OMRON

DeviceNet Safety System

SAFETY, TECHNOLOGY & INNOVATION

Safety Interlock Circuits Are Created or Changed with Software.
Build Standalone Safety Applications or Distributed Safety Control Systems.

DeviceNet Safety System

Complies with the FA Industry's Highest Safety Standards

Easier Safety Network Controller Use and a Wide Range of Peripheral Equipment!

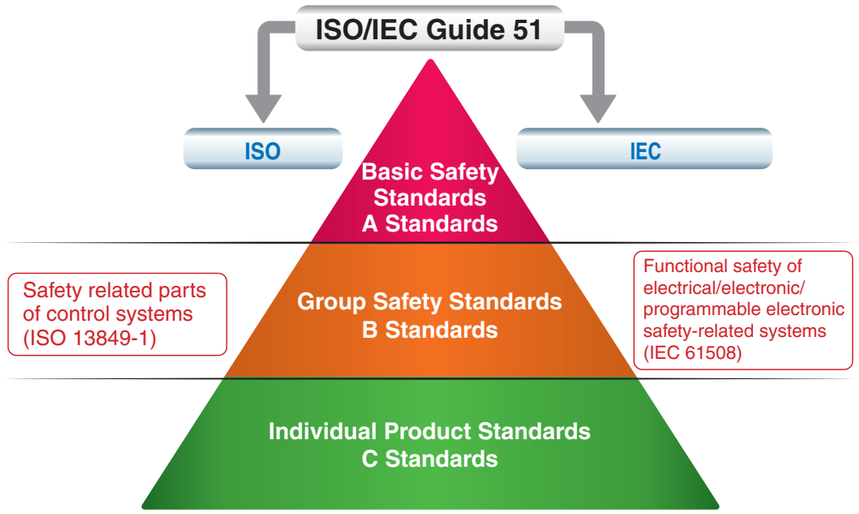
realizing

A Reliable Choice, Try It and You'll be Convinced -- OMRON Safety Controllers with Reduced Network Wiring.

- **Total cost of ownership (TCO) is reduced** with a Safety Network Controller.
- Advances in safety standards and applicable technologies enable **programmable safety configurations and distributed networks with reduced wiring.**
- The world's highest levels of **safety standards** are achieved.
- **Low-cost system construction** for a wide range of safety applications.

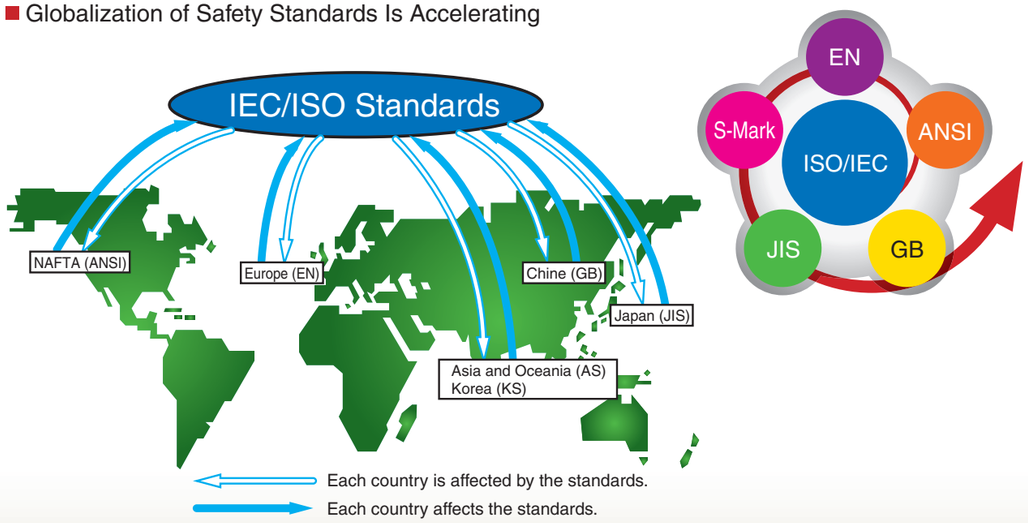
International Safety Standard Certification

- ISO 13849-1 Safety Categories 2 to 4
- IEC 61508 SIL 3



Bringing safety measures to electronic devices!

- Globalization of Safety Standards Is Accelerating

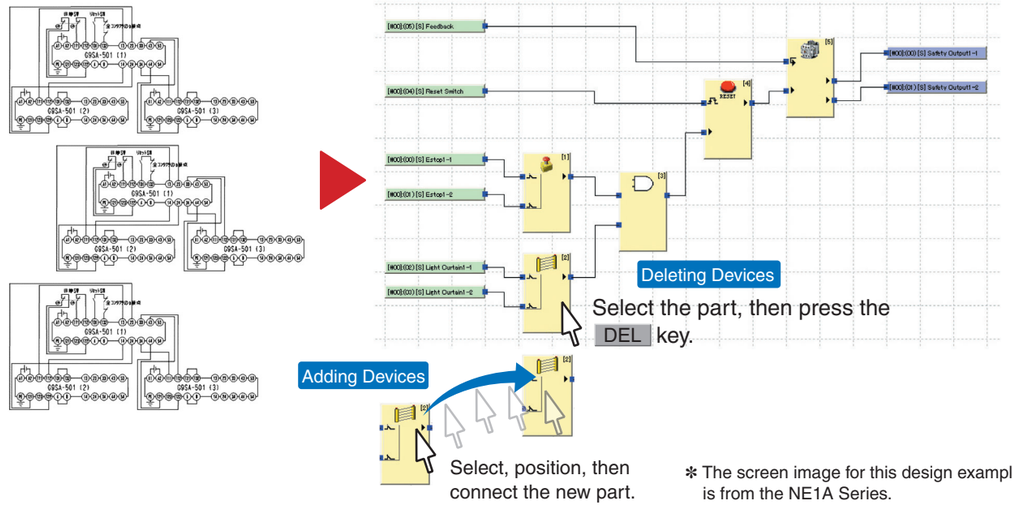


Raising Design Efficiency by Making Safety Circuit Designs Programmable

- Work involving complicated safety design is dramatically improved.
- Safety circuits can be improved and flexibly changed.
- Safety logic is easily understandable by machine designers.

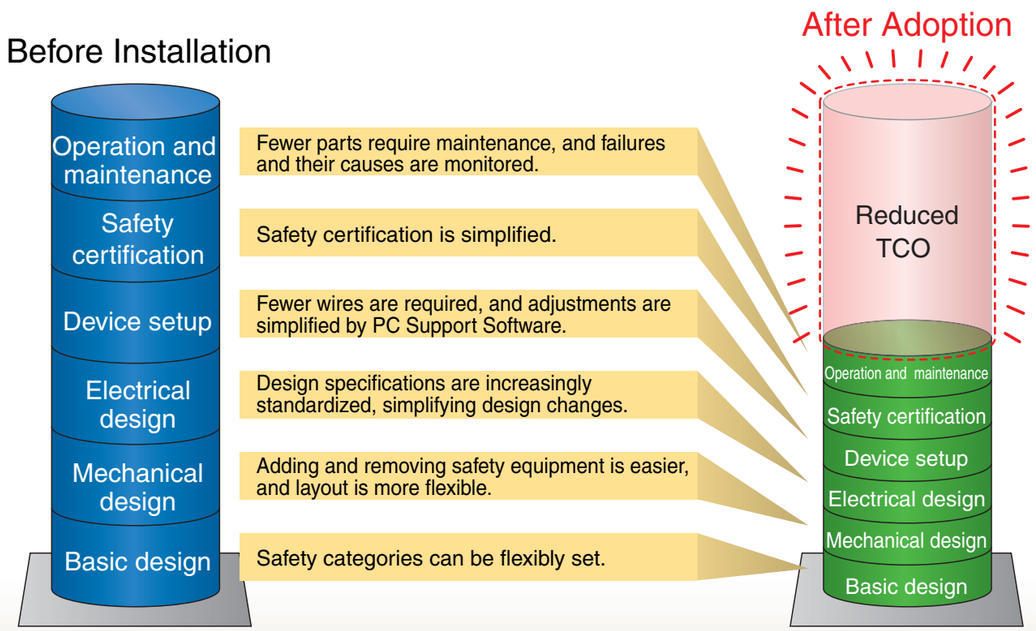
Conventional International Safety Standards:
Hardware Design

New International Safety Standards:
Hardware and Software Design



* The screen image for this design example is from the NE1A Series.

TCO Reduction with an OMRON Safety Controller



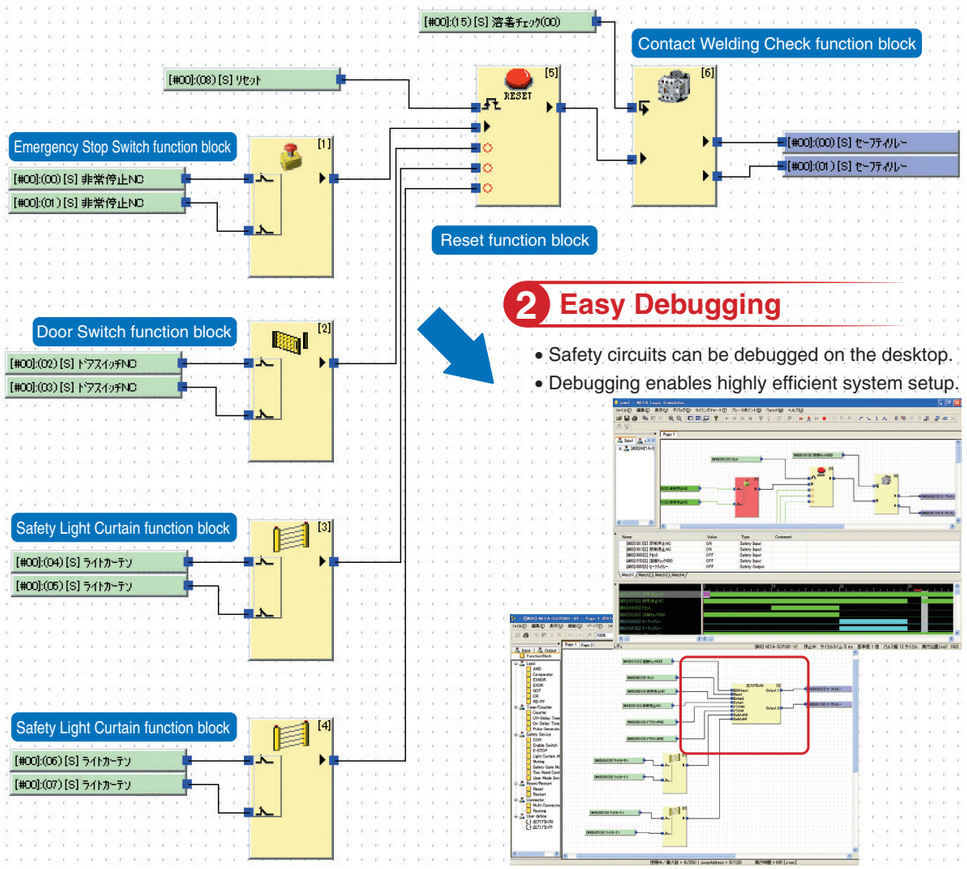
NE1A-series Features Flexibly Handle a Variety of Safety Applications

- **Programmable** operation increases design efficiency for even complicated safety circuits.
- Work efficiency is further improved by **easier changing, modifying, and debugging of safety circuits**.
- An **optimal network distributed system can be configured, and costs can be lowered due to reduced wiring,** by combining NE0A-series Safety Controllers and DST1-series Slave.
- **Safety control can be graphically represented** by combining NE1A-series Safety Controllers with a standard DeviceNet network **to make maintenance more reliable.**

Programmable Safety Systems That Satisfy the World's Highest-level Standards

1 Flexible Safety Design Using Support Software

- Safety circuits are designed with function blocks (FB).
- A total of 23 safety-certified function blocks are provided.
- Function blocks can be connected to easily design even complicated safety.



2 Easy Debugging

- Safety circuits can be debugged on the desktop.
- Debugging enables highly efficient system setup.

