chanhvinh.com

# NX-series Temperature Input Unit / Heater Burnout Detection Unit

# NX-TS/HB

CSM_NX-TS_HB_DS_E_4_1

## NX Units to meet every temperature control need

- Temperature Input Unit (NX-TS)
  Standard and high-speed, high-precision temperature measurement and control
- Heater Burnout Detection Unit (NX-HB)
  Temperature control with heater burnout detection in conjunction with a temperature input unit and PID instructions



NX-TS2101 NX-TS3101 NX-TS2201 NX-TS3201



NX-HB3101

## General Specifications

| Item | | Specification |
|---|---|---|
| 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 | Must be free from corrosive gases. |
| | Ambient storage temperature | –25 to 70°C (with no condensation or icing) |
| | Altitude | 2,000 m max. |
| | Pollution degree | 2 or less: Meets IEC 61010-2-201. |
| | Noise immunity | 2 kV on power supply line (Conforms to IEC61000-4-4.) |
| | Overvoltage category | Category II: Meets IEC 61010-2-201. |
| | EMC immunity level | Zone B |
| | Vibration resistance | Conforms to IEC 60068-2-6.<br>5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 $m/s^2$, 100 min each in X, Y, and Z directions<br>(10 sweeps of 10 min each = 100 min total) |
| | Shock resistance | Conforms to IEC 60068-2-27. 147 $m/s^2$, 3 times each in X, Y, and Z directions |
| Applicable standards * | | cULus: Listed (UL508), ANSI/ISA 12.12.01, EU: EN 61131-2, C-Tick or RCM, KC Registration, NK, LR |

* Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

Sysmac is a trademark or registered trademark of OMRON Corporation in Japan and other countries for OMRON factory automation products.
EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
EtherNet/IP™ is a trademark of ODVA.
Other company names and product names in this document are the trademarks or registered trademarks of their respective companies.

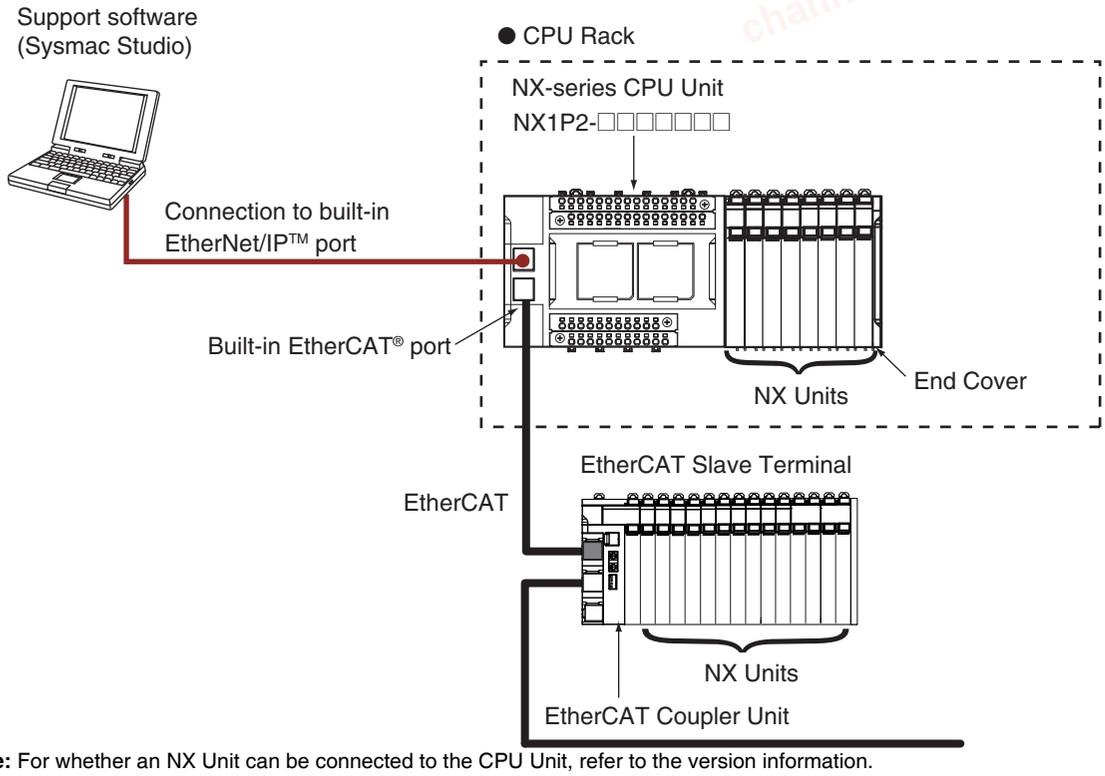
chanhvinh.com



# System Configurations

## Connected to a CPU Unit

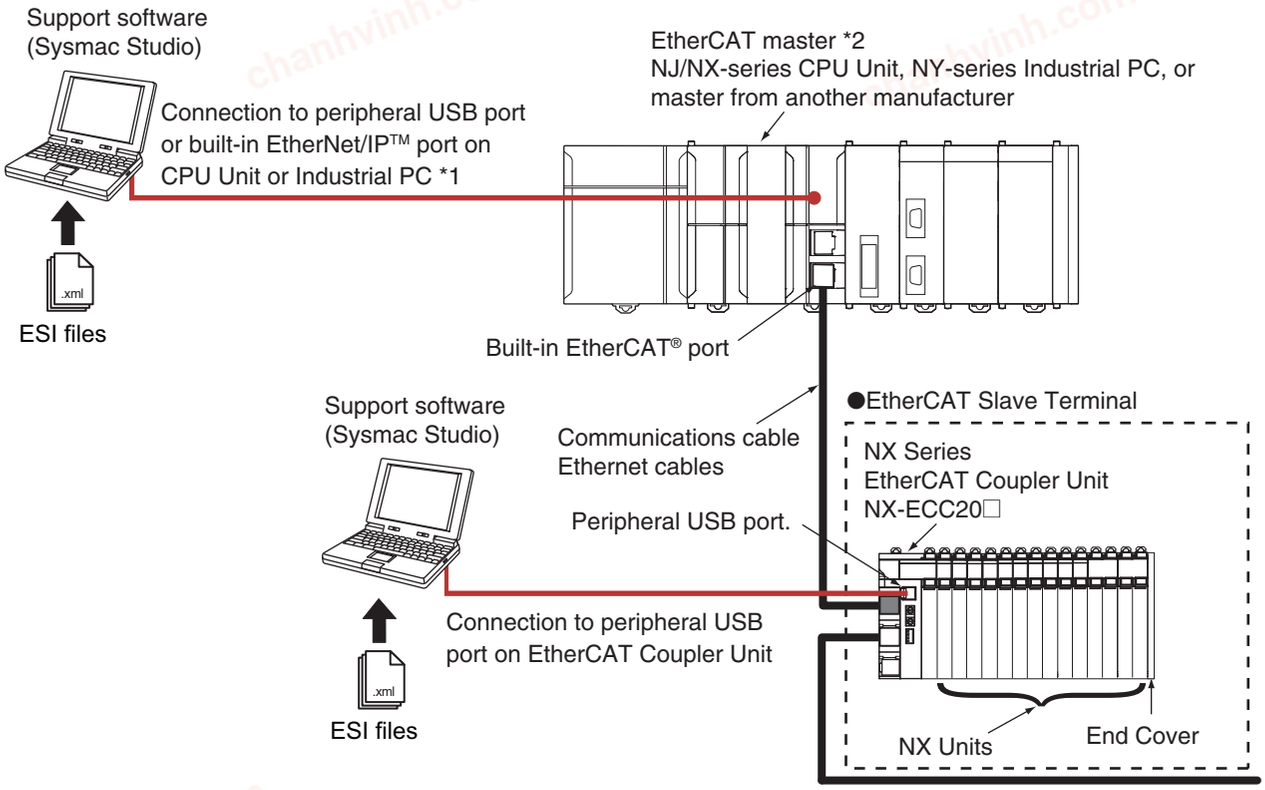
The following figure shows a system configuration when NX Units are connected to an NX-series CPU Unit.




**Note:** For whether an NX Unit can be connected to the CPU Unit, refer to the version information.

## Connected to an EtherCAT Coupler Unit

The following figure shows an example of the system configuration when an EtherCAT Coupler Unit is used as a Communications Coupler Unit.




*1. The connection method for the Sysmac Studio depends on the model of the CPU Unit or Industrial PC.
*2. An EtherCAT Slave Terminal cannot be connected to any of the OMRON CJ1W-NC□81/□82 Position Control Units even though they can operate as EtherCAT masters.

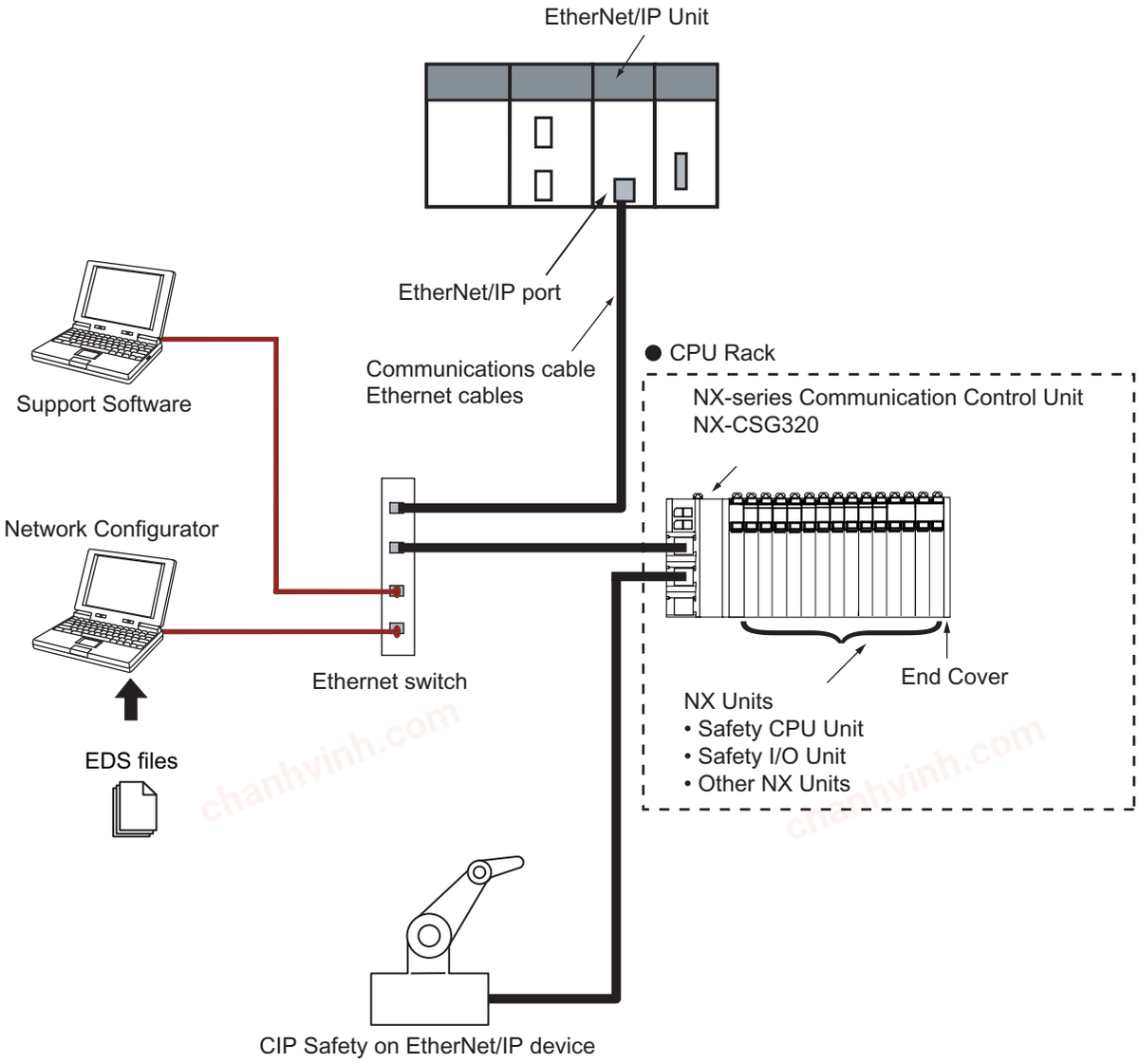
**Note:** For whether an NX Unit can be connected to the Communications Coupler Unit, refer to the version information.

chanhvinh.com



## System Configuration in the Case of a Communication Control Unit

The following figure shows a system configuration when a group of NX Units is connected to an NX-series Communication Control Unit. To configure a Safety Network Controller, mount the Safety CPU Unit, which is one of the NX Units, to the CPU Rack of the Communication Control Unit.
You cannot connect a Communication Control Unit with Heater Burnout Detection Unit.




