



## Operating instructions No. BA 170 Edition 06/11 GB

These safety instructions supplement operating instructions BA 168, BA200 and the data sheet 122.

### GENERAL

The safety instructions serve to protect people and objects from damage and dangers which could result from improper installation, incorrect use, insufficient servicing or other incorrect handling of electrical drives in potentially explosive atmospheres. The technical documentation is produced and administered by Bauer Gear Motor GmbH.

#### 1 Requirements with regard to personnel


All necessary work on explosion-protected electrical drives, especially planning, transport, assembly, installation, putting into operation, servicing and repair may only be performed by competent personnel.

The necessary qualifications for „competent personnel“ are defined in EN 60079-17: „Testing, servicing and repairs may only be performed by experienced personnel whose training encompasses the different types of protection and installation procedures, the pertinent rules and regulations as well as the general principles of zone classification. Appropriate further education or training must be absolved by the personnel regularly. Proof must be furnished that personnel have the relevant experience and have received the requisite training.

Such work must be monitored by a competent person in a supervisory role. Such personnel are persons who assume the supervision of competent personnel, have appropriate knowledge in the field of explosion protection, are familiar with the conditions on site and with the plant itself, bear the overall responsibility for the plant and inspection systems for the electrical equipment within the explosion-protected areas.“

#### 2 Intended use

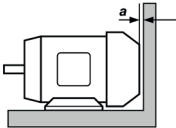
The drives are designed for use in electrical plants in potentially explosive atmospheres. The design and the intended use are apparent from the marking:

 Example of marking	Basic compliance with Directive 94/9/EG (ATEX 95) Design in compliance with Standard	Use in zone
<b>Earlier generation of standards</b>		
II 2G EEx e II T3	EN 50014 / EN 50019	1 or 2
II 2G EEx de IIC T4	EN 50014 / EN 50018 (Connection EN 50019)	1 or 2
II 3G EEx nA II T3	EN 50014 / EN 50021	2
II 2D EEx tD T < 160 °C	EN 50281-1-1 or EN 61241-0 / EN 61241-1	21 or 22
II 3D EEx tD T < 160 °C	EN 50281-1-1 or EN 61241-0 / EN 61241-1	22
<b>New generation of standards</b>		
II 2G Ex e II T3	EN 60079-0 / EN 60079-7	1 or 2
II 2G Ex de IIC T4	EN 60079-0 / EN 60079-1 (Klk. EN 60079-7)	1 or 2
II 3G Ex nA II T3	EN 60079-0 / EN 60079-15	2
II 2D Ex tD T < 160 °C	EN 61241-0 / EN 61241-1	21 or 22
II 3D Ex tD T < 160 °C	EN 61241-0 / EN 61241-1	22
<b>Gearbox</b>		
II 2G c k T4	EN 13463-1 / EN 13463-5 / EN 13463-8	1 or 2
II 3G c k T4	EN 13463-1 / EN 13463-5 / EN 13463-8	2
II 2D c k T < 160 °C	EN 13463-1 / EN 13463-5 / EN 13463-8	21 or 22
II 3D c k T < 160 °C	EN 13463-1 / EN 13463-5 / EN 13463-8	22

The drives in standard design are rated for ambient temperatures from  $-20\text{ }^{\circ}\text{C}$  to  $+40\text{ }^{\circ}\text{C}$  and for installation heights up to 1000 m above sea level: conditions deviating from these are marked on the ratings plate. Dirt, moisture or other typical outdoor conditions must not exceed the corresponding degree for the IP protection.

The air intake and exhaust must not be obstructed – e.g. by means of a noise reduction fan cowl.

Motor size	Min. distance a at the air intake	
	up to D .. 16	35 mm
	D .. 18 to D. 22	85 mm
	from D .. 25	125 mm



### 3 Installation, Operation and Maintenance

In addition to the valid installation regulations for non-explosion-protected electrical equipment, the regulations for the installation of electrical equipment in potentially explosive atmospheres must be observed:

for gas explosion protection	EN 60079-14
for dust explosion protection	EN 61241-14

The following apply for testing and maintenance:

for gas explosion protection	EN 60079-17
for dust explosion protection	EN 61241-17

For repairs and overhaul, the following apply regarding also the TRBS

for gas explosion protection	EN 60079-19
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The user is under firm obligation to ensure compliance with Directive 1999/92/EG (ATEX 137) as implemented in the country concerned, eg. as national Code of Practice.

## MOTOR

### 4 Electrical connection

#### 4.1 General requirements

All work must be performed by qualified personnel with no danger of explosion (after written work permit has been issued) with the machine at a standstill, isolated from the mains and secured against switching back on. This is also valid for secondary circuits (e.g. brakes). Any transport protection should be removed before commissioning.

#### **Check that the equipment is disconnected from the supply voltage!!**

The terminal box may only be opened when it has been guaranteed that the power has been switched off. The specified voltage and frequency on the ratings plate must correspond to the mains voltage connected to the respective terminals. The tolerances as defined by EN 60034-1, i. e. voltages  $\pm 5\%$ , frequency  $\pm 2\%$  must not be exceeded in the case of type of protection „e“. The extended tolerance in area „B“ must be clearly specified on the ratings plate and in the documentation in the case of type of protection „d“ and in special cases type of protection „e“.

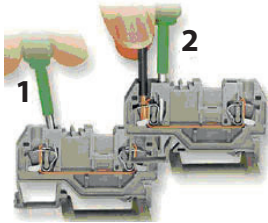

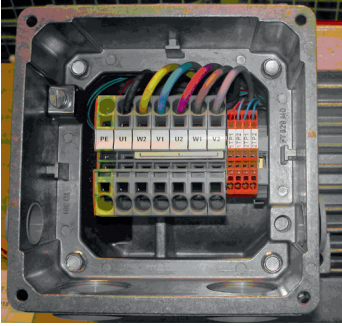

The plastic plugs intended for transport must be replaced by permissible category 2G or 2D cable glands with minimum degree of protection IP65; cable entries which are not used must be closed with ATEX-conform (e.g. metallic) blind plugs.

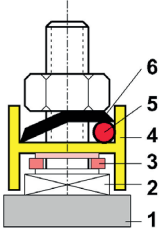
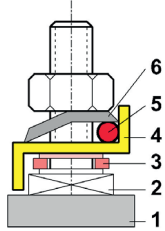
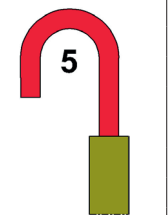
Enclosed connection diagrams, especially for special designs (e. g. pole-changing motors, thermistor protection etc.) must be observed. The type and cross section of the mains cables together with the earth connection and of any necessary bonding must comply with the installation requirements. The starting current must be observed for switching operation.

The connection aids fitted at the factory must be used.

Version with WAGO spring clamp technology

This technology, approved under PTB 05 ATEX 1070 U for types of protection „e” and „tD”, together with the jumpers provided for delta and star connection, allows simple and easy connection to main and auxiliary terminals. Observe the corresponding connection diagram!

		<ol style="list-style-type: none"> <li>1 Fully insert screwdriver</li> <li>2 Screwdriver remains in position and holds CAGE CLAMP open;</li> <li>3 Pull out the screwdriver- Cable is automatically clamped</li> </ol>
	 <p>jumpers supplied for Y or Δ</p>	<p>CAGE CLAMP terminal block          6 terminals for the winding          1 terminal for PE          4 auxiliary terminals in different sizes and colours (e.g. thermistors for warning and shutdown);          Star jumper W2-U2-V2 inserted;          lower terminal row for mains connection;</p>

Version with bolt clamp	Special with „e”	Special with „tD” and „nA”	Normal with „d” and „de”
<p>Connection of solid core cables for type of protection</p> <ol style="list-style-type: none"> <li>1 - Plastic base of the terminal block</li> <li>2 - Square on brass bolt as twist protection</li> <li>3 - Winding ends with closed cable lug</li> <li>4 - U- or Z-Clamp in brass as twist protection (base) and to accommodate the mains cable (top)</li> <li>5 - Mains cable</li> <li>6 - Connection disc acc. to DIN 46288 as thrust pad and protection against working loose</li> </ol>			

In the case of connection boxes for type of protection “increased safety”, the clearances prescribed in EN 50019 and 60079-7 between conductive parts of different potential must be observed. Screws and nuts on live parts must be tightened with the prescribed tightening torques.

Clearances (60079-7, Tab.1, + 10 %)	
Working voltage U	Minimum clearance
175 < U ≤ 275 V	5 mm
275 < U ≤ 440 V	6 mm
440 < U ≤ 550 V	8 mm
550 < U ≤ 700 V	10 mm
700 < U ≤ 1100 V	14 mm

Tightening torques for current-carrying bolts	
Thread size	Tightening torque
M4	1.2 Nm
M5	2.0 Nm
M6	3.0 Nm
M8	6.0 Nm
M10	10.0 Nm

Additional terminals, for example for temperature monitoring or heaters, can be found either in the main connection box or in an additional connection box depending upon the design (see enclosed circuit diagram). The enclosed circuit diagram found in the connection box must be kept in the plant together with all other documentation for the drive.

If the drive has a forced cooler, this must be switched on together with the main motor and should run continuously in the case of operating modes S3 or S4. The drive must be principally protected against overload and from the danger of unintentional restarting due to automatic reclosure of the circuit.

The terminal box must be closed using the seals supplied and in compliance with the IP-enclosure to protect against contact with live parts.

The “special conditions” indicated are to be observed in the case of inspection certificates with the addition “X”.

#### 4.2 Terminal box

Changing of the cable entry positions is possible by rotating the terminal box by 4x90°. Depending on the model, this can be done by loosening either the four bolts or the twist-protection threaded stud, holding the terminal box and turning it to the required position. The fastening elements must then be tightened again. Terminal boxes for type of protection „d” which are fastened by a thread may only be turned back by a maximum of one rotation!

All openings which are not used must be closed by means of a blind plug with corresponding certification with the marking given above. If cable entries are supplied with blind plugs, these serve only as transport protection; they do not provide an admissible closure. This also applies when storing the motors in the open air. Additional rain protection is necessary in this case.

The cable entries supplied with motors for type of protection “d” or “de” serve as entries for firmly laid cables, unless special cable entries have been ordered.

Cable glands and blind plugs which do not correspond to the requirements are not permissible. The cable diameter must correspond to that given on the clamping area of the cable gland.

The motors must be connected using cable glands or through conduit systems in accordance with EN 60079-14 and which meet the following requirements:

- EN 60079-7 for connection boxes in type of protection „increased safety”, (marking on component Ex e II)
- EN 60079-1 for type of protection „flameproof enclosure”, (marking on component Ex d IIC(B))
- Separate inspection certificates are required for the cable glands.

