X1-NIS-DI-03

SIL3 Line-Fault Transparent Switch/Proximity Repeater

The Switch/Proximity Detector Repeater X1-NIS-DI-03 is a module suitable for applications requiring SIL 3 level in safety related systems for high risk industries. The unit can be configured for switches or proximity detectors. The output port can assume two different impedance values (RL or RH) or it can open completely. The module output repeats the input state according to the following correspondence: low input impedance -> RL, high input impedance -> RH. Alternatively, the output can be configured to invert the input state. In both cases, the output can be configured to open if any fault (open or short circuit) occurs at the corresponding input. Four different (RL, RH) sets can be selected through DIP switch to match different system Digital Input card requirements. To ease maintenance operations, field devices can be disconnected through a two-position insertion/extraction mechanism. This product requires a dedicated Termination Board.

FEATURES

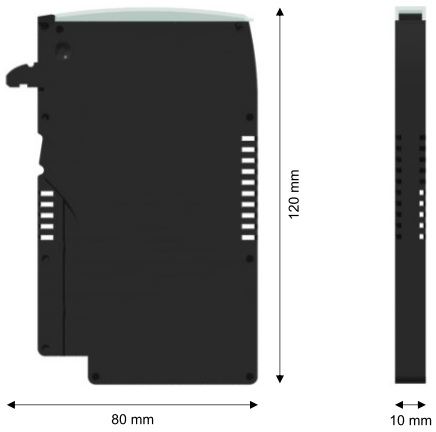
- SIL 3 / SC 3
- Installation in Zone 2 / Division 2
- Loop disconnection to ease maintenance operations
- Mechanical polarization key to prevent destructive mismatches
- High frequency transistor output
- Field open and short circuit detection (DIP switch programmable)
- Inverted output available (DIP switch programmable)
- Line fault transparency to system Digital Input (when fault enabled)
- Three port isolation, Input/Output/Supply

ORDERING INFORMATION

Ordering codes

X1-NIS-DI-03-S: 1 channel

OVERALL DIMENSIONS



TECHNICAL DATA

General

Power dissipation: 0.5 W (excluding output dissipation) @ 24 Vdc with short circuit input and closed output, typical.

System Supply

24 Vdc nom (18 to 28.8 Vdc).
Current consumption: 20 mA @ 24 Vdc with short circuit input and closed output, typical.

System Out

MOSFET switches, with series (RL) and parallel (RH-RL) resistances. RL and RH are DIP switch selectable to match different Supervised Digital Input cards requirements.
Output impedance: DIP switch programmable RL/RH combinations: 2.2 kΩ/12.2 kΩ, 0.47 kΩ/1.38 kΩ, 5 kΩ/15 kΩ, 0 Ω/ 33.2 kΩ.
Fault impedance: > 1 MΩ.
Max voltage: 28.8 Vdc.
Max current: 10 mA (RL/RH=2.2 kΩ/12.2 kΩ),
12 mA (RL/RH=0.47 kΩ/1.38 kΩ), 15 mA in all other cases.
Response time: ≤ 1 ms.
Frequency response: 500 Hz maximum.

Field In

Voltage source according to NAMUR standard.
Input equivalent source: 8 V/1 kΩ typical (8 V no load, 8 mA short).
Input switching current levels: ON ≥ 2.1 mA, OFF ≤ 1.2 mA.
No fault: input current ≥ 0.35 mA and input resistance ≥ 360 Ω.
Open fault: input current ≤ 0.05 mA.
Short fault: input resistance ≤ 100 Ω.

Fault

Field sensor fault is mirrored to the DI card and it is available on the common fault line, when input diagnostics is active.

Isolation

Field In/System Out 2.5 kV; Field In/System Supply 2.5 kV; System Out/System Supply 500 V.

Environmental conditions

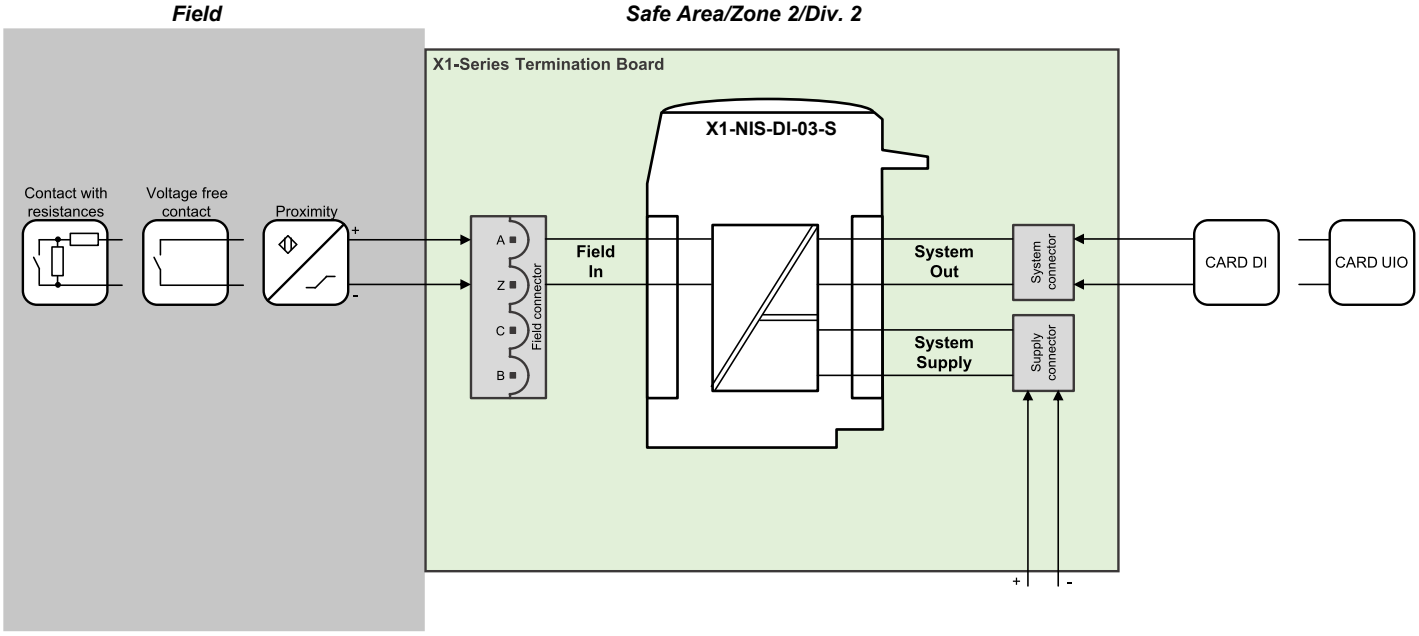
Operating temperature: temperature limits –40 to +70 °C.
Storage temperature: temperature limits –45 to +80 °C.

Mounting

On custom Termination Board.
Weight: about 55 g.
Dimensions: Width 10 mm, Depth 80 mm, Height 120 mm.

Functional Safety Management Certification:
GM International is certified to conform to IEC61508:2010 part 1 clauses 5-6 for safety related systems up to and included SIL3. In addition, GM International products have been granted I.S. certificates from the most credited Notified Bodies in the world.

FUNCTION DIAGRAM



*Additional installation diagrams may be found in Instruction Manual.

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