

Certificate



Functional
Safety

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No.: 968/FSP 1205.02/21

Product tested	Pressure Transmitter and Transducer	Certificate holder	Dynisco 38 Forge Parkway Franklin, MA 02038 USA
Type designation	SPX 2xxx-..., SPX 3xxx-... (with linearity correction and process temperature compensation) (SPX-T 3xxx), SPX 4xxx-..., SPX 5xxx-... (with linearity correction) (SPX-L 5xxx), each optionally with separate monitoring channel for over-pressure (Guardian series, option code at the end of the model code: GCxxx)		
Codes and standards	ISO 13849-1:2015 EN 62061:2005 + AC:2010 + A1:2013 + A2:2015 IEC 61508 Parts 1-7:2010		
Intended application	Pressure measurement and monitoring, 4 - 20 mA output proportional to the pressure. The transmitters meet the requirements up to SIL 2 (low demand mode of operation) in HFT=0 architecture and SIL 2 (any mode of operation) in HFT=1 architecture acc. to IEC 61508 and IEC 61511-1 (Route 2), and may be used accordingly. They further meet in a HFT=0 architecture SIL 1 and in HFT=1 SIL 2 requirements of EN 62061. The monitoring channel in the Guardian Series Transducers meets Cat. 1 / PL c acc. to ISO 13849-1 and may be used accordingly in safety functions up to PL c and SIL 1 acc. to EN 62061/IEC 61508/IEC 61511-1. If 2 monitoring channels are used (HFT = 1 architecture), they may be used in safety functions up to PL d and SIL 2.		
Specific requirements	The instructions of the associated Operating Manual and the Datasheets shall be considered. Further information see page 2 of this certificate.		

The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/FSP 1205.02/21 dated 2021-05-05.

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, 2021-06-04

Certification Body Safety & Security for Automation & Grid

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Safety function: Measuring of pressure and output of an analogue signal 4 – 20mA proportional to the volume pressure applied to the sensor. 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 measurement of the pressure with a tolerance of $\pm 0.5\%$ of the span (worst-case). Monitoring for an excessive pressure condition has to be performed in the downstream safety device, the transmitter is connected to. This safety device has to treat output currents lower than 3.6 mA or greater than 21 mA as failure conditions. It must be configured to recognize the configured pressure range for the high alarms or low alarms as a safety trip and secondary alarms as defined by NAMUR are diagnostic failure.

The transmitters of the Guardian Series contain a separate HW monitoring channel for excessive pressure. In case the configured over-pressure value is exceeded the contact of the output relay opens.
It has to be considered, that it is not allowed to use the analogue output of a combi-transmitter for the control of a pressure and the monitoring output of the same transmitter for monitoring of an over-pressure condition at the same machine. In this case 2 different devices have to be used (see EN 1114-1, cl. 5.2.5).

Characteristics as per IEC 61508	Value	
SIL	SIL 2 (HFT = 0 architecture, 1oo1)	
Device Type	B	
Mode of operation	Low demand mode	
SFF	SPX Series 2	78 %
	SPX Series 3	79 %
	SPX Series 4	78 %
	SPX Series 5	78 %
	SPX Series Industrial	78 %
	Guardian	71 %
Recommended time interval for proof-testing T1	1 year	
PFD _{avg} for T1 = 1 year	SPX Series 2	4.8x10 ⁻⁵
	SPX Series 3	2.1x10 ⁻⁵
	SPX Series 4	4.8x10 ⁻⁵
	SPX Series 5	4.8x10 ⁻⁵
	SPX Series Industrial	4.8x10 ⁻⁵
	Guardian	4.8x10 ⁻⁵
PFH	SPX Series 2	2.2x10 ⁻⁸ 1/h
	SPX Series 3	9.4x10 ⁻⁹ 1/h
	SPX Series 4	2.2x10 ⁻⁸ 1/h
	SPX Series 5	2.2x10 ⁻⁸ 1/h
	SPX Series Industrial	2.2x10 ⁻⁸ 1/h
	Guardian	2.3x10 ⁻⁸ 1/h
λ_{tot}	SPX Series 2	99.2 FIT
	SPX Series 3	44.6 FIT
	SPX Series 4	99.2 FIT
	SPX Series 5	99.2 FIT
	SPX Series Industrial	99.2 FIT
	Guardian	79.6 FIT
λ_s	SPX Series 2	77.2 FIT
	SPX Series 3	35.1 FIT
	SPX Series 4	77.2 FIT
	SPX Series 5	77.2 FIT
	SPX Series Industrial	77.2 FIT
	Guardian	56.5 FIT
λ_d	SPX Series 2	22.0 FIT
	SPX Series 3	9.4 FIT
	SPX Series 4	22.0 FIT
	SPX Series 5	22.0 FIT
	SPX Series Industrial	22.0 FIT
	Guardian	23.2 FIT
λ_{du}	SPX Series 2	22.0 FIT
	SPX Series 3	9.4 FIT
	SPX Series 4	22.0 FIT
	SPX Series 5	22.0 FIT
	SPX Series Industrial	22.0 FIT
	Guardian	23.2 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 85 °C.