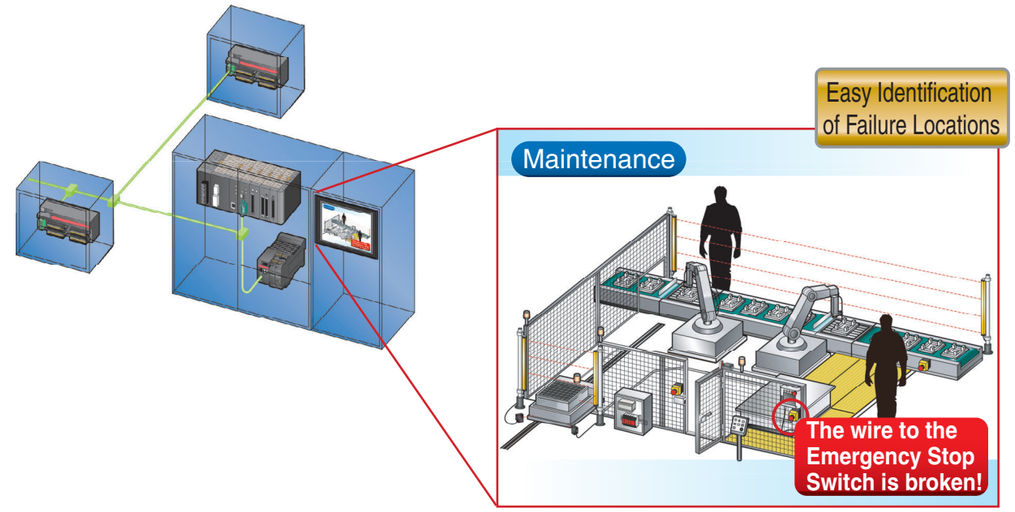
3 Easy Changing and Modifying

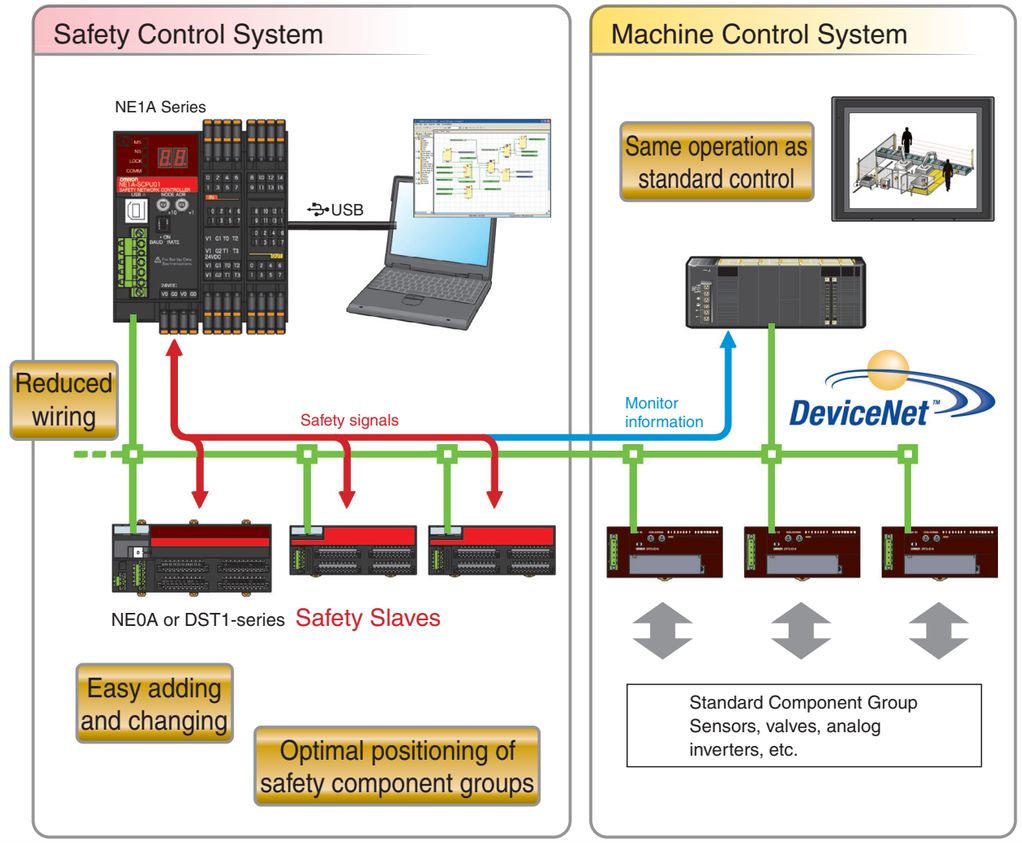
- Parts can be added or removed with Support Software.
- Circuits can be changed by simply changing the connections.

4 Easy Reuse

- Designs can be reused in the form of circuit blocks.
- User-defined function blocks can be registered and used.

Easy System Expansion through Networking





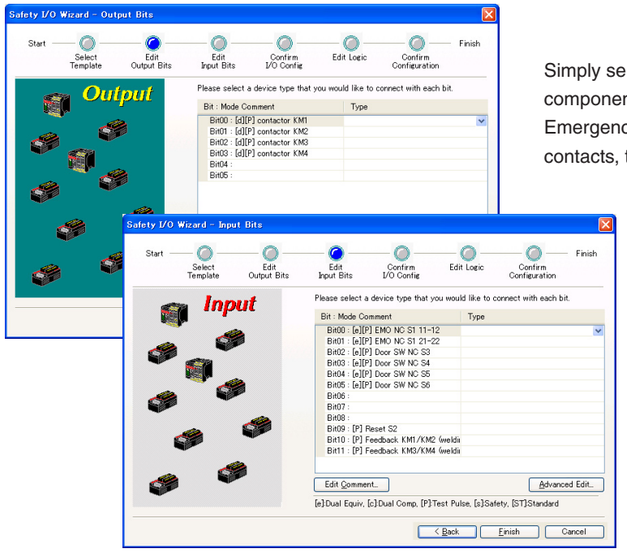
- Safety system devices and standard DeviceNet devices can be used on the same network.

NE0A-series Features Small-scale Safety Applications Are Easy to Design, Easy to Set Up, and Easy to Standardize

- Circuits for the required safety category are **easy to build**.
- You can **register safety circuits as templates and reuse them** for easy standardization.
- A wide range of **TÜV-certified templates** is also available.
- You can **monitor** NE0A operating conditions from a standard DeviceNet Master.
- **Network distribution** is possible by combining **with NE1A Safety Controllers**.

Safety-certified Circuits Are Even Easier to Configure

1 Select Safety Measures and Make Settings in an interactive Format.

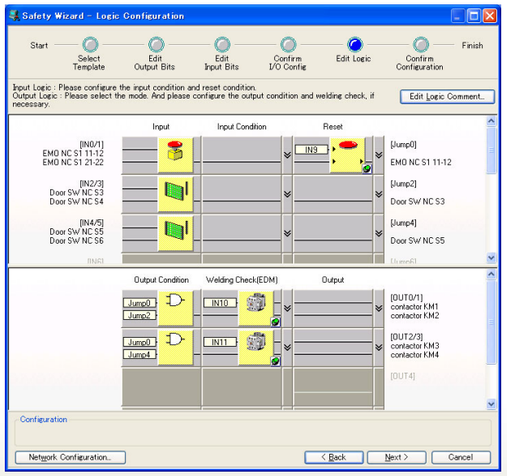


Simply select the safety input and output components (measures), such as Emergency Stop Switches and DPST-NC contacts, to complete the basic settings.

Select from the following six safety input components:

- Emergency Stop Switches
- Safety Door Switches
- Limit Switches
- Safety Light Curtains
- Enabling Switches
- Mode Selectors

2 Design Circuits with a Simple Logic Editor.

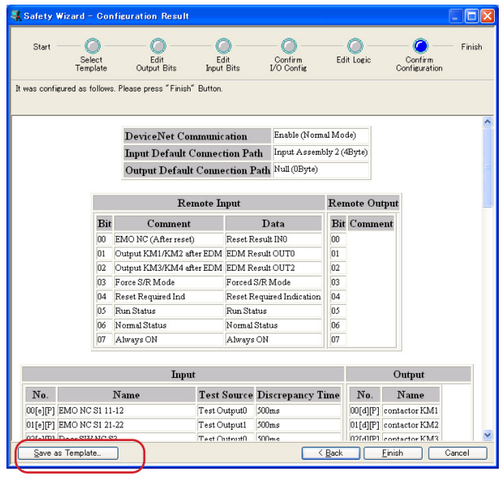


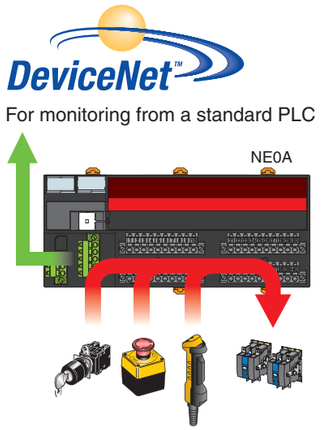
Construct safety circuits by selecting and combining items, such as reset conditions and AND operations.

It is also possible to combine logic with safety signals from the NE1A over a network.

3 Physically Wire and Debug Safety Devices.

By simply wiring according to the wiring information and turning ON the power, you can verify the operation of safety circuits for Safety Category 2 to 4.





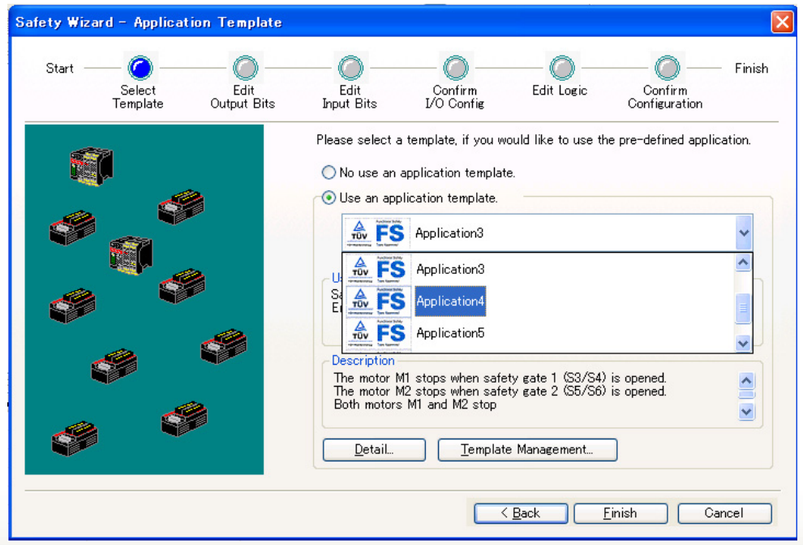
The fixed response of 20 ms is among the fastest in the industry.

4 Register and Reuse Templates of Certified Circuits.

Even if the safety circuit is changed, the NE0A's fixed response of 20 ms allows reusing circuits with no loss to quality of safety.

Standardize by Using TÜV-certified Templates

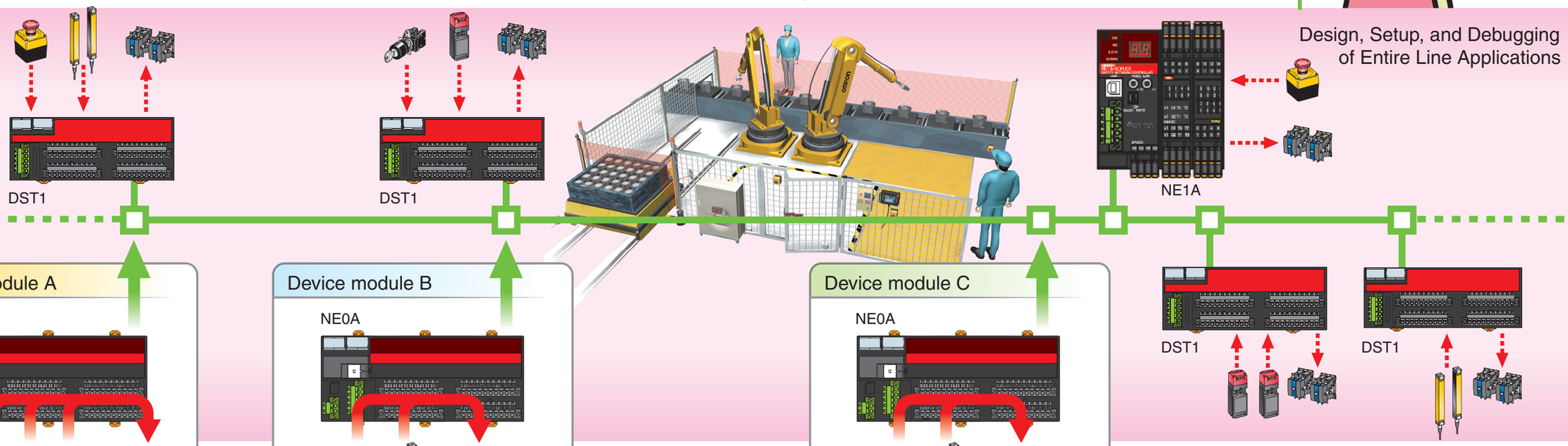
A full lineup of TÜV-certified safety circuits is available.
Using or customizing these circuits helps to achieve standardization for effective safety operation.



