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OMRON

TYPE NE1A-SCPU01-EIP

Safety Network Controller

English

INSTRUCTION MANUAL

Thank you for purchasing this NE1A-SCPU01-EIP.

This manual primarily describes precautions required in installing and operating the NE1A-SCPU01-EIP.

Only qualified person trained in professional electrical technique should be handle the NE1A.

Before operating the NE1A-SCPU01-EIP, read this manual through to acquire sufficient knowledge of the NE1A-SCPU01-EIP.

To ensure safe and correct use of the NE1A-SCPU01-EIP, also read the following manuals:

Safety Network Controller OPERATION MANUAL (Cat.No. Z906-E1)

SYSTEM CONFIGURATION MANUAL (Cat.No. Z905-E1)

DeviceNet™ OPERATION MANUAL (Cat. No. W267-E1)

Keep this manual for future reference.

OMRON Corporation

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Instructions in the official EU languages and a signed EU Declaration of Conformity in English are available on our website at <http://www.ia.omron.com/support/models/>.

EU Declaration of Conformity

OMRON declares that NE1A-SCPU01-EIP is in conformity with the requirements of the following EU Directives:

EMC Directive:2014/30/EU

Machinery Directive:2006/42/EC

Standards

NE1A-SCPU01-EIP is designed and manufactured in accordance with the following standards:

EN ISO13849-1:2015 Cat.4 PL e

EN ISO13850

IEC61508 parts 1-7 SIL3

EN61131-2

UL508

ANSI/ISA 12.12.01

EN ISO13849-2

EN62061

EN60204-1

NFPA 79

ANSI RIA 15.06

ANSI B11.19

CSA C22.2 No.142, No.213

ANSI/UL1998

⚠

WARNING

Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.

- Meaning of Alert Symbols
- The following alert symbols are used in this manual.

⊘	Indicates prohibited actions
❗	Indicates mandatory actions

Alert Statements

⚠ WARNING	
Serious injury may possibly occur due to loss of required safety functions. Do not use test outputs of the NE1A-SCPU01-EIP as any safety outputs.	⊘
Serious injury may possibly occur due to loss of required safety functions. Do not use DeviceNet standard I/O data, EtherNet/IP standard I/O data, Explicit message data or UDP/IP message data as any safety data.	⊘
Serious injury may possibly occur due to loss of required safety functions. Do not use LEDs on the NE1A-SCPU01-EIP for safety operations.	⊘
Serious injury may possibly occur due to breakdown of outputs. Do not connect loads beyond the rated value to the safety outputs and the test outputs.	⊘
Serious injury may possibly occur due to loss of required safety functions.Wire the NE1A-SCPU01-EIP properly so that 24VDC line do NOT touch the outputs accidentally or unintentionally.	❗
Serious injury may possibly occur due to loss of required safety functions.Ground the 0V line of the power supply for external output devices so that the devices do Not turn ON when the safety output line or the test output line is grounded.	❗
Serious injury may possibly occur due to loss of required safety functions. Use appropriate components or devices according to the requirements given in the following table.	❗

Controlling Devices	Requirements
Emergency stop switch	Use approved devices with Direct Opening Mechanism complying with IEC/EN 60947-5-1.
Door interlocking switch	Use approved devices with Direct Opening Mechanism complying with IEC/EN 60947-5-1 and capable of switching micro loads of 24VDC, 4mA.
Limit switch	
Safety sensor	Use approved sensors complying with the relevant product standards, regulations, and rules in the country where it is used.
Relay with forcibly guided contacts	Use approved devices with forcibly guided contacts complying with IEC61810-3. For feedback purpose, use devices with contacts capable of switching micro loads of 24VDC, 4mA.
Contactors	Use contactors with forcibly guided mechanism and monitor its auxiliary NC contact to detect failures of contactor. For feedback purpose, use devices with contacts capable of switching micro loads of 24VDC, 4mA.
Other devices	Evaluate whether devices used are appropriate to satisfy the requirements of safety category level.

Precautions for Safe Use

● Handle with care

Do not drop the NE1A-SCPU01-EIP to the ground or excessive vibration or mechanical shocks. The NE1A-SCPU01-EIP may be damaged and may not function properly.

● Installation and storage environment

Do not use or store the NE1A-SCPU01-EIP in any of the following locations.

Locations subject to direct sunlight.

Locations subject to temperatures or humidity outside the range specified in the specifications.

Locations subject to condensation as the result of severe changes in temperature.

Locations subject to corrosive or flammable gases.

Locations subject to dust (especially iron dust) or salts.

Locations subject to water, oil, or chemicals.

Locations subject to shock or vibration.