**Note:** For whether an NX Unit can be connected to the Communication Control Unit, refer to the version information.

chanhvinh.com



# Model Number Structure

**NX-□□□□□□**

(1) (2) (3) (4)

### (1) Unit type

| No. | Specification |
|---|---|
| TS | Temperature input |
| HB | Heater burnout detection |

### (2) Number of points

| No. | Specification |
|---|---|
| 2 | 2 points |
| 3 | 4 points |
| 4 | 8 points |

### (3) I/O type

- Temperature Input Units

| No. | Sensor type |
|---|---|
| 1 | Thermocouple |
| 2 | Resistance thermometer |

- Heater Burnout Detection Units

| No. | Internal I/O common processing of control outputs |
|---|---|
| 1 | NPN |
| 2 | PNP |

### (4) Other specifications

- Temperature Input Units

| No. | Conversion time | Resolution | I/O refreshing method | |
|---|---|---|---|---|
| | | | Free-Run refreshing only *1 | Switching Synchronous I/O refreshing *2 and Free-Run refreshing |
| 01 | 250 ms/Unit | 0.1°C max. *3 | Yes | --- |
| 02 | 10 ms/Unit | 0.01°C max. | Yes | --- |
| 04 | 60 ms/Unit | 0.001°C max. | Yes | --- |

*1. Free-Run refreshing
*2. Synchronous I/O refreshing
*3. The resolution is 0.2°C max. when the input type is R, S, or W.

- Heater Burnout Detection Units

| No. |
|---|
| 01 |

chanhvinh.com



# Ordering Information

## Applicable standards

Refer to the OMRON website (www.ia.omron.com) or ask your OMRON representative for the most recent applicable standards for each model.

## Temperature Input Units

| Product name | Specification | | | | | | | Model |
|---|---|---|---|---|---|---|---|---|
| | Number of points | Input type | Resolution(25°C) | Over all accuracy (25°C) | Conversion time | I/O refreshing method | Terminals | |
| Thermocouple Input type  | 2 points | Thermocouple | 0.1°C max. *1 | Refer to the *Reference accuracy and temperature coefficient according to the input type and measurement temperature.* | 250 ms/ Unit | Free-Run refreshing | 16 Terminals | **NX-TS2101** |
| | 4 points | | | | | | 16 Terminals x 2 | **NX-TS3101** |
| | 2 points | | 0.01°C max. | | 10 ms/Unit | | 16 Terminals | **NX-TS2102** |
| | 4 points | | | | | | 16 Terminals x 2 | **NX-TS3102** |
| | 2 points | | 0.001°C max. | | 60 ms/Unit | | 16 Terminals | **NX-TS2104** |
| | 4 points | | | | | | 16 Terminals x 2 | **NX-TS3104** |
| Resistance Thermometer Input type  | 2 points | Resistance Thermometer (Pt100/Pt1000, three-wire) *2 | 0.1°C max. | | 250 ms/ Unit | | 16 Terminals | **NX-TS2201** |
| | 4 points | | | | | | 16 Terminals x 2 | **NX-TS3201** |
| | 2 points | | 0.01°C max. | | 10 ms/Unit | | 16 Terminals | **NX-TS2202** |
| | 4 points | | | | | | 16 Terminals x 2 | **NX-TS3202** |
| | 2 points | | 0.001°C max. | | 60 ms/Unit | | 16 Terminals | **NX-TS2204** |
| | 4 points | | | | | | 16 Terminals x 2 | **NX-TS3204** |

*1. The resolution is 0.2°C max. when the input type is R, S, or W.
*2. The NX-TS2202 and NX-TS3202 only support Pt100 three-wire sensor.

## Heater Burnout Detection Units

| Product name | Specification | | | | | | | Model |
|---|---|---|---|---|---|---|---|---|
| | CT input section | | Control output section | | | | | |
| | Number of inputs | Maximum heater current | Number of outputs | Internal I/O common | Maximum load current | Rated voltage | I/O refreshing method | |
| Heater Burnout Detection Unit  | 4 | 50 A AC | 4 | NPN | 0.1 A/point, 0.4 A/Unit | 12 to 24 VDC | Free-Run refreshing | **NX-HB3101** |
| | | | | PNP | | 24 VDC | | **NX-HB3201** |

## Optional Products

| Product name | Specification | Model |
|---|---|---|
| Unit/Terminal Block Coding Pins | Pins for 10 Units (30 terminal block pins and 30 Unit pins) | **NX-AUX02** |

| Product name | Specification | | | | Model |
|---|---|---|---|---|---|
| | No. of terminals | Terminal number indications | Ground terminal mark | Terminal current capacity | |
| Terminal Block | 16 | A/B | Not provided | 10 A | **NX-TBA162** |

| Product name | Specification | Model |
|---|---|---|
| Current Transformer (CT)* | Hole diameter: 5.8 mm | **E54-CT1** |
| | Hole diameter: 12.0 mm | **E54-CT3** |

* Can be connected to the NX-HB Heater Burnout Detection Unit.

## Accessories

Not included.

chanhvinh.com



# Version Information

## Connected to a CPU Unit

Refer to the user's manual for the CPU Unit details on the CPU Units to which NX Units can be connected.

### Temperature Input Units

| NX Unit | | Corresponding unit versions/versions | |
|---|---|---|---|
| Model | Unit version | CPU Unit | Sysmac Studio |
| NX-TS2101 | Ver.1.0 | Ver.1.13 | Ver.1.17 |
| | Ver.1.1 | | |
| NX-TS2102 | Ver.1.1 | | |
| NX-TS2104 | Ver.1.1 | | |
| NX-TS2201 | Ver.1.0 | | |
| | Ver.1.1 | | |
| NX-TS2202 | Ver.1.1 | | |
| NX-TS2204 | Ver.1.1 | | |
| NX-TS3101 | Ver.1.0 | | |
| | Ver.1.1 | | |
| NX-TS3102 | Ver.1.1 | | |
| NX-TS3104 | Ver.1.1 | | |
| NX-TS3201 | Ver.1.0 | | |
| | Ver.1.1 | | |
| NX-TS3202 | Ver.1.1 | | |
| NX-TS3204 | Ver.1.1 | | |

### Heater Burnout Detection Units

| NX Unit | | Corresponding unit versions/versions | |
|---|---|---|---|
| Model | Unit version | CPU Unit | Sysmac Studio |
| NX-HB3101 | Ver.1.0 | Ver.1.13 | Ver.1.17 |
| NX-HB3201 | | | |

**Note:** Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

chanhvinh.com



## Connected to an EtherCAT Coupler Unit

### Temperature Input Units

| NX Unit | | Corresponding unit versions/versions | | |
|---|---|---|---|---|
| Model | Unit Version | EtherCAT Coupler Unit | CPU Unit or Industrial PC | Sysmac Studio |
| NX-TS2101 | Ver.1.0 | Ver.1.0 | Ver.1.05 | Ver.1.06 |
| | Ver.1.1 | | | Ver.1.08 |
| NX-TS2102 | Ver.1.1 | | | |
| NX-TS2104 | Ver.1.1 | | | |
| NX-TS2201 | Ver.1.0 | | | Ver.1.06 |
| | Ver.1.1 | | | Ver.1.08 |
| NX-TS2202 | Ver.1.1 | | | |
| NX-TS2204 | Ver.1.1 | | | |
| NX-TS3101 | Ver.1.0 | | | Ver.1.06 |
| | Ver.1.1 | | | Ver.1.08 |
| NX-TS3102 | Ver.1.1 | | | |
| NX-TS3104 | Ver.1.1 | | | |
| NX-TS3201 | Ver.1.0 | | | Ver.1.06 |
| | Ver.1.1 | | | Ver.1.08 |
| NX-TS3202 | Ver.1.1 | | | |
| NX-TS3204 | Ver.1.1 | | | |

### Heater Burnout Detection Units

| NX Unit | | Corresponding unit versions/versions | | |
|---|---|---|---|---|
| Model | Unit version | EtherCAT Coupler Unit | CPU Unit or Industrial PC | Sysmac Studio |
| NX-HB3101 | Ver.1.0 | Ver.1.0 | Ver.1.05 | Ver.1.16 |
| NX-HB3201 | | | | |

**Note:** Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

chanhvinh.com



## Connected to an EtherNet/IP Coupler Unit

### Temperature Input Units

| NX Unit | | Corresponding unit versions/versions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Application with an NJ/NX/NY-series Controller *1 | | | Application with a CS/CJ/CP-series PLC *2 | | |
| Model | Unit version | EtherNet/IP Coupler Unit | CPU Unit or Industrial PC | Sysmac Studio | EtherNet/IP Coupler Unit | Sysmac Studio | NX-IO Configurator *3 |
| NX-TS2101 | Ver.1.0 | Ver.1.2 | Ver.1.14 | Ver.1.19 | Ver.1.0 | Ver.1.10 | Ver.1.00 |
| | Ver.1.1 | | | | | | |
| NX-TS2102 | Ver.1.1 | | | | | | |
| NX-TS2104 | Ver.1.1 | | | | | | |
| NX-TS2201 | Ver.1.0 | | | | | | |
| | Ver.1.1 | | | | | | |
| NX-TS2202 | Ver.1.1 | | | | | | |
| NX-TS2204 | Ver.1.1 | | | | | | |
| NX-TS3101 | Ver.1.0 | | | | | | |
| | Ver.1.1 | | | | | | |
| NX-TS3102 | Ver.1.1 | | | | | | |
| NX-TS3104 | Ver.1.1 | | | | | | |
| NX-TS3201 | Ver.1.0 | | | | | | |
| | Ver.1.1 | | | | | | |
| NX-TS3202 | Ver.1.1 | | | | | | |
| NX-TS3204 | Ver.1.1 | | | | | | |

### Heater Burnout Detection Units

| NX Unit | | Corresponding unit versions/versions | | | | | |
|---|---|---|---|---|---|---|---|
| | | Application with an NJ/NX/NY-series Controller *1 | | | Application with a CS/CJ/CP-series PLC *2 | | |
| Model | Unit version | EtherNet/IP Coupler Unit | CPU Unit or Industrial PC | Sysmac Studio | EtherNet/IP Coupler Unit | Sysmac Studio | NX-IO Configurator *3 |
| NX-HB3101 | Ver.1.0 | Ver.1.2 | Ver.1.14 | Ver.1.19 | Ver.1.0 | Ver.1.16 | Ver.1.00 |
| NX-HB3201 | | | | | | | |

**Note:** Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

*1. Refer to the user's manual of the EtherNet/IP Coupler Unit for the unit versions of EtherNet/IP Units corresponding to EtherNet/IP Coupler Units.

*2. Refer to the user's manual of the EtherNet/IP Coupler Unit for the unit versions of CPU Units and EtherNet/IP Units corresponding to EtherNet/IP Coupler Units.

*3. For connection to an EtherNet/IP Coupler Unit with unit version 1.0, connection is supported only for a connection to the peripheral USB port on the EtherNet/IP Coupler Unit. You cannot connect by any other path. If you need to connect by another path, use an EtherNet/IP Coupler Unit with unit version 1.2 or later.

chanhvinh.com



## Connected to an Communication Control Unit

### Temperature Input Units

| NX Unit | | Corresponding unit versions/versions | |
|---|---|---|---|
| Model | Unit version | Communication Control Unit | Sysmac Studio |
| NX-TS2101 | Ver.1.0 | Ver.1.00 | Ver.1.24 |
| | Ver.1.1 | | |
| NX-TS2102 | Ver.1.1 | | |
| NX-TS2104 | Ver.1.1 | | |
| NX-TS2201 | Ver.1.0 | | |
| | Ver.1.1 | | |
| NX-TS2202 | Ver.1.1 | | |
| NX-TS2204 | Ver.1.1 | | |
| NX-TS3101 | Ver.1.0 | Ver.1.00 | Ver.1.24 |
| | Ver.1.1 | | |
| NX-TS3102 | Ver.1.1 | | |
| NX-TS3104 | Ver.1.1 | | |
| NX-TS3201 | Ver.1.0 | | |
| | Ver.1.1 | | |
| NX-TS3202 | Ver.1.1 | | |
| NX-TS3204 | Ver.1.1 | | |

### Heater Burnout Detection Units

| NX Unit | | Corresponding unit versions/versions | |
|---|---|---|---|
| Model | Unit version | Communication Control Unit | Sysmac Studio |
| NX-HB3101 | Ver.1.0 | --- | --- |
| NX-HB3201 | | | |

**Note: 1.** Some Units do not have all of the versions given in the above table. If a Unit does not have the specified version, support is provided by the oldest available version after the specified version. Refer to the user's manuals for the specific Units for the relation between models and versions.