Dramatically Improve Work Efficiency for Constructing Safety Applications for Lines

- The investment efficiency required for building lines with safety systems is greatly increased.
- The conventional cascade equipment structure can be changed to parallel operation and procedures.
- The design, setup, and debugging of applications that stop the entire line using NE1A-series Safety Controllers and DST1-series Slaves, and modules that partially stop applications with NE0A-series Safety Controllers can be separated and executed in parallel.
- Templates can be made of modules that partially stop applications with NE0A-series Safety Controllers, while maintaining a fixed 20-ms response -- which is among the fastest in the industry.

- Technical discussions and management are easier to understand because designing is done with individual device modules.
- Even when delivery times differ for multiple modules, the line can be set up and debugged whenever it is most convenient.
- Overall line design and debugging can safely proceed in parallel because the interface specifications for the device modules are easily decided.
- Because much of the safety design is reused, safety certification can be focused on the parts that have been changed, thus minimizing the steps required for certification.



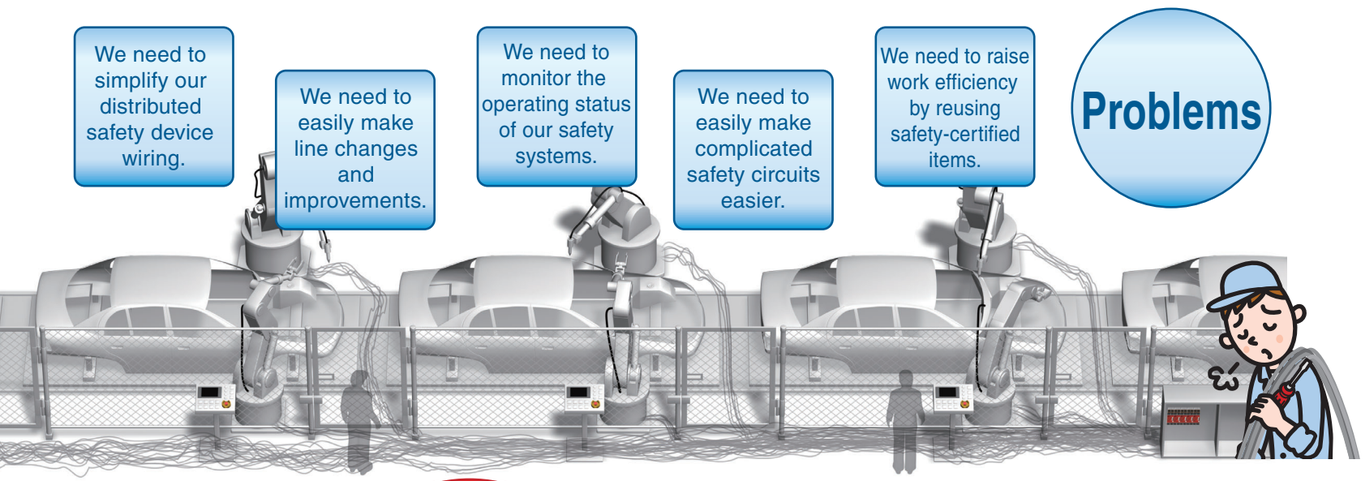
- TÜV-certified templates are fully reused.
- No change to the entire line and interface.
- Individual modules are debugged.
- Safety performance for partial stopping is fixed and thus worry free.

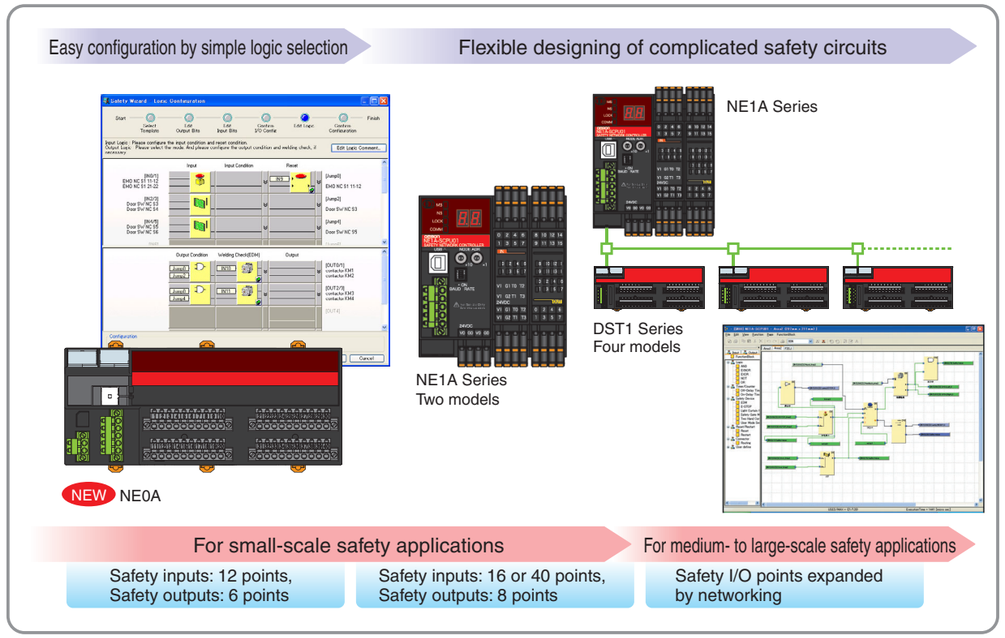
- The template is partially changed.
- The entire line and interface are partially changed, but the forced set/reset function is used.
- Individual modules are debugged.
- No changes because the safety performance for partial stopping is fixed.

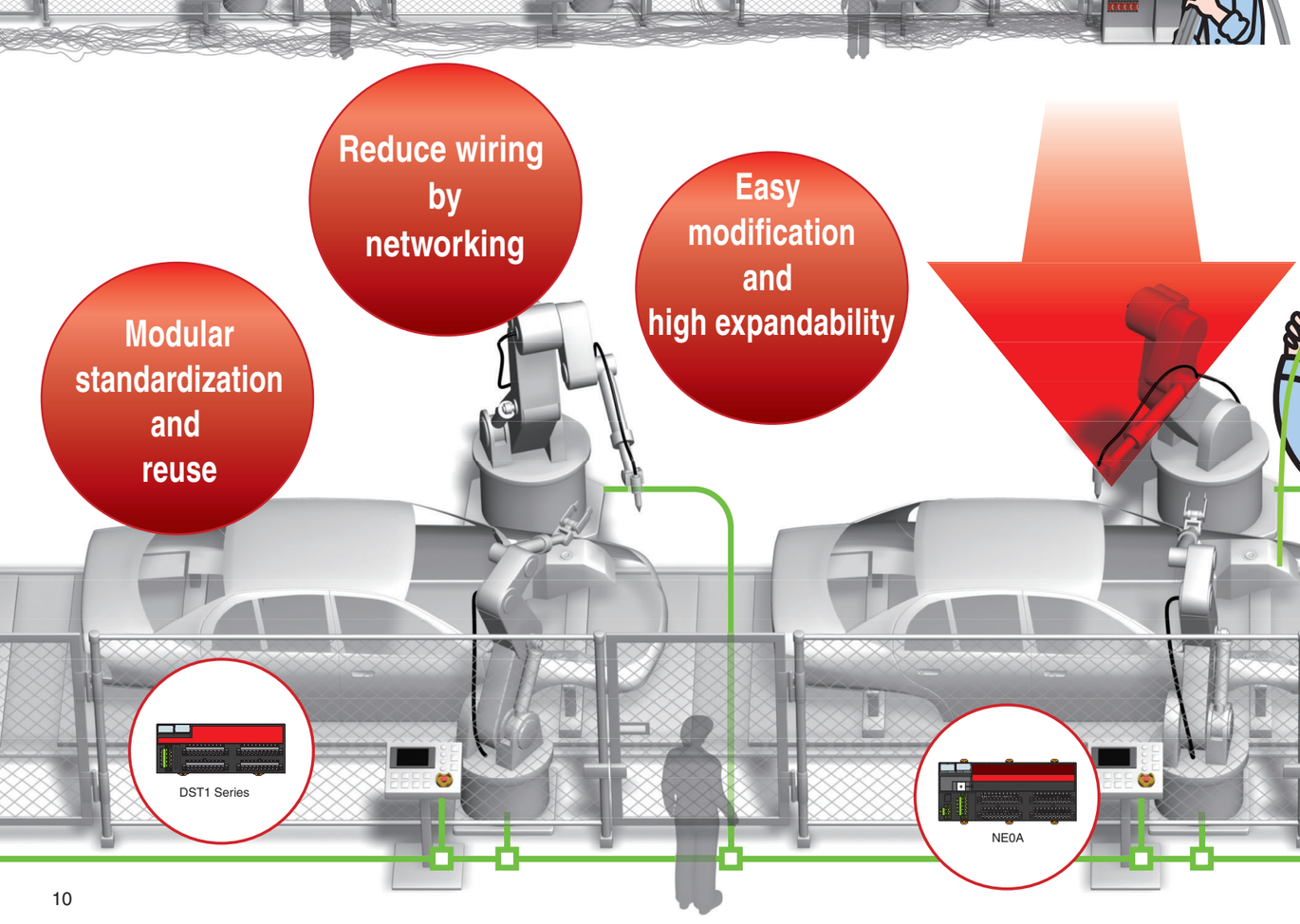
- Templates are fully reused.
- No change to the entire line and interface.
- Individual modules are debugged.
- Safety performance for partial stopping is fixed and thus worry free.

A Full Lineup Provides Optimal Solutions for a Variety of Customer Needs

- The NE1A Series gives a high degree of flexibility to complicated safety design.
- Flexible systems can be configured by combining the NE1A Series with the DST1 Series or NE0A.
- The NE0A makes it easy to create safety circuits by using TÜV-certified safety templates.
- Safety systems can be optimally distributed by combining the system with either of four types of DST1-series Slaves.







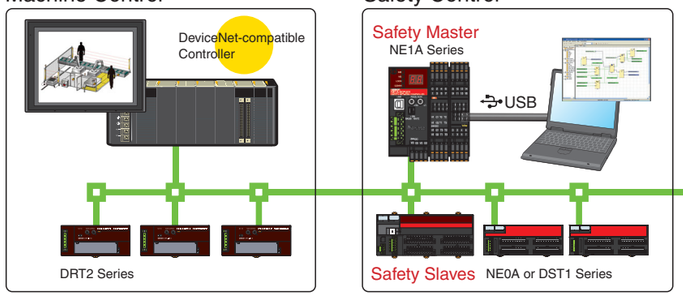
Select the System Configuration That Matches the Desired Safety Application with the Most Suitable Cost

Total Control System 1

Lines in Which Safety Control and Machine Control Are Integrated

Visualization at the Control Panel

- NE0A
- NE1A-SCPU01-V1 or NE1A-SCPU02
- DST1 Series
- WS02-CFSC1-E



Total Control System 2

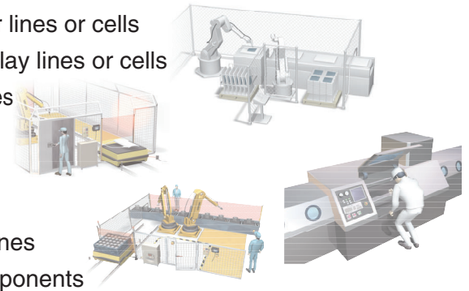
Even detailed data can be remotely monitored using Support Software running on a personal computer.