Take appropriate and sufficient countermeasures when installing systems in the following locations. Inappropriate and insufficient measures may result in malfunction.

Locations subject to static electricity or other forms of noise.

Locations subject to strong electromagnetic fields.

Locations subject to possible exposure to radioactivity.

Locations close to power supplies.

● Installation/ Mounting

Use the NE1A-SCPU01-EIP within an enclosure with IP54 protection or higher of IEC/EN 60529.

Use DIN rail (TH35-7.5 according to IEC60715) for placing the NE1A-SCPU01-EIP into the control board.

Mount the NE1A-SCPU01-EIP to DIN rails with attachments (TYPE PFP-M, not incorporated to this product), not to drop out of rails by vibration etc.

Spacing should be available around the NE1A-SCPU01-EIP at least 5mm from its side and at least 50mm from its top and bottom surfaces for ventilation and wiring.

This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.

● Installation/ Wiring

Use the following to wire external I/O devices to the NE1A-SCPU01-EIP.

Solid wire	0.2 to 2.5mm ² AWG24 to 12
Standard (Flexible) wire	0.34 to 1.5mm ² AWG22 to 16

Disconnect the NE1A-SCPU01-EIP from power supply when wiring. Devices connected to NE1A-SCPU01-EIP may operate unexpectedly.

Apply properly specified voltages to the NE1A-SCPU01-EIP inputs. Applying inappropriate DC voltage and any AC voltages cause the NE1A-SCPU01-EIP to fail.

Be sure to separate the communication cable and the I/O cable from the high-voltage/current lines.

Be cautious not to have your fingers caught when attaching connectors to the plugs on the NE1A-SCPU01-EIP.

Mount screw of DeviceNet Connector and I/O Connector correctly. (0.25-0.3N·m)

Incorrect wiring may lead to loss of safety function. Wire conductors correctly and verify the operation of the NE1A-SCPU01-EIP before commissioning the system in which NE1A-SCPU01-EIP is incorporated.

After wiring is completed, be sure to remove label for wire clipping prevention on the NE1A-SCPU01-EIP to enable heat to escape for proper cooling.

● Power Supply Selection

Use DC power supply satisfying requirements below.

Secondary circuits of DC power supply is isolated from its primary circuit by double insulations or reinforced insulations.

DC power supply satisfies the requirement for class 2 circuits or limited voltage/current circuit stated in UL 508.

20ms or over of the output hold time.

DC power supply that satisfies the requirements for SELV given in IEC/EN60950-1 or EN 50178.

● Periodical Inspection and Maintenance

Disconnect the NE1A-SCPU01-EIP from power supply when replacing. Devices connected to the NE1A-SCPU01-EIP may operate unexpectedly.

Do not dismantle, repair, or modify the NE1A-SCPU01-EIP. It may lead to loss of its safety functions.

● Disposal

Be cautious not to have you injured when dismantling the NE1A-SCPU01-EIP.

The above-mentioned is a part of directions. Please use it after reading the operation manual.

Additional Precautions According to ANSI/ISA 12.12.01

1. This equipment is suitable for use in Class I, Div.2, Group A, B, C, D or Non-Hazardous Locations Only.

2. WARNING: Explosion Hazard-Substitution of Components may Impair Suitability for Class I, Div.2.

3. WARNING: Explosion Hazard - Do not Disconnect Equipment Unless Power Has Been Switched off or the Area Is Known to Be Non-Hazardous.

4. This device is open-type and is required to be installed in an enclosure suitable for the environment and can only be accessed with the use of a tool or key.

5. WARNING: Explosion Hazard - Do not connect USB Connector Unless Power Has Been Switched Off Or The Area Is Known To Be Non-Hazardous.

1. Cet équipement convient a l'utilisation dans des emplacements de Classe I, Division 2, Groupes A, B, C, D, ou ne convient qu'a l'utilisation dans des endroits non dangereux.

2. AVERTISSEMENT - Risque d'explosion - La substitution de composants peut rendre ce materiel inacceptable pour les emplacements de Classe I, Division 2

3. AVERTISSEMENT - Risque d'explosion - Avant de debrancher l'equipement, couper le courant ou s'assurer que l'emplacement est designe non dangereux.

4. Ce dispositif est de type ouvert et doit etre installe dans un coffret adapte a l'environnement et auquel on ne pourra acceder uniquement au moyen d'un outil ou d'une cle.

5. AVERTISSEMENT - Risque d'explosion - Ne pas deconnecter l'USB avant que l'alimentation ait été coupée ou que la zone soit reconnue comme non dangereuse.