**2.** You cannot connect the relevant NX Unit to the Communication Control Unit if "---" is shown in the corresponding unit versions/versions column.

chanhvinh.com

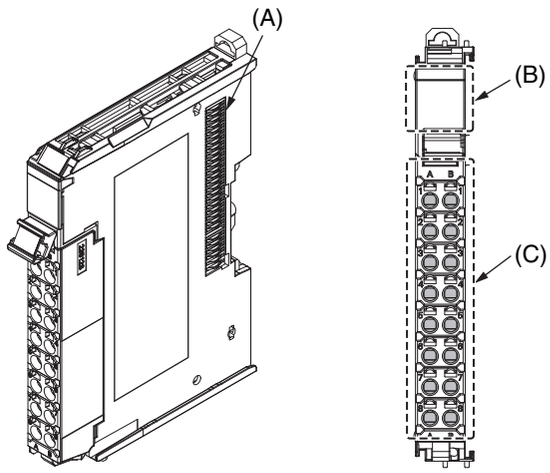


# External Interface

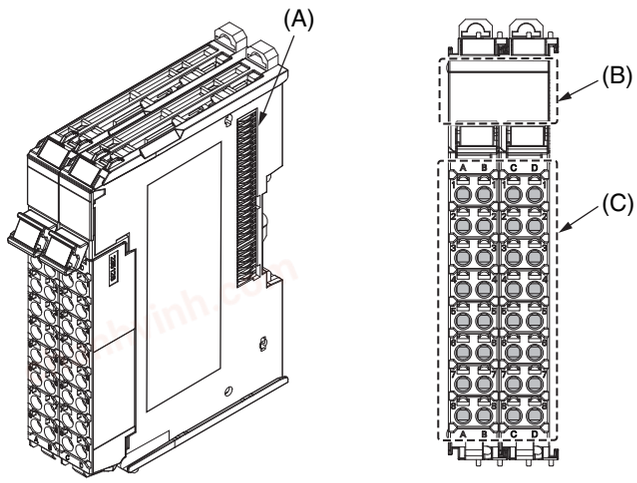
## Screwless Clamping Terminal Block Type

### Temperature Input Unit (Resistance Thermometer Input type)/Heater Burnout Detection Unit

**12mm Width**




**24mm Width**



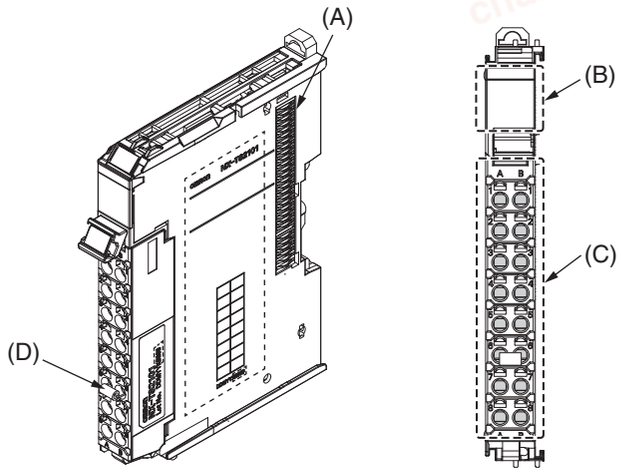

| Letter | Item | Specification |
|---|---|---|
| (A) | NX bus connector | This connector is used to connect to another Unit. |
| (B) | Indicators | The indicators show the current operating status of the Unit. |
| (C) | Terminal block | The terminal block is used to connect to external devices.<br>The number of terminals depends on the Unit. |

chanhvinh.com

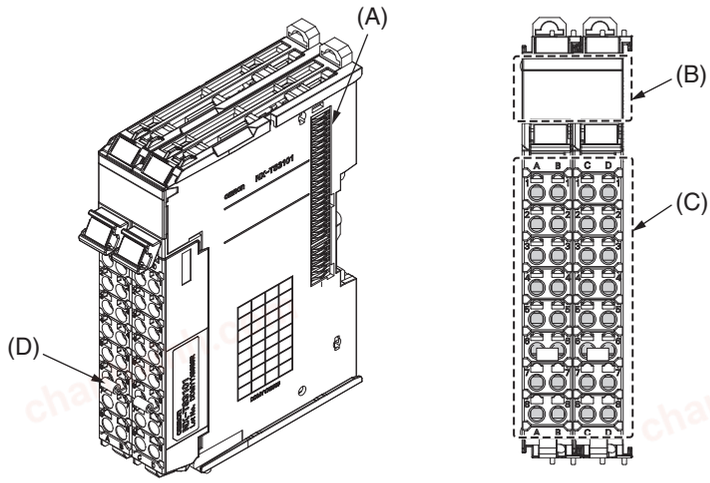


## Temperature Input Unit (Thermocouple Input type)

### 12mm Width




### 24mm Width

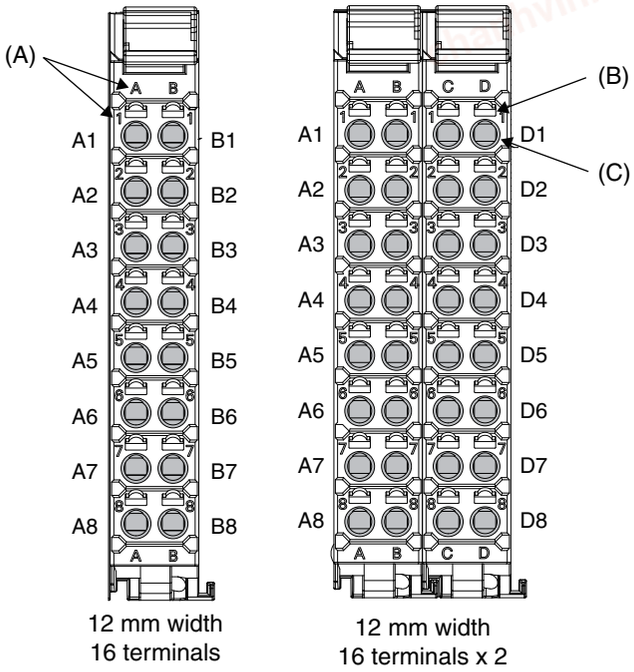



| Letter | Item | Specification |
|---|---|---|
| (A) | NX bus connector | This connector is used to connect to another Unit. |
| (B) | Indicators | The indicators show the current operating status of the Unit. |
| (C) | Terminal block | The terminal block is used to connect to external devices.<br>The number of terminals depends on the Unit. |
| (D) | Cold junction sensor | This sensor is used to compensate the cold junction.<br>The sensors are mounted on both left and right terminal blocks for models with 24 mm width. |

chanhvinh.com



## Terminal Blocks




| Letter | Item | Specification |
|---|---|---|
| (A) | Terminal number indications | The terminal number is identified by a column (A through D) and a row (1 through 8).<br>Therefore, terminal numbers are written as a combination of columns and rows, A1 through A8 and B1 through B8.<br>For a 24-mm-wide terminal block (16 terminals x 2), the left side contains terminals A1 through A8 and B1 through B8. The right side contains terminals C1 through C8 and D1 through D8.<br>The terminal number indication is the same regardless of the number of terminals on the terminal block. |
| (B) | Release holes | A flat-blade screwdriver is inserted here to attach and remove the wiring. |
| (C) | Terminal holes | The wires are inserted into these holes. |

## Applicable Terminal Blocks for Each Unit Model

| Unit model | Terminal Blocks | | | | |
|---|---|---|---|---|---|
| | Model | No. of terminals | Terminal number indications | Ground terminal mark | Terminal current capacity |
| **NX-TS2□□□** | NX-TBA162 | 16 | A/B | None | 10 A |
| **NX-TS3□□□** | NX-TBA162 | 16 | A/B | None | 10 A |
| | NX-TBB162 | | C/D | | |
| **NX-HB3□01** | NX-TBA162 | 16 | A/B | Not provided | 10A |

chanhvinh.com



# Applicable Wires

## Using Ferrules

If you use ferrules, attach the twisted wires to them.
Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.
Always use plated one-pin ferrules. Do not use unplated ferrules or two-pin ferrules.

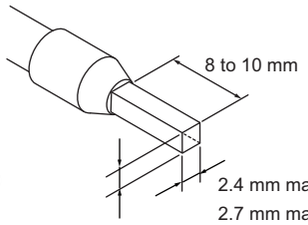
The applicable ferrules, wires, and crimping tool are given in the following table.

| Terminal type | Manufacturer | Ferrule model | Applicable wire ($mm^2$ (AWG)) | Crimping tool |
|---|---|---|---|---|
| Terminals other than ground terminals | Phoenix Contact | AI0,34-8 | 0.34 (#22) | Phoenix Contact (The figure in parentheses is the applicable wire size.) CRIMPFOX 6 (0.25 to 6 $mm^2$, AWG24 to 10) |
| | | AI0,5-8 | 0.5 (#20) | |
| | | AI0,5-10 | | |
| | | AI0,75-8 | 0.75 (#18) | |
| | | AI0,75-10 | | |
| | | AI1,0-8 | 1.0 (#18) | |
| | | AI1,0-10 | | |
| | | AI1,5-8 | 1.5 (#16) | |
| | | AI1,5-10 | | |
| Ground terminals | | AI2,5-10 | 2.0 * | |
| Terminals other than ground terminals | Weidmuller | H0.14/12 | 0.14 (#26) | Weidmuller (The figure in parentheses is the applicable wire size.) PZ6 Roto (0.14 to 6 $mm^2$, AWG 26 to 10) |
| | | H0.25/12 | 0.25 (#24) | |
| | | H0.34/12 | 0.34 (#22) | |
| | | H0.5/14 | 0.5 (#20) | |
| | | H0.5/16 | | |
| | | H0.75/14 | 0.75 (#18) | |
| | | H0.75/16 | | |
| | | H1.0/14 | 1.0 (#18) | |
| | | H1.0/16 | | |
| | | H1.5/14 | 1.5 (#16) | |
| | | H1.5/16 | | |

* Some AWG 14 wires exceed 2.0 $mm^2$ and cannot be used in the screwless clamping terminal block.

When you use any ferrules other than those in the above table, crimp them to the twisted wires so that the following processed dimensions are achieved.

Finished Dimensions of Ferrules




1.6 mm max. (except ground terminals)
2.0 mm max. (ground terminals)

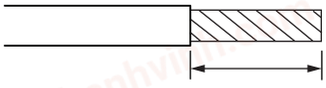
2.4 mm max. (except ground terminals)
2.7 mm max. (ground terminals)

## Using Twisted Wires/Solid Wires

If you use the twisted wires or the solid wires, use the following table to determine the correct wire specifications.

| Terminals | | Wire type | | | | Wire size | Conductor length (stripping length) |
|---|---|---|---|---|---|---|---|
| | | Twisted wires | | Solid wire | | | |
| Classification | Current capacity | Plated | Unplated | Plated | Unplated | | |
| All terminals except ground terminals | 2 A or less | Possible | Possible | Possible | Possible | 0.08 to 1.5 $mm^2$ AWG28 to 16 | 8 to 10 mm |
| | Greater than 2 A and 4 A or less | | Not Possible | Possible *1 | Not Possible | | |
| | Greater than 4 A | Possible *1 | | Not Possible | | | |
| Ground terminals | --- | Possible | Possible | Possible *2 | Possible *2 | 2.0 $mm^2$ | 9 to 10 mm |

*1. Secure wires to the screwless clamping terminal block. Refer to the Securing Wires in the USER'S MANUAL for how to secure wires.
*2. With the NX-TB□□□1 Terminal Block, use twisted wires to connect the ground terminal. Do not use a solid wire.



