



Re(1)

UK - Type Examination Certificate

(2) Equipment and protective systems intended for use in potentially explosive atmospheres – **UKSI 2016:1107 (as amended)**

(3) UK - Type Examination Certificate Number

EPS 22 UKEX 1 024

Revision 0

(4) Equipment: TMP tripping units type 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 equipment and any acceptable variation thereto are specified in the annex to this certificate and the documentation therein referred to.

(8) Bureau Veritas Consumer Products Services United Kingdom Limited, approved body No. 8507 in accordance with UKSI 2016:1107 (as amended) Part 4, certifies that this equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Schedule 1 of UKSI 2016:1107 (as amended). The examination and test results are recorded in the confidential documentation under the reference number 22TH0195.

(9) Compliance with the essential health and safety requirements has been assured by compliance with:

EN 50495:2010


EN IEC 60079-0:2018

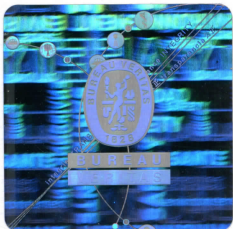
(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the annex to this certificate.

(11) This UK - Type Examination Certificate relates only to the design and construction of the specified equipment in accordance with UKSI 2016:1107 (as amended). Further requirements apply to the manufacture of this equipment and its placing on the market. Those requirements are not covered by this certificate.

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

 II (2) G [Ex eb Gb] [Ex db Gb] [Ex pxb Gb]

 II (2) D [Ex tb Db] [Ex pxb Db]



Certification department of explosion protection

Warrington, 24-11-2022

N. Wilkinson
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Bureau Veritas Consumer Products Services United Kingdom Limited
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Registered in England & Wales
Company Number: 00852439

ZERT-0003-GBR-ZE-EX-V01 / TEMP-0005-GBR-ZE-EX-V01



(13)

Annex

(14) **UK - Type Examination Certificate EPS 22 UKEX 1 024**

Revision 0

(15) Description of equipment:

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 signaled 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):

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}): $4.07 \times 10^{-7}/h$

Fraction of detected dangerous failures (λ_{DD}): 0

Fraction of undetected safe failures (λ_{SU}): $5.55 \times 10^{-8}/h$

Fraction of detected safe failures (λ_{SD}): $4.44 \times 10^{-7}/h$

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Average probability of a hazardous failure to perform the safety function on demand (PFD) at a proof test interval TI 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}): $4.26 \times 10^{-7}/h$

Fraction of detected dangerous failures (λ_{DD}): 0

Fraction of undetected safe failures (λ_{SU}): $6.1 \times 10^{-8}/h$

Fraction of detected safe failures (λ_{SD}): $4.52 \times 10^{-7}/h$

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

PFD: 5.6×10^{-3} (requirement for SIL 1 as per standard: $\geq 10^{-2}$ 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.

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- (16) Reference number: 22TH0195
- (17) Special conditions for safe use:
No special conditions.
- (18) Essential health and safety requirements:

Met by compliance with standards.

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