

Certificate



Product Safety
Functional
Safety

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No.: 968/EZ 348.08/20

Product tested	Infra-red and ultra-violet flame detector series	Certificate holder	Rosemount Inc. 6021 Innovation Boulevard Shakopee, MN 55379 USA
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Type designation	Spectrex Sharpeye 40/40 - I, R, M, LB, L4B, UB, UFL, UFI
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Codes and standards	IEC 61508 Parts 1-7:2010 EN 54-10:2002 + A1:2005	EN 50130-4:2011 + A1:2014
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Intended application	Detection of hydrocarbon based fuel and gas fires, hydroxyl and hydrogen fires as well as metal and inorganic fires. The Spectrex Sharpeye 40/40R, I, M, UB, LB, L4B, UFL, UFI flame detectors are suitable for safety-related applications in accordance with IEC 61508 up to SIL 2.
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Specific requirements	The safety notes in the User Manuals shall be considered. Details for the use in safety function can be found on the backside of this certificate.
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Valid until 2025-05-20

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/EZ 348.08/20 dated 2020-05-20.

This certificate is valid only for products which are identical with the product tested.

TÜV Rheinland Industrie Service GmbH
Bereich Automation
Funktionale Sicherheit
Am Grauen Stein, 51105 Köln

Köln, 2020-05-20

Certification Body Safety & Security for Automation & Grid

Dr. R. G. A.
Dr.-Ing. Thorsten Gantevoort

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Precisely Right.

Safety function:

The safety function of the *Sharpeye 40/40* is defined by recognizing of Hydrocarbon-based fuel and gas fires, hydroxyl and hydrogen fires as well as metal and inorganic fires and announces this over the 4 - 20 mA – interface, Analog Output – Interface (only UFI – Detector) and/or by opening the alarm-relay-contact.

Characteristics as per IEC 61508:

SIL	2
HFT	0
Device Type	B
Mode of operation	Low demand mode and high demand or continues mode (only 4040I; 4040M; 4040UFI)
SFF	95% (IR Detectors) 97% (UV Detectors)
Recommended time interval for proof-testing T1	180 days

	PFD _{avg}	PFD (%) of SIL2	PFH (1/h)	PFH (%) of SIL2	λ_{DU} (1/h)	λ_{DD} (1/h)	λ_D (1/h)	λ_S (1/h)
4040R								
Variant A	2,4E-04	2,4%	n.a.	n.a.	1,1E-07	1,3E-06	1,4E-06	1,2E-06
Variant B	2,6E-04	2,6%	n.a.	n.a.	1,2E-07	1,1E-06	1,2E-06	1,1E-06
4040I								
Variant A	3,1E-04	3,1%	n.a.	n.a.	1,4E-07	1,3E-06	1,5E-06	1,3E-06
Variant B	3,3E-04	3,3%	1,5E-07	15,0%	1,5E-07	1,2E-06	1,3E-06	1,1E-06
4040M								
Variant A	3,4E-04	3,4%	n.a.	n.a.	1,6E-07	1,3E-06	1,5E-06	1,3E-06
Variant B	3,6E-04	3,6%	1,6E-07	16,5%	1,6E-07	1,2E-06	1,4E-06	1,2E-06
4040UB								
Variant A	9,1E-05	0,9%	n.a.	n.a.	3,8E-08	9E-07	9,4E-07	9,6E-07
Variant B	1,1E-04	1,1%	n.a.	n.a.	4,7E-08	7,4E-07	7,9E-07	8,3E-07
4040UV/IR								
Variant A	2,7E-04	2,7%	n.a.	n.a.	4,9E-08	9,1E-07	9,7E-07	9,9E-07
Variant B	2,9E-04	2,9%	n.a.	n.a.	5,8E-08	7,5E-07	8,2E-07	8,6E-07
4040UFL								
Variant A	2,7E-04	2,7%	n.a.	n.a.	4,9E-08	9,1E-07	9,6E-07	9,9E-07
Variant B	2,9E-04	2,9%	n.a.	n.a.	5,8E-08	7,5E-07	8,1E-07	8,6E-07
4040UFI								
Variant A	3,1E-04	3,1%	n.a.	n.a.	1,4E-07	1,3E-06	1,5E-06	1,3E-06
Variant B	3,3E-04	3,3%	1,5E-07	15,0%	1,5E-07	1,2E-06	1,3E-06	1,1E-06
Variant C	2,9E-04	2,9%	n.a.	n.a.	1,3E-07	8,7E-07	1,0E-06	7,9E-07

Remarks:

- n.a.: not allowed for high demand mode!
- Variant A: Using only the Alarm - relay for Alarming
- Variant B: Using the 4-20 mA - Interface for Alarming
- Variant C: Using the Analog Output - Interface for Alarming in UFI-Detector
- Failure rates of the electronic components as per Siemens SN 29500, calculated based upon an ambient temperature of 55 °C and statistical data of the sensor elements
- The calculation was performed based on a proof-test interval T1 = 180 days.
- Without knowledge of the partly redundant internal structure of the detector a calculation with other proof-test intervals (e.g. 1 year) leads only to an approximate result