Conductor length (stripping length)

**<Additional Information>** If more than 2 A will flow on the wires, use plated wires or use ferrules.

chanhvinh.com

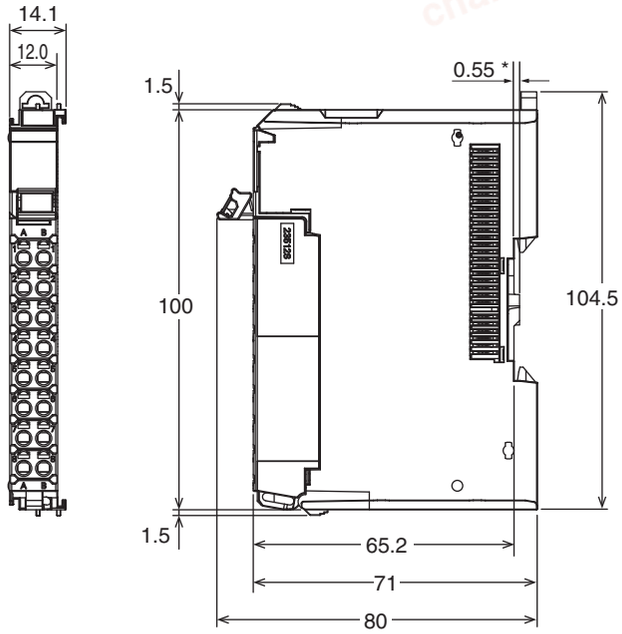


# Dimensions

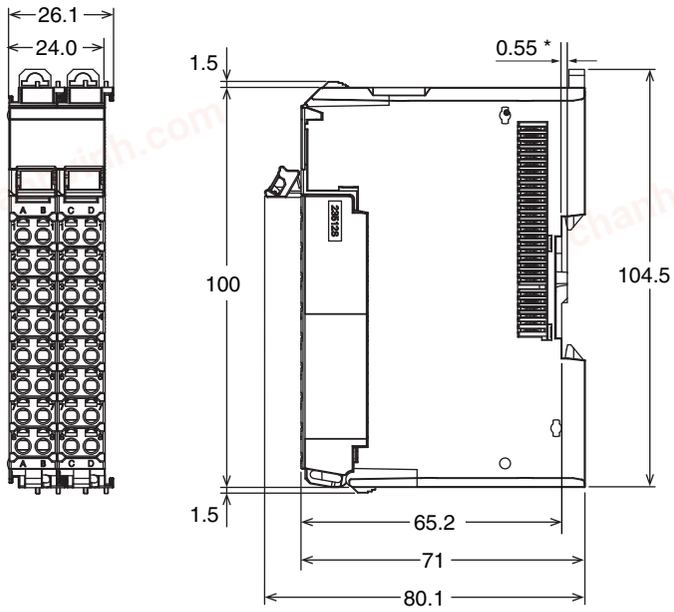
(Unit/mm)

## Screwless Clamping Terminal Block Type

### 12 mm Width




### 24 mm Width




* The dimension is 1.35 mm for Units with lot numbers through December 2014.

# Related Manual

| Cat. No. | Model number | Manual name | Application | Description |
|---|---|---|---|---|
| W566 | NX-TS□□□□<br>NX-HB□□□□ | NX-series Analog I/O Units User's Manual for Temperature Input Units and Heater Burnout Detection Units | Learning how to use NX-series Temperature Input Units and Heater Burnout Detection Units | The hardware, setup methods, and functions of the NX-series Temperature Input Units and Heater Burnout Detection Units are described. |

chanhvinh.com

## NX-series Temperature Input Unit

# NX-TS

## Standard and high-speed, high-precision temperature measurement and control



- Temperature Input Units for the NX-series modular I/O system
- Connect to other NX I/O Units and EtherCAT Coupler Units using the high-speed NX-bus
- Thermocouple and platinum resistance thermometer input models are available

## Features

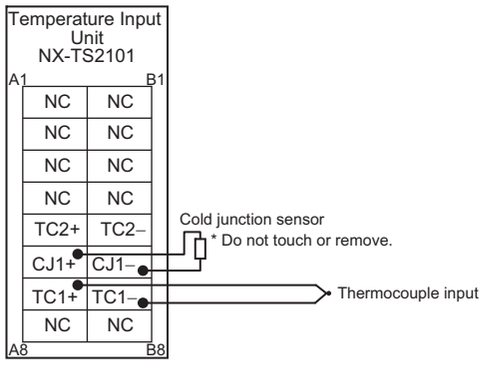
- Up to four temperature sensor inputs per unit
- Three sampling speeds, 250 ms, 60 ms, and 10 ms, are available to cover a wide range from general-purpose application to high-speed, high-precision control
- Moving average, input sensor disconnection detection, cold junction compensation enable/disable setting, and input correction
- Detachable front connector with screwless Push-In Plus terminals for easy installation and maintenance
- Connect to the CJ PLC using the EtherNet/IP™ bus coupler

chanhvinh.com



# Temperature Input Unit Specifications

## Temperature Input Unit (Thermocouple Input type) 2 points NX-TS2101

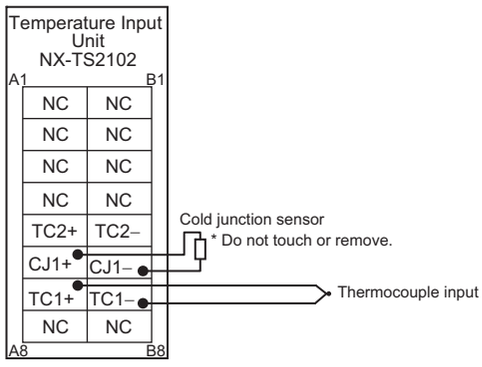
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (thermocouple input type) | **Model** | NX-TS2101 |
| **Number of points** | 2 points | **External connection terminals** | Screwless clamping terminal block (16 terminals) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicators** | TS indicator   | **Temperature sensor** | K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Absolute maximum rating** | ±130 mV |
| | | **Input impedance** | 20 kΩ min. |
| | | **Resolution** | 0.1°C max. *1 |
| | | **Reference accuracy** | *2 |
| | | **Temperature coefficient** | *2 |
| | | **Cold junction compensation error** | ±1.2°C *3 *4 |
| | | **Input disconnection detection current** | Approx. 0.1 μA |
| **Warm-up period** | 30 minutes | **Conversion time** | 250 ms/Unit |
| **Dimensions** | 12 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Photocoupler<br>Between inputs: Power = Transformer, Signal = Photocoupler |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>1.25 W max.<br>• Connected to a Communications Coupler Unit<br>0.90 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 70 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions:<br>The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*. | | |
| **Terminal connection diagram** |   | | |

*1. The resolution is 0.2°C max. when the input type is R, S, or W.
*2. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.
*3. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.
*4. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

chanhvinh.com



## Temperature Input Unit (Thermocouple Input type) 2 points NX-TS2102

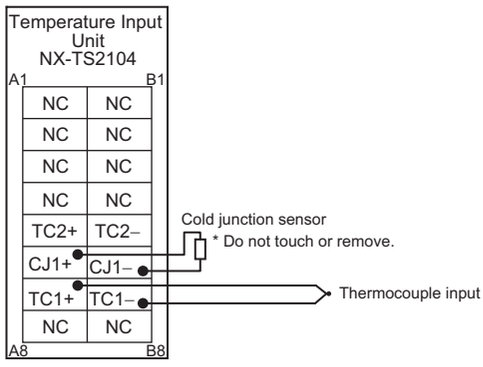
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (thermocouple input type) | **Model** | NX-TS2102 |
| **Number of points** | 2 points | **External connection terminals** | Screwless clamping terminal block (16 terminals) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicators** | TS indicator   | **Temperature sensor** | K, J, T, E, L, U, N, R, S, WRe5-26, PLII |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Absolute maximum rating** | ±130 mV |
| | | **Input impedance** | 20 kΩ min. |
| | | **Resolution** | 0.01°C max. |
| | | **Reference accuracy** | *1 |
| | | **Temperature coefficient** | *1 |
| | | **Cold junction compensation error** | ±1.2°C *2 *3 |
| | | **Input disconnection detection current** | Approx. 0.1 μA |
| **Warm-up period** | 45 minutes | **Conversion time** | 10 ms/Unit |
| **Dimensions** | 12 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit 1.15 W max.<br>• Connected to a Communications Coupler Unit 0.80 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 70 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions:<br>The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*. | | |
| **Terminal connection diagram** |   | | |

*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.
*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.
*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

chanhvinh.com



## Temperature Input Unit (Thermocouple Input type) 2 points NX-TS2104

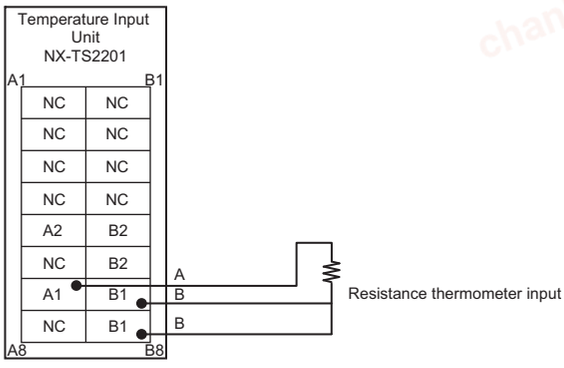
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (thermocouple input type) | **Model** | NX-TS2104 |
| **Number of points** | 2 points | **External connection terminals** | Screwless clamping terminal block (16 terminals) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicators** | TS indicator   | **Temperature sensor** | K, J, T, E, L, U, N, R, S, WRe5-26, PLII |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Absolute maximum rating** | ±130 mV |
| | | **Input impedance** | 20 kΩ min. |
| | | **Resolution** | 0.001°C max. |
| | | **Reference accuracy** | *1 |
| | | **Temperature coefficient** | *1 |
| | | **Cold junction compensation error** | ±1.2°C *2 *3 |
| | | **Input disconnection detection current** | Approx. 0.1 μA |
| **Warm-up period** | 45 minutes | **Conversion time** | 60 ms/Unit |
| **Dimensions** | 12 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>0.95 W max.<br>• Connected to a Communications Coupler Unit<br>0.80 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 70 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions:<br>The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*. | | |
| **Terminal connection diagram** |   | | |

*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.
*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.
*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

chanhvinh.com



## Temperature Input Unit (Resistance Thermometer Input type) 2 points NX-TS2201

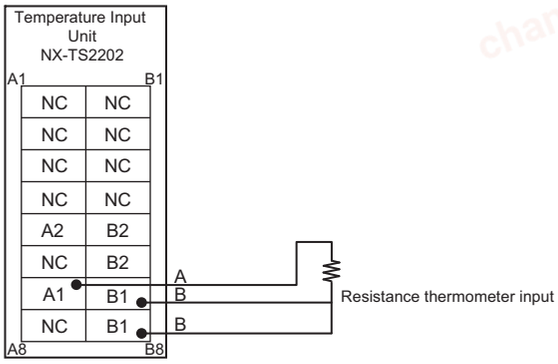
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (resistance thermometer input type) | **Model** | NX-TS2201 |
| **Number of points** | 2 points | **External connection terminals** | Screwless clamping terminal block (16 terminals) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicator** | TS indicator   | **Temperature sensor** | Pt100 (three-wire)/Pt1000 (three-wire) |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Input detection current** | Approx. 0.25 mA |
| | | **Resolution** | 0.1°C max. |
| | | **Reference accuracy** | * |
| | | **Temperature coefficient** | * |
| | | **Effect of conductor resistance** | 0.06°C/Ω max. (also 20 Ω max.) |
| **Warm-up period** | 10 minutes | **Conversion time** | 250 ms/Unit |
| **Dimensions** | 12 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Photocoupler<br>Between inputs: Power = Transformer, Signal = Photocoupler |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>1.25 W max.<br>• Connected to a Communications Coupler Unit<br>0.90 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 70 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions: No restrictions | | |
| **Terminal connection diagram** |   | | |

* Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature.*

chanhvinh.com



## Temperature Input Unit (Resistance Thermometer Input type) 2 points NX-TS2202

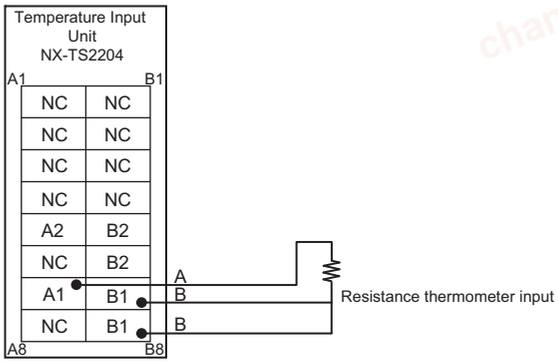
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (resistance thermometer input type) | **Model** | NX-TS2202 |
| **Number of points** | 2 points | **External connection terminals** | Screwless clamping terminal block (16 terminals) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicator** | TS indicator<br><br> | **Temperature sensor** | Pt100 (three-wire) |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Input detection current** | Approx. 0.25 mA |
| | | **Resolution** | 0.01°C max. |
| | | **Reference accuracy** | * |
| | | **Temperature coefficient** | * |
| | | **Effect of conductor resistance** | 0.06°C/Ω max. (also 20 Ω max.) |
| **Warm-up period** | 30 minutes | **Conversion time** | 10 ms/Unit |
| **Dimensions** | 12 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>1.15 W max.<br>• Connected to a Communications Coupler Unit<br>0.75 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 70 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions: No restrictions | | |
| **Terminal connection diagram** | <br> | | |

* Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature.*

chanhvinh.com



## Temperature Input Unit (Resistance Thermometer Input type) 2 points NX-TS2204

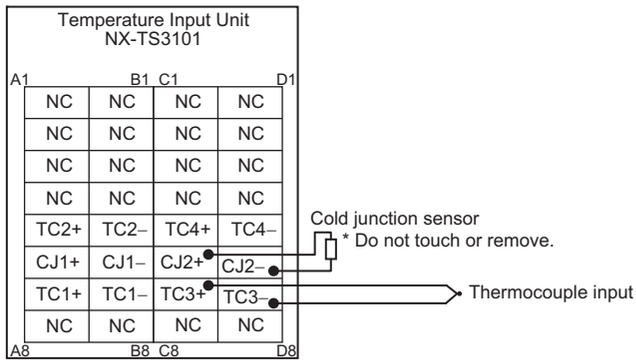
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (resistance thermometer input type) | **Model** | NX-TS2204 |
| **Number of points** | 2 points | **External connection terminals** | Screwless clamping terminal block (16 terminals) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicator** | TS indicator<br> | **Temperature sensor** | Pt100 (three-wire)/Pt1000 (three-wire) |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Input detection current** | Approx. 0.25 mA |
| | | **Resolution** | 0.001°C max. |
| | | **Reference accuracy** | * |
| | | **Temperature coefficient** | * |
| | | **Effect of conductor resistance** | 0.06°C/Ω max. (also 20 Ω max.) |
| **Warm-up period** | 30 minutes | **Conversion time** | 60 ms/Unit |
| **Dimensions** | 12 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>0.90 W max.<br>• Connected to a Communications Coupler Unit<br>0.75 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 70 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions: No restrictions | | |
| **Terminal connection diagram** |  | | |

* Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature.*

chanhvinh.com



## Temperature Input Unit (Thermocouple Input type) 4 points NX-TS3101

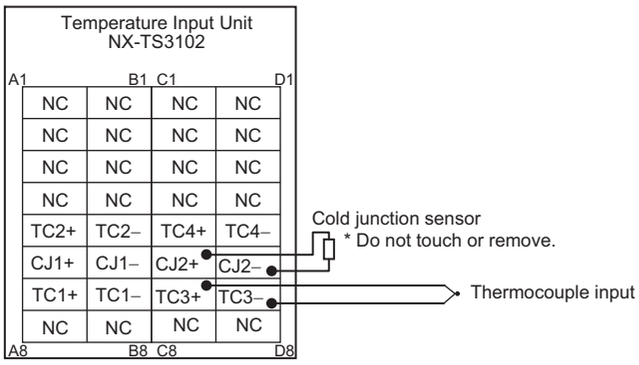
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (thermocouple input type) | **Model** | NX-TS3101 |
| **Number of points** | 4 points | **External connection terminals** | Screwless clamping terminal block (16 terminals x 2) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicators** | TS indicator   | **Temperature sensor** | K, J, T, E, L, U, N, R, S, B, WRe5-26, PLII |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Absolute maximum rating** | ±130 mV |
| | | **Input impedance** | 20 kΩ min. |
| | | **Resolution** | 0.1°C max. *1 |
| | | **Reference accuracy** | *2 |
| | | **Temperature coefficient** | *2 |
| | | **Cold junction compensation error** | ±1.2°C *3 *4 |
| | | **Input disconnection detection current** | Approx. 0.1μA |
| **Warm-up period** | 30 minutes | **Conversion time** | 250 ms/Unit |
| **Dimensions** | 24 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Photocoupler<br>Between inputs: Power = Transformer, Signal = Photocoupler |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>1.75 W max.<br>• Connected to a Communications Coupler Unit<br>1.30 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 140 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions:<br>The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*. | | |
| **Terminal connection diagram** |   | | |

*1. The resolution is 0.2°C max. when the input type is R, S, or W.
*2. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.
*3. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.
*4. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

chanhvinh.com



## Temperature Input Unit (Thermocouple Input type) 4 points NX-TS3102

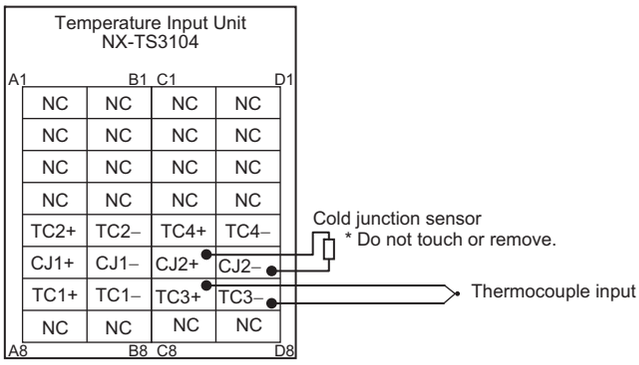
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (thermocouple input type) | **Model** | NX-TS3102 |
| **Number of points** | 4 points | **External connection terminals** | Screwless clamping terminal block (16 terminals x 2) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicators** | TS indicator   | **Temperature sensor** | K, J, T, E, L, U, N, R, S, WRe5-26, PLII |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Absolute maximum rating** | ±130 mV |
| | | **Input impedance** | 20 kΩ min. |
| | | **Resolution** | 0.01°C max. |
| | | **Reference accuracy** | *1 |
| | | **Temperature coefficient** | *1 |
| | | **Cold junction compensation error** | ±1.2°C *2 *3 |
| | | **Input disconnection detection current** | Approx. 0.1 μA |
| **Warm-up period** | 45 minutes | **Conversion time** | 10 ms/Unit |
| **Dimensions** | 24 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>1.55 W max.<br>• Connected to a Communications Coupler Unit<br>1.10 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 140 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions:<br>The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*. | | |
| **Terminal connection diagram** |   | | |

*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.
*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.
*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

chanhvinh.com



## Temperature Input Unit (Thermocouple Input type) 4 points NX-TS3104

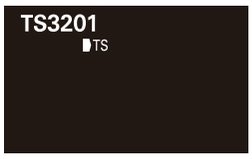
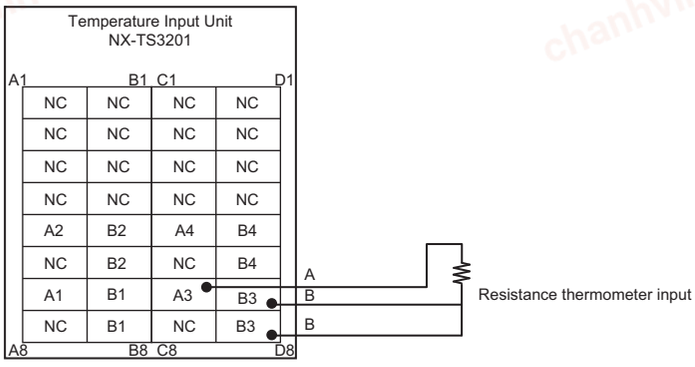
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (thermocouple input type) | **Model** | NX-TS3104 |
| **Number of points** | 4 points | **External connection terminals** | Screwless clamping terminal block (16 terminals x 2) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicators** | TS indicator   | **Temperature sensor** | K, J, T, E, L, U, N, R, S, WRe5-26, PLII |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Absolute maximum rating** | ±130 mV |
| | | **Input impedance** | 20 kΩ min. |
| | | **Resolution** | 0.001°C max. |
| | | **Reference accuracy** | *1 |
| | | **Temperature coefficient** | *1 |
| | | **Cold junction compensation error** | ±1.2°C *2 *3 |
| | | **Input disconnection detection current** | Approx. 0.1 μA |
| **Warm-up period** | 45 minutes | **Conversion time** | 60 ms/Unit |
| **Dimensions** | 24 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit 1.45 W max.<br>• Connected to a Communications Coupler Unit 1.10 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 140 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions:<br>The cold junction compensation error is restricted according to the installation orientation and the power consumption of adjacent Units. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type*. | | |
| **Terminal connection diagram** |   | | |

*1. Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.
*2. The overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and the Temperature Input Unit together. A calibration control number is both displayed on the terminal block and the Unit. Make sure to return the terminal block (including a cold junction sensor mounted) and the Unit together for repair.
*3. Refer to *Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type* for the specifications for each set of operating conditions.

chanhvinh.com



## Temperature Input Unit (Resistance Thermometer Input type) 4 points NX-TS3201

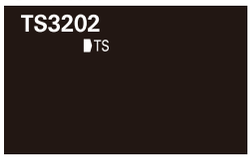
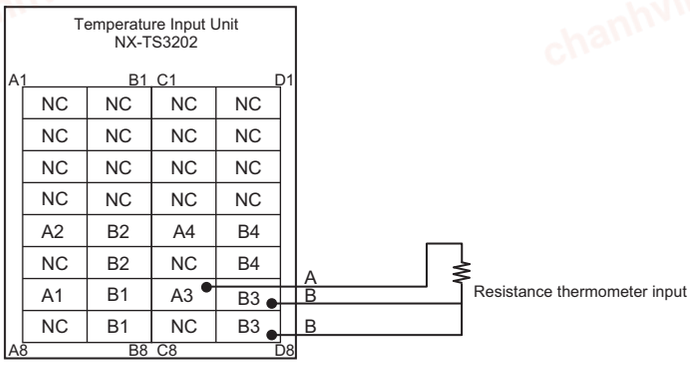
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (resistance thermometer input type) | **Model** | NX-TS3201 |
| **Number of points** | 4 points | **External connection terminals** | Screwless clamping terminal block (16 Terminals x 2) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicator** | TS indicator<br><br> | **Temperature sensor** | Pt100 (three-wire)/Pt1000 (three-wire) |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Input detection current** | Approx. 0.25 mA |
| | | **Resolution** | 0.1°C max. |
| | | **Reference accuracy** | * |
| | | **Temperature coefficient** | * |
| | | **Effect of conductor resistance** | 0.06°C/Ω max. (also 20 Ω max.) |
| **Warm-up period** | 10 minutes | **Conversion time** | 250 ms/Unit |
| **Dimensions** | 24 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Photocoupler<br>Between inputs: Power = Transformer, Signal = Photocoupler |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit<br>1.75 W max.<br>• Connected to a Communications Coupler Unit<br>1.30 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 140 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions: No restrictions | | |
| **Terminal connection diagram** | <br> | | |

* Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.

chanhvinh.com



## Temperature Input Unit (Resistance Thermometer Input type) 4 points NX-TS3202

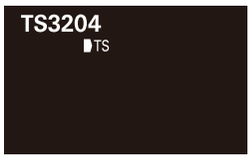
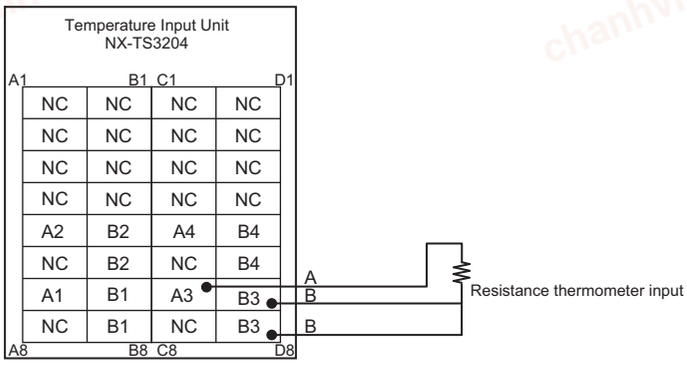
| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (resistance thermometer input type) | **Model** | NX-TS3202 |
| **Number of points** | 4 points | **External connection terminals** | Screwless clamping terminal block (16 terminals x 2) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicator** | TS indicator   | **Temperature sensor** | Pt100 (three-wire) |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Input detection current** | Approx. 0.25 mA |
| | | **Resolution** | 0.01°C max. |
| | | **Reference accuracy** | * |
| | | **Temperature coefficient** | * |
| | | **Effect of conductor resistance** | 0.06°C/Ω max. (also 20 Ω max.) |
| **Warm-up period** | 30 minutes | **Conversion time** | 10 ms/Unit |
| **Dimensions** | 24 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit 1.50 W max.<br>• Connected to a Communications Coupler Unit 1.05 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 130 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions: No restrictions | | |
| **Terminal connection diagram** |   | | |

* Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.