#### 4.3 Plugs and sockets

In intended use plugs and sockets for the motor supply must not be connected or disconnected while energised. If arranged side by side, they must be marked by coding in order to avoid wrong connections.

On motors with plug and socket connection (type of protection „nA” or „tD”), the locking bars on the bottom section of the housing must be protected against unintentional disconnection using the lock sheet metal. If the plug is not inserted in the housing cable entry, the socket must be sealed using the protection cap provided at the factory.

## 5 Electrical overload protection

Independent of the type of protection („e“, „d“, „de“, „nA“ or „tD“), all electrical machines must be protected against overload by one of the following overload protection devices:

- MR** – a current-dependent, time-delayed protection device for the monitoring of all three phases, set no higher than the nominal current of the machine, which must trip within 2 hours at 1.2 times the set current and must not trip within 2 hours at 1.05 times the set current, or
- TMS** – direct temperature monitoring by means of embedded temperature sensors.

### 5.1 MR protective device

The following must be observed for the „MR“ devices for all types of protection („e“, „d“, „de“, „nA“ or „tD“):

- The protective device must correspond to EN 60947 and its function must be checked and marked by a notified body with II (2) G D

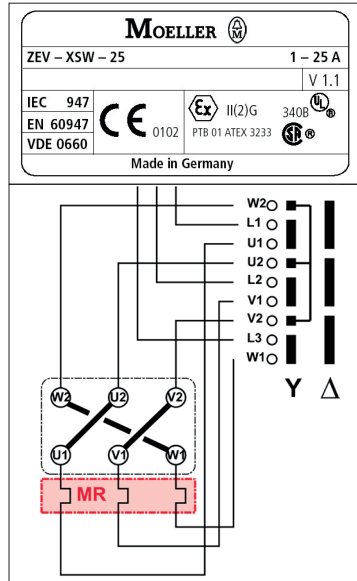
(2) means: Relay is located in the non-dangerous area; its protective function works in category 2 (Zone 1) in accordance with Directive 94/9/EC Article 1 (2) and ATEX Guidelines 11.2.1

Example of the current sensors for a ZEV electronic motor protection relay manufactured by MOELLER.

- The motor protection must also be guaranteed when one external line is lost (“single-phasing”), e.g. by use of triggers with phase-loss sensitivity.
- Pole-changing motors must have separate mutually independent triggers for each speed.
- The triggers for Star-Delta-starting must be connected in series with the individual windings and set to the phase current (1/1.73 = 0.58 times the motor nominal current). In this way, the motor is protected even when the motor is not switched from star into delta.
- The following must also be observed for motors in type of protection „e“:

The protection mechanism must trip within time  $t_E$  in the case of a locked rotor. The current/time characteristic curve on the operator's premises must meet this condition for the values  $I_N/I_N$  and  $t_E$  given on the ratings plate, with a permissible tolerance of  $\pm 20\%$ .

- A practical test with current injection is only necessary on initial testing and/or during subsequent regular testing if performance during operation indicates that this is advisable (EN 60079-17 Section 5.2.1).
- In general, motors with current-dependent delayed overload protection systems are permissible for constant operation with light and infrequent starting which does not cause mentionable additional heating. Motors which have frequent or heavy starts are only permissible if suitable protection equipment ensures that the temperature limit is not exceeded. Heavy starting conditions are present when a correctly chosen, current-dependent delayed overload protection system switches off the motor before the nominal speed is reached. Generally, this is the case when the total starting time is longer than 1.7  $t_E$  (EN 60079-14, Section 11.3.1).



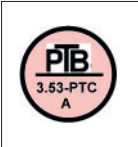
□ The nominal power of some motors is oversized, especially in connection with gearboxes with four and more stages. In these cases, the nominal current is not a suitable gauge for the gearbox loading and may not be used as overload protection for the gearbox. The type of the driven machine can in some cases principally exclude any overload. In other cases, it makes sense to protect the gearbox through a mechanical device (e.g. slip clutch or similar). The decisive value is the maximum permissible constant limited torque  $M_2$  found on the gearbox ratings plate (see section 9).

## 5.2 TMS protective device as sole protection


As the temperature sensor is embedded in the winding, it is only representative for the copper temperature and for the surface temperature of the stator housing through direct heat conduction and not for the temperature of the rotor. Apart from relatively small "stator-critical" motors for type of protection „e“, this form of protection can thus only be used for cases where the surface temperature of the housing is decisive for the explosion protection; type of protection "d" and "tD".

### Marking of the TMS and corresponding protective device

Example of an additional plate for a three-phase motor, type of protection „d“ with TMS as sole protection, design prior to ATEX:

Ex de II C T4	Mot. No. 123 456 789	
Thermistor	DIN 44081-145	
Relay	PTB 3.53-PTC/A	
$t_A$	19 s $U_N$ 20 °C	
$I_A/I_N$	6.8	

To conform with ATEX, the motor must be provided with an additional marking, for example as follows:

Thermistors PTC DIN 44081/82-145
Relay function-tested  II (2) G D
$t_A$ 28 s / 20 °C $U_N$ $I_A/I_N$ 5,0

(2) means: Relay is located in the non-dangerous area; its protective function works in category 2

(Zone 1) according to Directive 94/9/EC Article 1 (2) and ATEX Guidelines 11.2.1

GD means: Certified for apparatus for use in Category 2G and / or 2D applications

These regulations also apply analogously to motors in type of protection „tD“.

The ratings plate must be observed when selecting the protective device.

The response time  $t_A$  is based on testing with a locked rotor; it is to be expected for nominal voltage  $U_N$  at an ambient temperature of 20 °C and for the given relative starting current. It is a measure for the thermal coupling between the sensor and the copper. If no other reasons are present, it is not necessary to carry out a practical test for functionality of the protective device during the 1<sup>st</sup> test and/or during further tests.

However, if a new winding is fitted in the process of repairs, the officially authorised competent person is under obligation to test the thermal coupling for compliance with the set value; a difference of  $t_A + 20\%$  is permissible (PTB test rules; Section 10.2).

A continuity test or resistance measurement of the PTC sensor may only be performed with a maximum of 2.5 V DC per sensor (usually 3 connected in series), as otherwise there is a danger of destroying the sensor.

## 6 Operation with frequency inverter

Motors for type of protection „nA“ and „e“ must undergo testing as a unit together with the inverter.

For **type of protection “e”** this must take the form of type examination performed by a notified body (EN 60079-14, Section 11.3.4). Bauer Gear Motor does not supply this combination at present.

In the case of **types of protection „nA“**, the manufacturer confirms that the equipment has been successfully tested by issuing a

Declaration of Conformity (EN 60079-15, Section 17.8.2.2).

For motors in **type of protection “d” and “de” for temperature classes up to T4**, the motor and the inverter do not need to be tested together; the decisive surface temperature for the explosion protection is monitored via the TMS monitoring device (EN 60079-14, 10.4 a).

The decisive surface temperature for the explosion protection for **type of protection “tD”** is monitored via the TMS monitoring device; it is not necessary to test the combination of the motor and inverter (EN 61241-14, Section 12.4 a).

### **Only motors with temperature monitoring by means of PTC sensors may be used for operation with frequency inverters!**

The permissible ratings for this mode of operation are given on the ratings plate or on an additional plate. Should the additional information be missing, the details confirmed by Bauer Gear Motor are valid.

For operation with frequency inverters, the “electromagnetic compatibility” of the drives must be tested in accordance with EMC Directive No. 89/336 EWG.

- When operating motors with frequency inverters with DC intermediate circuit, it is important to ensure that the periodically occurring commutating voltage spikes do not exceed the maximum permissible value of 1600 V (limit value for terminals, clearances and creepage paths).
- If pulse width modulated (PWM) voltage intermediate circuit inverters (pulse inverters) are used for motor supply, it must be guaranteed that no high frequency oscillations with high voltage spikes occur. These can occur through the steep switching flanks of the voltage pulse, especially in the case of long cables between the inverter and motor, and can reduce the service life of the winding insulation. Voltage spikes in excess of 1600 V should be avoided. Appropriate measures may be needed at the inverter output.
- One of the following measures for the overload protection of the earth cable acc. to DIN VDE 0160 (Equipping of high power plants with electronic equipment) is needed for inverters with current limiting and non-galvanic separate power output (extract from DIN VDE 0160):
  - measurement of the earth cable cross-section beyond the minimal requirement of DIN VDE 0100 part 540, so that the earth cable protects the outer cabling through the current overload device. This requirement is regarded as fulfilled if the capacity of the earth cable is 3 times higher than the capacity of one of the cables leading from the mains to the BLE (equipment for power electronics). (These measures ensure that neither a dangerous voltage nor danger of fire can occur, so that an automatic disconnection of the BLE is not needed in this case).
  - Disconnection of the BLE through a suitable device (e.g. via additional current inverters) which prevent thermal overload of the earth cable.

**The standards for explosion-protected electrical machines do not prescribe measures for the limiting of the causes of the voltage spikes triggered by PWM inverters. From the point of view of the motor manufacturers and to increase reliability, it is recommendable to reduce the additional strain on the insulation by means of measures on the inverter (e.g. moderate switching frequency, avoiding extremely short rise times for the voltage – extremely high du/dt, filter or restrictors on the inverter output).**

**Such measures are also recommended in Section 7.7 of IEC 60034-25 and in Section 9 of IEC/TS 60034-17.**

## 7 Commissioning

The insulation resistance must be measured after storage over a long period in a damp environment. If the resistance is under approximately  $1\text{M}\Omega$ , the winding must be dried in a drying oven at approximately  $80 \dots 100\text{ }^\circ\text{C}$  with the motor open and with good air circulation.

Before installation, the mechanical connection to the driven machine should be removed and the direction of rotation be checked under no-load conditions. The keys should be removed or secured so that they cannot be hurled out. If the direction of rotation is correct, the drive can be connected to the driven machine and switched on.

Ensure that the current draw in loaded condition does not exceed the value given on the ratings plate for any length of time. The drive should be observed for at least one hour after the first installation, paying particular attention to unusual heating or noises.

## 8 Service

The motor surface and the air intake openings should be kept clean as part of the periodic inspection.

A visual check must show that the terminal box and the cable entries are sealed, that the connecting parts have not worked loose and that fan cowls are not deformed.

When performing subsequent regular testing, there is no need to carry out a practical test with current injection unless performance in operation indicates that this is necessary (EN 60079-17, Section 5.2.1).

