# OMRON

**NX-S□**
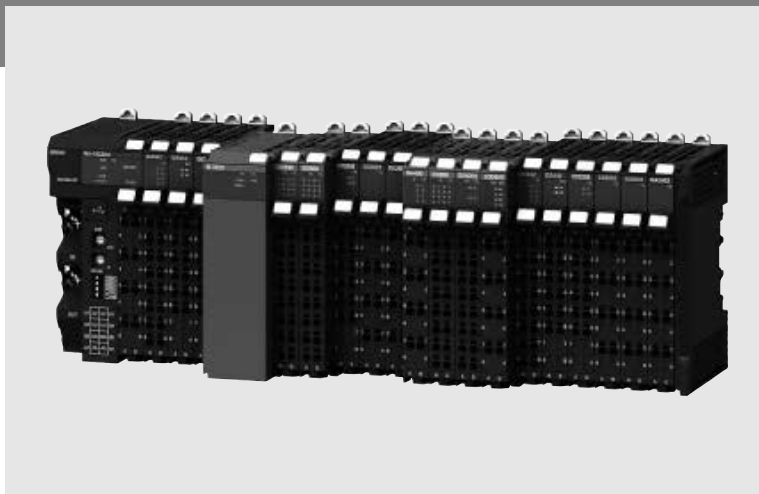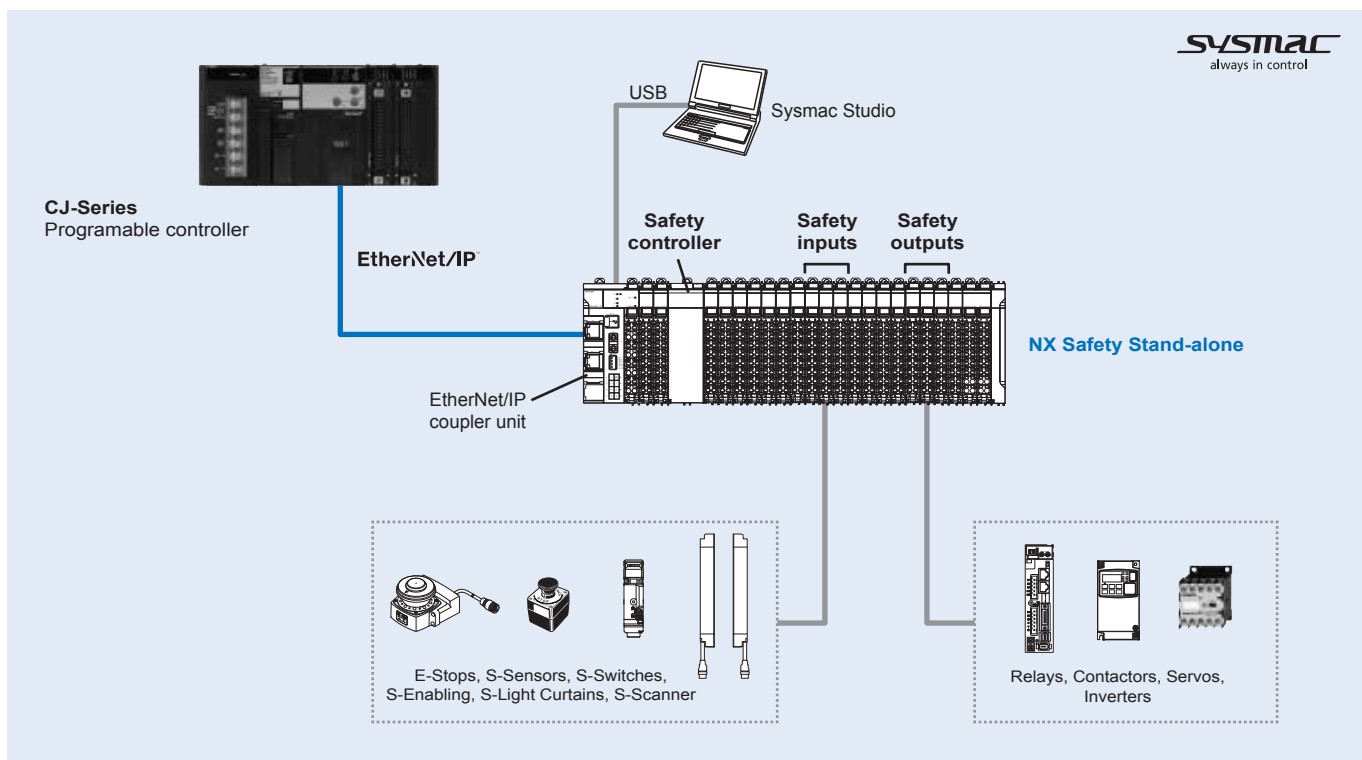
# NX safety stand-alone

## Safety stand-alone into machine automation

- Expandable safety system up to 32 safety connections or 63 standard connections
- Safety controller flexible system lets your freely mix safety I/O units with standard NX I/O digital or analogue
- The safety controller meets Category 4, PLe according to the ISO 13849-1 and SIL 3 according to the IEC 61508
- Programming tool conforming with IEC 61131-3
- Safety PLCopen function blocks
- Compatible and reusable Sysmac Studio software program user codes