chanhvinh.com



## Temperature Input Unit (Resistance Thermometer Input type) 4 points NX-TS3204

| | | | |
|---|---|---|---|
| **Unit name** | Temperature Input Unit (resistance thermometer input type) | **Model** | NX-TS3204 |
| **Number of points** | 4 points | **External connection terminals** | Screwless clamping terminal block (16 terminals x 2) |
| **I/O refreshing method** | Free-Run refreshing | | |
| **Indicator** | TS indicator   | **Temperature sensor** | Pt100 (three-wire)/Pt1000 (three-wire) |
| | | **Input conversion range** | ±20°C of the input range |
| | | **Input detection current** | Approx. 0.25 mA |
| | | **Resolution** | 0.001°C max. |
| | | **Reference accuracy** | * |
| | | **Temperature coefficient** | * |
| | | **Effect of conductor resistance** | 0.06°C/Ω max. (also 20 Ω max.) |
| **Warm-up period** | 30 minutes | **Conversion time** | 60 ms/Unit |
| **Dimensions** | 24 (W) x 100 (H) x 71 (D) | **Isolation method** | Between the input and the NX bus: Power = Transformer, Signal = Digital isolator<br>Between inputs: Power = Transformer, Signal = Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute at a leakage current of 5 mA max. |
| **I/O power supply method** | No supply | **Current capacity of I/O power supply terminal** | Without I/O power supply terminals |
| **NX Unit power consumption** | • Connected to a CPU Unit or Communication Control Unit 1.45 W max.<br>• Connected to a Communications Coupler Unit 1.05 W max. | **Current consumption from I/O power supply** | No consumption |
| **Weight** | 130 g max. | | |
| **Installation orientation and restrictions** | Installation orientation:<br>• Connected to a CPU Unit or Communication Control Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions: No restrictions | | |
| **Terminal connection diagram** |   | | |

* Refer to *Reference Accuracy and Temperature Coefficient According to the Input Type and Measurement Temperature*.

chanhvinh.com



## • Reference accuracy and temperature coefficient according to the input type and measurement temperature *1

**For NX-TS□□02/TS□□04**

| Conversion time | Input type | | Measurement temperature (°C) | Reference accuracy °C (%) *3 | Temperature coefficient °C/°C *4 (ppm/°C *5) |
|---|---|---|---|---|---|
| | Input type *2 | Temperature range (°C) | | | |
| 10/60ms | K | -200 to 1300 | Same as the left | ±0.75 (±0.05%) | ±0.08 (±50 ppm/°C) |
| | K | -20 to 600 (High Resolution) | Same as the left | ±0.30 (±0.05%) | ±0.03 (±48 ppm/°C) |
| | J | -200 to 1200 | -200 to 0 | ±0.70 (±0.05%) | ±0.13 (±96 ppm/°C) |
| | | | 0 to 1200 | | ±0.06 (±42 ppm/°C) |
| | J | -20 to 600 (High Resolution) | Same as the left | ±0.30 (±0.05%) | ±0.04 (±72 ppm/°C) |
| | T | -200 to 400 | -200 to -180 | ±1.30 (±0.22%) | ±0.05 (±75 ppm/°C) |
| | | | -180 to 0 | ±0.70 (±0.12%) | |
| | | | 0 to 400 | ±0.33 (±0.055%) | |
| | E | -200 to 1000 | -200 to 0 | ±0.60 (±0.05%) | ±0.12 (±100 ppm/°C) |
| | | | 0 to 1000 | | ±0.06 (±50 ppm/°C) |
| | L | -200 to 900 | Same as the left | ±0.50 (±0.05%) | ±0.04 (±40 ppm/°C) |
| | U | -200 to 600 | -200 to -100 | ±0.70 (±0.09%) | ±0.06 (±75 ppm/°C) |
| | | | -100 to 0 | ±0.50 (±0.07%) | |
| | | | 0 to 600 | ±0.40 (±0.05%) | |
| | N | -200 to 1300 | -200 to -150 | ±1.60 (±0.11%) | ±0.11 (±70 ppm/°C) |
| | | | -150 to -100 | ±0.75 (±0.05%) | |
| | | | -100 to 1300 | | ±0.08 (±50 ppm/°C) |
| | R | -50 to 1700 | -50 to 0 | ±3.20 (±0.19%) | ±0.13 (±77 ppm/°C) |
| | | | 0 to 100 | ±2.50 (±0.15%) | ±0.11 (±60 ppm/°C) |
| | | | 100 to 1700 | ±1.75 (±0.10%) | |
| | S | -50 to 1700 | -50 to 0 | ±3.20 (±0.19%) | ±0.13 (±77 ppm/°C) |
| | | | 0 to 100 | ±2.50 (±0.15%) | ±0.11 (±60 ppm/°C) |
| | | | 100 to 1700 | ±1.75 (±0.10%) | |
| | WRe5-26 | 0 to 2300 | 0 to 1500 | ±1.15 (±0.05%) | ±0.13 (±58 ppm/°C) |
| | | | 1500 to 2200 | | ±0.21 (±91 ppm/°C) |
| | | | 2200 to 2300 | ±1.40 (±0.07%) | |
| | PL II | 0 to 1300 | Same as the left | ±0.65 (±0.05%) | ±0.07 (±57 ppm/°C) |
| | Pt100 | -200 to 850 | -200 to -50 | ±0.50 (±0.05%) | ±0.08 (±78 ppm/°C) |
| | | | -50 to 150 | ±0.21 (±0.02%) | ±0.03 (±29 ppm/°C) |
| | | | 150 to 850 | ±0.50 (±0.05%) | ±0.08 (±78 ppm/°C) |
| | Pt1000 | -200 to 850 | Same as the left | ±0.50 (±0.05%) | ±0.09 (±85 ppm/°C) |

chanhvinh.com



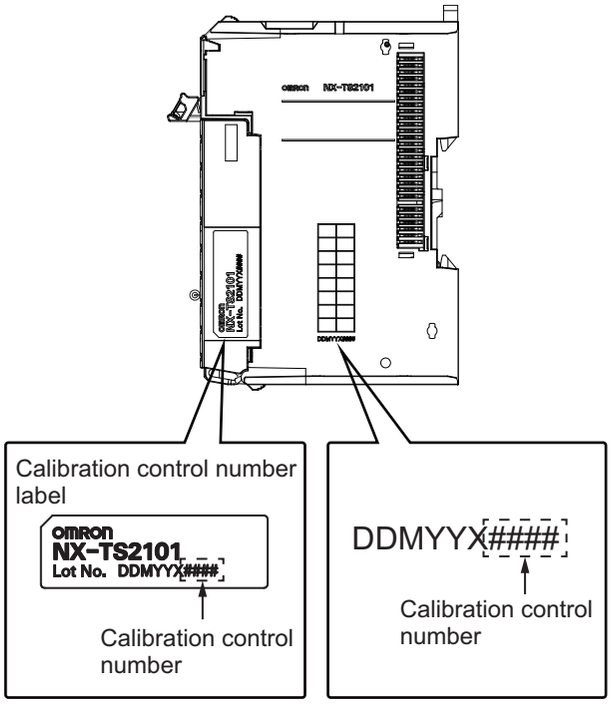
**For NX-TS□□01**

| Conversion time | Input type | | Measurement temperature (°C) | Reference accuracy °C (%) *3 | Temperature coefficient °C/°C *4 (ppm/°C *5) |
|---|---|---|---|---|---|
| | Input type | Temperature range (°C) | | | |
| 250 ms | K | -200 to 1300 | -200 to -100 | ±1.5 (±0.1%) | ±0.15 (±100 ppm/°C) |
| | | | -100 to 400 | | ±0.30 (±200 ppm/°C) |
| | | | 400 to 1300 | | ±0.38 (±250 ppm/°C) |
| | J | -200 to 1200 | -200 to 400 | ±1.4 (±0.1%) | ±0.14 (±100 ppm/°C) |
| | | | 400 to 900 | ±1.2 (±0.09%) | ±0.28 (±200 ppm/°C) |
| | | | 900 to 1200 | | ±0.35 (±250 ppm/°C) |
| | T | -200 to 400 | -200 to -100 | ±1.2 (±0.2%) | ±0.30 (±500 ppm/°C) |
| | | | -100 to 400 | | ±0.12 (±200 ppm/°C) |
| | E | -200 to 1000 | -200 to 400 | ±1.2 (±0.1%) | ±0.12 (±100 ppm/°C) |
| | | | 400 to 700 | ±2.0 (±0.17%) | ±0.24 (±200 ppm/°C) |
| | | | 700 to 1000 | | ±0.30 (±250 ppm/°C) |
| | L | -200 to 900 | -200 to 300 | ±1.1 (±0.1%) | ±0.11 (±100 ppm/°C) |
| | | | 300 to 700 | ±2.2 (±0.2%) | ±0.22 (±200 ppm/°C) |
| | | | 700 to 900 | | ±0.28 (±250 ppm/°C) |
| | U | -200 to 600 | -200 to 400 | ±1.2 (±0.15%) | ±0.12 (±150 ppm/°C) |
| | | | 400 to 600 | ±1.0 (±0.13%) | |
| | N | -200 to 1300 | -200 to 400 | ±1.5 (±0.1%) | ±0.30 (±200 ppm/°C) |
| | | | 400 to 1000 | | |
| | | | 1000 to 1300 | | ±0.38 (±250 ppm/°C) |
| | R | -50 to 1700 | -50 to 500 | ±1.75 (±0.1%) | ±0.44 (±250 ppm/°C) |
| | | | 500 to 1200 | ±2.5 (±0.15%) | |
| | | | 1200 to 1700 | | |
| | S | -50 to 1700 | -50 to 600 | ±1.75 (±0.1%) | ±0.44 (±250 ppm/°C) |
| | | | 600 to 1100 | ±2.5 (±0.15%) | |
| | | | 1100 to 1700 | | |
| | B | 0 to 1800 | 0.0 to 400.0 | Reference accuracy does not apply | Reference accuracy does not apply |
| | | | 400 to 1200 | ±3.6 (±0.2%) | ±0.45 (±250 ppm/°C) |
| | | | 1200 to 1800 | ±5.0 (±0.28%) | ±0.54 (±300 ppm/°C) |
| | WRe5-26 | 0 to 2300 | 0 to 300 | ±1.15 (±0.05%) | ±0.46 (±200 ppm/°C) |
| | | | 300 to 800 | ±2.3 (±0.1%) | |
| | | | 800 to 1500 | ±3.0 (±0.13%) | |
| | | | 1500 to 2300 | | ±0.691 (±300 ppm/°C) |
| | PLII | 0 to 1300 | 0 to 400 | ±1.3 (±0.1%) | ±0.23 (±200 ppm/°C) |
| | | | 400 to 800 | ±2.0 (±0.15%) | ±0.39 (±300 ppm/°C) |
| | | | 800 to 1300 | | ±0.65 (±500 ppm/°C) |
| | Pt100 | -200 to 850 | -200 to 300 | ±1.0 (±0.1%) | ±0.1 (±100 ppm/°C) |
| | | | 300 to 700 | ±2.0 (±0.2%) | ±0.2 (±200 ppm/°C) |
| | | | 700 to 850 | ±2.5 (±0.25%) | ±0.25 (±250 ppm/°C) |
| | Pt1000 | -200 to 850 | -200 to 300 | ±1.0 (±0.1%) | ±0.1 (±100 ppm/°C) |
| | | | 300 to 700 | ±2.0 (±0.2%) | ±0.2 (±200 ppm/°C) |
| | | | 700 to 850 | ±2.5 (±0.25%) | ±0.25 (±250 ppm/°C) |

chanhvinh.com



*1. To convert the temperature unit from Celsius to Fahrenheit, use the following equation.
Fahrenheit temperature (°F) = Celsius temperature (°C) x 1.8 + 32
*2. If there is more than one input range for the same input type, the one with narrower input range has higher resolution.
*3. For a thermocouple input type Temperature Input Unit, the overall accuracy is guaranteed for a set consisting of a cold junction sensor that is mounted on the terminal block and a Temperature Input Unit. Be sure to use the terminal block and Temperature Input Unit with the same calibration control number together. For the 24 mm wide model, also be sure the left and right terminal blocks are correctly attached.