- NE1A-EDR01
- WS02-CFSC1-E

Safety Application Examples

The following are examples of the many possible applications:

- Automobile parts on automotive lines
- Semiconductor lines or cells
- Flat-panel display lines or cells
- Printing machines
- Packaging machines
- Machine tools
- Molding machines
- Electronic components
- Manufacturing equipment for office automation products



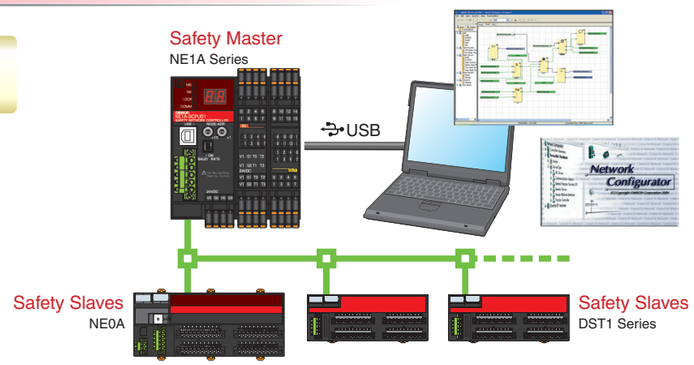
Distributed Safety System 1

Lines with Distributed Safety Devices

Up to 32 Safety Slaves can be connected.

✻ Up to 16 I/O Slaves can be connected.

- NE0A
- NE1A-SCPU01-V1 or NE1A-SCPU02
- DST1 Series
- WS02-CFSC1-E

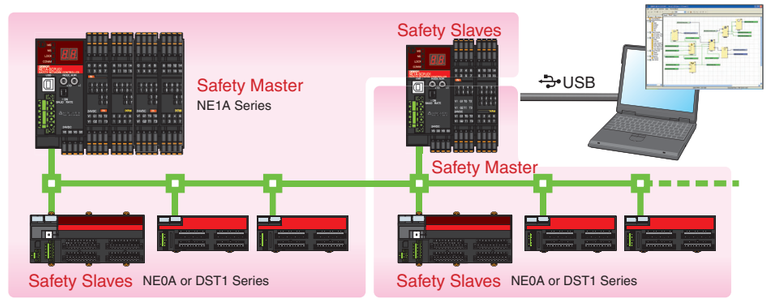


Distributed Safety System 2

For lines with various levels of distributed safety devices

Up to 64 Units can be connected to the network.

- NE1A-SCPU01-V1 or NE1A-SCPU02
- DST1 Series
- WS02-CFSC1-E



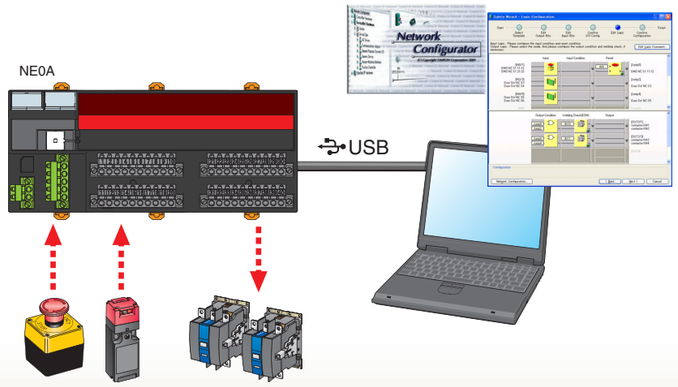
Programmable Safety Circuits 1

Easy Safety Circuit Configuration

Safety circuit design scale:
Safety inputs: Up to 12 points
Safety outputs: Up to 6 points

✻ Connections to the DST1 Series are not possible.

- NE0A-SCPU01
- WS02-CFSC1-E



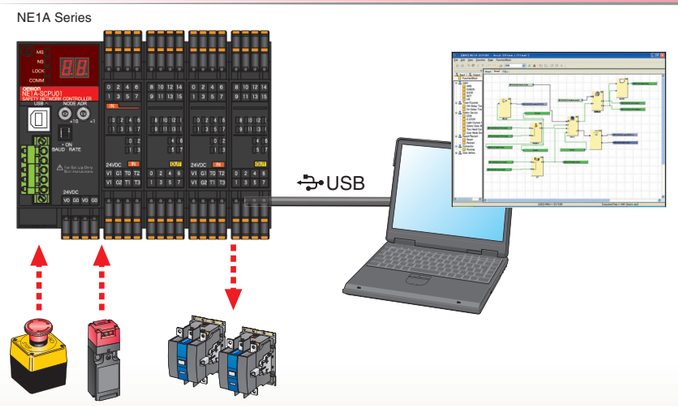
Programmable Safety Circuits 2

For designing complicated safety circuits

Safety circuit design allows safety applications up to the following scale:
Safety inputs: Up to 40 points
Safety outputs: Up to 8 points

✻ The NE1A-SCPU01-V1 Safety Network Controller handles up to 16 safety inputs.

- NE1A-SCPU01-V1 or NE1A-SCPU02
- WS02-CFSC1-E

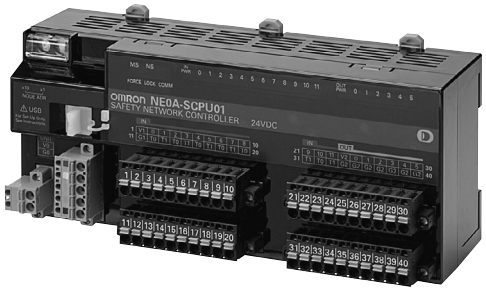


Safety Network Controller

NE0A-SCPU01

New Lineup for Safety Applications with Up to 12 Inputs / 6 Outputs

- Circuits for the required safety category are easy to build.
- The safety circuits you create can be registered as templates and reused, for easy standardization.
- A wide range of TÜV-certified templates is also available.
- The NE0A operating conditions can be monitored from a standard DeviceNet Master.
- Network distribution is possible by combining with an NE1A Safety Controller.



NEW

Ordering Information

Name	No. of I/O points			Model	Unit version
	Safety inputs	Test outputs	Safety outputs		
Safety Network Controllers	12 ✻	2	6	**NE0A-SCPU01**	Ver. 1.0

Note: Network Configurator version 2.1□ or higher must be used when using a NE0A-SCPU01 Safety Network Controller.
✻ When using the NE0A-SCPU01 as a standalone Controller, one input each is required for the feedback input and manual restart.

Specifications

Certified Standards

Certification body	Standard
TÜV Rheinland	NFPA 79-2007 ISO13849-1: 1999 IEC61508 part1-7/12.98-05.00 IEC61131-2: 2007 EN ISO13849-2: 2003 EN ISO 13850: 2006 EN954-1: 1996 EN61000-6-4: 2007 EN61000-6-2: 2005 EN60204-1: 2006 ANSI RIA15.06-1999 ANSI B11.19-2003
UL	UL508 UL1604 UL1998 NFPA79 IEC61508 CSA22.2 No.142 CSA22.2 No.213

Specifications

Communications power supply voltage		11 to 25 VDC supplied via communications connector
Internal circuit power supply voltage (V0) ✻		20.4 to 26.4 VDC (24 VDC –15%/+10%)
I/O power supply voltage (V1, V2) ✻		
Current consumption	**Communications power supply**	24 VDC, 15 mA
	Internal circuit power supply	24 VDC, 110 mA
Overvoltage category		II
Noise immunity		Conforms to IEC61131-2.
Vibration resistance		10 to 57 Hz: 0.35 mm, 57 to 150 Hz: 50 m/s^2
Shock resistance		150 m/s^2 : 11 ms
Mounting method		DIN Track (IEC 60715 TH35-7.5/TH35-15)
Ambient operating temperature		–10 to 55°C
Ambient operating humidity		10% to 95% (with no condensation)
Ambient storage temperature		–40 to 70°C
Degree of protection		IP20
Serial interface		USB version 1.1
Weight		440 g max.

✻ V0-G0: Internal control circuit
V1-G1 (G): For external input device, test output
V2-G2 (G): For external output device

Safety Input Specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each terminal and ground
OFF voltage	5 VDC min. between each terminal and ground
OFF current	1 mA max.
Input current	4.5 mA

Test Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	60 mA
ON residual voltage	1.2 V max. between each output terminal and V1
Leakage current	0.1 mA max.

Safety Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max./output
ON residual voltage	1.2 V max. between each output terminal and V2
Leakage current	0.1 mA max.

DeviceNet Communications Specifications

Communications protocol	DeviceNet compliant
Connection form	Multi-drop system and T-branch system can be combined (for trunk line and branch lines)
Communications speed	500/250/125 kbps
Communications media	Special cable, 5 conductors (2 for communications, 2 for power supply, 1 for shielding)
Communications distance	See table below
Communications power supply	11 to 25 VDC
No. of connectable nodes	63
Safety I/O communications	Safety Master function • Max. no. of connections: 2 (one each for inputs and outputs) Multi-cast inputs can be used to enable communications with up to 15 Safety Masters. • Connection type: Single-cast, multi-cast
Standard I/O communications	Standard Slave function • Max. no. of connections: 2 • Connection type: Poll, bit-strobe, COS, cyclic
Message communications	Max. message length: 502 bytes

Communications speed	Max. network length	Branch length	Total branch length
500 kbps	100 m max. (100 m max.)	6 m max.	39 m max.
250 kbps	250 m max. (100 m max.)		78 m max.
125 kbps	500 m max. (100 m max.)		156 m max.

Note: Figures in parentheses ( ) indicate values when a thin cable is used.

Functions

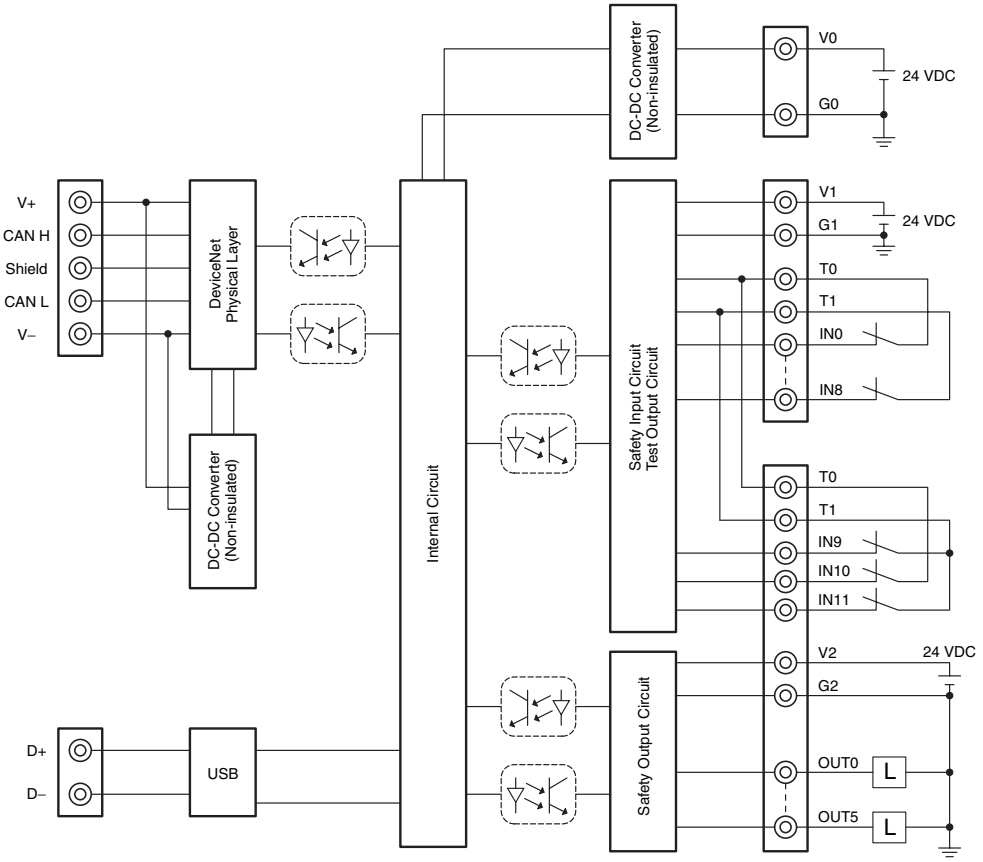
The following function blocks are available for designing safety circuits with the NE0A-SCPU01. These function blocks can be selected and assembled using the interactive wizard format to efficiently design safety applications.