The response time must correspond to that defined from the characteristic curve, with a tolerance of  $\pm 20\%$ , but must not exceed the  $t_{\text{e}}$  time stated on the ratings plate.

Excessive and constant dust layers are to be avoided, especially when equipment is used in dust explosion atmospheres of Zone 21 and 22.

With the new „classification of potentially dust-explosive atmospheres“ in accordance with EN 60079-10-2; EN 61241-10, the degree of cleanliness is ascertained and taken into consideration during classification of the areas:

Degree of cleanliness	Thickness of the dust layer	Duration of the dust layer	Threat of fire or explosion
Good	None or negligible	None	None
Fair	Not negligible	Shorter than one factory shift	None
Poor	Not negligible	Longer than one factory shift	Risk of fire and with resuspension Zone 22

Where it is not possible to avoid deposits of  $> 5\text{ mm}$ , the maximum permissible surface temperatures in accordance with EN 60241-14 and EN 61241-17 must be taken into consideration.





## GEARBOX

Provided that the selection criteria and the information in these operating instructions are complied with, gearboxes of the BG, BF, BK, BS and BM series fulfil the basic requirements of Directive 94/9/EG (ATEX 95). The assessment of the ignition hazard has been filed with a notified body; the assessment is based on the standard generation „Non-electrical equipment for use in potentially explosive atmospheres“:


Standard	Section
EN 13463-1	Principles and requirements
EN 13463-5	Protection by constructional safety „c“
EN 13463-8	Protection by liquid immersion „k“

## 9 Capacity of the gearbox and the service factor

The gearbox is fitted with an additional ratings plate with the following data relevant to explosion protection:

 <b>GETRIEBE/REDUCER/REDUCTEUR</b> No. E 25189019 - 2 A/ 171Z2889 29/2008 Type BF40-74W (Ex) II 2G c k II T3 / (Ex) II 2D c k T<160 ° / EN13463-1/-5/-8 i 41,42 max. n <sub>1</sub> 1400 r/min n <sub>2</sub> 34 r/min max. M <sub>2</sub> 420 Nm max. P 1,5 kW BF/SF f <sub>B</sub> 2,1 4,9 L CLP 220 PTB Reg.Nr. 03 ATEX D005  <small>SCH60</small> EN 60 034	<p><b>Explanation:</b></p> <p><b>max. n<sub>1</sub>:</b> maximum permissible input speed</p> <p><b>max. M<sub>2</sub>:</b> maximum permissible nominal torque at the output shaft</p> <p><b>max. P:</b> maximum permissible nominal power at the output shaft (throughput power)</p> <p><b>BF/SF f<sub>B</sub>:</b> Service Factor</p> <p><b>II 2 G c k T.. :</b> suitable for Zone 1, Temperature class T.. (observe T3 or T4 individually)</p> <p><b>II 2 D c k T&lt;160 °C:</b> suitable for Zone 21, housing temperature &lt; 160 °C</p>
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### Explanation of Ex markings:

	Specific marking of explosion protection	
II	Use other than in mines	II Explosion group
2	Category 2 (Zone 1 or 21)	T .. Temperature class T3 or T4
G	Areas with gas	D Areas with combustible dust
c	Type of protection „constructional safety c“	T<160 °C Maximum surface temperature
k	Type of protection „liquid immersion k“	EN Standards considered during evaluation

Each of the three limiting values of n<sub>1</sub>, M<sub>2</sub> and P must be adhered to for itself.

The service factor f<sub>B</sub> describes the conditions such as daily operating time, shock classification, switching frequency, inertia and important properties of the transmission elements. It is defined during drive planning in accordance with the specifications in the catalogue (at present DG05 or the corresponding CD version).

**Adherence to the service factor is an important prerequisite for the type of protection constructional safety “c”.**

The service factor is to be determined for the actual operating conditions as follows:

## 9.1 Bauer-Service factors for gearboxes of Series BG, BF and BK

### Constant operation without switching frequency $Z \leq 1$ c/h

Factor  $f_1$  for shock classification and operating time

Shock classification	Operating time per day $t_d$		
	$4 \text{ h} < t_d \leq 8 \text{ h}$	$8 \text{ h} < t_d \leq 16 \text{ h}$	$16 \text{ h} < t_d \leq 24 \text{ h}$
I	0.8	1.0	1.2
II	1.05	1.25	1.45
III	1.45	1.55	1.7

### Switching duty

Factor  $f_2$  for shock classification and switching frequency in single-shift operation  $t_d \leq 8$  h/d

Shock classification	Switching frequency $Z$ per hour		
	$1 \text{ c/h} < Z \leq 100 \text{ c/h}$	$100 \text{ c/h} < Z \leq 1\,000 \text{ c/h}$	$1\,000 \text{ c/h} < Z$
I	0.95	1.1	1.15
II	1.2	1.35	1.4
III	1.55	1.6	1.6

Factor  $f_2$  for shock classification and switching frequency in multiple-shift operation  $t_d > 8$  h/d

Shock classification	Switching frequency $Z$ per hour		
	$1 \text{ c/h} < Z \leq 100 \text{ c/h}$	$100 \text{ c/h} < Z \leq 1\,000 \text{ c/h}$	$1\,000 \text{ c/h} < Z$
I	1.3	1.45	1.5
II	1.5	1.6	1.65
III	1.75	1.8	1.8

### Total service factor

$$f = f_1 \cdot \text{oder} \quad f = f_2$$

Example: Shock classification II for  $Z = 100$  c/h and multiple-shift operation means a service factor  $f = f_2 = 1.5$ .

**Definition of the shock classification** (see also special publication SD 3296 „Service factors“)

#### Shock classification I

Uniform without shocks

The following requirements must be satisfied:

$$FI \leq 1.3 \quad M/M_N \leq 1$$

Additional conditions especially for switching operation:

Shock-absorbing power transmission elements

(e.g. highly elastic, play-free coupling,  $\varphi_N \geq 5^\circ$ )

#### Shock classification II

Moderate shock loads

At least one of the following requirements must be fulfilled:

$$1.3 < FI \leq 4 \quad 1 < M/M_N \leq 1.6$$

Shock neutral power transmission elements

(e.g. gear wheels, play-free elastic coupling with  $\varphi_N < 5^\circ$  or a rigid coupling)

#### Shock classification III

Heavy shock loads

At least one of the following requirements must be fulfilled:

$$FI > 4 \quad 1.6 < M/M_N \leq 2$$

Shock-amplifying power transmission elements

(e.g. coupling with play, chain drive)

### Explanation of the abbreviations

$Z$	-	Switching frequency (c/h)
$t_d$	-	Operating time in hours per day (h/d)
$FI$	-	Inertia factor
$M/M_N$	-	Relative shock torque in relation to the nominal torque
$\varphi_N$	-	Torsional offset of the elastic coupling at nominal torque

## 9.2 Bauer-Service factors for worm gearboxes of the series BS

### Constant operation without switching frequency $Z \leq 1 \text{ c/h}$

Factor  $f_1$  for shock classification and operating time

Shock Classification	Operating time per day $t_d$					
	$t_d \leq 10 \text{ min}$	$t_d \leq 1 \text{ h}$	$1 \text{ h} < t_d \leq 4 \text{ h}$	$4 \text{ h} < t_d \leq 8 \text{ h}$	$8 \text{ h} < t_d \leq 16 \text{ h}$	$16 \text{ h} < t_d \leq 24 \text{ h}$
I	0.7	0.8	0.9	1.0	1.25	1.4
II	0.9	1.0	1.12	1.25	1.6	1.8
III	1.25	1.4	1.6	1.8	2.2	2.5

### Switching duty

Factor  $f_2$  for shock classification and switching frequency in single-shift operation  $t_d \leq 8 \text{ h/d}$

Shock classification	Switching frequency $Z$ per hour		
	$1 \text{ c/h} < Z \leq 100 \text{ c/h}$	$100 \text{ c/h} < Z \leq 1\,000 \text{ c/h}$	$1\,000 \text{ c/h} < Z$
I	1.25	1.4	1.6
II	1.6	1.8	2.0
III	1.8	2.0	2.2

Factor  $f_2$  for shock classification and switching frequency in multiple-shift operation  $t_d > 8 \text{ h/d}$

Shock classification	Switching frequency $Z$ per hour		
	$1 \text{ c/h} < Z \leq 100 \text{ c/h}$	$100 \text{ c/h} < Z \leq 1\,000 \text{ c/h}$	$1\,000 \text{ c/h} < Z$
I	1.4	1.6	1.8
II	1.8	2.0	2.2
III	2.0	2.2	2.5

### Ambient temperature

Factor  $f_3$  for increased ambient temperature

UT (°C)	-10 ... +25	> 25	> 30	> 35	> 40
$f_3$	1.0	1.1	1.2	1.3	On request

### Total service factor

$$f = f_1 \text{ oder } f_2$$

In the case of mixed duty when both factors have been determined, the higher value is valid.

However, minimum  $f_3$  for operating times  $> 1 \text{ h}$ .

**Definition of the shock classification** (see also special publication SD 3296 „Service factors“)

**Shock classification I** Uniform without shocks

The following requirements must be satisfied:

$$FI \leq 1.3$$

$$M/M_N \leq 1$$

Additional conditions especially for switching operation:

Shock-absorbing power transmission elements

(e.g. highly elastic, play-free coupling,  $\varphi_N \geq 5^\circ$ )

## Shock classification II

Moderate shock loads

At least one of the following requirements must be fulfilled:

$$1.3 < FI \leq 2$$

$$1 < M/M_N \leq 1.4$$

Shock-neutral power transmission elements

(e.g. gear wheels, play-free elastic coupling with  $\varphi_N < 5^\circ$  or a rigid coupling)

## Shock classification III

Heavy shock loads

At least one of the following requirements must be fulfilled:

$$FI > 2$$

$$1.4 < M/M_N \leq 2$$

Shock-amplifying power transmission elements

(e.g. coupling with play, chain drive)

## Explanation of the abbreviations

Z	-	Switching frequency (c/h)
t <sub>d</sub>	-	Operating time in hours per day (h/d)
FI	-	Inertia factor
M/M <sub>N</sub>	-	Relative shock torque in relation to the nominal torque
φ <sub>N</sub>	-	Torsional offset of the elastic coupling at nominal torque

**Gearboxes in the series BM** for monorail drives are designed for the specific application; a service factor is not necessary.

## 10 Mounting

The equipment is filled with the optimum lubricant quantity and type for the planned mounting arrangement at the factory; Mounting arrangement (symbol IM), oil quantity (oil can symbol) and lubricant type are listed on the ratings plate of the geared motor.

