release the user from the obligation for detailed study of and compliance with all relevant standards and directives.

NORD DRIVESYSTEMS Group

Headquarters and technology centre
in Bargteheide, near Hamburg

Innovative drive solutions
for more than 100 branches of industry

Mechanical products
Parallel shaft gear, helical gear, bevel gear and worm gear units

Electrical products
IE2/IE3/IE4 motors

Electronic products
Centralised and decentralised frequency inverters, motor starters

7 production locations with cutting edge technology
for all drive components

Subsidiaries and sales partners
in 98 countries on 5 continents
provide local stocks, assembly centres, technical support and customer service

More than 3,600 employees throughout the world
create customised solutions

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