## System configuration



**CJ-Series**
Programable controller

EtherNet/IP

USB

Sysmac Studio

sysmac
always in control

**Safety controller**   **Safety inputs**   **Safety outputs**

EtherNet/IP coupler unit

**NX Safety Stand-alone**

E-Stops, S-Sensors, S-Switches, S-Enabling, S-Light Curtains, S-Scanner

Relays, Contactors, Servos, Inverters

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## Specifications

### Regulations and standards

| Certification body | Standards | |
|---|---|---|
| TÜV Rheinland[*1] | EN ISO 13849-1: 2008 + AC: 2009<br>EN ISO 13849-2: 2012<br>IEC 61508 parts 1-7: 2010<br>EN 62061: 2005<br>EN 61131-2: 2007<br>EN ISO 13850: 2008<br>EN 60204-1: 2006 + A1: 2009 + AC: 2010 | EN 61000-6-2: 2005<br>EN 61000-6-4: 2007<br>NFPA 79: 2012<br>ANSI RIA 15.06-1999<br>ANSI B11.19-2010<br>UL1998<br>IEC 61326-3-1: 2008 |
| UL | cULus: Listed (UL508) and ANSI/ISA 12.12.01 | |

*1. Certification was received for applications in which OMRON FSoE devices are connected to each other.

The NX-series Safety Control Units allow you to build a safety control system that meets the following standards.
- Requirements for SIL 3 (Safety Integrity Level 3) in IEC 61508, EN 62061, Safety Standard for Safety Instrumented Systems (Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems)
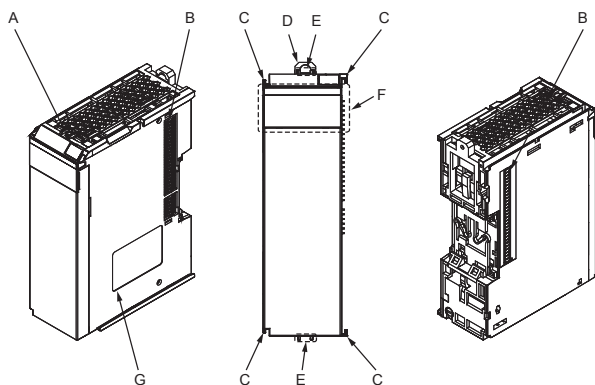- Requirements for PLe (Performance Level e) and for safety category 4 in EN ISO13849-1

The NX-series Safety Control Units are also registered for C-Tick and KC compliance.

### General specifications

| Item | | Specifications |
|---|---|---|
| Enclosure | | Mounted in a panel |
| Grounding method | | Ground to 100 Ω or less |
| Operating environment | Ambient operating temperature | 0 to 55°C |
| | Ambient operating humidity | 10% to 95% (with no condensation or icing) |
| | Atmosphere | No corrosive gases |
| | Ambient storage temperature | –25 to 70°C (with no condensation or icing) |
| | Altitude | 2,000 m max. |
| | Pollution degree | 2 or less: Conforms to JIS B3502 and IEC 61131-2 |
| | Noise immunity | Compliant with IEC 61131-2<br>2 kV on power supply line (compliant with IEC 61000-4-4) |
| | Insulation class | Class III (SELV) |
| | Overvoltage category | Category II: Conforms to JIS B3502 and IEC 61131-2 |
| | EMC immunity level | Zone B |
| | Vibration resistance | Compliant with IEC 60068-2-6<br>5 to 8.4 Hz, 3.5-mm amplitude, 8.4 to 150 Hz, acceleration: 9.8 $m/s^2$ for 100 minutes each in X, Y and Z directions (time coefficient: 10 minutes x coefficient factor 10 = total time 100 min.) |
| | Shock resistance | Compliant with IEC 60068-2-27<br>147 $m/s^2$, 3 times each in X, Y and Z directions |
| | Insulation resistance | 20 MΩ between isolated circuits (at 100 VDC) |
| | Dielectric strength | 510 VAC for 1 min between isolated circuits, leakage current: 5 mA max. |
| Installation method | | DIN track (IEC 60715 TH35-7.5/TH35-15) |
| Applicable standards | | EN ISO 13849-1, 13849-2: 2008 PLe/Safety Category 4<br>IEC 61508: 2010 SIL 3, EN 62061: 2005 SIL CL3<br>UL 1988<br>cULus: listed (UL508), ANSI/ISA 12.12.01<br>EC: EN 61131-2, C-Tick, KC: KC Registration |