<table>
<tr><th>Classification of function block for safety circuit designs</th><th colspan="3">Application</th></tr>
<tr><td rowspan="7">Function blocks for safety input devices and setting input filter times</td><td colspan="3">The following six parts can be selected for use as safety input devices.
For Category 3 or 4 compliance, the filter monitoring time between signals can also be adjusted with redundant wiring for the necessary safety devices.</td></tr>
<tr><td colspan="2">Emergency Stop Switches</td></tr>
<tr><td colspan="2">Safety Door Switches</td></tr>
<tr><td colspan="2">Limit Switches</td></tr>
<tr><td colspan="2">Safety Light Curtains</td></tr>
<tr><td colspan="2">Enabling Switches</td></tr>
<tr><td colspan="2">Mode Selectors</td></tr>
<tr><td rowspan="6">Logic function blocks for input conditions</td><td colspan="3">Select a Safety Light Curtain as the safety input device, and select a muting function when required.</td></tr>
<tr><td>No setting</td><td>Uses the ON/OFF status from the safety input device exactly as it is.</td></tr>
<tr><td>OR operation</td><td rowspan="4">• For switching maintenance areas with a Mode Selector.
• For applications such as a Safety Light Curtain muting function.</td></tr>
<tr><td>AND/OR operations</td></tr>
<tr><td>AND operation</td></tr>
<tr><td>OR/AND operations</td></tr>
<tr><td>Function blocks for resets</td><td colspan="3">Selects manual or auto reset.</td></tr>
<tr><td rowspan="4">Logic function blocks for output conditions</td><td colspan="3">For applications such as stopping all outputs for multiple safety devices.</td></tr>
<tr><td>No setting</td><td>Uses the ON/OFF status of the safety signal exactly as it is.</td></tr>
<tr><td>AND operation</td><td rowspan="2">Selects the interlock conditions for the safety signal.</td></tr>
<tr><td>OR/AND operations</td></tr>
<tr><td rowspan="3">Function blocks for setting the welded contact check</td><td colspan="3">Used to check the safety condition of an output device.</td></tr>
<tr><td>No setting</td><td>No checking of the output device (used for Category 2 or lower).</td></tr>
<tr><td>EDM</td><td>Used to check for contact welding in a Relay or Contactor.
Also used to change the setting for monitoring time.</td></tr>
<tr><td>Function blocks for safety output devices and setting output delay times</td><td colspan="3">Logic
For setting an auxiliary output (to output an error condition) and for setting the output delay.</td></tr>
</table>

Note: There is a possibility that safety cannot be maintained when an OR part or an AND/OR part is selected for input logic, or an OR/AND part is selected for output logic. Sufficiently confirm safety prior to use.

Internal Circuit Diagrams

NE0A-SCPU01

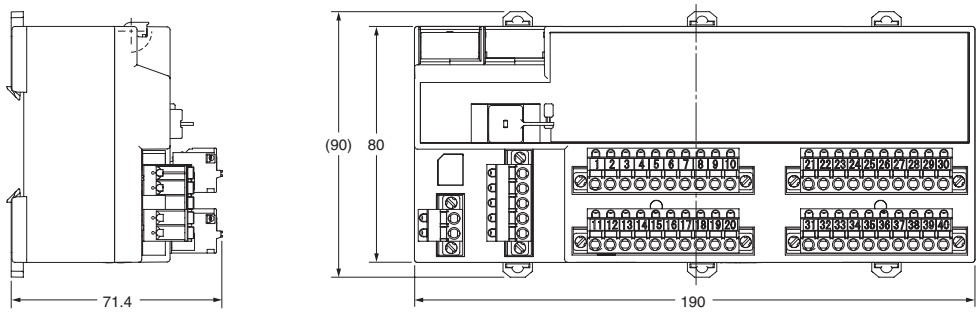


Terminal No.	Terminal name	Description
---	V0	Power supply terminal for internal circuit (24 VDC)
---	G0	
1	V1	Power supply terminal for external input device and test output (24 VDC)
11	G1	
24	V2	Power supply terminal for external output device (24 VDC)
34	G2	
2 to 10	IN0 to IN8	Safety input terminal Terminals IN10 and IN11 are used only for connecting a reset switch or EDM feedback.
21 to 23	IN9 to IN11	
12 to 20 31 to 33	T0 to T1	Test output terminal Connected to IN0 to IN11 safety inputs. T0 and T1 output test pulses with different patterns. The T0 terminals are internally connected and the T1 terminals are internally connected.
25 to 30	OUT0 to OUT5	Safety output terminals
35 to 40	G2	Common terminal Terminals 34 to 40 are internally connected.

Dimensions

(Unit: mm)

NE0A-SCPU01



Safety Precautions

Be sure to read the following operation manual for precautions and other details required for correct use of the Safety Network Controller.
***DeviceNet Safety Safety Network Controller NE0A Series Operation Manual* (Cat. No. Z916)**

Achieve Safety Control through Programming.

- Compact Safety Controller.
- The NE1A-SCPU01-V1 provides 16 built-in safety inputs and 8 built-in safety outputs.
  The NE1A-SCPU02 provides 40 built-in safety inputs and 8 built-in safety outputs.
- Reduced wiring with safety networks. Connect up to 32 Safety Terminals.
- Monitor the safety system from Standard Controllers across the network.
- EN 954-1/ISO13849-1 CAT4 and IEC 61508 SIL3 certification.

Ordering Information

List of Models

Name	No. of I/O points			Model	Unit version
	Safety inputs	Test outputs	Safety outputs		
Safety Network Controllers	16	4	8	**NE1A-SCPU01-V1**	2.0
	40	8	8	**NE1A-SCPU02**	2.0

Note: The standard NE1A Controllers are equipped with spring-cage terminal blocks, but other screw terminal blocks are available if desired, e.g., to replace previous terminals. Refer to *Accessories*.

Specifications

Certified Standards

Certification body	Standard
TÜV Rheinland	NFPA 79-2002 ISO13849-1: 1999 IEC61508 part1-7/12.98-05.00 IEC61131-2: 2003 EN ISO13849-2: 2003 EN954-1: 1996 EN61000-6-4: 2007 EN61000-6-2: 2005 EN60204-1: 2006 EN418: 1992 ANSI RIA15.06-1999 ANSI B11.19-2003
UL	UL508 UL1604 UL1998 NFPA79 IEC61508 CSA22.2 No.142 CSA22.2 No.213

Specifications

Item	Model	NE1A-SCPU01-V1	NE1A-SCPU02
Communications power supply voltage		11 to 25 VDC supplied via communications connector	
Internal circuit power supply voltage (V0) ✻		20.4 to 26.4 VDC (24 VDC −15%/+10%)	
I/O power supply voltage (V1, V2) ✻			
Current consumption	**Communications power supply**	24 VDC, 15 mA	
	Internal circuit power supply	24 VDC, 230 mA	24 VDC, 280 mA
Overvoltage category		II	
Noise immunity		Conforms to IEC61131-2.	
Vibration resistance		10 to 57 Hz: 0.35 mm, 57 to 150 Hz: 50 m/s^2	
Shock resistance		150 m/s^2: 11 ms	
Mounting method		DIN Track (IEC 60715 TH35-7.5/TH35-15)	
Ambient operating temperature		−10 to 55°C	
Ambient operating humidity		10% to 95% (with no condensation)	
Ambient storage temperature		−40 to 70°C	
Degree of protection		IP20	
Serial interface		USB version 1.1	
Weight		460 g max.	690 g max.

✻ V0-G0: Internal control circuit
V1-G1 (G): For external input device, test output
V2-G2 (G): For external output device
The two ground terminals on the NE1A-SCPU02 are internally connected.

Safety Input Specifications

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min. between each terminal and ground
OFF voltage	5 VDC min. between each terminal and ground
OFF current	1 mA max.
Input current	4.5 mA

Safety Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max./output
ON residual voltage	1.2 V max. between each output terminal and V2
Leakage current	0.1 mA max.

Test Output Specifications

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max./output ✻
ON residual voltage	1.2 V max. between each output terminal and V1
Leakage current	0.1 mA max.

✻ The maximum current for simultaneously ON outputs is 1.4 A.
(T0 to T3: NE1A-SCPU01-V1, T0 to T7: NE1A-SCPU02)
A 15 to 400-mA, 24-VDC external indicator can be connected to T3 and T7.

DeviceNet Communications Specifications

Communications protocol	DeviceNet compliant
Connection form	Multi-drop system and T-branch system can be combined (for trunk line and branch lines)
Communications speed	500/250/125 kbps
Communications media	Special cable, 5 conductors (2 for communications, 2 for power supply, 1 for shielding)
Communications distance	See table below
Communications power supply	11 to 25 VDC
No. of connectable nodes	63
Safety I/O communications (Pre-Ver. 1.0)	Safety Master function • Max. no. of connections: 16 • Max. data size: Input 16 bytes or output 16 bytes (per connection) • Connection type: Single-cast, multi-cast Safety Slave function • Max. no. of connections: 4 • Max. data size: Input 16 bytes or output 16 bytes (per connection) • Connection type: Single-cast, multi-cast
Safety I/O communications (unit version 1.0 or later)	Safety Master function • Max. no. of connections: 32 • Max. data size: Input 16 bytes or output 16 bytes (per connection) • Connection type: Single-cast, multi-cast Safety Slave function • Max. no. of connections: 4 • Max. data size: Input 16 bytes or output 16 bytes (per connection) • Connection type: Single-cast, multi-cast
Standard I/O communications (all unit versions)	Standard Slave function • Max. no. of connections: 2 • Max. data size: Input 16 bytes or output 16 bytes (per connection) • Connection type: Poll, bit-strobe, COS, cyclic
Message communications	Max. message length: 552 bytes

Communications distance

Communications speed	Max. network length	Branch length	Total branch length
500 kbps	100 m max. (100 m max.)	6 m max.	39 m max.
250 kbps	250 m max. (100 m max.)		78 m max.
125 kbps	500 m max. (100 m max.)		156 m max.

Note: Figures in parentheses ( ) indicate values when a thin cable is used.

Functions

Function Blocks

NE1A-SCPU-series Controller support the following logic functions and function blocks. Support depends on the unit version.

Logic Functions

Name	Function list entry	Supporting unit versions
NOT	NOT	All
AND	AND	
OR	OR	
Exclusive OR	EXOR	
Exclusive NOR	EXNOR	
RS Flip-flop	RS-FF	1.0 or later
Comparator	Comparator	

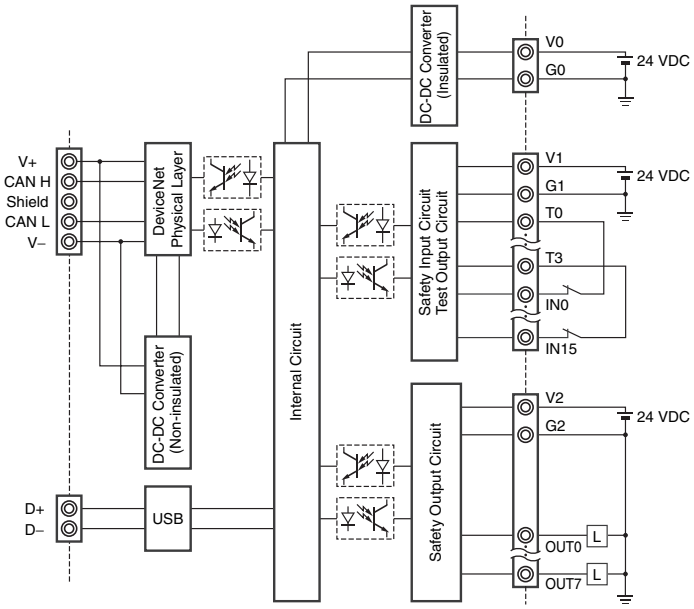
Function Blocks

Name	Function list entry	Supporting unit versions
Reset	Reset	All
Restart	Restart	
Emergency Stop Monitoring	E-STOP	
Light Curtain Monitoring	Light Curtain Monitoring	
Safety Gate Monitoring	Safety Gate Monitoring	
Two-hand Controller	Two Hand Controller	
Off-Delay Timer	Off-Delay Timer	
On-Delay Timer	On-Delay Timer	
User Mode Switch Monitoring	User Mode Switch	
External Device Monitoring	EDM	
Routing	Routing	
Muting	Muting	1.0 or later
Enable Switch Monitoring	Enable Switch	
Pulse Generator	Pulse Generator	
Counter	Counter	
Multiconnector	Multi Connector	

