Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
Nationales Metrologieinstitut

(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 12 ATEX 3006 **Issue: 2**

(4) Product: TMP tripping units of types MS(R) 220KA and MS(R) 220VA

(5) Manufacturer: Ziehl industrie-elektronik GmbH + Co KG

(6) Address: Daimlerstraße 13, 74523 Schwäbisch Hall, 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 21-31168.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 50495:2010, EN 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, November 16, 2021
On behalf of PTB:

Dr.-Ing. M. Thedens
Regierungsdirektor

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(13) # SCHEDULE

(14) **EU-Type Examination Certificate Number PTB 12 ATEX 3006, Issue: 2**

(15) Description of the Product

All TMP tripping units (also called PTC thermistor relays) MS(R)220KA and MS(R)220VA 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 of non-explosion-protected motors in normal operation and in the event of a failure.

The MS(R)220KA types are manufactured in seven variants. The MS(R)220VA types are manufactured in three variants.

TMP tripping units with a DC supply are without potential separation and permissible only with safety isolation transformers or when connected to a battery network.

Additional information can be found in the operating instructions of the PTC thermistor relays MS(R)220KA (10580-0700-06-DE) and MS(R)220VA (11660-0700-05-DE) which are enclosed with the devices.
In addition, updated versions can be downloaded from the website www.ziehl.de.

For the low-demand mode and the "**1oo1**" architecture, 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 functional safety characteristic values have been determined for the types MS(R)220KA and MS(R)220VA at an ambient temperature of 40 °C (component temperature: 60 °C):

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Motor protection by thermistor:

Safety integrity level:	SIL 1 (type A)

a) Types MS220KA and MS220VA

Fraction of non-hazardous failures compared to hazardous failures (SFF):	55 %
Fraction of undetected dangerous failures (λ_{DU}):	4.07×10^{-7} /h
Fraction of detected, dangerous failures (λ_{DD}):	0
Fraction of undetected, safe failures (λ_{SU}):	5.55×10^{-8} /h
Fraction of detected, safe failures (λ_{SD}):	4.44×10^{-7} /h

Average probability of a hazardous failure to perform the safety function on demand (PFD) at a proof test interval T1 of 36 months (in accordance with EN 60079-17):

PFD: 5.35×10^{-3} (requirement for SIL 1 as per standard: $\geq 10^{-2}$ to $< 10^{-1}$). The mean time between failures (MTBF) is 54 years.

b) MSR220KA and MSR220VA

Fraction of non-hazardous failures compared to hazardous failures (SFF):	55 %
Fraction of undetected dangerous failures (λ_{DU}):	4.26×10^{-7} /h
Fraction of detected, dangerous failures (λ_{DD}):	0
Fraction of undetected, safe failures (λ_{SU}):	6.1×10^{-8} /h
Fraction of detected, safe failures (λ_{SD}):	4.52×10^{-7} /h

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):

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PFD: 5.6 × 10^{-3} (requirement for SIL 1 as per standard: ≥ 10^{-2} to < 10^{-1}). The mean 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 types MS(R)220KA and MS(R)220VA.
(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 apply to the units of type MS(R)220VA and concern the size of the printed circuit card, the layout design, the components and additional components for the RFID function.

(16) Test Report PTB Ex 21-31168

(17) Specific conditions of use

None

(18) Essential health and safety requirements

Met by compliance with the aforementioned standards.

Konformitätsbewertungsstelle, Sektor Explosionsschutz — Braunschweig, November 16, 2021
On behalf of PTB:

Dr.-Ing. M. Thedens
Regierungsdirektor