It is not permissible to change any of these conditions arbitrarily; it could lead to either dry running or excessive heating of the gearbox.

For the correct quantity of lubricant for the specific mounting arrangements (design), please also refer to the current version of the operating instructions. BA 168 ..

<b>Bauer</b>			
3 - Mot.-No. E	25189019-4	A/ 171Z2889	29/2008
Type	BF40-74W/DXE09LA4/C2-SP		
⊕ II 2 G Ex e II T3			
PTB 99 ATEX 3272-BI.03			
50 Hz	1,5 kW	0,80 S1	isoCl F
n <sub>1</sub>	1400 n <sub>2</sub>	34 r/min	420 Nm
i 41,42			
I <sub>A</sub> /I <sub>N</sub>	5,4	t <sub>g</sub>	12,0 s
IM H2/V1	IP65	4,9 L	CLP 220
Cl		t <sub>amb.</sub>	40°C
			62,1 kg
Ex		CE	0102 EN 60034
			SCH20

Example for marking prescribing a lubricant quantity of 4.9 litres

## 11 Torque arm

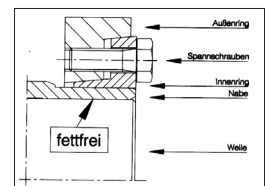
The following assembly instructions must be observed for fixing and support. The effectiveness of the rubber buffers is to be monitored within the scope of the regular inspections (after 3 000 operating hours, or 6 months). The torque arm should never be supported directly by metal, as unavoidable relative movements can lead to frictional heat.

For details of the arrangement of the torque arm and the rubber buffers, see operating instructions BA 168..

## 12 Shrinkdisk connection SSV

The shrinkdisk connection (SSV) between the hollow shaft of the gearbox and the driven solid shaft is calculated in such a way that no slip can occur when the unit is used as intended.

An important prerequisite for avoiding ignitable frictional heat: Compliance with the assembly instructions in operating instructions BA 168 .. is essential.



### 13 Protection against extremely high torque shocks (e.g. blockage)

If a high resistance or certain blockage-related events can occur in specific applications, extremely large torque spikes can occur, which are fed by the rotational energy of the rotor. To avoid breakage in the gearbox and resultant danger of explosion in such cases a mechanical protection device (slip coupling without threat of explosion) or at least highly elastic couplings must be used. The electrical overload protection devices cannot take over the mechanical protection of the gearbox. See the Bauer book "Protective measures for three-phase gear motors".

### 14 Periodic inspection and continuous supervision

The following are to be included in the test plan for maintenance of the conditions of electrical plants taking place at regular intervals of 3 000 operating hours but at least every 6 months (if needed also at shorter intervals):

Object	Recommended method
Leakage	Visual check in the area of the gearbox housing
Running condition	Acoustic check or comparative vibration test
Fixing	Visual check or tightening of the fixing bolts
SSV Shrinkdisk	Visual check or tightening of the bolts
Rubber buffers on the torque arm	Visual check
Coupling in the adapter	Acoustic check or visual check for correct seating of the clamping screw, version K: Type designation ... K/DNFXD ... see KTR operating instructions. (Shorter initial interval 2000 h for explosion group IIC,.)

### 15 Monitoring of bearings and gear wheels

The motor bearings are lubricated for life; the bearings in the gearbox are provided with lubrication from the gearbox lubricant. Under normal operating conditions, with usage as intended and when the service factor  $f_B$  (Section 9) is adhered to, it is sufficient when the running condition of the gearbox (bearings and gear wheels) is checked within the scope of the periodic inspection at intervals of 3 000 operating hours, but at least every 6 months. If there is an indication of unacceptable wear on any of the components, these must be replaced.

### 16 Mechanically operated clutch for gearboxes in the series BM

The gearbox clutch operated by a clutch lever and disconnection bar found outside of the gearbox housing must fulfil at least one of the following conditions to safely rule out any risk of explosion:

- Disconnection bar lies outside the explosive atmosphere
- Disconnection bar made of plastic
- Operating at velocities under 1 m/s due to fixed control systems

The mechanical clutch which is located inside the gearbox housing does not pose any danger of explosion.



### 17 Running wheel for Monorails with gearboxes of the series BM

If the running wheel supplied by the monorail system supplier has a plastic coating, this must be made of an electrostatically conductive material.

## 18 Motor attached via coupling

### Version N: Type designation ... N/DNF ...

The shrink connection has no wear or relative movement; no servicing or checks are required.

### Version C: Type designation ... C/DNF ...

The clamp connection has no wear or relative movement.

The clamping screw must be monitored for tight seating within the framework of the regular inspections.

The installation of IEC standard motors must be performed as shown in the flow diagram in BA 168..

### Version K: Type designation ... K/DNFXD ...

When connecting large standard flange motors (e. g. in protection type Ex de IIC T4), a ROTEX coupling manufactured by KTR is used. A type examination certificate

No. IBExU02ATEXB001X from the notified body IBExU Institut für Sicherheitstechnik GmbH has been filed under II 2G Ex c IIC T4 for this coupling.

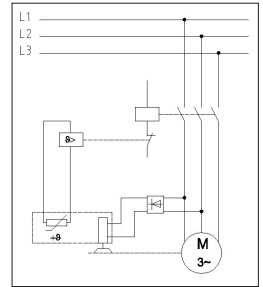
The KTR operating instructions are supplied with the relevant gear motors.

When used in areas with explosive mixtures of the explosion group IIC, please observe the shortened intervals for the recurrent checks to avoid the threat of explosion due to impact sparks when metallic coupling elements contact. If the motor marked for IIC is actually used in areas with explosion group IIA or IIB, the corresponding longer intervals between the recurrent checks can be applied.

## 19 Spring-loaded brakes

Motors for type of protection „d“, „de“, „nA“ and „tD“ are supplied with built-on spring-loaded brakes for the corresponding type of protection. Built-in thermal sensors monitor the temperature of the winding and the active parts of the brakes stressed as a result of the switching operation.

For details of the type and the connection of the brakes and the permissible switching work, see the following table:



Type of protection	Product	Operating instructions
„tD“ and „nA“	Bauer Gear Motor GmbH	BA 168 .., Section Spring-loaded brakes
II 2G Ex de II C T5	Kendrion Binder Magnete GmbH	76..G..B00 and 76..E..B00
II 2D IP67 T100 °C	Kendrion Binder Magnete GmbH	76..G..B00 and 76..E..B00

**Maximum permissible switching operations for the brakes E../Z.. when used in potentially explosive atmospheres Zone 2 (Ex nA II T3), Zone 22 (II 3D Ex tD T<160 °C) and combination Zone 2/22 (II 3 GD)**

The values for the permissible switching operations in potentially explosive atmospheres are lower than those for normal operation

Single disc brake					Double disc brake				
Typ	M <sub>N</sub> Nm	W <sub>max</sub> 10 <sup>3</sup> J	W <sub>th</sub> 10 <sup>3</sup> J	W <sub>L</sub> 10 <sup>6</sup> J	Typ	M <sub>N</sub> Nm	W <sub>max</sub> 10 <sup>3</sup> J	W <sub>th</sub> 10 <sup>3</sup> J	W <sub>L</sub> 10 <sup>6</sup> J
E003B9	3	1,5	36	10	Z..008B9	20	10	100	30
E003B7	2,2	1,5	36	15	Z..008B8	16	10	100	50
E003B4	1,5	1,5	36	25	Z..008B6	13	10	100	70
E004B9	5	2,5	60	20	Z..008B5	10	10	100	90
E004B8	4	2,5	60	40	Z..008B4	7	10	100	110
E004B6	2,8	2,5	60	70	Z..015B9	40	15	150	150
E004B4	2	2,5	60	90	Z..015B8	34	15	150	180
E004B2	1,4	2,5	60	120	Z..015B6	27	15	150	220
E..008B9	10	10	100	30	Z..015B5	22	15	150	250
E..008B8	8	10	100	50	Z..015B4	16	15	150	280
E..008B6	6,5	10	100	70	Z..075B9	140	20	200	200
E..008B5	5	10	100	90	Z..075B8	125	20	200	300
E..008B4	3,5	10	100	110	Z..075B7	105	20	200	400
E..008B2	2,5	10	100	120	Z..075B6	85	20	200	500
E..075B9	70	20	200	200	Z..075B5	65	20	200	600
E..075B8	63	20	200	300	Z..075B4	50	20	200	700
E..075B7	50	20	200	400	Z..075B2	38	20	200	800
E..075B6	42	20	200	500	Z..100B9	200	30	300	300
E..075B5	33	20	200	600	Z..100B8	185	300	300	400
E..075B4	25	20	200	700	Z..100B7	150	30	300	500
E..075B2	19	20	200	800	Z..100B6	125	30	300	600
					Z..100B5	100	30	300	700
					Z..100B4	80	30	300	800
					Z..100B2	60	30	300	900

M<sub>N</sub> Nominal braking torque.

This value is only reached after a certain running-in time for the brake discs and can deviate by approximately -10 / +30 % after this time, depending on the operating temperature and the wear on the friction partner.

W<sub>max</sub> Maximum permissible switching work for single braking operation.