*4. An error for a measured value when the ambient temperature changes by 1°C.
The following formula is used to calculate the error of the measured value.
Overall accuracy = Reference accuracy + Temperature characteristic x Change in the ambient temperature + Cold junction compensation error
(Calculation example)
Conditions

| Item | Description |
|---|---|
| Ambient temperature | 30°C |
| Measured value | 100°C |
| NX Unit | NX-TS2101 |
| Thermocouple | K thermocouple |

The characteristic values are formulated from the data sheet or reference accuracy and temperature coefficient table under the above conditions

| Item | Description |
|---|---|
| Reference accuracy | -100 to 400°C: ±1.5°C |
| Temperature coefficient | -100 to 400°C: ±0.30°C/°C |
| Change in the ambient temperature | 25°C -> 30°C 5 deg |
| Cold junction compensation error | ±1.2°C |

Therefore,
Overall accuracy = Reference accuracy + Temperature characteristic x Change in the ambient temperature + Cold junction compensation error
= ±1.5°C + (±0.30°C/°C) x 5 deg + ±1.2°C
= ±4.2°C

*5. The ppm value is for the full scale of temperature range.

chanhvinh.com



## • Cold Junction Compensation Error Specifications for Units That Take a Thermocouple Input Type

The cold junction compensation error for Units that take a thermocouple input type is restricted as follows according to the installation orientation and the power consumption of adjacent Units *.

(a) For upright installation, when the power consumption is 1.5 W or less for both the left and right adjacent Units

The cold junction compensation error is ±1.2°C.
However, there are exceptions depending on the input type and temperature. Those conditions and the cold junction compensation error are as in the table below.

| Input type and temperature range | Cold junction compensation error |
|---|---|
| T below -90°C | ±3.0°C |
| J, E, K and N below -100°C | |
| U, L and PLII | |
| R and S below 200°C | |
| B below 400°C | Not guaranteed |
| W | ±3.0°C |

(b) When the power consumption of either the left or the right adjacent Unit is more than 1.5 W but less than 3.9 W. Or for any installation other than upright, when the power consumption of both the left and right adjacent Units is less than 3.9 W

The cold junction compensation error is ±4.0°C.
However, there are exceptions depending on the input type and temperature. Those conditions and the cold junction compensation error are as in the table below.

| Input type and temperature range | Cold junction compensation error |
|---|---|
| T below -90°C | ±7.0°C |
| J, E, K and N below -100°C | |
| U, L and PLII | |
| R and S below 200°C | |
| B below 400°C | Not guaranteed |
| W | ±9.0°C |

(c) When the power consumption exceeds 3.9 W for either the left or right adjacent Unit

Do not use the above condition (c) because the cold junction compensation error is not guaranteed in this condition.

* The power consumption of adjacent Units is the total of the following values.
The power consumption of the NX Unit power supply and I/O power supply for the NX Units adjacent to the Temperature Input Unit. If the adjacent Unit is an Input Unit, it is the total power consumption according to the input current.

chanhvinh.com

## NX-series Heater Burnout Detection Unit

# NX-HB

## Temperature control with heater burnout detection in conjunction with a temperature input unit and PID instructions

- Reduce the costs for communications programming and other development
- Achieve flexible temperature control




NX-HB3101

## Features

- Up to four CT inputs per unit
- Omron's proven heater burnout detection function
- Monitoring of CT currents to detect heater burnouts and SSR failures
- Time-proportional control outputs to drive SSRs
- Control outputs not affected by controller cycle time
- Four control outputs to drive SSRs (100 mA max.)
- Heater burnout detection for a single-phase or three-phase heater
- Detachable front connector with screwless Push-In Plus terminals for easy installation and maintenance

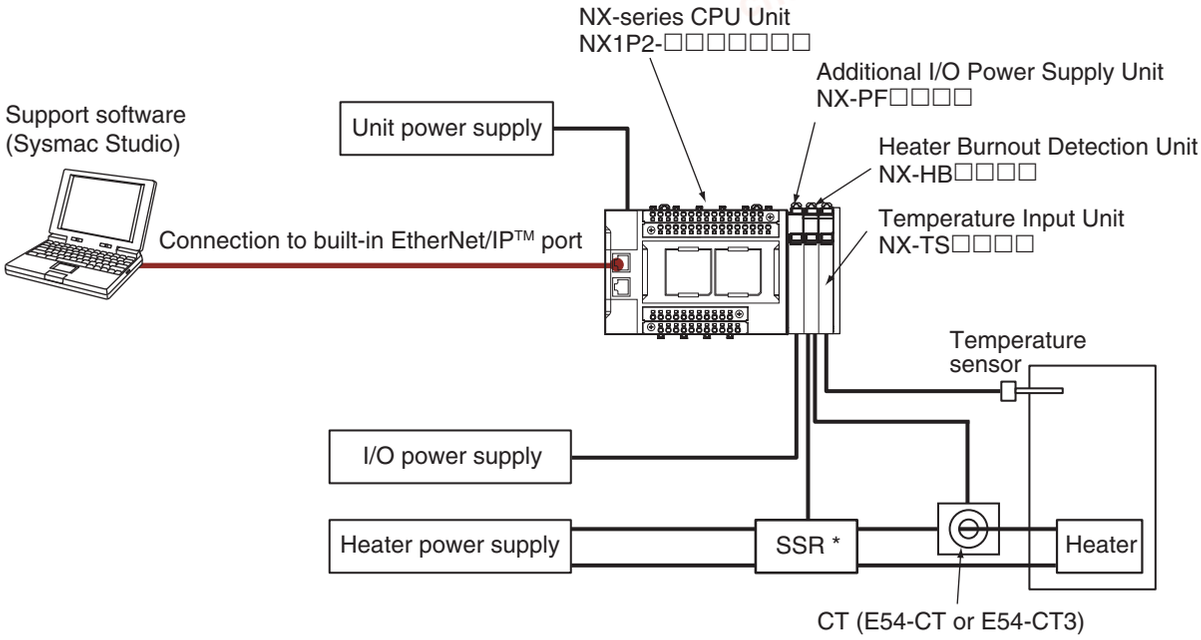
chanhvinh.com



# System Configurations

## Connected to a CPU Unit

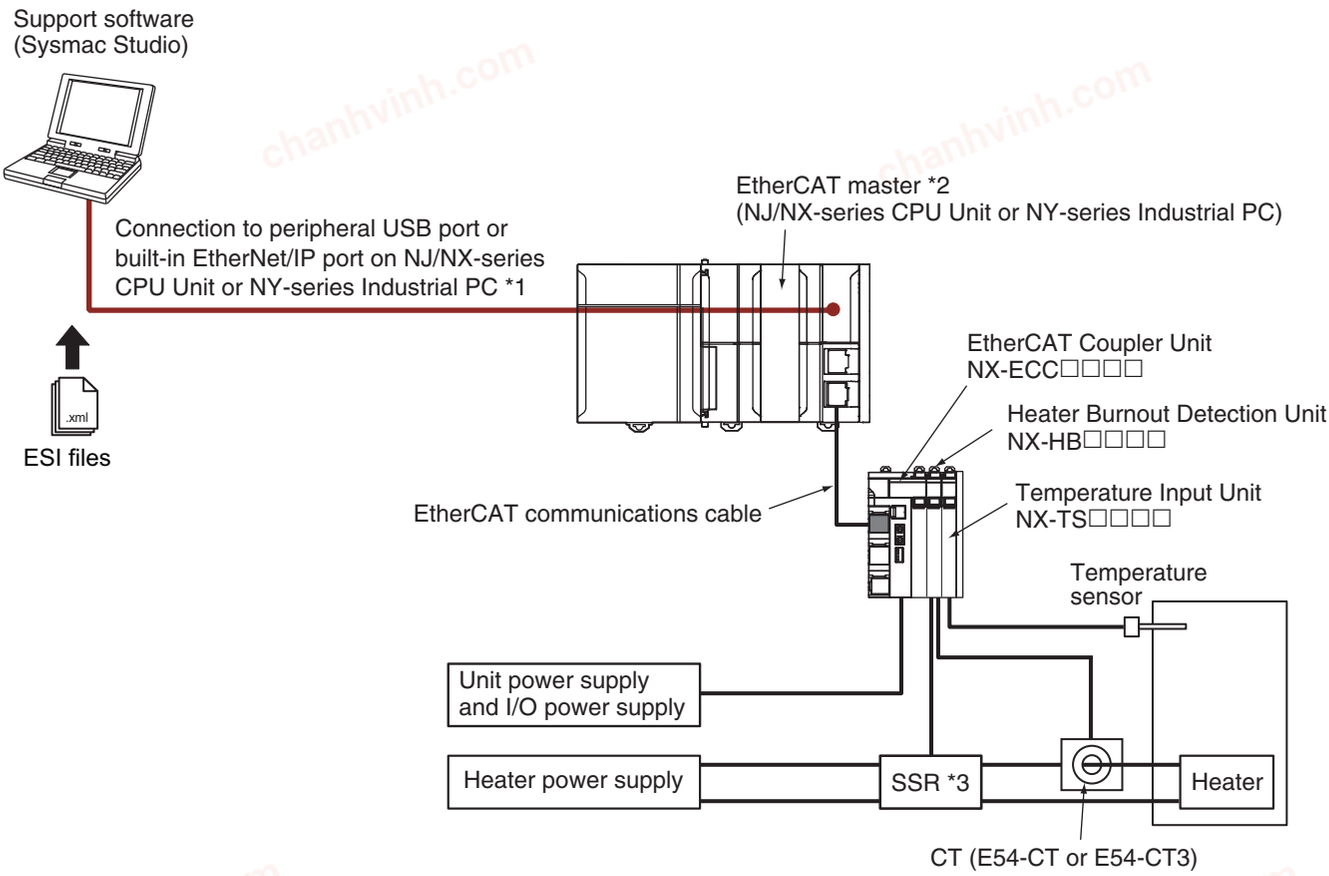
The system configuration that you use to connect a Heater Burnout Detection Unit and Temperature Input Unit to an NX-series NX1P2 CPU Unit is shown in the following figure.




* The SSR is used to turn the heater ON and OFF.

## Connected to an EtherCAT Coupler Unit

The system configuration that you use to connect a Heater Burnout Detection Unit and Temperature Input Unit to an EtherCAT Coupler Unit and combine these with an NJ/NX/NY-series Controller is shown in the following figure.




*1. The connection method for the Sysmac Studio depends on the model of the CPU Unit or Industrial PC.
*2. An EtherCAT Slave Terminal cannot be connected to any of the OMRON CJ1W-NC□81/□82 Position Control Units even though they can operate as EtherCAT masters.
*3. The SSR is used to turn the heater ON and OFF.

**Note:** To check whether NX Units can be connected to your CPU Unit or Communications Coupler Unit, refer to the user's manual for the CPU Unit or Communications Coupler Unit.

chanhvinh.com



## Function Specifications

| Function | Description |
|---|---|
| **Free-Run Refreshing** | With this I/O refreshing method, the refresh cycle of the NX bus and I/O refresh cycles of the NX Units are asynchronous. |
| **CT Allocation** | This function is used to assign each CT input to a corresponding control output. |
| **Reading CT Currents** | This function reads CT inputs as heater currents or leakage currents. |
| **Heater Burnout Detection** | This function detects heater burnouts. A heater burnout is detected if the control output is ON and the heater current is equal to or less than the heater burnout detection current. |
| **SSR Failure Detection** | This function detects SSR failures. An SSR failure is detected if the control output is OFF and the leakage current is equal to or greater than the detection current. An SSR failure is a failure that is caused by an SSR short-circuit. |
| **Time-proportional Output** | This function controls a control output by using the manipulated variable from the host controller as a duty ratio. You can also specify the minimum pulse widths and execute immediate output commands. |
| **Load Rejection Output Setting** | This function performs a preset output operation when the Heater Burnout Detection Unit cannot receive an output set value due to a communications error between the host and the Communications Coupler Unit or due to an error on the NX bus. |
| **Load Short-circuit Protection** | This function is used to protect the output circuits of the Heater Burnout Detection Unit when an external device short-circuits. This function is supported only by the NX-HB3201. |

chanhvinh.com



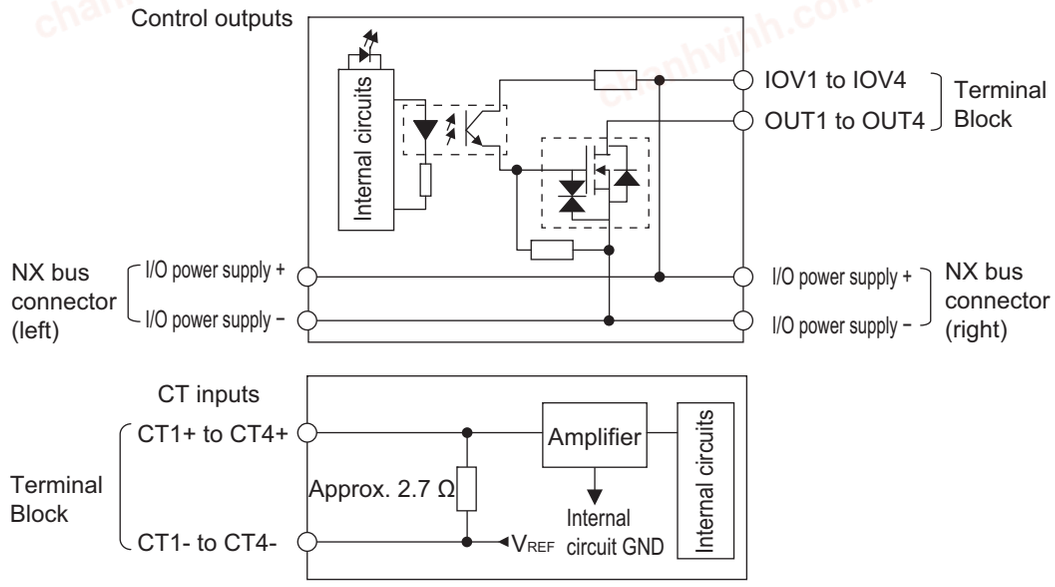
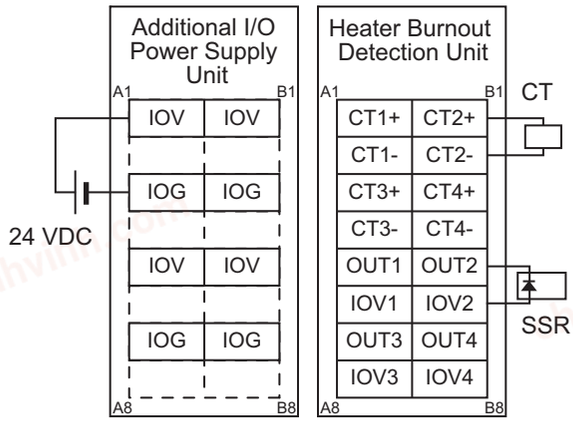
# Heater Burnout Detection Unit

