Certificate

Functional Safety

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No.: 968/FSP 1070.03/24

Product tested	Vortex/Swirl Flow Meter	**Certificate holder**	ABB Engineering (Shanghai) Ltd. No. 4528, Kangxin Highway Pudong New District Shanghai, 201319 P.R. China
Type designation	VortexMaster FSV450 / FSV430 (with output signal H5) SwirlMaster FSS450 / FSS430 (with output signal H5) Details see the actual "Revision List"		
Codes and standards	IEC 61508 Parts 1-7:2010		
Intended application	Flow measuring of gas, steam and liquids in pipes as part of a Safety Instrumented System (SIS). The flow meter complies with the requirements for SIL 2 / SC 2 acc. to IEC 61508 and can be used in a SIS up to SIL 2 acc. to IEC 61508 / IEC 61511:2016 + Corr.1:2016 + AMD1:2017. Further details see page 2 of certificate.		
Specific requirements	The instructions of the associated Safety Manual shall be considered.		

The issue of this certificate is based upon an evaluation in accordance with the Certification Program CERT FSP1 V3.0:2020 in its actual version, whose results are documented in Report No. 968/FSP 1070.03/24 dated 2024-02-21. This certificate is valid only for products, which are identical with the product tested. Issued by the certification body accredited by DAkkS according to DIN EN ISO/IEC 17065. The accreditation is only valid for the scope listed in the annex to the accreditation certificate D-ZE-11052-02-00.

TÜV Rheinland Industrie Service GmbH
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Am Grauen Stein, 51105 Köln

Köln, 2024-02-21

Certification Body Safety & Security for Automation & Grid

Dipl.-Ing. Gebhard Bouwer

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Precisely Right.

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Safety function: Measuring of the flow rate and output of an analog signal 4 - 20 mA proportional to the volume flow rate. The total valid range of the output signal shall be configured to a minimum of 3.8 mA and a maximum of 20.5 mA (Factory Default).

The safety related function of the transmitter is the safe monitoring of the volume flow rate with a tolerance of ±4% of the span (16 mA). The safe state is that the output current is lower than 3.6 mA or greater than 21 mA.

The downstream safety device must be configured to recognize the configured high alarms or low alarms as a malfunction detection.

Characteristics as per IEC 61508	**Value**
SIL	SIL 2 (single-channel architecture 1oo1, HFT = 0)
HFT	0
Device Type	B
Mode of operation	Low demand mode
SFF	CB board 94.3% FE board 97.7% Total: 97.07%
Recommended time interval for proof-testing T1	2 years
PFD_{avg} for T1 = 2 years.	CB board 1.00 E-03 10 % of SIL 2 FE board 1.46 E-03 14.6% of SIL 2 Total: 2.47 E-03 24.7 % of SIL 2
λ_{sd}	1520 FIT
λ_{su}	2730 FIT
λ_{dd}	5080 FIT
λ_{du}	282 FIT
λ_{tot}	9612 FIT

1 FIT = 1 E-09 1/h

Remark: Failure rates of the electronic components as per Siemens SN 29500, calculated based upon an ambient temperature of 100 °C.