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## Nomenclature

### Safety controller unit



| Symbol | Name | Function |
|---|---|---|
| A | Marker installation location | These are where markers are attached. OMRON markers are attached when the unit is shipped. You can also attach commercially available markers. |
| B | NX bus connector | This is the NX-series bus connector. It is used to connect an NX-series safety I/O unit or other NX unit. |
| C | Unit hookup guide | This guide is used to connect the unit to another unit. |
| D | DIN track mounting hooks | These hooks are used for installation on a DIN track. |
| E | Unit pull out tabs | Place your fingers on these tabs to pull out the unit. |
| F | Indicators | The indicators show the current operating status of the NX unit and signal I/O status. The number of indicators depend on the NX unit. |
| G | Unit specifications | The specifications of the NX unit are given here. |

### Safety controller unit

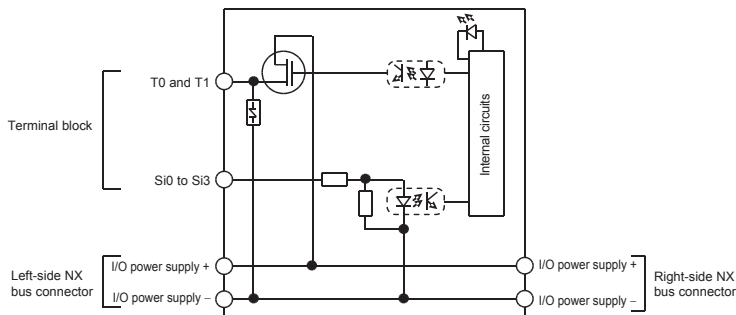| Item | Specifications |
|---|---|
| Model | **NX-SL3300** |
| Name | Safety CPU unit |
| Maximum number of safety I/O points | 256 points |
| Program capacity | 512 KB |
| Number of safety master connections | 32 |
| External connection terminals | None |
| Unit power consumption | 0.90 W max. |
| I/O power supply system | Not supplied |
| I/O current consumption | No consumption |
| Current capacity of I/O power supply terminal | No I/O power supply terminals |
| I/O refreshing method | Free-run refreshing |
| Dimensions (W × H × D) | 30 × 100 × 71 |
| Weight | 75 g max. |

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## Safety I/O unit

### Safety input unit

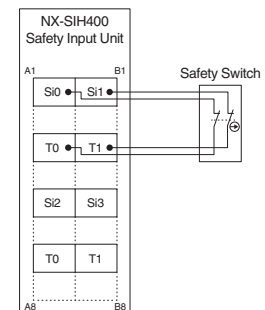| Item | Specifications | |
|---|---|---|
| Model | NX-SIH400 | NX-SID800 |
| Name | Advanced safety input unit | Safety input unit |
| Number of safety inputs | 4 points | 8 points |
| Number of test outputs | 2 points | |
| Internal I/O common | Sinking (PNP) | |
| Rated input voltage | 24 VDC | |
| OMRON special safety input devices | Can be connected | Cannot be connected |
| Number of safety slave connections | 1 | |
| Safety input current | 4.5 mA | 3.0 mA |
| Safety input ON voltage | 11 VDC min. | 15 VDC min. |
| Safety input OFF voltage/OFF current | 5 VDC max., 1 mA max. | |
| Test output type | Sourcing outputs (PNP) | |
| Rated current of test outputs | 25 mA max. | 50 mA max. |
| Residual ON voltage of test outputs | 1.2 V max. | |
| Leakage current of test outputs | 0.1 mA max. | |
| Dielectric strength | 510 VAC for 1 min between isolated circuits, leakage current: 5 mA max. | |
| Insulation resistance | 20 MΩ min. between isolated circuits (at 100 VDC) | |
| Isolation method | Photocoupler isolation | |
| Unit power consumption | 0.70 W max. | 0.75 W max. |
| I/O power supply system | Power supplied through the NX bus | |
| I/O current consumption | 20 mA max. | |
| Current capacity of I/O power supply terminal | No applicable terminals | |
| I/O refreshing method | Free-run refreshing | |
| Terminal block type | Screwless push-in terminals 8 terminals (A + B) | Screwless push-in terminals 16 terminals (A + B) |
| Dimensions (W × H × D) | 12 × 100 × 71 | |
| Weight | 70 g max. | |
| Maximum cable length | Devices with mechanical contacts: 400 m, other devices: 100 m | |
| Protective functions | Overvoltage protection circuit and ground fault detection (test outputs) | |