NE1A-SCPU Series

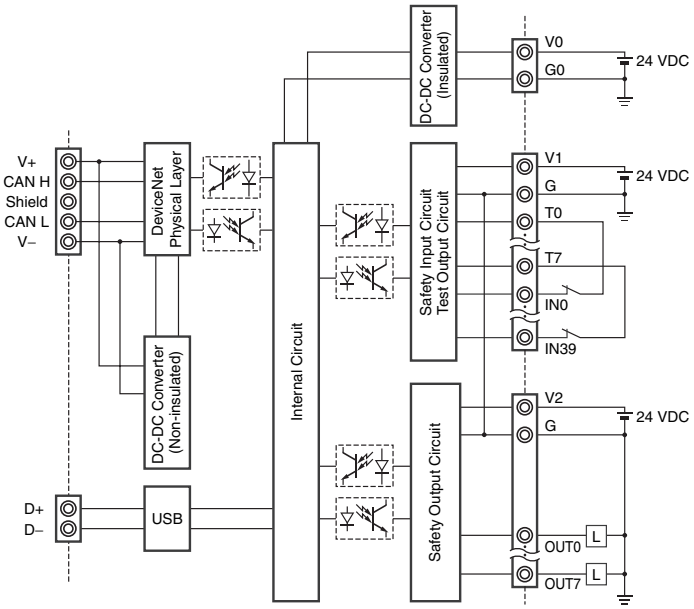
Internal Circuit Diagrams

NE1A-SCPU01-V1



Terminal name	Description
V0	Power supply terminal for internal circuit The two V0 terminals are internally connected.
G0	Power supply terminal for internal circuit The two G0 terminals are internally connected.
V1	Power supply terminal for external input device and test output
G1	Power supply terminal for external input device and test output
V2	Power supply terminal for external output device
G2	Power supply terminal for external output device
IN0 to IN15	Safety input terminal
T0 to T3	Test output terminal Connected to IN0 to IN15 safety inputs. Each test output terminal outputs a different test pulse pattern. Terminal T3 also supports a current monitoring function for the output signal. Example: Muting lamp
OUT0 to OUT7	Safety output terminals

NE1A-SCPU02



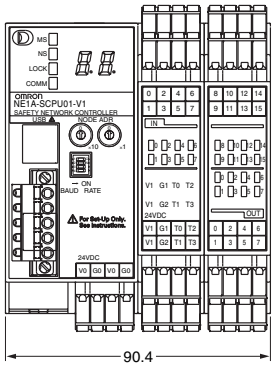
Terminal name	Description
V0	Power supply terminal for internal circuit The two V0 terminals are internally connected.
G0	Power supply terminal for internal circuit The two G0 terminals are internally connected.
V1	Power supply terminal for external input device and test output
G	Power supply terminal for external input device and test output
V2	Power supply terminal for external output device
G	Power supply terminal for external output device
IN0 to IN39	Safety input terminal
T0 to T3	Test output terminal Connected to IN0 to IN19 safety inputs. Each test output terminal outputs a different test pulse pattern. Terminal T3 also supports a current monitoring function for the output signal. Example: Muting lamp
T4 to T7	Test output terminal Connected to IN20 to IN39 safety inputs. Each test output terminal outputs a different test pulse pattern. Terminal T7 also supports a current monitoring function for the output signal. Example: Muting lamp
OUT0 to OUT7	Safety output terminals

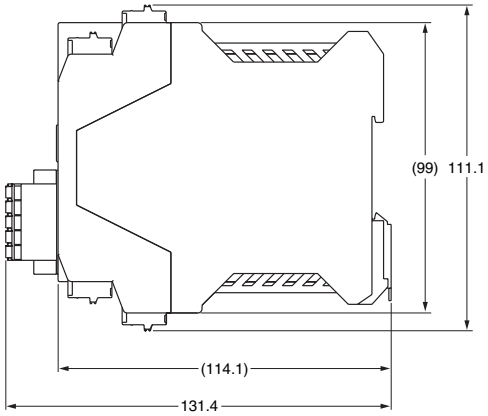
Refer to the *DeviceNet Safety Safety Network Controllers Operation Manual* (Cat. No. Z906) for wiring examples.

Dimensions

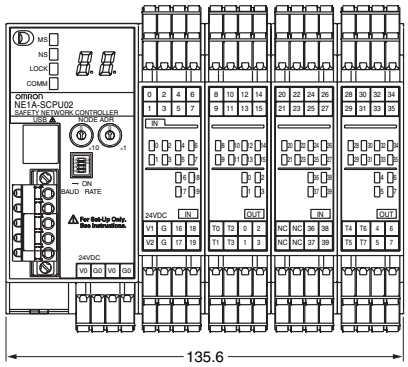
(Unit: mm)

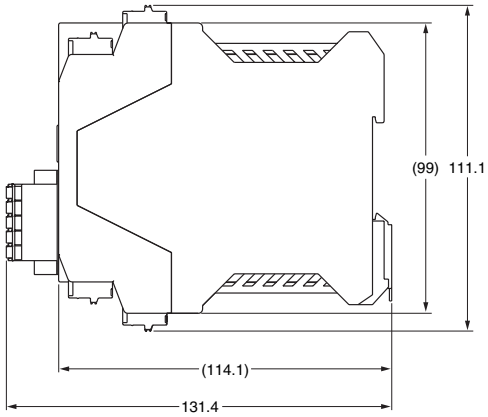
NE1A-SCPU01-V1





NE1A-SCPU02





NE1A-SCPU Series

Safety Precautions

Be sure to read the following operation manual for precautions and other details required for correct use of the Safety Network Controller.
***DeviceNet Safety Safety Network Controller Operation Manual* (Cat. No. Z906)**

Functions Supported According to Unit Version

❍ : Supported, ---: Not supported

Function	Model / Unit version	NE1A-SCPU01 Pre-Ver. 1.0	NE1A-SCPU01-V1, NE1A-SCPU02 Unit version 1.0	NE1A-SCPU01-V1, NE1A-SCPU02 Unit version 2.0
Logic processing functions	Maximum program size (total number of function blocks)	128	254	254
	New Function Blocks • RS flip-flop • Multiconnector • Muting • Enable Switch Monitoring • Pulse Generator • Counter • Comparator	---	❍	❍
	Selecting a rising edge as the reset condition for Reset and Restart function blocks	---	❍	❍
	Using local I/O status in logic programming	---	❍	❍
	Using overall Unit status in logic programming	---	❍	❍
I/O control functions	Monitoring contact operation counter	---	❍	❍
	Mounting total ON time monitor	---	❍	❍
DeviceNet communications functions	Number of safety I/O connections for Safety Master	16	32	32
	Selecting operating mode for safety I/O communications when communications errors occur	---	❍	❍
	Attaching local output data to send data during slave operation	---	❍	❍
	Attaching local I/O monitor data to send data during slave operation	---	❍	❍
System startup and error recovery functions	Storing log of nonfatal errors in nonvolatile memory	---	❍	❍
	Adding function block errors to error log	---	❍	❍
Compatible with the NE1A-EDR01 EtherNet/IP-DeviceNet Router		---	---	❍

Unit Versions and Network Configurator Versions

Network Configurator version 1.6□ or higher must be used when using a NE1A-SCPU01-V1 or NE1A-SCPU02 Safety Logic Controller with unit version 2.0. The following table shows the relationship between unit versions and Network Configurator versions.

❍ : Applicable, × : Not applicable

Model	Version	Network Configurator Ver. 1.32	Ver. 1.51	Ver. 1.6□	Ver. 2.0
NE1A-SCPU01	Pre-Ver. 1.0	❍	❍	❍	❍
NE1A-SCPU01-V1 NE1A-SCPU02	Unit version 1.0	×	×	❍	❍
	Unit version 2.0	×	×	❍ ✻	❍

✻ When using Network Configurator version 1.6□, there are no operational differences in the NE1A-SCPU01-V1 and NE1A-SCPU02 Safety Logic Controllers that derive from the unit version.

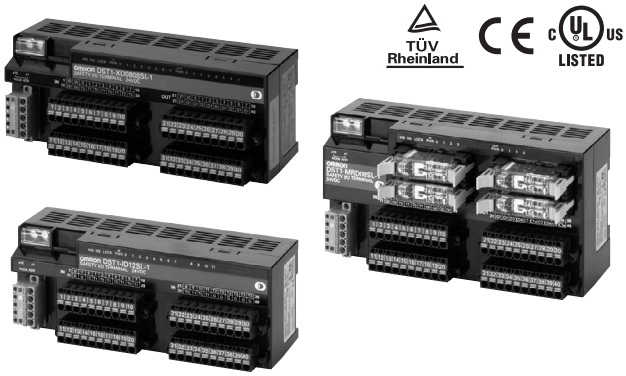
Version Upgrade

If you have purchased Ver.1.□□, you will need to buy the upgrade CD-ROM. (Refer to *WS02-CFSC1-E*.)

DST1 Series

Distributed Safety Terminals That Reduce Wiring.

- Lineup includes four models to accommodate various I/O types and number of I/O points.
- Monitor the safety system from Standard Controllers across the network.
- EN 954-1/ISO13849-1 CAT4 and IEC 61508 SIL3 certification.
- The DST1-XD0808SL-1 also supports logic operation functions for high-speed processing in applications requiring partial stopping of the safety system.



Ordering Information

List of Models

Name	No. of I/O points	Model
Safety I/O Terminals	Safety inputs: 12, test outputs: 4	**DST1-ID12SL-1**
	Safety inputs: 8, safety outputs (semiconductor): 8, test outputs: 4	**DST1-MD16SL-1**
		DST1-XD0808SL-1 ✻
	Safety inputs: 4, safety outputs (relay): 4, test outputs: 4	**DST1-MRD08SL-1**

Note: The standard DST1 Safety I/O Terminals are equipped with spring-cage terminal blocks, but screw terminal blocks are available if desired, e.g., to replace previous terminals. Refer to *Accessories*.

✻ Use the Safety Network Configurator Ver. 2.0 or later to make DST1-XD0808SL-1 settings.

Specifications

Certified Standards

Certification body	Standard
TÜV Rheinland	NFPA 79-2002 ISO13849-1: 1999 IEC61508 part1-7/12.98-05.00 IEC61131-2: 2003 EN ISO13849-2: 2003 EN954-1: 1996 EN61000-6-4: 2007 EN61000-6-2: 2005 EN60204-1: 2006 EN418: 1992 ANSI RIA15.06-1999 ANSI B11.19-2003
UL	UL508 UL1604 (excluding the DST1-MRD08SL-1) UL1998 NFPA79 IEC61508 CSA22.2 No.142 CSA22.2 No.213 (excluding the DST1-MRD08SL-1)

Specifications

Item \ Model		DST1-ID12SL-1	DST1-MD16SL-1	DST1-MRD08SL-1	DST1-XD0808SL-1
Communications power supply voltage		11 to 25 VDC supplied via communications connector			
I/O power supply voltage		20.4 to 26.4 VDC (24 VDC –15%/+10%)			
Current consumption	**Communications power supply**	24 VDC 100 mA	24 VDC 110 mA	24 VDC 100 mA	24 VDC 110 mA
Overvoltage category		II			
Noise immunity		Conforms to IEC61131-2.			
Vibration resistance		10 to 57 Hz: 0.35-mm single amplitude, 57 to 150 Hz: 50 m/s^2			
Shock resistance		150 m/s^2, 11 ms		100 m/s^2, 11 ms	150 m/s^2, 11 ms
Mounting method		35-mm DIN Track			
Ambient operating temperature		–10 to 55°C			
Ambient operating humidity		10% to 95% (with no condensation)		10% to 85% (with no condensation)	10% to 95% (with no condensation)
Ambient storage temperature		–40 to 70°C			
Degree of protection		IP20			
Weight		420 g		600 g	420 g

Safety Input Specifications

(Common with the DST1 Series)

Input type	Sinking inputs (PNP)
ON voltage	11 VDC min.
OFF voltage	5 VDC max.
OFF current	1 mA max.
Input current	6 mA

Safety Output Specifications (Semiconductor output)

(Common with the DST1-MD16SL-1/XD0808SL-1)

Output type	Sourcing outputs (PNP)
Rated output current	0.5 A max./output
ON residual voltage	1.2 V max.
Leakage current	0.1 mA max.

