



(1) **EU-TYPE EXAMINATION CERTIFICATE**  
**(Translation)**

(2) Equipment or Protective Systems Intended for Use in  
Potentially Explosive Atmospheres - **Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number:

**PTB 03 ATEX 3045**

**Issue: 1**

(4) Product: Thermal motor protection (TMP) Type U-EK230E

(5) Manufacturer: ZIEHL-ABEGG SE

(6) Address: Heinz-Ziehl-Straße, 74653 Künzelsau, Germany

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in the confidential Test Report PTB Ex 22-32091.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:  
**EN 50495:2010, EN IEC 60079-0:2018**

(10) If the sign "X" is placed after the certificate number, it indicates that the product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

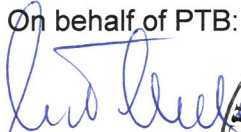
(12) The marking of the product shall include the following:

 **II (2) G [Ex eb Gb] [Ex db Gb] [Ex pxb Gb] resp**  **II (2) D [Ex tb Db] [Ex pxb Db]**

Konformitätsbewertungsstelle, Sektor Explosionsschutz

Braunschweig, July 26, 2022

On behalf of PTB:

  
Dr.-Ing. M. Thedens  
Regierungsdirektor



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EU-Type Examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

(13)

## SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 03 ATEX 3045 , Issue: 1**

(15) Description of Product

The TMP tripping units, type U-EK230E monitor, control and switching off explosion-protected motors of categories 2 and 3 (gas: zones 1 and 2; dust: zones 21 and 22) in accordance with RL2014/34/EU and non-explosion-protected motors. They work according to the closed-circuit principle.

Among the most important functions are: overtemperature detection, sensor-wire failure-detection and sensor-short-circuit detection in all sensor circuits.

The operating condition of the supply voltage and of the failures (overtemperature, PTC wire interruption and PTC short circuit) is signalized by light-emitting diodes (LEDs).

All functions in the thermistor tripping units serve to protect explosion-protected motors and non-explosion-protected motors in normal operation and in the event of a failure.

Additional information can be taken from the operating instructions "Type U-EK230E article No. 382008 (L-BAL-E185-D 2022/22 Index 005, ZNr. 1166-0710-03-DE of 30.05.2022) which are enclosed with the devices.

In addition, current versions can be downloaded from the following Internet page: [www.ziehl-abegg.de](http://www.ziehl-abegg.de) or [info@ziehl-abegg.de](mailto:info@ziehl-abegg.de).

For the mode of operation with low demand and the architecture "1oo1", composed of sub-systems according to type A, and hardware fault tolerance (HFT) = 0 (see EN 61508, Part 1, Table 2, and EN 61508, Part 2, Table 2), the following characteristic values of the functional safety were determined for the type U-EK230E at an ambient temperature of 40 °C (component temperature: 60 °C):

### Motor protection by thermistor:

Safety integrity level:	SIL 1 (type A)
Fraction of non-hazardous failures compared to hazardous failures (SFF):	55 %
Fraction of undetected dangerous failures ( $\lambda_{DU}$ ):	$4.26 \times 10^{-7} /h$
Fraction of detected, dangerous failures ( $\lambda_{DD}$ ):	0
Fraction of undetected, safe failures ( $\lambda_{SU}$ ):	$6.10 \times 10^{-8} /h$
Fraction of detected, safe failures ( $\lambda_{SD}$ ):	$4.52 \times 10^{-7} /h$

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Mean probability of a dangerous failure to perform the safety function on demand (PFD) at a maximum proof test interval T1 of max. 36 months (according to EN 60079-17):

PFD:  $5.60 \times 10^{-3}$  (requirement for SIL 1 as per standard:  $\geq 10^{-2}$  to  $< 10^{-1}$ ).

The mean operating time between failures (MTBF) is 52 years.

For the safety-related parts of control systems according to EN ISO 13849, the following data have been determined at an ambient temperature of 40 °C (component temperature: 60 °C):

Category 1 for a performance level (PL) = c, an average diagnostic coverage  $DC_{avg} = 0$ , and a mean time of 268 years until a dangerous failure of each channel ( $MTTF_d$ ) occurs for the type U-EK230E. (According to EN ISO 13849-1 standard, limited to a period of 100 years.)

**Note:** The performance level is the result of the risk assessment, related to the fraction of the risk reduction due to the safety-related parts of the control system.

**Note:**

**The functional safety data stated above are valid for an ambient temperature of 40 °C. Data for additional ambient temperatures can be obtained on request.**

For explosion-protected motors, only 3 and 6 PTC thermistors, resp., connected in series are permitted.

The changes compared to the former version concern the size of the printed circuit card, the layout design, the components and additional components for the RFID function.

(16) Test Report PTB Ex22-32091

(17) Specific conditions of use

None

(18) Essential health and safety requirements

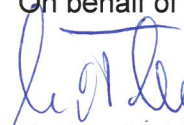

Met by compliance with the aforementioned standards.

According to Article 41 of Directive 2014/34/EU, EC-type examination certificates which have been issued according to Directive 94/9/EC prior to the date of coming into force of Directive 2014/34/EU (April 20, 2016) may be considered as if they were issued already in compliance with Directive 2014/34/EU. By permission of the European Commission supplements to such EC-type examination certificates and new issues of such certificates may continue to hold the original certificate number issued before April 20, 2016.

Konformitätsbewertungsstelle, Sektor Explosionsschutz

Braunschweig, July 26, 2022

On behalf of PTB:

  
  
Dr.-Ing. M. Thele  
Regierungsdirektor

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