## Circuit layout

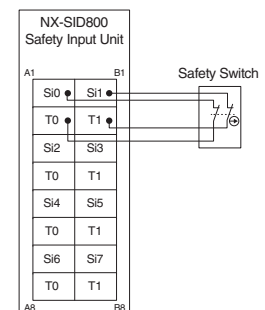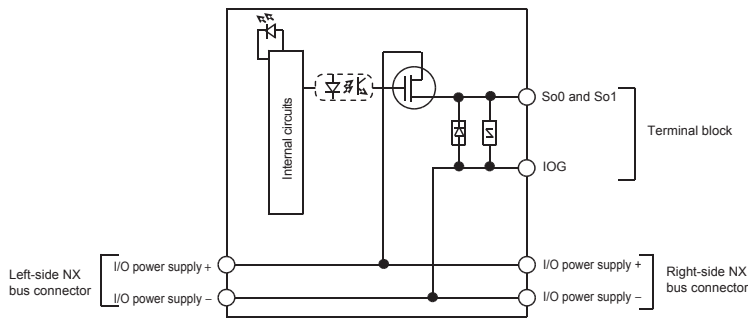### NX-SIH400



### NX-SID800



## Terminal wiring

### NX-SIH400



### NX-SID800

## Safety output unit

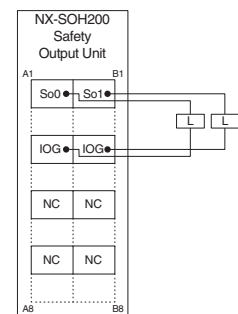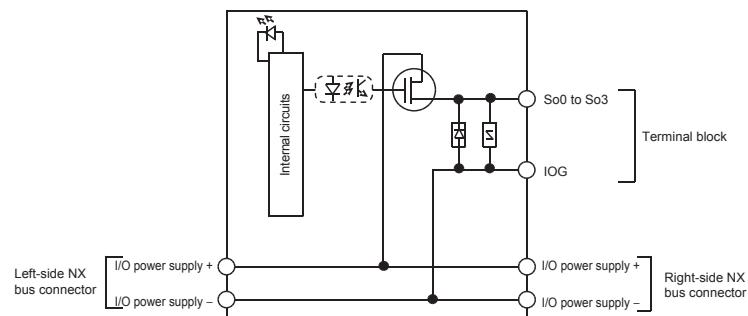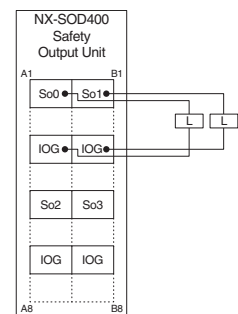| Item | Specifications | |
|---|---|---|
| Model | NX-SOH200 | NX-SOD400 |
| Name | High-current safety output unit | Safety output unit |
| Number of safety outputs | 2 points | 4 points |
| Internal I/O common | Sourcing outputs (PNP) | |
| Maximum load current | 2.0 A/point, 4.0 A/unit at 40ºC, 2.5 A/unit at 55ºC The maximum load current depends on the installation orientation and ambient temperature. | 0.5 A/point and 2.0 A/unit |
| Rated voltage | 24 VDC | |
| Number of safety slave connections | 1 | |
| Safety output ON residual voltage | 1.2 V max. | |
| Safety output OFF residual voltage | 2 V max. | |
| Safety output leakage current | 0.1 mA max. | |
| Dielectric strength | 510 VAC for 1 min between isolated circuits, leakage current: 5 mA max. | |
| Insulation resistance | 20 MΩ min. between isolated circuits (at 100 VDC) | |
| Isolation method | Photocoupler isolation | |
| Unit power consumption | 0.70 W max. | 0.75 W max. |
| I/O power supply system | Power supplied through the NX bus | |
| I/O current consumption | 40 mA max. | 60 mA max. |
| Current capacity of I/O power supply terminal | IOG: 2 A max./terminal | IOG (A3 and B3): 2 A max./terminal, IOG (A7 and B7): 0.5 A max./terminal |
| I/O refreshing method | Free-run refreshing | |
| Terminal block type | Screwless push-in terminals 8 terminals (A + B) | |
| Dimensions (W × H × D) | 12 × 100 × 71 | |
| Weight | 65 g max. | |
| Maximum cable length | 100 m | |
| Protective functions | Overvoltage protection circuit and ground fault detection | |