Test Output Specifications

(Common with the DST1 Series)

Output type	Sourcing outputs (PNP)
Rated output current	0.7 A max./output
ON residual voltage	1.2 V max.
Leakage current	0.1 mA max.

Safety Output Specifications (Relay Output) (DST1-MRD08SL-1)

Applicable relays		G7SA-2A2B, EN50205 Class A
Failure rate P level ✻ (Reference value)		5 VDC, 1 mA
Rated load (resistive)		2 A at 240 VAC, 2 A at 30 VDC
Durability	**Mechanical**	5,000,000 operations min. (at 7,200 operations/h)
	Electrical	100,000 operations min. (at 1,800 operations/h with a resistive load)

✻ This value is equivalent to 300 operations/minute.

DeviceNet Safety Communications

Safety Slave communications	Max. 4 connections (Max. 2 connections for the DST1-XD0808SL-1)

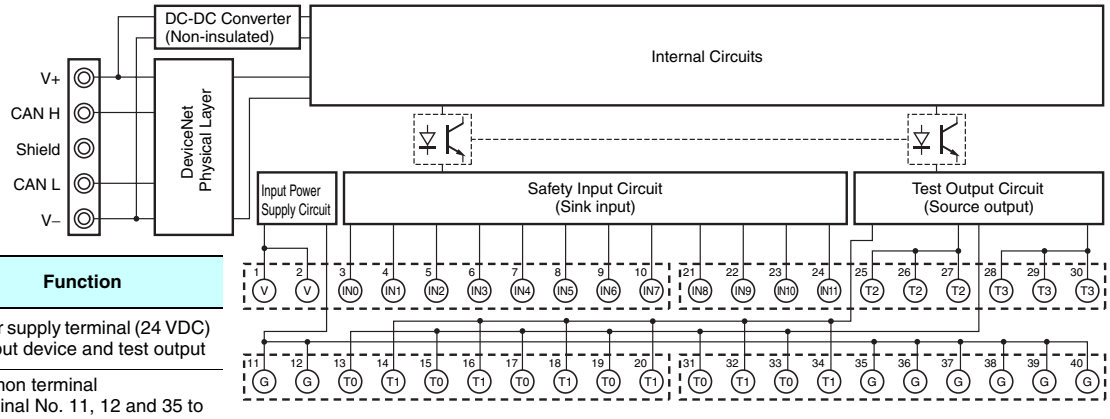
DeviceNet Slave Communications

(Common with the DST1 Series)

Standard Slave communications	Max. 2 connections

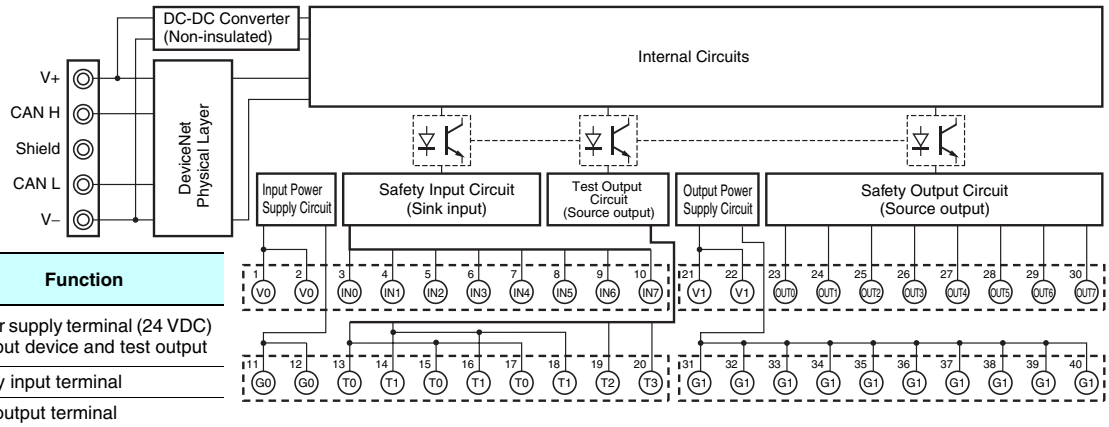
Internal Circuit Configuration

DST1-ID12SL-1



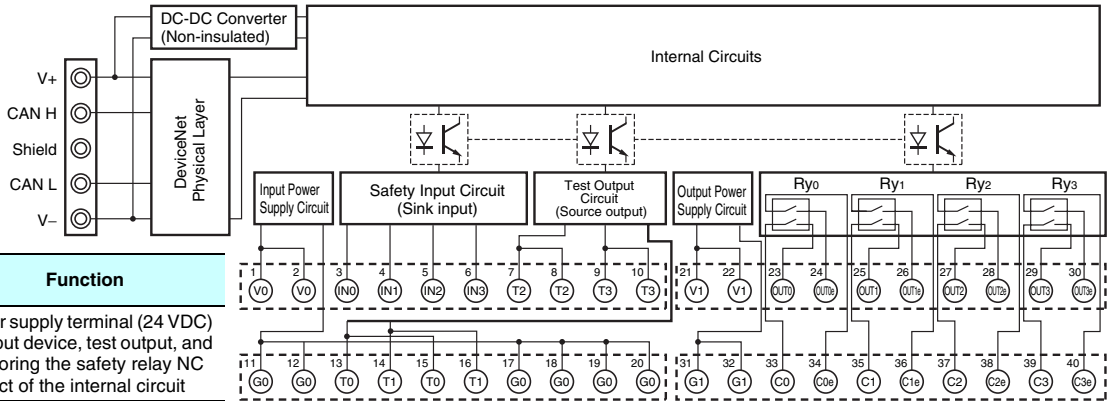
Terminal No.	Name	Function
1, 2	V	Power supply terminal (24 VDC) for input device and test output
11, 12	G	
35 to 40	G	Common terminal (Terminal No. 11, 12 and 35 to 40 are internally connected.)
3 to 10 21 to 24	IN0 to IN11	Safety input terminal
13 to 20 25 to 30 31 to 34	T0 to T3	Test output terminal

DST1-MD16SL-1
DST1-XD0808SL-1



Terminal No.	Name	Function
1, 2	V0	Power supply terminal (24 VDC) for input device and test output
11, 12	G0	
3 to 10	IN0 to IN7	Safety input terminal
13 to 20	T0 to T3	Test output terminal
21, 22	V1	Power supply terminal (24 VDC) for output device
31, 32	G1	
23 to 30	OUT0 to OUT7	Safety output terminal
33 to 40	G1	Common terminal (Terminal Nos. 31 to 40 are internally connected.)

DST1-MRD08SL-1



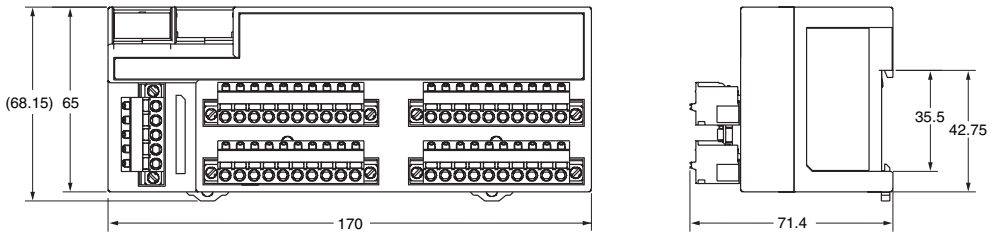
Terminal No.	Name	Function
1, 2	V0	Power supply terminal (24 VDC) for input device, test output, and monitoring the safety relay NC contact of the internal circuit
11, 12	G0	
17 to 20	G0	Common terminal (Terminal Nos. 11, 12 and 17 to 20 are internally connected.)
3 to 6	IN0 to IN3	Safety input terminal
7 to 10 13 to 16	T0 to T3	Test output terminal
21, 22	V1	Power supply terminal (24 VDC) for driving the safety relay of the internal circuit
31, 32	G1	
23 to 30 33 to 40	OUT0 to OUT3 C0 to C3 OUT0e to OUT3e C0e to C3e	Safety output terminal (The outputs of terminal No. 23/33 (OUT0) and 24/34 (OUT0e) are the same.) (The outputs of terminal No. 25/35 (OUT1) and 26/36 (OUT1e) are the same.) (The outputs of terminal No. 27/37 (OUT2) and 28/38 (OUT2e) are the same.) (The outputs of terminal No. 29/39 (OUT3) and 30/40 (OUT3e) are the same.)

Refer to the *DeviceNet Safety DST1-series Safety I/O Terminals Operation Manual* (Cat. No. Z904) for wiring examples.

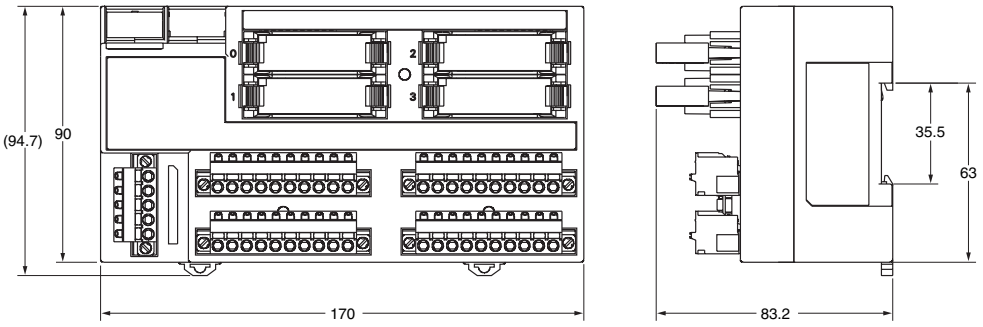
Dimensions

(Unit: mm)

DST1-ID12SL-1
DST1-MD16SL-1
DST1-XD0808SL-1



DST1-MRD08SL-1



Safety Precautions

Be sure to read the following operation manual for precautions and other details required for correct use of the Safety Network Controller.
***DeviceNet Safety DST1-series Safety I/O Terminals Operation Manual* (Cat. No. Z904)**

EtherNet/IP-DeviceNet Router

NE1A-EDR01

Allows a safety system to be monitored from Ethernet.

- The safety system can be remotely operated with a personal computer.
- The safety system can also be monitored by an Ethernet-compatible PLC of another brand.
- UDP packet messages supported.

Ordering Information

Name	Model	Unit version
Ethernet/IP-DeviceNet Router	**NE1A-EDR01**	1.0

Specifications

Certified Standards

Certification body	Standard
UL	UL508, UL1604, CSA22.2 No.142, CSA22.2 No.213

Specifications

DeviceNet communications power supply voltage		11 to 25 VDC (supplied via DeviceNet communications connector)
Internal circuit power supply voltage		20.4 to 26.4 VDC (24 VDC −15%/+10%)
Current consumption	**DeviceNet communications power supply**	24 VDC, 15 mA
	Internal circuit power supply	24 VDC, 230 mA
Overvoltage category		II
Noise immunity		Conforms to IEC 61131-2.
Vibration resistance		10 to 57 Hz: 0.35 mm, 57 to 150 Hz: 50 m/s^2
Shock resistance		150 m/s^2: 11 ms
Mounting method		35-mm DIN Track (IEC 60715 TH35-7.5/TH35-15)
Ambient operating temperature		−10 to 55°C
Ambient operating humidity		10 to 95% (with no condensation)
Ambient storage temperature		−40 to 70°C
Degree of protection		IP20
Weight		220 g max.

DeviceNet Communications Specifications

Communications protocol	DeviceNet compliant
Connection form	Multi-drop system and T-branch system can be combined (for trunk line and branch lines)
Communications speed	500/250/125 kbps
Communications media	Special cable, 5 conductors (2 for communications, 2 for power supply, 1 for shielding)
Communications distance	See table below
Communications power supply	11 to 25 VDC
No. of connectable nodes	64 (including Master)

Communications speed	Max. network length	Branch length	Total branch length
500 kbps	100 m max. (100 m max.)	6 m max.	39 m max.
250 kbps	250 m max. (100 m max.)	6 m max.	78 m max.
125 kbps	500 m max. (100 m max.)	6 m max.	156 m max.

Figures in parentheses ( ) indicate values when a thin cable is used.