1. SPECIFICATIONS

Environmental Specifications	
Item	Specifications
DeviceNet supply voltage	11 to 25VDC (Supplied from communications power supply)
Device supply voltage V0, V1, V2 ¹⁾	20.4 to 26.4VDC (24VDC, -15% to +10%)
DeviceNet current consumption	15mA at 24VDC
Current consumption V0 (internal logic circuit)	280mA at 24VDC
EMC	Conform to IEC61131-2
Operating Temperature	-10 to +55deg.C
Storage Temperature	-40 to +70deg.C
Relative Humidity	10 to 95% non-condensing
Vibration resistance	0.35 mm at 10 to 57Hz, 50m/s ² at 57 to 150Hz
Shock resistance	150m/s ² : 11ms
Protection degree	IP20
Over Voltage Category	II (per IEC61131-2: 4.4.2)
Pollution Degree	2
Altitude	Max. 2000m
Weight	570g

¹⁾ V0-G0: for internal logic circuit, V1-G1: for external input devices and test outputs
V2-G2: for external output devices

● Safety Input Specifications

Item	Specifications
Inputs type	Current sinking
ON voltage	11VDC min.
OFF voltage	5VDC max.
OFF current	1mA max.
Input current	4.5mA

● Safety Output Specifications

Item	Specifications
Outputs type	Current sourcing
Rated output current	0.5A max. / channel
Residual voltage	1.2V max.
Leakage current	0.1mA max.

In case that a safety output is configured as "Safety Pulse Test", while this output is in an ON state, the pulsed off signal(pulse width:580μs) is output continuously for fault diagnosis. Confirm response time of device connected to safety outputs so the device does not malfunction due to this off pulse.

● Test Output Specifications

Item	Specifications
Outputs type	Current sourcing
Rated output current	0.7A max. / channel ²⁾
Residual voltage	1.2V max.
Leakage current	0.1mA max.

²⁾ T0-T3 total current at the same time:1.4A

2. PART NAMES AND FUNCTION / DIMENSIONS

● Indicators

LED Designations	LED Color	Status	Description
MS (Module Status)	Green	Lit	In Executing
		Flashing	In Idle
	Red	Lit	In Critical fault
		Flashing	In Recoverable fault
	Green/Red	Flashing	In Self Testing, Waiting for TUNID, or Configuring
NS D (DeviceNet Network Status)	Green	Lit	Online and connection established
		Flashing	Online but connection not established
	Red	Lit	Critical link failure
		Flashing	Connection time-out
	Green/Red	Flashing	In Waiting for TUNID
LOCK (Configuration Lock)	Yellow	Not lit	No power
		Lit	Not online / Not powered
		Flashing	Not online / Not powered
COMM U (USB)	Yellow	Lit	Locked Valid Configuration
		Flashing	Unlocked Valid Configuration
IN 0, 1, 2...15 OUT 0, 1,2...7 (I/O status)	Yellow	Not lit	Invalid Configuration
		Flashing	Communicating
NS E (EtherNet/IP Network Status)	Yellow	Lit	Communicating
		Not lit	Not communicating
	Red	Lit	Input / Output signal ON
		Not lit	Input / Output signal OFF
	Red	Lit	Failure detected in the Input / Output circuit
100M (Ethernet 100M Link Status)	Red	Flashing	Discrepancy error has occurred in I/O set for dual channel mode
		Flashing	Failure detected in the associated I/O circuit in case of dual channel configuration
	Green	Lit	Online and connection established
		Flashing	Online but connection not established
10M (Ethernet 10M Link Status)	Red	Lit	Critical link failure
		Flashing	Connection time-out
	Yellow	Not lit	Not online / Not powered
COM E (Ethernet)	Yellow	Lit	Not online / Not powered
		Flashing	Not online / Not powered
100M (Ethernet 100M Link Status)	Yellow	Lit	Communicating
		Not lit	Not communicating
10M (Ethernet 10M Link Status)	Yellow	Lit	Ethernet has established a 100Base-TX link.
		Not lit	Ethernet has not established a 100Base-TX link.
	Yellow	Lit	Ethernet has established a 10Base-T link.
		Not lit	Ethernet has not established a 10Base-T link.

● 7 segment LEDs

At normal state, 7-Segment LED displays the node address of the NE1A-SCPU01-EIP itself in decimal number (00-63). The node address, depending on the operational state of the NE1A-SCPU01-EIP, turns "ON" or "Flashing".

If in fault status, error code and error occurrence node address are displayed alternately in the order of node address.

In "standalone mode", "nd" is displayed in the normal condition.

● Dip Switch

1

2

3

4

→ ON

● Rotary Switch

At normal state, 7-Segment LED displays the node address of the NE1A-SCPU01-EIP itself in decimal number (00-63). The node address, depending on the operational state of the NE1A-SCPU01-EIP, turns "ON" or "Flashing".

