

# Certificate



Functional  
Safety

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**No.: 968/FSP 1205.02/21**

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |                                                          |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------|
| <b>Product tested</b>        | Pressure Transmitter and Transducer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Certificate holder</b> | Dynisco<br>38 Forge Parkway<br>Franklin, MA 02038<br>USA |
| <b>Type designation</b>      | SPX 2xxx-...,<br>SPX 3xxx-... (with linearity correction and process temperature compensation) (SPX-T 3xxx),<br>SPX 4xxx-..., SPX 5xxx-... (with linearity correction) (SPX-L 5xxx),<br>each optionally with separate monitoring channel for over-pressure (Guardian series, option code at the end of the model code: GCxxx)                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |                                                          |
| <b>Codes and standards</b>   | ISO 13849-1:2015 IEC 61508 Parts 1-7:2010<br>EN 62061:2005 + AC:2010 + A1:2013 +<br>A2:2015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |                                                          |
| <b>Intended application</b>  | 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. |                           |                                                          |
| <b>Specific requirements</b> | 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, 1001)                                                                                                                                                                                                                      |
| Device Type                                    | B                                                                                                                                                                                                                                                       |
| Mode of operation                              | Low demand mode                                                                                                                                                                                                                                         |
| SFF                                            | SPX Series 2                78 %<br>SPX Series 3                79 %<br>SPX Series 4                78 %<br>SPX Series 5                78 %<br>SPX Series Industrial       78 %<br>Guardian                    71 %                                    |
| Recommended time interval for proof-testing T1 | 1 year                                                                                                                                                                                                                                                  |
| PFD <sub>avg</sub> for T1 = 1 year             | SPX Series 2 $4.8 \times 10^{-5}$<br>SPX Series 3 $2.1 \times 10^{-5}$<br>SPX Series 4 $4.8 \times 10^{-5}$<br>SPX Series 5 $4.8 \times 10^{-5}$<br>SPX Series Industrial $4.8 \times 10^{-5}$<br>Guardian $4.8 \times 10^{-5}$                         |
| PFH                                            | SPX Series 2 $2.2 \times 10^{-8}$ 1/h<br>SPX Series 3 $9.4 \times 10^{-9}$ 1/h<br>SPX Series 4 $2.2 \times 10^{-8}$ 1/h<br>SPX Series 5 $2.2 \times 10^{-8}$ 1/h<br>SPX Series Industrial $2.2 \times 10^{-8}$ 1/h<br>Guardian $2.3 \times 10^{-8}$ 1/h |
| $\lambda_{tot}$                                | SPX Series 2                99.2 FIT<br>SPX Series 3                44.6 FIT<br>SPX Series 4                99.2 FIT<br>SPX Series 5                99.2 FIT<br>SPX Series Industrial       99.2 FIT<br>Guardian                    79.6 FIT            |
| $\lambda_s$                                    | SPX Series 2                77.2 FIT<br>SPX Series 3                35.1 FIT<br>SPX Series 4                77.2 FIT<br>SPX Series 5                77.2 FIT<br>SPX Series Industrial       77.2 FIT<br>Guardian                    56.5 FIT            |
| $\lambda_d$                                    | SPX Series 2                22.0 FIT<br>SPX Series 3                9.4 FIT<br>SPX Series 4                22.0 FIT<br>SPX Series 5                22.0 FIT<br>SPX Series Industrial       22.0 FIT<br>Guardian                    23.2 FIT             |
| $\lambda_{du}$                                 | SPX Series 2                22.0 FIT<br>SPX Series 3                9.4 FIT<br>SPX Series 4                22.0 FIT<br>SPX Series 5                22.0 FIT<br>SPX Series Industrial       22.0 FIT<br>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.