The switching work W<sub>Br</sub> for one braking operation is calculated as follows:

$$W_{Br} = \frac{J \cdot n^2}{182.5}$$

J – Mass moment of inertia [kgm<sup>2</sup>] of the overall system relative to the motor shaft  
n – Motor speed [r/min] braked

W<sub>th</sub> Maximum permissible switching work per hour

W<sub>L</sub> Maximum permissible switching work before replacing the brake discs

**Maximum permissible switching operations for the brakes ES(X).. /ZS(X).. when used in potentially explosive atmospheres Zone 2 (Ex nA II T3), Zone 22 (II 3D Ex tD T<160 °C) and combination Zone 2/22 (II 3 GD)**

Holding Brakes with Emergency Stop Characteristic Types ES.. / ZS..						Working Brakes Types ESX.. / ZSX..					
Type	M <sub>br</sub> Nm	W <sub>max</sub> 10 <sup>3</sup> J	W <sub>th</sub> 10 <sup>3</sup> J	W <sub>L</sub> 10 <sup>6</sup> J	S <sub>Lmax</sub> mm	Type	M <sub>br</sub> Nm	W <sub>max</sub> 10 <sup>3</sup> J	W <sub>th</sub> 10 <sup>3</sup> J	W <sub>L</sub> 10 <sup>6</sup> J	S <sub>Lmax</sub> mm
ES010AX	15*	2	-	-	0,5	ESX010AX	15*	2	100	60	0,5
ES010A9	10	2	-	-	0,5	ESX010A9	10	2	100	60	0,5
ES010A8	8	2	-	-	0,5	ESX010A8	8	2	100	70	0,5
ES010A5	5	2	-	-	0,7	ESX010A5	5	2	100	120	0,7
ES010A4	4	2	-	-	0,7	ESX010A4	4	2	100	120	0,7
ES010A2	2,5	2	-	-	0,7	ESX010A2	2,5	2	100	120	0,7
ES027AX	32*	2,5	-	-	0,5	ESX027AX	27*	5	150	70	0,5
ES027A9	27	2,5	-	-	0,5	ESX027A9	22	5	150	70	0,5
ES027A7	20	2,5	-	-	0,7	ESX027A7	16	5	150	150	0,7
ES027A6	16	2,5	-	-	0,7	ESX027A6	13	5	150	170	0,7
ES040A9	40	3,5	-	-	0,7	ESX040A9	32	10	200	200	0,7
ES040A8	34	3,5	-	-	0,7	ESX040A8	27	10	200	240	0,7
ES040A7	27	3,5	-	-	0,7	ESX040A7	22	10	200	240	0,7
ES070AX	90*	3,5	-	-	0,7	ESX070AX	72*	15	250	350	0,7
ES070A9	70	3,5	-	-	0,6	ESX070A9	58	15	250	250	0,6
ES070A8	63	3,5	-	-	0,7	ESX070A8	50	15	250	350	0,7
ES070A7	50	3,5	-	-	0,7	ESX070A7	40	15	250	350	0,7
ES125A9	125	4,5	-	-	0,9	ESX125AX	100*	20	300	900	0,9
ES125A8	105	4,5	-	-	0,9	ESX125A9	85	20	300	800	0,9
ES125A7	85	4,5	-	-	0,9	ESX125A8	70	20	300	800	0,9
ES125A6	70	4,5	-	-	0,9	ESX125A7	58	20	300	800	0,9
ES125A5	57	4,5	-	-	0,9	ESX125A5	45	20	300	800	0,9
ES125A3	42	4,5	-	-	0,9	ESX125A3	34	20	300	800	0,9
ES200A9	200	8	-	-	0,8	ESX200AX	160*	30	400	1000	0,8
ES200A8	150	8	-	-	0,7	ESX200A9	120	30	400	800	0,7
ES200A7	140	8	-	-	0,9	ESX200A8	110	30	400	1300	0,9
ES250AX	350*	9	-	-	0,8	ESX250AX	280*	40	500	1100	0,8
ES250A9	250	9	-	-	0,8	ESX250A9	200	40	500	1400	0,8
ES250A8	200	9	-	-	1,1	ESX250A8	160	40	500	2800	1,1
ES250A6	150	9	-	-	1,1	ESX250A6	120	40	500	2800	1,1
ES250A5	125	9	-	-	1,1	ESX250A5	100	40	500	2800	1,1
ES250A4	105	9	-	-	1,1	ESX250A4	85	40	500	2800	1,1
ZS300A9	300	8	-	-	0,8	ZSX300A9	250	30	400	600	0,8
ZS300A8	250	8	-	-	0,9	ZSX300A8	200	30	400	1000	0,9

\* only possible with MSG-Rectifier as over excitation is required

- M<sub>br</sub> Nominal braking torque  
 Brake Torque Tolerance  
 Types ES../ZS...: -10 / +30%  
 Types ESX../ZSX...: -20 / +30% when worn in. In new state up to -30% possible
- W<sub>max</sub> Maximum permissible switching work for single braking operation.
- W<sub>th</sub> Maximum permissible switching work per hour
- W<sub>L</sub> Maximum permissible switching until servicing i.e. replacement of the brake disc or air gap adjustment.  
 Adjustment of the air gap only possible for ZS(X) brakes possible
- S<sub>Lmax</sub> Maximum permissible air gap

No values given for W<sub>th</sub> and W<sub>L</sub> as the holding brakes ES../ZS.. in standard duty do not perform frictional work.

**The values given for W<sub>L</sub> are for guidance only and can differ considerably depending on the corresponding application. Therefore, the air gap must be monitored regularly.**



## 20 Transmission elements and driven non-electrical equipment

Non-electrical equipment such as couplings, V-belt gears, pumps, agitators etc. placed on the market since 01.07.2003 must comply with ATEX Directives. Equipment manufacturers and users must follow these rules if connecting a geared motor to such driven components.

## 21 Repair

Any repair work on explosion-protected machines may only be performed by the manufacturer or by corresponding authorised qualified personnel in a specialised workshop specially equipped for such work. In every case, the original spare parts or standard parts of the same design (screws, bearings) must be used. The work procedures specified by the manufacturer must be followed.

The surface of the flameproof gaps may not be re-machined or be coated with any sealants or paints. These surfaces have to be kept metallic clean.

A thin oil or non-hardening grease coating can be used as corrosion protection. This is particularly important in the case of the gaps in the lids for connection boxes of protection type "Ex d II".

All bolts in connection with the flame proof enclosure of the motor must be available in the requisite number and be tightened with the designated torque.

Thread size	M5	M6	M8	M10	M12	M16	M20
Tightening torque (Nm)	6	10	25	49	85	210	425

Only in exceptional cases is it permissible to repair flameproof gaps using the damaged original parts. For the approved gap dimensions, which may be smaller than the standard dimensions, a type-specific data sheet must be obtained from the manufacturer.

Electrical equipment where components on which the explosion protection depends have been modified or repaired may not be put back into operation until a licensed monitoring agency (ZÜS) or an **officially authorised competent person** has ascertained that it meets the requirements of ElexV and the BetrSichV and thus complies with the respective Code of Practice, and until the aforementioned agency or person has issued corresponding certification of this fact or attached an inspection mark to the equipment (compare local equivalent to §§ 9 and 14 ElexV old and revised version resp. § 14 BetrSichV).

The „Technical directives for operational safety“ on „repairs to equipment, protective systems, safety, monitoring and control devices as defined by RL 94/9/EG -

Evaluation of necessity for testing in accordance with § 14 Section 6 BetrSichV“

contain important instructions for personnel carrying out repairs. Excerpts from these instructions are quoted in the following paragraphs.

This summary is not intended as and cannot be a substitute for careful study of the TRBS . or any locally applicable Code of Practice.

### **Definition of terms**

#### **Furnishing**

Includes all machines and installations, tools and auxiliary devices such as lifting tackle, as well as measuring and testing devices, required in order to perform repair work appropriately.

#### **Qualified person with state certification**

Is the member of a company's staff with the appropriate expertise and appointed by the relevant authorities to carry out testing after completion of repair work.

#### **Significant modification**

Any modification which affects one or more basic health or safety requirements ... (e. g. temperature) or the integrity of the explosion protection.

#### **Repairs**

Work carried out to restore equipment to the target status .... This can be done by replacing individual parts or performing repairs on the parts themselves, without impairing the integrity of explosion protection measures and safety, monitoring and control devices or the functional status of protective systems, safety, monitoring and control devices.

#### **Repairs relevant to explosion protection**

Repair procedures which involve work carried out on explosion-protected equipment and influencing the protection of the equipment against active ignition sources or which involve work on a protective system ... influencing its correct functioning ..., whereby such work may only be performed by personnel with the requisite know-how and skills ... and where appropriate using special equipment (tools, measuring devices etc.).

#### **Original spare parts**

Within the framework of this TRBS, replacement components which meet the same technical requirements for the specific application as the part to be replaced are also defined as original spare parts.

## Appendix 2 to the TRBS

Examples illustrating the difference between „general“ repairs without relevance to explosion protection and „special“ repairs relevant to explosion protection

Cat	Equipment/ type of protection	Nature of repairs	Testing in acc. with § 14 (6) BetrSichV required	Not permiss- ible as repair work
<b>2</b>	<b>Electric motor</b>		<b>no</b>	<b>yes</b>
	Increased safety „e“	Replacement with original spare parts in the case of <ul style="list-style-type: none"> <li>– bearings, packing</li> <li>– motor feet</li> <li>– terminal box (parts)</li> <li>– terminal block</li> <li>– cable insert</li> <li>– fan impeller/fan cowl</li> </ul>	<b>X</b>	
		Replacement winding in accordance with manufacturer's specifications or copy		<b>X</b>
		Winding in permissible voltage range in accordance with test certificate from the notified testing agency or notified body; data as per manufacturer's specifications or appropriate conversion		<b>X</b>
		Winding for other number of poles or frequency or voltage outside the certified range		
<b>2</b>	<b>Electric motor</b>			
	Flameproof enclosure „d“	Abrasion-free cleaning of gap surfaces	<b>X</b>	
		Replacement of fan impeller/fan cowl with original spare part	<b>X</b>	
		Restoration of ignition gaps as per manufacturer's specifications or test documentation (approved by the notified testing agency or notified body) – but not merely as per standard		<b>X</b>
		Intervention within the flameproof enclosure ; re- placement with original spare parts in the case of <ul style="list-style-type: none"> <li>– bearings,</li> <li>– stator housing</li> <li>– terminal box (parts)</li> <li>– terminal block</li> <li>– cable inlet</li> <li>– shaft seal</li> </ul>		<b>X</b>
		Thermistors as sole protection: <ul style="list-style-type: none"> <li>– in replacement winding in accordance with manufacturer's specifications or copy</li> </ul>		<b>X</b>
		Winding in permissible voltage range in accordance with test certificate from the notified testing agency or notified body; data as per manufacturer's specifications or appropriate conversion		<b>X</b>
		Thermistors as sole protection <ul style="list-style-type: none"> <li>– with redefinition of nominal response temperature (NAT) and response time <math>t_A</math></li> </ul>		

Cat	Equipment/ type of protection	Nature of repairs	Testing in acc. with § 14 (6) BetrSichV required	Not permissible as repair work
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2 Gearbox		no	yes		
	Constructional safety „c“,	Lubricant change; frequency, type and quantity in accordance with manufacturer's specifications	X		
	liquid immersion „k“	Replacement of original spare parts: - bearings - shaft seals	X		
		Gear wheels or shafts replaced exclusively with original spare parts <b>from the manufacturer</b>	X		
		Gear wheels or shafts replaced with original spare parts		X	

Original spare parts and instructions relating to explosion protection for their manufacture or installation are available from Bauer Gear Motor GmbH or its authorised partners on request (compare Section 24).

Any work on geared motors above and beyond this may constitute „repairs with relevance to explosion protection“ and as such require specialist know-how. Such work must therefore be performed exclusively by the trained technicians of the Bauer Gear Motor GmbH or one of its suitably qualified authorised partners (compare Section 24).