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● IP Address Display Switch

Press the IP address display switch for 1 s or longer to display at the 7-segment display the EtherNet/IP IP address that is set.

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3. INTERNAL CIRCUITRY AND WIRING

Terminal Designations and functions	
Terminal Designations	Descriptions
V0	Power terminal for internal circuit (Logic).
G0	Power terminal for internal circuit (Logic).
V1	Power terminal for external input devices and test outputs.
G1	Power terminal for external input devices and test outputs.
V2	Power terminal for external output devices e.g. safety outputs.
G2	Power terminal for external output devices e.g. safety outputs.
IN0 through IN15	Terminal for Safety input signals.
T0 through T3	Test output terminal for use in conjunction with IN0 through IN15 safety inputs. Each test output provides a unique set of test pulse patterns. T3 also supports current monitoring of the output signal for e.g. muting applications.
OUT0 through OUT7	Terminal for Safety outputs
⚡ (FG)	Terminal for functional earth.

● When a problem cause is assumed to be the noise, install a functional earth terminal to a ground of 100 Ω max. For correct wirings, read the user's manual carefully to establish a ground.

● The maximum terminal temperature is 80 °C

● Use SELV Power Source for the DC main power source.

● DeviceNet Connector

V+

CAN H

Drain

CAN L

V-

1

2

3

4

5

6

7

8

● Ethernet Connector

The connectors for the Ethernet twisted-pair cable.

Electrical specifications: Conforming to IEEE802.3 standards.

Connector structure: RJ45 8-pin Modular Connector (conforming to ISO 8877)

Color

Description

Red

V+

White

Signal(CAN H)

–

Drain

Blue

Signal(CAN L)

Black

V-

Connector

Signal name

Abbr.

Signal direction

1

Transmission data+

TD+

Output

2

Transmission data-

TD-

Output

3

Reception data +

RD+

Input

4

Not used.

–

–

5

Not used.

–

–

6

Reception data –

RD-

Input

7

Not used.

–

–

8

Not used.

–

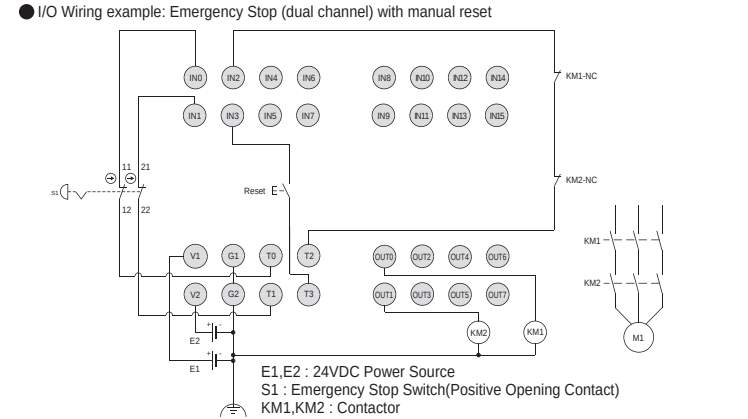
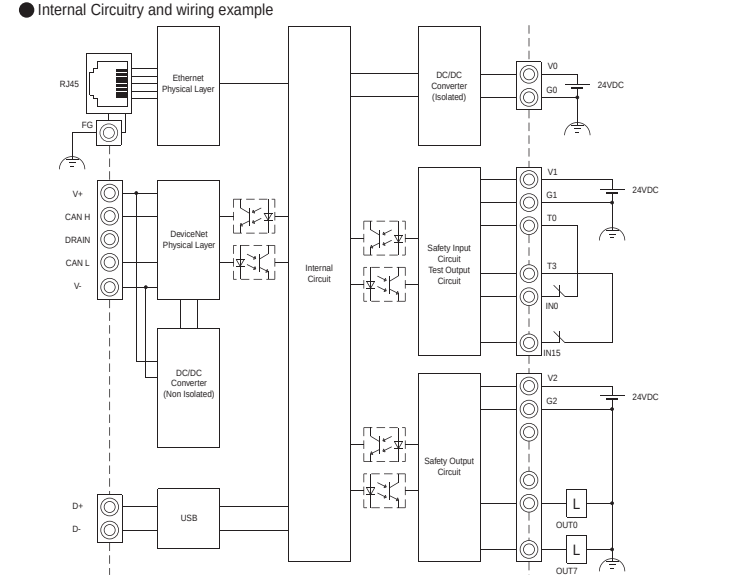
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Hood

Frame ground

FG

–



Suitability for 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.

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Note: Specifications subject to change without notice.