FUNCTIONAL SAFETY ASSESSMENT

This certifies, that the company

Sensitron S.r.l.
Via della Repubblica, 48
20007 Cornaredo (MI)
Italy

Manufacturing plant: **Sensitron S.r.l.**
Via della Repubblica, 48
20007 Cornaredo (MI)
Italy

Is authorized to provide the product mentioned below with the mark as illustrated

Description of product:
(Details see Annex 1)

Control System MULTISCAN++S2**
**** Configuration covered: 8, 32, 64, 128 and 256 inputs**

Tested in accordance with:

EN 61508: 2010 Parts 1, 2, 3, 4, 5, 6, 7
EN 50402: 2017

Inspection & Certification Services
TÜV
TÜV NORD Italia S.r.l.

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TÜV NORD Italia S.r.l. (TÜV NORD Group)
Via Turati, 70 20023 Cerro Maggiore (MI) www.tuev-nord.it

Cerro Maggiore, 2023-08-11
prodotto@tuev-nord.it

Please also pay attention to the information stated overleaf

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Product description	Model MULTISCAN++S2** — Central unit with input and output modules Four open BUS-connections Housing: 19“ 6U (HE) rack or plastic cabinet dimensions 426 x 460 x 148 mm Inputs: Max 256 RS485 communications gas detectors loop connected (IDI version) or 4-20mA through STG/IN8-S2 Modules Outputs: 8 relays onboard. 256 open collectors on remote modules STG/OUT16-S2. 8 Relays board to connect to STG/OUT16-S2 Modules. Serial ports: 4 x RS485 – 1 x RS232 (PC Connect) Power supply: 12-24 Vdc rack 19“. 230 Vac box version. Operating temperature: 0°C ÷ + 55°C Storage temperature: -20°C ÷ +60°C Operating humidity: 15% ÷ 85% Storage humidity: 5% ÷ 85% (not condensing)
Type designation:	Control System MULTISCAN++S2** HW Version: 1.0.2 FW Version: 3.0.4 Refer to the internal document DN 92.0
Safety related data:	To achieve the claimed SIL-compliance for the Multiscan++ the conditions for use overleaf have to be obeyed. Function 1: CPU + STG/OUT16-S2 Function 2: CPU + STG/OUT16-S2 with STG/8REL Function 3: CPU + STG/IN8-S2 + STG/OUT16-S2 Function 4: CPU + SSTG/IN8-S2 + STG/OUT16-S2 with STG/8REL Functions 1 and 2 for connection of digital detectors only; Functions 3 and 4 if also analogue detectors are used Model MULTISCAN++S2** — Central unit + input and output modules. Two closed BUS-loops for high availability

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	Single channel use of Multiscan++			
	Function 1	Function 2	Function 3	Function 4
Safety Function	Open collector or relay output of alarm			
Measuring range	0-100% LEL ; 0-XX %Vol. ; 0-XXX ppm			
SIL Capability Hardware	2			
SIL Capability Software	3			
Type of device	B			
Proof test interval	1 year			
MTTR	72 h			
SFF	97,70%	95,96%	98,24%	95,96%
HFT	0			
β factor	-			
PFD_{avg}	$2{,}00 \times 10^{-4}$	$3{,}65 \times 10^{-4}$	$2{,}30 \times 10^{-4}$	$3{,}94 \times 10^{-4}$
λ_{du} (per h)	$3{,}03 \times 10^{-8}$	$6{,}56 \times 10^{-8}$	$3{,}11 \times 10^{-8}$	$6{,}64 \times 10^{-8}$
λ_{dd} (per h)	$9{,}07 \times 10^{-7}$	$1{,}01 \times 10^{-6}$	$1{,}27 \times 10^{-6}$	$1{,}38 \times 10^{-6}$
λ_{su} (per h)	$3{,}15 \times 10^{-7}$	$3{,}28 \times 10^{-7}$	$4{,}04 \times 10^{-7}$	$4{,}16 \times 10^{-7}$
λ_{sd} (per h)	$6{,}95 \times 10^{-8}$	$6{,}97 \times 10^{-8}$	$6{,}95 \times 10^{-8}$	$6{,}97 \times 10^{-8}$

Conditions for safe use:

For the rules of functional safety only closed loop system shall be used.
The values for the SIL-Capability of the Multiscan++ central unit and the determined failure rates are valid only if the following conditions for use will be obeyed (responsibility of the user).

The environmental parameters (e.g. the ranges for temperature, humidity and pressure) specified in the users manual have to be observed and followed for the Multiscan++ and the detectors connected.

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Analogue 4 – 20 mA detectors to be connected to the input module Rio-In have to comply with the requirements for SIL 2 and the following interface specification:

Below 3 mA	Fault Low Level	will be interpreted as detector fault
Between 3 mA and 4 mA	Under-Scale	when gas signal is indicated negative
4 mA	Zero Level	when gas signal is zero.
20 mA	Full Scale	when the gas signal is 100% of measuring range
between 20 mA and 21 mA	Over-Range	when gas signal is above measuring range
Above 21 mA	Fault High Level	will be interpreted as detector fault

When detectors from Sensitron will be used Sensitron is responsible to choose the appropriate types of detectors.
Digital detectors from Sensitron have to be used because the detectors connected have to comply with the Sensitron–specific high safety data protocol from Multiscan++.
The detectors connected have to be placed at a position suitable for the measuring application, to be connected correctly to the Multiscan++ and the whole system has to be put into operation by Sensitron or an authorized installer company.

The proof test has to be carried out minimum once per year. As proof test a regular calibration of all detectors connected using a certified calibration gas mixture has to be carried out.

The correct indication of measuring values has to be confirmed at the Multiscan++.

All safety related output functions have to be tested for correct operation including the switching of the relays to detect the presence of faulty relays.

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