A repair shop can also be asked to perform other work in addition to the typical repairs to geared motors listed in the table. However, such work constitutes „significant modification“ and should therefore only be assessed and where appropriate carried out - with the appropriate special measures - by the manufacturer or his licensed workshops

#### Examples of significant modifications to geared motors

Change (modification)	Evaluation
Installation with the motor shaft positioned vertically instead of horizontally	As a result of the increased amount of oil in the gearbox, heavy losses caused by churning can occur and can lead to inadmissibly high temperatures, especially in applications with ignition hazards of Temperature Class T4.
Inverter supply with operation at frequencies > 60 Hz	As a result of the increased speed, heavy oil loss caused by churning can occur in the gearbox and can lead to inadmissibly high temperatures, especially in applications with ignition hazards of Temperature Class T4.
Drive conditions with higher service factor (9.1)	Reclassification of gearbox suitability

#### Test results, documentation

Tests performed in accordance with § 14 Section 6 Point 1 and 2 of the BetrSichV must be documented as prescribed in § 19 BetrSichV. The certificates or records must show that the geared motor meets the requirements of the German health and safety at work regulations in all essential points relating to explosion protection after performance of the repairs. This documentation must be filed by the user at least for the duration of the service life of the geared motor and produced on request. Appendix 4 of the TRBS contains an example of the documentation of a test performed on a rotating electrical machine (electric motor) after repair work as defined in § 14 Section 6 BetrSichV. A comparable form is available from the ZVEH.

Repairs which, under the terms of this TRBS, do not require subsequent testing in accordance with § 14 Section 6 BetrSichV must be documented appropriately according to the individual case.

To ensure traceability, we recommend affixing a permanent inspection mark to repaired geared motors after successful testing.

These specification may be modified by local Code of Practice if any

## EC DECLARATION OF CONFORMITY

acc. to ATEX Directive 94/9/EG (ATEX 95)  
for gear units with type of protection "c" and "k"

B 000.1200-01 E Rev.: 11/06 EE-gr/ef

File : KonfErkl\_ATEX\_ck\_B000\_1200\_01\_EN.doc (replacing Exc\_Konferkl\_EN)

### Bauer Gear Motor GmbH

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Homepage: www.bauergears.com

Gear units of type series **BG, BF, BK, BS, BM**

comply with the requirements of the following European Directive(s) in their latest version  
**94/9/EG** Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres proved by compliance with the following standards and regulations:

**Ignition hazard assessment** (registered with the Notified Body PTB, Identification-No. 0102) acc. to:

EN 1127:2007	Explosion prevention and protection; Basic concepts and methodology
EN 13463	Non-electrical equipment for potentially explosive atmospheres
EN 13463-1:2001	Basic methods and requirements
EN 13463-5:2003	Protection by constructional safety "c"
EN 13463-8:2003	Protection by liquid immersion "k"

#### Notes:

Gear units marked  II 2G c k II T3 / II 2D c k T<160°C / EN 13463-1/ -5 / -8  
may be used in areas with potential hazard by:

- Gas explosions in Zones 1 and 2 (Categories 2 and 3), Temperature Class T3**  
Selection of output power, input speed and mounting arrangement as specified by Danfoss Bauer technical staff
- Dust explosions in Zones 21 and 22 (Categories 2 and 3), ignition temperature (layer and cloud) > 240 °C**  
for all listed mounting arrangements and input speeds up to 3000 r/min
- Explosions in such Zones by hybrid mixtures** consisting of explosive gas and combustible dust, provided the ignition characteristics of the mixture (e.g. the ignition temperatures) are not more unfavourable than the characteristics of the components of the mixture.

**For the motor section of a geared motor a separate Declaration of Conformity applies.**

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 06.03.2003

Danfoss Bauer GmbH



ppa. Hanel  
(Leiter IM)



i.V. Dipl.-Ing. Nispel  
(Leiter R&D)

For areas with **Temperature Class T4** gases the selection has been checked for the following parameters:

Gear units marked

 II 2G c k II T4 / II 2D c k T<135°C / EN 13463-1/ -5 / -8

Type:

ID-No:

Rated output: (kW)

Max. input speed: (r/min)

Mounting arrangement:

Other conditions:

Danfoss Bauer GmbH  
Authorised internal person

This declaration certifies the compliance with the indicated directives but implies no warranty of properties. The technical documentation is produced and administered by Bauer Gear Motor GmbH

THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

Erfüllungsort und Gerichtsstand: 73734 Esslingen  
Sitz: Esslingen-Neckar  
Registergericht: Amtsgericht Stuttgart HRB 736269  
Geschäftsführer: Karl-Peter Simon  
USt-IdNr.: DE 276650470 · Steuer Nr. 59330/13048

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BIC/SWIFT: COBADEFF611 IBAN: DE21 6114 0071 0700 4088 00

## EC DECLARATION OF CONFORMITY

**Bauer Gear Motor GmbH**

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acc. to ATEX Directive 94/9/EG (ATEX 95)  
for gear units with type of protection "c" and "k"

B 000.1200-05 E Rev.: 11/06 EE-gr/ef

File : KonfErkl\_ATEX\_ck\_B000\_1200\_05\_EN\_Staub120C.doc (replacing Exc\_Konferkl\_EN)

Gear units of type series **BG, BF, BK, BS, BM**

comply with the requirements of the following European Directive(s) in their latest version  
**94/9/EG** Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres proved by compliance with the following standards and regulations:

**Ignition hazard assessment** (registered with the Notified Body PTB, Identification-No. 0102) acc. to:

EN 1127:2007	Explosion prevention and protection; Basic concepts and methodology
EN 13463	Non-electrical equipment for potentially explosive atmospheres
EN 13463-1:2001	Basic methods and requirements
EN 13463-5:2003	Protection by constructional safety "c"
EN 13463-8:2003	Protection by liquid immersion "k"

Notes:

Gear units marked  II 2G c k II T3 / II 2D c k T<160°C / EN 13463-1/ -5 / -8

may be used in areas with potential hazard by:

- Gas explosions in Zones 1 and 2 (Categories 2 and 3), Temperature Class T3**  
Selection of output power, input speed and mounting arrangement as specified by Danfoss Bauer technical staff
- Dust explosions in Zones 21 and 22 (Categories 2 and 3), ignition temperature (layer and cloud) > 240 °C**  
for all listed mounting arrangements and input speeds up to 3000 r/min
- Explosions in such Zones by hybrid mixtures** consisting of explosive gas and combustible dust, provided the ignition characteristics of the mixture (e.g. the ignition temperatures) are not more unfavourable than the characteristics of the components of the mixture.

**For the motor section of a geared motor a separate Declaration of Conformity applies.**

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 06.03.2003

Danfoss Bauer GmbH




ppa. Hanel  
(Leiter IM)



i.V. Dipl.-Ing. Nispel  
(Leiter R&D)

For areas with **Temperature Class T4 gases and dust with ignition temperature (layer and cloud) >195°C** the selection has been checked for the following parameters:

Gear units marked  II 2G c k II T4 / II 2D c k T 120°C / EN 13463-1/ -5 / -8

Type:

ID-No:

Rated output: (kW)

Max. input speed: (r/min)

Mounting arrangement:

Other conditions:

Danfoss Bauer GmbH  
Authorised internal person

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THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

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## EC DECLARATION OF CONFORMITY

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acc. to ATEX-Directive 94/9/EG (ATEX 95)

for three-phase cage motors with type of explosion protection "d" or "de"

B 230.1300-04 E Rev.: 11/06 EE-gr/ef

File : KonfErkl\_ATEX\_d\_B320\_1300\_04\_EN.doc

**Three-phase cage motors of type series**

**DNXD05, DNXD06, DNXD07, DNXD08, DNXD09, DNXD10, DNXD11, DNXD13, DNXD16, DNXD18,  
DNXD20, DNXD22, DNXD25, DNXD28**

**with type of protection "d" or "de"**

comply with the requirements of the following European Directive(s) in their latest version

**94/9/EG**

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by EC Type-Examination Certification (EC Prototype Test Certificate) by the Notified Body PTB (Identification No. 0102):

PTB 09 ATEX 1050 X

PTB 09 ATEX 1051 X

PTB 09 ATEX 1052 X

PTB 09 ATEX 1053 X

PTB 09 ATEX 1054 X

and by compliance with the following standards and regulations:

EN 60079-0:2006 Electrical apparatus for potentially explosive atmospheres; General requirements

EN 60079-1:2007 Electrical apparatus for potentially explosive atmospheres; Flameproof enclosure "d"

EN 60079-7:2003 Electrical apparatus for potentially explosive atmospheres; Increased safety "e"

Note:

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 01.10.2000

Danfoss Bauer GmbH



pp.a. Hanel  
(Leiter IM)



i.V. Dipl.-Ing. Eiffler  
(Leiter EE)

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THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

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## EC DECLARATION OF CONFORMITY

acc. to ATEX-Directive 94/9/EG (ATEX 95)  
for three-phase cage motors with type of explosion protection "d" or "de"  
and of special design for use in the presence of combustible  
dusts II 2 D

B 320.1300-05 E Rev.: 11/06 EE-gr/ef  
File : KonfErkl\_ATEX\_d\_B320\_1300\_05\_EN.doc

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### Three-phase cage motors of type series

**DNXD06, DNXD07, DNXD08, DNXD09, DNXD10, DNXD11, DNXD13, DNXD16, DNXD18,  
DNXD20, DNXD22, DNXD25, DNXD28, DNFXD31**

**with type of protection "d" or "de" and of special design for use in the presence of combustible  
dusts II 2 D**

comply with the requirements of the following European Directive(s) in their latest version  
**94/9/EG**

Directive of the European Parliament and the Council on the approximation of the laws of the Member States  
concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by EC Type-Examination Certification (EC Prototype Test Certificate) by the Notified Body PTB  
(Identification No. 0102):

PTB 09 ATEX 1050 X	PTB 09 ATEX 1051 X	PTB 09 ATEX 1052 X
PTB 09 ATEX 1053 X	PTB 09 ATEX 1054 X	

and by compliance with the following standards and regulations:

EN 60079-0:2006	Electrical apparatus for potentially explosive atmospheres; General requirements
EN 60079-1:2007	Electrical apparatus for potentially explosive atmospheres; Flameproof enclosure "d"
EN 60079-7:2003	Electrical apparatus for potentially explosive atmospheres; Increased safety "e"
EN 61241-0:2006	Electrical apparatus for use in the presence of combustible dust; General requirements
EN 61241-1:2004	Electrical apparatus for use in the presence of combustible dust; Protection by enclosures "tD"

#### Note:

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be  
followed.