## Heater Burnout Detection Unit (NPN) NX-HB3101

| | | | | | |
|---|---|---|---|---|---|
| **Unit name** | Heater Burnout Detection Unit | | **Model** | NX-HB3101 | |
| **Number of points** | 4 CT inputs and 4 control outputs | | **External connection terminals** | Screwless Clamping Terminal Block (16 terminals) | |
| **I/O refreshing method** | Free-Run refreshing | | | | |
| **Indicators** | TS indicator and output indicators<br> | | | | |
| **CT input section** | **CT current input range** | 0 to 0.125 A | **Control output section** | **Internal I/O common** | NPN |
| | **Input resistance** | Approx. 2.7 Ω | | **Control period** | 50 to 100,000 ms |
| | **Connectable CTs** | E54-CT1 and E54-CT3 | | **Manipulated variable** | 0% to 100% |
| | | | | **Resolution** | 1 ms |
| | | | | **Rated voltage** | 12 to 24 V DC |
| | **Maximum heater current** | 50 A AC | | **Operating load voltage range** | 10.2 to 28.8 VDC |
| | **Resolution** | 0.1 A | | **Maximum load current** | 0.1 A/point, 0.4 A/Unit |
| | **Overall accuracy (25°C)** | ±5% (full scale)<br>±1 digit | | **Maximum inrush current** | 1.0 A/point max., 10 ms |
| | | | | **Leakage current** | 0.1 mA max. |
| | **Influence of temperature (0 to 55°C)** | ±2% (full scale)<br>±1 digit | | **Residual voltage** | 1.5 V max. |
| | | | | **Disconnection/ short-circuit detection** | None |
| | **Conversion time** | 10 ms | | **Protective functions** | None |
| **Dimensions (mm)** | 12 × 100 × 71 mm (W×H×D) | | **Isolation method** | Between control outputs and Internal circuits: Photocoupler isolation<br>No isolation between Internal circuits and CT inputs | |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max. | |
| **I/O power supply method** | Supplied from the NX bus. | | **Current capacity of I/O power supply terminals** | IOV: 0.1 A max. per terminal | |
| **NX Unit power consumption** | • Connected to a CPU Unit<br>1.05 W max.<br>• Connected to a Communications Coupler Unit<br>0.75 W max. | | **Current consumption from I/O power supply** | 20 mA max. | |
| **Weight** | 70 g max. | | | | |

chanhvinh.com



| | |
|---|---|
| **Circuit configuration** |  |
| **Installation method and restrictions** | Installation orientation:<br>• Connected to a CPU Unit: Possible in upright installation.<br>• Connected to a Communications Coupler Unit: Possible in 6 orientations.<br>Restrictions: No restrictions |
| **Terminal connection diagram** |  |

chanhvinh.com



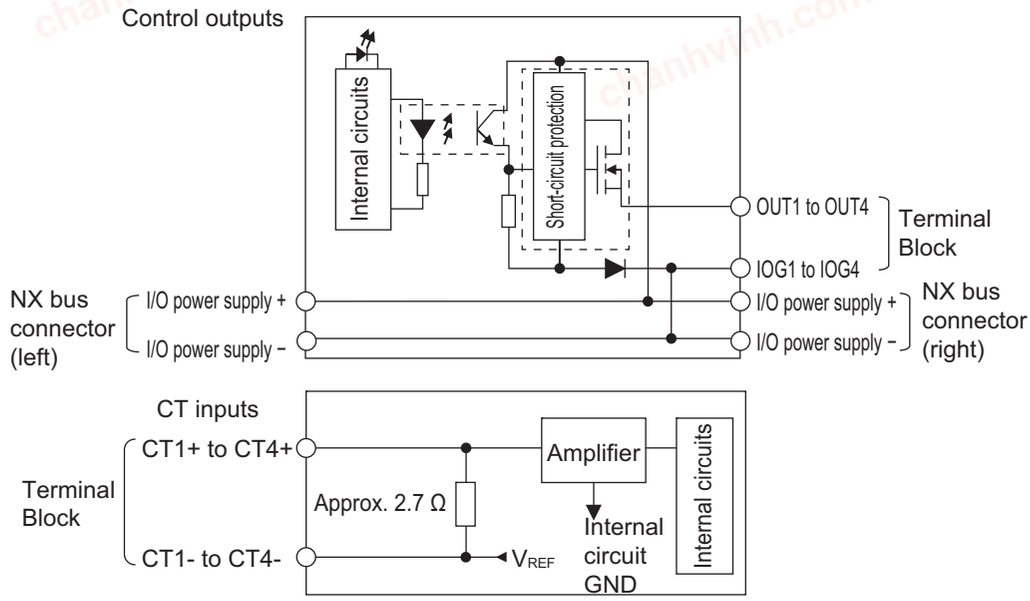
## Heater Burnout Detection Unit (PNP) NX-HB3201

| | | | | | |
|---|---|---|---|---|---|
| **Unit name** | Heater Burnout Detection Unit | | **Model** | NX-HB3201 | |
| **Number of points** | 4 CT inputs and 4 control outputs | | **External connection terminals** | Screwless Clamping Terminal Block (16 terminals) | |
| **I/O refreshing method** | Free-Run refreshing | | | | |
| **Indicators** | TS indicator and output indicators<br> | | | | |
| **CT input section** | **CT current input range** | 0 to 0.125 A | **Control output section** | **Internal I/O common** | PNP |
| | **Input resistance** | Approx. 2.7 Ω | | **Control period** | 50 to 100,000 ms |
| | **Connectable CTs** | E54-CT1 and E54-CT3 | | **Manipulated variable** | 0% to 100% |
| | | | | **Resolution** | 1 ms |
| | | | | **Rated voltage** | 24 VDC |
| | **Maximum heater current** | 50 A AC | | **Operating load voltage range** | 15 to 28.8 VDC |
| | **Resolution** | 0.1 A | | **Maximum load current** | 0.1 A/point, 0.4 A/Unit |
| | **Overall accuracy (25°C)** | ±5% (full scale)<br>±1 digit | | **Maximum inrush current** | 1.0 A/point max., 10 ms |
| | | | | **Leakage current** | 0.1 mA max. |
| | **Influence of temperature (0 to 55°C)** | ±2% (full scale)<br>±1 digit | | **Residual voltage** | 1.5 V max. |
| | | | | **Disconnection/ short-circuit detection** | None |
| | **Conversion time** | 10 ms | | **Protective functions** | Provided. |
| **Dimensions (mm)** | 12 × 100 × 71 mm (W×H×D) | | **Isolation method** | Between control outputs and Internal circuits: Photocoupler isolation<br>No isolation between Internal circuits and CT inputs | |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute with a leakage current of 5 mA max. | |
| **I/O power supply method** | Supplied from the NX bus. | | **Current capacity of I/O power supply terminals** | IOV: 0.1 A max. per terminal | |
| **NX Unit power consumption** | • Connected to a CPU Unit<br>1.05 W max.<br>• Connected to a Communications Coupler Unit<br>0.75 W max. | | **Current consumption from I/O power supply** | 20 mA max. | |
| **Weight** | 70 g max. | | | | |

chanhvinh.com



**Circuit configuration**

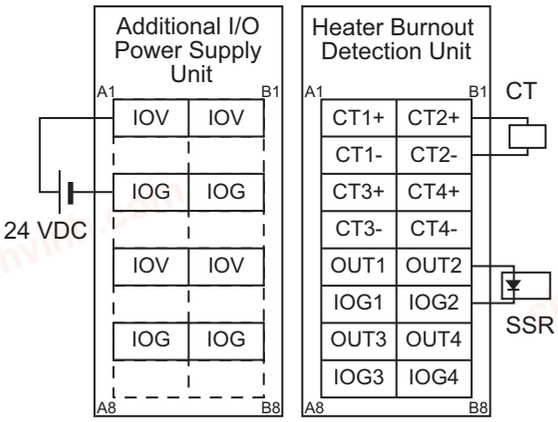



**Installation method and restrictions**

Installation orientation:
- Connected to a CPU Unit: Possible in upright installation.
- Connected to a Communications Coupler Unit: Possible in 6 orientations.

Restrictions: No restrictions

**Terminal connection diagram**



chanhvinh.com

# Terms and Conditions Agreement

Read and understand this catalog.
Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

Warranties.
(a) Exclusive Warranty. Omron's exclusive warranty is that the Products will be free from defects in materials and workmanship for a period of twelve months from the date of sale by Omron (or such other period expressed in writing by Omron). Omron disclaims all other warranties, express or implied.
(b) Limitations. OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, ABOUT NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF THE PRODUCTS. BUYER ACKNOWLEDGES THAT IT ALONE HAS DETERMINED THAT THE
PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE.
Omron further disclaims all warranties and responsibility of any type for claims or expenses based on infringement by the Products or otherwise of any intellectual property right. (c) Buyer Remedy. Omron's sole obligation hereunder shall be, at Omron's election, to (i) replace (in the form originally shipped with Buyer responsible for labor charges for removal or replacement thereof) the non-complying Product, (ii) repair the non-complying Product, or (iii) repay or credit Buyer an amount equal to the purchase price of the non-complying Product; provided that in no event shall Omron be responsible for warranty, repair, indemnity or any other claims or expenses regarding the Products unless Omron's analysis confirms that the Products were properly handled, stored, installed and maintained and not subject to contamination, abuse, misuse or inappropriate modification. Return of any Products by Buyer must be approved in writing by Omron before shipment. Omron Companies shall not be liable for the suitability or unsuitability or the results from the use of Products in combination with any electrical or electronic components, circuits, system assemblies or any other materials or substances or environments. Any advice, recommendations or information given orally or in writing, are not to be construed as an amendment or addition to the above warranty.
See http://www.omron.com/global/ or contact your Omron representative for published information.

Limitation on Liability; Etc.
OMRON COMPANIES SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR PRODUCTION OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED IN CONTRACT, WARRANTY, NEGLIGENCE OR STRICT LIABILITY.
Further, in no event shall liability of Omron Companies exceed the individual price of the Product on which liability is asserted.

Suitability of Use.
Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.
NEVER USE THE PRODUCT FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY OR IN LARGE QUANTITIES WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Programmable Products.
Omron Companies shall not be responsible for the user's programming of a programmable Product, or any consequence thereof.

Performance Data.
Data presented in Omron Company websites, catalogs and other materials is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of Omron's test conditions, and the user must correlate it to actual application requirements. Actual performance is subject to the Omron's Warranty and Limitations of Liability.

Change in Specifications.
Product specifications and accessories may be changed at any time based on improvements and other reasons. It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without any notice. When in doubt, special part numbers may be assigned to fix or establish key specifications for your application. Please consult with your Omron's representative at any time to confirm actual specifications of purchased Product.

Errors and Omissions.
Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

2020.2

**In the interest of product improvement, specifications are subject to change without notice.**

**OMRON Corporation**
**Industrial Automation Company**

**http://www.ia.omron.com/**

(c)Copyright OMRON Corporation 2020 All Right Reserved.