**Circuit layout**

**Terminal wiring**

**NX-SOH200**

**NX-SOH200**



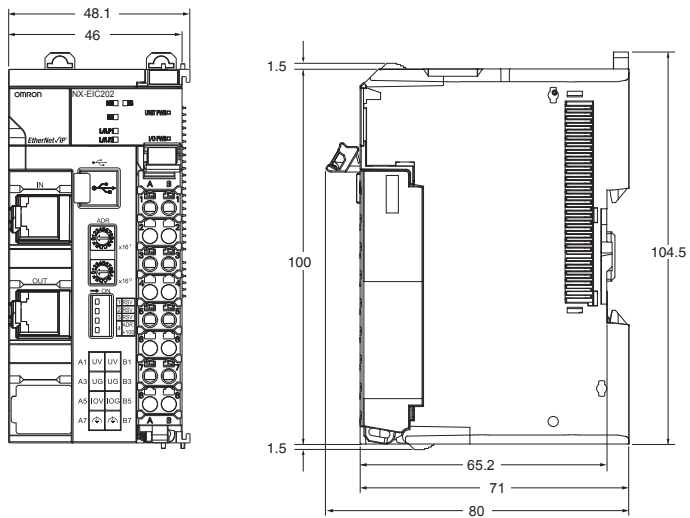**NX-SOD400**

**NX-SOD400**

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## Dimensions

### Communication coupler unit (EtherNet/IP)

**NX-EIC202**

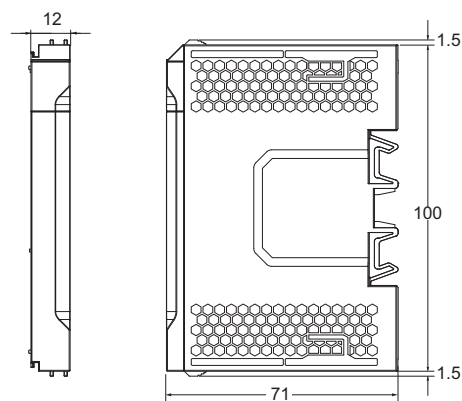

### Safety controller unit

**NX-SL3300**



### Safety I/O unit

**12 mm width**



### End cover unit (included with communication coupler)

**NX-END01**

## Ordering information

### Communication coupler unit

| Type | Signal type | Specifications | Connection | Max. I/O power supply | Width | Model |
|---|---|---|---|---|---|---|
| Communication coupler | EtherNet/IP slave | Up to 63 I/O units<br>Max. 512 bytes in + 512 bytes out<br>Supports local safety communication<br>Free run I/O refresh mode only | 2 RJ45 ports with built-in switch | 10.0 A | 46 mm | NX-EIC202 |

### Safety controller unit

| Type | Safety master connections | Safety I/O points | Program capacity | Width | Model |
|---|---|---|---|---|---|
| Safety CPU | 32 | 256 points max. | 512 KB | 30 mm | NX-SL3300 |

### Safety I/O unit

#### Safety input unit

| Type | Signal type | Safety slave connections | Safety inputs | Test outputs | Width | Model |
|---|---|---|---|---|---|---|
| Safety input | PNP type | 1 | 4 points | 2 points | 12 mm | NX-SIH400 |
| | | | 8 points | 2 points | 12 mm | NX-SID800 |

#### Safety output unit

| Type | Signal type | Safety slave connections | Safety outputs | Width | Model |
|---|---|---|---|---|---|
| Safety output | PNP type | 1 | 2 points | 12 mm | NX-SOH200 |
| | | | 4 points | 12 mm | NX-SOD400 |

### System unit

| Type | Specifications | Width | Model |
|---|---|---|---|
| End cover | Included with communication coupler | 12 mm | NX-END01 |

### Accessories

| Name | Specifications | Model |
|---|---|---|
| Terminal block coding pins | For 10 units (Terminal block: 30 pins, unit: 30 pins) | NX-AUX02 |
| Terminal block | Replacement front connector with 8 wiring terminals (A + B) | NX-TBA082 |
| | Replacement front connector with 16 wiring terminals (A + B) | NX-TBA162 |

### Computer software

| Name | Model |
|---|---|
| Sysmac Studio version 1.10 or higher[1] | SYSMAC-SE2□□□ |

*1. Please contact your OMRON representative for compatibility between the Sysmac Studio version 1.09 or lower and NX I/O units.

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