Three-phase motors marked II 2 G Ex d IIC T4 / II 2 D T120 °C  
or II 2 G Ex de IIC T4 / II 2 D T120 °C

may be used in areas with the risk of

- Gas explosions in Zones 1 and 2 (Categories 2 and 3), Temperature Class T4
- Dust explosions in Zones 21 and 22 (Categories 2 and 3), Ignition temperature of layer or cloud > 195°C
- Explosions in these Zones by hybrid mixtures of explosive gas and combustible dust, provided the  
explosion characteristics of the mixture (e.g. Ignition temperature) are within the same limits as for the  
components of the mixture.

Esslingen, date of the initial edition 11.03.2004

Danfoss Bauer GmbH



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(Leiter IM)



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is produced and administered by Bauer Gear Motor GmbH

THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

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## EC DECLARATION OF CONFORMITY

acc. to ATEX-Directive 94/9/EG (ATEX 95)  
for three-phase cage motors with type of explosion protection "e"

B 320.1200-12 E Rev.: 11/06 EE-gr/ef  
File : KonfErkl\_ATEX\_e\_B320\_1200\_12\_EN.doc

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### Three-phase cage motors of type series DXE06, DXE08, DXE09, DXE11, DXE13, DXE16 with type of protection "e"

comply with the requirements of the following European Directive(s) in their latest version

#### 94/9/EG

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by EC Type-Examination Certification (EC Prototype Test Certificate) by the Notified Body PTB (Identification No. 0102):

D.XE06	PTB 08 ATEX 3048
D.XE08	PTB 08 ATEX 3049
D.XE09	PTB 08 ATEX 3050
D.XE11	PTB 08 ATEX 3051
D.XE13	PTB 08 ATEX 3052
D.XE16	PTB 08 ATEX 3053

and by compliance with the following standards and regulations:

EN 60079-0:2006 Electrical apparatus for explosive gas atmospheres: General requirements  
EN 60079-7:2007 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

#### Note:

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 01.03.2000

Danfoss Bauer GmbH



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THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

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## EC DECLARATION OF CONFORMITY

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B 320.1200-15 E Rev.: 11/06 EE-gr/ef

File : KonfErkl\_ATEX\_e\_tD\_B320\_1200\_15\_EN.doc

### Three-phase cage motors of type series

**DXE06, DXE08, DXE09, DXE11, DXE13, DXE16**

**with type of protection "e" and in special design for explosive areas with combustible dust II 2 D**

comply with the requirements of the following European Directive(s) in their latest version **94/9/EG** Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres proved by EC Type-Examination Certification (EC Prototype Test Certificate) by the Notified Body PTB (Identification No. 0102):

D.XE06 PTB 08 ATEX 3048    D.XE08 PTB 08 ATEX 3049    D.XE09 PTB 08 ATEX 3050  
D.XE11 PTB 08 ATEX 3051    D.XE13 PTB 08 ATEX 3052    D.XE16 PTB 08 ATEX 3053

and by compliance with the following standards and regulations:

EN 60079-0:2006 Electrical apparatus for explosive gas atmospheres: General requirements  
EN 60079-7:2007 Explosive atmospheres - Part 7: Equipment protection by increased safety "e"

proved by EC Type-Examination Certification (EC Prototype Test Certificate) by the Notified Body EXAM BBG(0158) **BVS 04 ATEX E 128** and compliance with the following standards and regulations:

"Electrical apparatus for use in the presence of combustible dust"

EN 61241-0:2006 Electrical apparatus for use in the presence of combustible dust: General requirements  
EN 61241-1:2004 Electrical apparatus for use in the presence of combustible dust: Protection by enclosures "tD"

#### Notes:

Gear units marked **II 2 G Ex e II T3 / II 2D Ex tD A21 IP6X T 120 °C** may be used in areas with potential hazard by:

- Gas explosions in Zones 1 and 2 (Categories 2 and 3), Temperature Class T3**  
Selection of output power, input speed and mounting arrangement as specified by Danfoss Bauer technical staff
- Dust explosions in Zones 21 and 22 (Categories 2 and 3), ignition temperature (layer and cloud) > 195 °C**  
for all listed mounting arrangements and input speeds up to 3000 r/min
- Explosions in such Zones by hybrid mixtures** consisting of explosive gas and combustible dust, provided the ignition characteristics of the mixture (e.g. the ignition temperatures) are not more unfavourable than the characteristics of the components of the mixture.

Installer and user must observe installation rules EN 60079-14 resp. EN 61241-14:

In case of duty in **gas explosion areas II 2 G and II 3 G** the motor winding is to be protected by means of a functionally tested current dependent time delayed overload device (bi-metal relay) as sole protection. The motor internal thermistors are only permitted as additional protection.

In case of duty in **dust explosive areas II 2 D and II 3 D** the motor internal thermistors together with a functionally tested monitoring device are to be used for sole protection.

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, Datum der Erstaussgabe 18.11.2004

Danfoss Bauer GmbH



ppa. Hanel  
(Leiter IM)



i.V. Dipl.-Ing. Eiffler  
(Leiter EE)

This declaration certifies the compliance with the indicated directives but implies no warranty of properties. The technical documentation is produced and administered by Bauer Gear Motor GmbH

THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

Erfüllungsort und Gerichtsstand: 73734 Esslingen  
Sitz: Esslingen-Neckar  
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## EC DECLARATION OF CONFORMITY

acc. to ATEX-Directive 94/9/EG (ATEX 95)  
for three-phase cage motors D.XC with type of explosion protection "tD"  
dust explosion protected for Zone 21

B 320.1100-13 E Rev.: 11/06 EE-gr/ief  
File : KonfErkl\_ATEX\_tD\_Z21\_B320\_1100\_13\_EN.doc

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#### Three-phase cage motors of type series

**D.XC04, D.XC05, D.XC06, D.XC07, D.XC08, D.XC09, D.XC11, D.XC13, D.XC16, D.XC18**  
of explosionprotection II 2D Ex tD A21 IP6X T < 160 °C acc. to EN 61241-0 and EN 61241-1  
optionally with built-on tachogenerator or back stop

comply with the requirements of the following European Directive(s) in their latest version  
**94/9/EG**

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by EC Type-Examination Certification (EC Prototype Test Certificate)  
by the Notified Body EXAM BBG(0158)

#### BVS 04 ATEX E 128

and compliance with the following standards and regulations:

"Electrical apparatus for use in the presence of combustible dust"

EN 61241-0:2006	Electrical apparatus for use in the presence of combustible dust: General requirements
EN 61241-1:2004	Electrical apparatus for use in the presence of combustible dust: Protection by enclosures "tD"

#### Notes:

The maximum surface temperature of the enclosure (related to ambient temperature 40 °C) is well below 160 °C.  
The drive units can be used in areas with combustible dusts having an  
Ignition temperature of a cloud > 240 °C  
Ignition temperature of a 5 mm layer > 235 °C.

#### Frequency Inverters for installation outside classified areas:

Frequency inverters of Danfoss type series VLT; 2800; 5000; 6000; FCD 300; FC 300.

**Inverters of other make** shall comply with the requirements of BAUER Operating Instructions 170..E

Installer and user must observe installation rules EN 61241-14 such as:

- For both feeding from the mains or via inverter supply the motor winding thermistors together with a function tested relay must be used as sole means of overload protection.
- Cable inlets must at least comply with degree of protection IP6X in accordance with EN 60529 in order to be dust protected.

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 21.06.2004

Danfoss Bauer GmbH



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(Leiter IM)



i.V. Dipl.-Ing. Eiffler  
(Leiter EE)

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THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

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## EC DECLARATION OF CONFORMITY

acc. to ATEX-Directive 94/9/EG (ATEX 95)

for three-phase cage motors D.XC with type of explosion protection "tD"  
dust explosion protected for Zone 21 T120°C

B 320.1100-15 E Rev.: 11/06 EE-gr/ef

File : KonfErkl\_ATEX\_ID\_Z21\_T120\_B320\_1100\_15\_EN.doc

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### Three-phase cage motors of type series

D.XC06, D.XC08, D.XC09, D.XC11, D.XC13, D.XC16, D.XC18

of explosion protection II 2D Ex tD A21 IP6X T 120 °C acc. to EN 61241-0 and EN 61241-1

optionally with built-on tachogenerator or back stop

comply with the requirements of the following European Directive(s) in their latest version

### 94/9/EG

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by EC Type-Examination Certification (EC Prototype Test Certificate)

by the Notified Body EXAM BBG(0158)

### BVS 04 ATEX E 128

and compliance with the following standards and regulations:

"Electrical apparatus for use in the presence of combustible dust"

EN 61241-0:2006 Electrical apparatus for use in the presence of combustible dust: General requirements

EN 61241-1:2004 Electrical apparatus for use in the presence of combustible dust: Protection by enclosures "tD"

### Notes:

The maximum surface temperature of the enclosure (related to ambient temperature 40 °C) is well below 120 °C.

The drive units can be used in areas with combustible dusts having an

Ignition temperature of a cloud > 180 °C

Ignition temperature of a 5 mm layer > 195 °C.

### Frequency Inverters for installation outside classified areas:

Frequency inverters of Danfoss type series VLT 2800; 5000; 6000; FCD 300; FC 300.

Frequency Inverters of other make shall comply with the requirements of BAUER Operating Instructions 170..E

Installer and user must observe installation rules EN 61241-14 such as:

- For both feeding from the mains or via inverter supply the motor winding thermistors together with a function tested relay must be used as sole means of overload protection.
- Cable inlets must at least comply with degree of protection IP6X in accordance with EN 60529 in order to be dust protected.