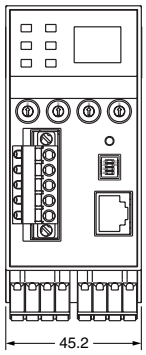
Ethernet/IP Communications Specifications

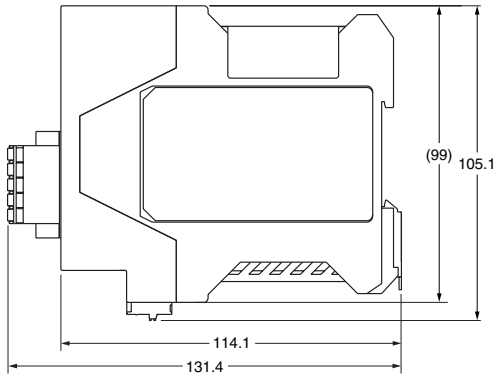
Media access method	CSMA/CD
Modulation method	Baseband
Transmission path type	Star
Transmission speed	10 Mbps (10BASE-T) 100 Mbps (100BASE-TX)
Transmission media	Shielded twisted pair cable (STP): Category 5, 5e
Transmission distance	100 m (distance between hub and node)
No. of cascade-connectable Units	No limit when a switching hub is used.

Dimensions

(Unit: mm)

NE1A-EDR01





Safety Precautions

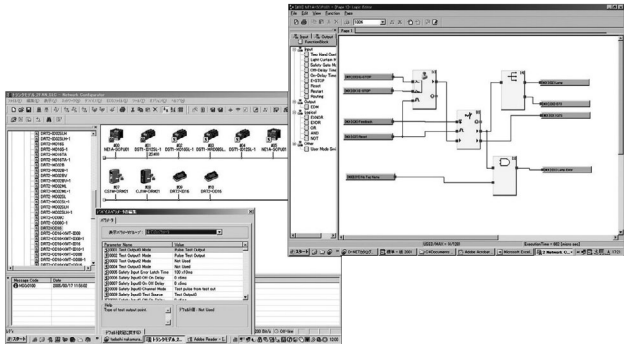
Be sure to read the following user's manual for precautions and other details required for correct use of the Safety Network Controller.
***Ethernet/IP-DeviceNet Router User's Manual* (Cat. No. Z912)**

Network Configurator

WS02-CFSC1-E

Programming Software for Creating Safety Circuits.

- Performs settings for the Safety Network Controllers and Safety I/O Terminals.
- Provides safety circuit programming functions.
- Provides monitoring functions for safety circuits.
- Includes DeviceNet Configurator functions.



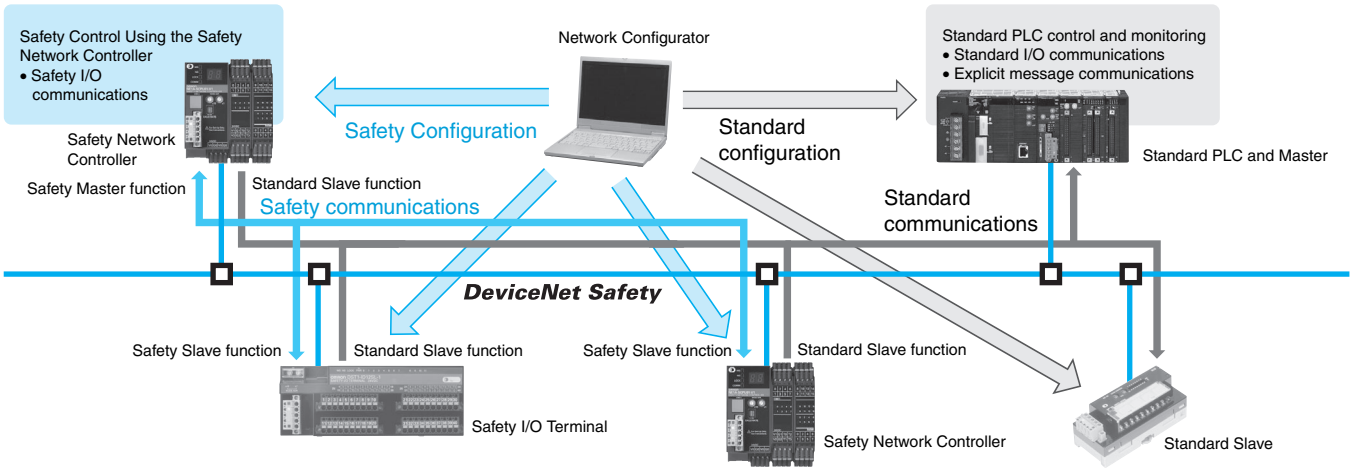
Ordering Information

List of Models

Name	Components	Applicable computer	Applicable OS	Model
Network Configurator	Installation disc (CD-ROM: 1 license)	IBM PC/AT or compatible	Windows 2000 Windows XP	**WS02-CFSC1-E**
	Upgrade disc (CD-ROM: 1 license)			**WS02-CFSC1-E-UP**

✻ We recommend you use the upgrade disk if you are using a version earlier than version 2.0.

System Configuration



Specifications

Applicable computer	IBM PC/AT or compatible
CPU	Intel Pentium PC, 300 MHz or higher (Pentium III, 1-GHz or higher recommended)
OS	Microsoft Windows 2000 Microsoft Windows XP
Supported languages	English
RAM	256 MB or higher
Hard disk	At least 200 MB of available hard disk space
Monitor	S-VGA or better display capability
CD-ROM	One CD-ROM drive min.
Communications ports	One of the following communications ports is required. • USB port Connecting online via the USB port (USB 1.1) of the NE1A-SCPU-series Controllers • DeviceNet Interface Card 3G8E2-DRM21-V1: Connecting online via DeviceNet

Note: Windows is a registered trademark of Microsoft. IBM is a registered trademark of International Business Machines Corp.

Safety Precautions

Be sure to read the following operation manual for precautions and other details required for correct use of the Safety Network Controller.
***DeviceNet Safety Safety Network Configurator Operation Manual* (Cat. No. Z905)**

Unit Versions and Network Configurator Versions

Network Configurator version 1.6□ or higher must be used when using a NE1A-SCPU01-V1 or NE1A-SCPU02 Safety Logic Controller with unit version 2.0. The following table shows the relationship between unit versions and Network Configurator versions.

❍ : Applicable, ×: Not applicable

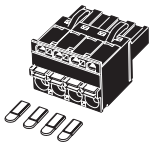
Model	Version	Network Configurator			
		Ver. 1.32	Ver. 1.51	Ver. 1.6□	Ver. 2.0
NE1A-SCPU01	Pre-Ver. 1.0	❍	❍	❍	❍
NE1A-SCPU01-V1 NE1A-SCPU02	Unit version 1.0	×	×	❍	❍
	Unit version 2.0	×	×	❍✻	❍

Note: Network Configurator version 2.1□ or higher must be used when using a NE0A-SCPU01 Safety Network Controller.

✻ When using Network Configurator version 1.6□, there are no operational differences in the NE1A-SCPU01-V1 and NE1A-SCPU02 Safety Logic Controllers that derive from the unit version.

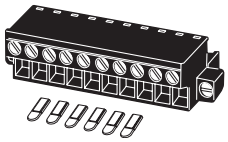
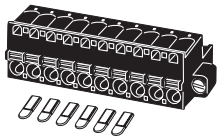
Accessories

Terminal Blocks for the NE1A

Appearance	Specification	Applicable Controllers	Model	Remarks
	Screw terminal blocks (4 pins)	NE1A-SCPU01 NE1A-SCPU01-V1 NE1A-SCPU02 NE1A-EDR01	**Y9S-04T1B-02A**	A set including two screw terminal blocks (black) and six code marks to prevent incorrect insertion
	Spring-cage terminal blocks (4 pins)		**Y9S-04C1B-02A**	A set including two spring-cage terminal blocks (black) and six code marks to prevent incorrect insertion

Note: The standard NE1A Controllers are equipped with spring-cage terminal blocks. Screw terminal blocks can be ordered if desired, e.g., to replace previous terminals.

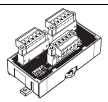
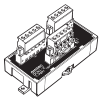
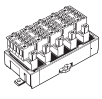
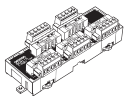
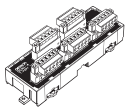
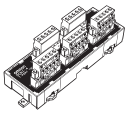
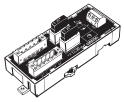
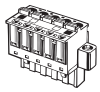
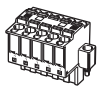
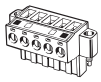
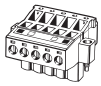
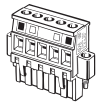
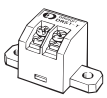
Terminal Blocks for the DST1

Appearance	Specification	Applicable Safety I/O Terminals	Model	Remarks
	Screw terminal blocks (10 pins)	DST1-ID12SL-1 DST1-MD16SL-1 DST1-XD0808SL-1 DST1-MRD08SL-1	**Y9S-10T1B-04B**	A set including four screw terminal blocks (black), six code marks to prevent incorrect insertion, one set of terminal labels ✻, and code mark instructions
	Spring-cage terminal blocks (10 pins)		**Y9S-10C1B-04B**	A set including four spring-cage terminal blocks (black), six code marks to prevent incorrect insertion, one set of terminal labels ✻, and code mark instructions

✻ The set of terminal labels is one sheet containing four sets of labels required for one Terminal Block, i.e., [1, 2 ... 10], [11, 12 ... 20], [21, 22 ... 30] and [31, 32 ... 40].

Note: The standard DS1T Safety I/O Terminals are equipped with spring-cage terminal blocks. Screw terminal blocks can be ordered if desired, e.g., to replace previous terminals.

Peripheral Devices for DeviceNet Communications

Product	Appearance	Model	Specification	
T-branch Tap for 1 branch line		**DCN1-1NC**	Cable wiring direction: Toward top Cable lock direction: From top Connector screw direction: From top	Provided with 3 parallel connectors with clamps (XW4G-05C1-H1-D), standard terminating resistor
		**DCN1-1C**	Cable wiring direction: Toward side Cable screw direction: From top Connector screw direction: From side	Provided with 3 parallel connectors with screws (XW4B-05C1-H1-D), standard terminating resistor
		**DCN1-2C**	Cable wiring direction: Toward top Cable screw direction: From side Connector screw direction: From top	
		**DCN1-2R**	Cable wiring direction: Toward side Cable screw direction: From top Connector screw direction: From top	Provided with 3 orthogonal connectors with screws (XW4B-05C1-VIR-D), standard terminating resistor
T-branch Tap for 3 branch lines		**DCN1-3NC**	Cable wiring direction: Toward top Cable lock direction: From top Connector screw direction: From top	Provided with 5 parallel clamp connectors with screws (XW4G-05C1-H1-D), standard terminating resistor
		**DCN1-3C**	Cable wiring direction: Toward side Cable screw direction: From top Connector screw direction: From side	Provided with 5 parallel connectors with screws (XW4B-05C1-H1-D), standard terminating resistor
		**DCN1-4C**	Cable wiring direction: Toward top Cable screw direction: From side Connector screw direction: From top	
		**DCN1-4R**	Cable wiring direction: Toward side Cable screw direction: From top Connector screw direction: From top	Provided with 5 orthogonal clamp connectors with screws (XW4B-05C1-VIR-D), standard terminating resistor
Power Supply Tap		**DCN1-1P**	One-branch tap provided with 2 connectors, standard terminating resistor, and fuse	
Connectors		**XW4G-05C1-H1-D**	Parallel clamp connector with screws Connector insertion and wiring both performed horizontally.	
		**XW4G-05C4-TF-D**	Parallel multi-branching clamp connector with screws Connector insertion and wiring performed in same direction.	
		**XW4B-05C1-H1-D**	Parallel connector with screws Connector insertion and wiring performed in same direction.	
		**XW4B-05C4-T-D**	Parallel, screw-less, multi-branching connector Connector insertion and wiring performed in same direction.	
		**XW4B-05C4-TF-D**	Parallel, multi-branching connector with screws Connector insertion and wiring performed in same direction.	
		**XW4B-05C1-VIR-D**	Orthogonal connector with screws Connector insertion and wiring performed at a right angle.	
DeviceNet Cables		**DCA1-5C10 (-B)**	Thin cable length: 100 m DCA1-5C10-B: Cable color: Blue DCA1-5C10: Cable color: Gray	
		DCA2-5C10 (-B)	Thick cable length: 100 m DCA2-5C10-B: Cable color: Blue DCA2-5C10: Cable color: Gray	
Terminal-block Terminator		**DRS1-T**	Resistance of 121 Ω	

MEMO

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