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 18.11.2004

Danfoss Bauer GmbH



ppa. Hanel  
(Leiter IM)



i.V. Dipl.-Ing. Eiffler  
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This declaration certifies the compliance with the indicated directives but implies no warranty of properties. The technical documentation is produced and administered by Bauer Gear Motor GmbH

THE GEAR MOTOR SPECIALIST

An Altra Industrial Motion Company

Erfüllungsort und Gerichtsstand: 73734 Esslingen  
Sitz: Esslingen-Neckar  
Registergericht: Amtsgericht Stuttgart HRB 736269  
Geschäftsführer: Karl-Peter Simon  
USt-IdNr.: DE 276650470 - Steuer Nr. 59330/13048

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BIC/SWIFT: ESSLDE66 IBAN: DE85 6115 0020 0101 5513 00  
Commerzbank Esslingen (BLZ 611 400 71) Nr. 700408800  
BIC/SWIFT: COBADEFF611 IBAN: DE21 6114 0071 0700 4088 00

## EC DECLARATION OF CONFORMITY

acc. to ATEX-Directive 94/9/EG (ATEX 95)

for three-phase cage motors with type of explosion protection "tD"  
due to explosion protected for Zone 22

B 320.1100-12 E Rev.: 11/06 EE-gr/ef

File : KonfErkl\_ATEX\_tD\_Z22\_B320\_1100\_12\_EN.doc

**Bauer Gear Motor GmbH**

Postfach 10 02 08  
D-73726 Esslingen  
Eberhard-Bauer-Str. 36-60  
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Telefon: (0711) 35 18 0  
Telefax: (0711) 35 18 381  
e-mail: info@bauergears.com  
Homepage: www.bauergears.com

### Three-phase cage motors of type series

**D.XS04, D.XS05, D.XS06, D.XS07, D.XS08, D.XS09, D.XS11, D.XS13, D.XS16, D.XS18**

**of special design with dust explosion protection II 3D Ex tD T<160 °C**

optionally with built-on brake and / or tacho generator, back stop, integrated frequency inverter

comply with the requirements of the following European Directive(s) in their latest version

### 94/9/EG

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by compliance with the following standards and regulations:

"Electrical apparatus for use in the presence of combustible dust"

EN 61241-0:2006	Electrical apparatus for use in the presence of combustible dust: General requirements
EN 61241-1:2004	Electrical apparatus for use in the presence of combustible dust: Protection by enclosures "tD"

### Notes:

The maximum surface temperature of the enclosure (related to ambient temperature 40 °C) is well below 160 °C.

The drive units can be used in areas with combustible dusts having a

Ignition temperature of a cloud > 240 °C

Ignition temperature of a 5 mm layer > 235 °C.

### Frequency Inverters for installation in Zone 22:

Integrated Danfoss inverters of type series Eta-K resp. FCD 300 or

separate inverters of type series FCD 300 marked "Ex II 3D"

### Frequency inverters for installation outside classified areas:

Frequency inverters of Danfoss type series VLT 2800; 5000; 6000; FCD 300; FC 300.

**Frequency inverters of other make** shall comply with the requirements of BAUER Operating Instructions 170..E

Installer and user must observe installation rules EN 61241-14 such as:

- Electrical machines must be protected against unacceptable heating (by a bi-metal overload relay, e.g.).
- In case of inverter duty the motor winding thermistors together with a function tested relay must be used as sole means of overload protection.
- Cable inlets must at least comply with degree of protection IP5X in accordance with EN 60529 in order to be dust protected.

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 01.05.2001

Danfoss Bauer GmbH



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BIC/SWIFT: COBADEFF611 IBAN: DE21 6114 0071 0700 4088 00

## EC DECLARATION OF CONFORMITY

acc. to ATEX-Directive 94/9/EG (ATEX 95)  
for three-phase cage motors with type of explosion protection "nA""

B 320.1200-13 E Rev.: 11/06 EE-gr/ef  
File : KonfErkl\_ATEX\_nA\_B320\_1200\_13\_EN.doc

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e-mail: info@bauergears.com  
Homepage: www.bauergears.com

#### Three-phase cage motors of type series

**D.XN04, D.XN05, D.XN06, D.XN07, D.XN08, D.XN09, D.XN11, D.XN13, D.XN16, D.XN18**  
In special design Ex nA II T3

comply with the requirements of the following European Directive(s) in their latest version

#### 94/9/EG

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by compliance with the following standards and regulations:

EN 60079-0:2006	Electrical apparatus for explosive gas atmospheres: General requirements
EN 60079-15:2005	Electrical apparatus for explosive gas atmospheres: Construction, test and marking of type of protection "n" electrical apparatus

#### Note:

##### Frequency Inverters for use in Zone 2:

Built-on Danfoss frequency inverters of the series Eta-K or FCD 300 or separate frequency inverters of the series FCD 300.

##### Frequency Inverters for use outside the explosive area:

Frequency inverters of the Danfoss VLT Series 2800; 5000; 6000; FCD300; FC300

Acc. to EN 60079-15, 17.8.2.2, the motor must be tested as one unit together with the laid down inverter. This condition is only fulfilled when using a Danfoss Bauer inverter.

In case of frequency inverter duty the motor internal thermistors are to be used with a functionally tested relay as sole overload protection.

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Esslingen, date of the initial edition 01.05.2001

Danfoss Bauer GmbH



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## EC DECLARATION OF CONFORMITY

acc. to ATEX-Directive 94/9/EG (ATEX 95)  
for three-phase cage motors with type of explosion protection  
"nA" for Zone 2 and "tD" dust explosion protected for Zone 22

B 320.1100-14 E Rev.: 11/06 EE-gr/ef  
File : KonfErkL\_ATEX\_nA\_ID\_B320\_1100\_14\_EN.doc

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### Three-phase cage motors of type series

**D.XS04, D.XS05, D.XS06, D.XS07, D.XS08, D.XS09, D.XS11, D.XS13, D.XS16, D.XS18**  
**of special design for use in areas with rarely explosive atmospheres category II 3 GD – Zone 2/22**

comply with the requirements of the following European Directive(s) in their latest version  
**94/9/EG**

Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres

proved by compliance with the following standards and regulations:

- EN 60079-0:2006 Electrical apparatus for potentially explosive atmospheres: General requirements  
EN 60079-15:2005 Electrical apparatus for explosive gas atmospheres: Construction, test and marking of type of protection "n" electrical apparatus  
EN 61241-0:2006 Electrical apparatus for use in the presence of combustible dust: General requirements  
EN 61241-1:2004 Electrical apparatus for use in the presence of combustible dust: Protection by enclosures "tD"

### Notes:

The safety instructions in the documentation attached to the product (e. g. operating instructions) must be followed.

Three-phase cage motors marked **Ex nA II T3 / Ex tD T<160° C** may be used in areas with potential hazard by:

- Gas explosions** in Zone 2 (category 3G), Temperature Class T3
- Dust explosions** in Zone 22 (category 3D), The maximum surface temperature of the enclosure (related to ambient temperature 40 °C) is well below 160 °C. The drive units can be used in areas with combustible dusts having an Ignition temperature of a cloud > 240 °C. Ignition temperature of a 5 mm layer > 235 °C.
- Explosions in such Zones by hybrid mixtures** consisting of explosive gas and combustible dust provided the ignition characteristics of the mixture (e.g. the ignition temperatures) are not more unfavourable than the characteristics of the components of the mixture.

Installer and user must observe installation rules EN 60079-14 resp. EN 61241-14 such as:

- Electrical machines must be protected against unacceptable heating (by a bi-metal overload relay, e.g.).
- In case of inverter duty the motor winding thermistors together with a function tested relay must be used as sole means of overload protection. For use in Zone 2 the motor has to be tested together with the defined converter as one unit. This condition is only fulfilled when using a Danfoss converter.
- Cable inlets must at least comply with degree of protection IP5X in accordance with EN 60529 in order to be dust protected.

Esslingen, date of the initial edition 16.11.2004

Danfoss Bauer GmbH



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THE GEAR MOTOR SPECIALIST

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Zertifizierungsstelle, Zertifizierungssektor Explosionsschutz

Physikalisch-Technische Bundesanstalt • Postfach 33 45 • 38023 Braunschweig

Bauer Gear Motor GmbH  
Herrn G. Eiffler  
Eberhard-Bauer-Str. 36 - 60  
73734 Esslingen

Ihr Zeichen: G. Eiffler  
Ihre Nachricht vom: 2011-06-09  
Unser Zeichen: 3.72-1904/11-Ne  
Unsere Nachricht vom:

Bearbeitet von: Frank Neugebauer  
Telefondurchwahl: +49 531 592-3536  
Telefaxdurchwahl: +49 531 592-3579  
E-Mail: Frank.Neugebauer@ptb.de

Datum: 9. Juni 2011

### Änderung der Firmenbezeichnung / Change of Company Name

Sehr geehrte Damen und Herren,  
Dear Madam, dear Sir,

aufgrund der Änderung des Firmennamens werden die bescheinigten Betriebsmittel der Firma  
Due to the change of the company name the certified apparatus manufactured by

#### Danfoss Bauer GmbH

mit der neuen Firmenbezeichnung  
are marked with the new company name

#### Bauer Gear Motor GmbH

gekennzeichnet.

Die ausgestellten Prüfbescheinigungen und die ihnen zugrundeliegenden Vertragsbedingungen sind weiterhin gültig.

The issued certificates and the conditions of contract forming the basis for these are furthermore valid.

Um Missverständnissen durch Unterschiede zwischen Prüfbescheinigungstext und Kennzeichnung vorzubeugen, wird vorgeschlagen, eine Kopie dieses Schreibens der jeweiligen Prüfbescheinigung beizufügen.

To prevent misunderstandings due to differences between certificate's wording and marking PTB proposes to add a copy of this letter to the respective certificate.

Mit freundlichen Grüßen / Yours faithfully,  
im Auftrag / On behalf of PTB:



Dr.-Ing. F. Lienesch



## **24 Service partners with officially authorised competent personnel**

In addition to the central service department in the Esslingen plant, the following partners with officially authorised personnel are available to help you.

These partners have been trained in the servicing of BAUER geared motors and have the necessary special tools.

### **EMS Elektro-Motoren GmbH**

Gewerbegebiet Egelsee 15

93354 Siegenburg

Tel.: 09444-976-0

Fax: 09444-976-177

[www.ems-elektromotoren.de](http://www.ems-elektromotoren.de)

### **Klebs & Hartmann GmbH & Co. KG**

August-Heller-Str. 3

67065 Ludwigshafen

Tel.: 0621-57900-0

Fax: 0621-57900-24

[www.klebs-hartmann.de](http://www.klebs-hartmann.de)

### **Scheib Elektrotechnik GmbH**

Martinstr. 38-42

40223 Düsseldorf

Tel.: 0211-90148-10

Fax: 0211-90148-11

[www.scheib-gmbh.de](http://www.scheib-gmbh.de)

### **Steinlen Elektromaschinenbau GmbH**

Ehlbeek 21

30938 Burgwedel

Tel.: 05139-8070-0

Fax: 05139-8070-60

[www.steinlen.de](http://www.steinlen.de)

## NOTES

## NOTES

## 25 Nominal data

After verification by routine testing, the following marking will be applied on the ratings plate:

Motor	Gearbox
<p data-bbox="183 405 456 475">Copy of the ratings plate with relevant data to be inserted after routine test</p>	<p data-bbox="668 405 941 475">Copy of the ratings plate with relevant data to be inserted after routine test</p>

### **Bauer Gear Motor GmbH**

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SV-0611/BAU5005787