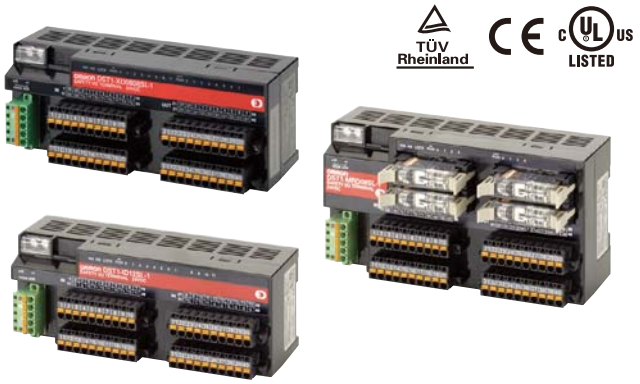
Safety I/O Terminals

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 DS1T 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 DeviceNet Safety 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)

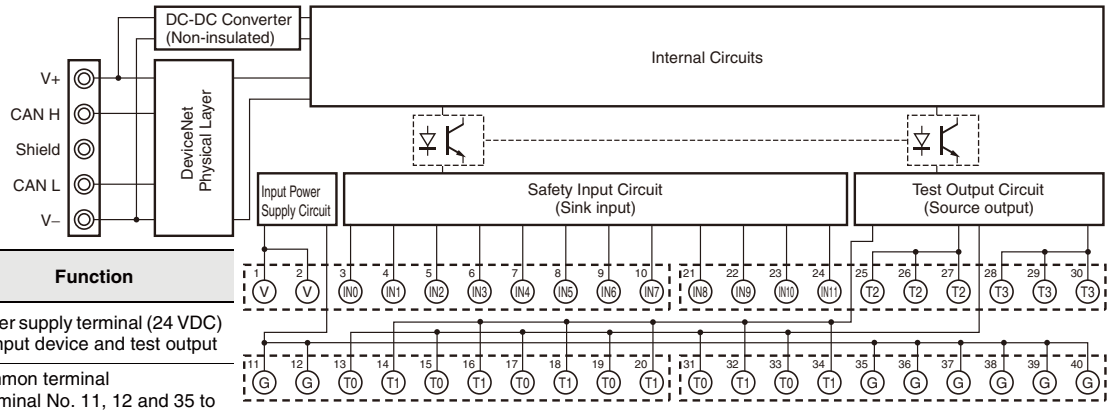
DeviceNet Slave Communications

(Common with the DST1 Series)

Standard Slave communications	Max. 2 connections

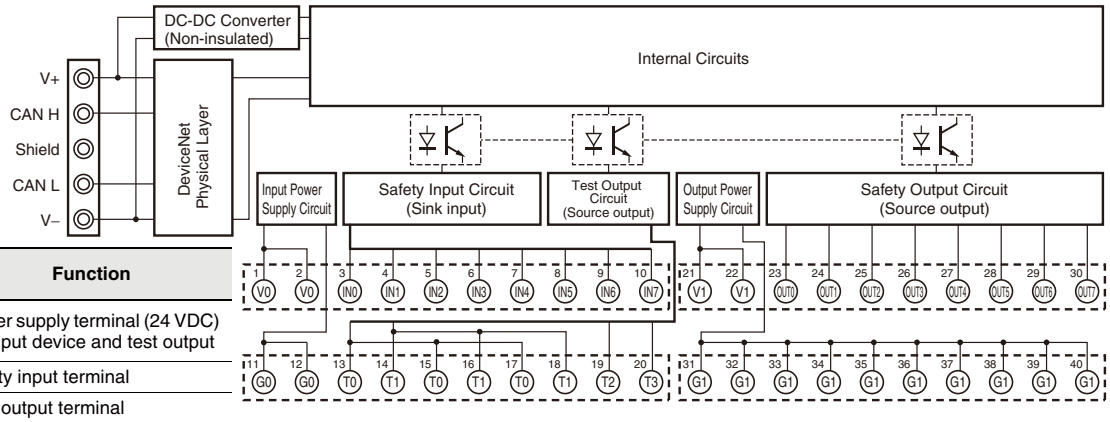
Internal Circuit Configuration

DST1-ID12SL-1



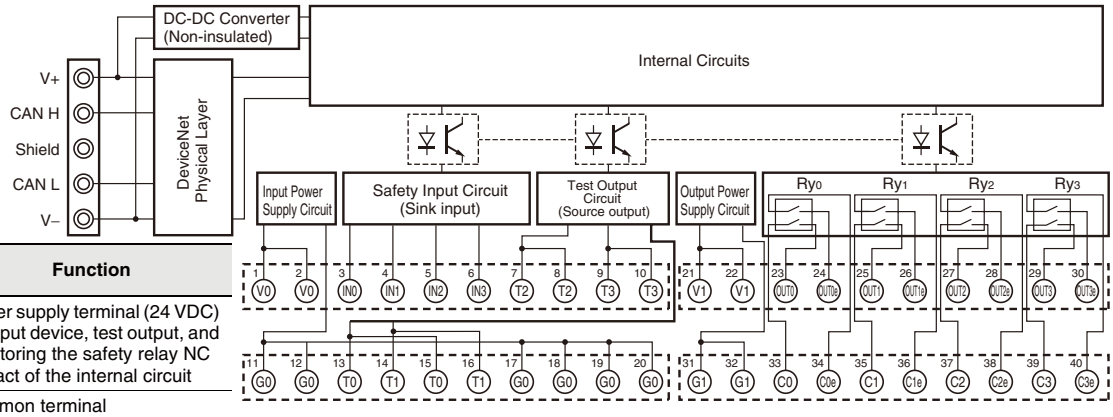
Terminal No.	Name	Function
1, 2	V	Power supply terminal (24 VDC) for input device and test output
11, 12	G	
35 to 40	G	Common terminal (Terminal No. 11, 12 and 35 to 40 are internally connected.)
3 to 10 21 to 24	IN0 to IN11	Safety input terminal
13 to 20 25 to 30 31 to 34	T0 to T3	Test output terminal

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



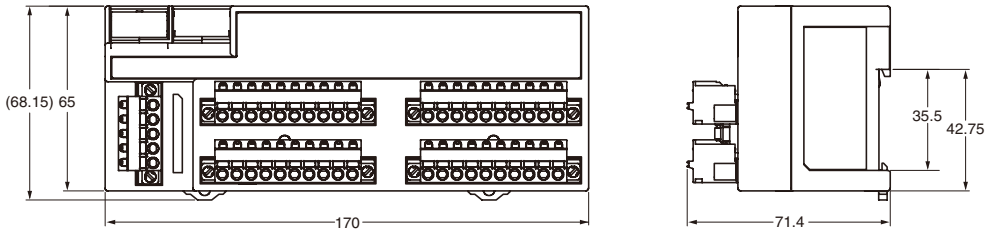
Terminal No.	Name	Function
1, 2	V0	Power supply terminal (24 VDC) for input device, test output, and monitoring the safety relay NC contact of the internal circuit
11, 12	G0	
17 to 20	G0	Common terminal (Terminal Nos. 11, 12 and 17 to 20 are internally connected.)
3 to 6	IN0 to IN3	Safety input terminal
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.

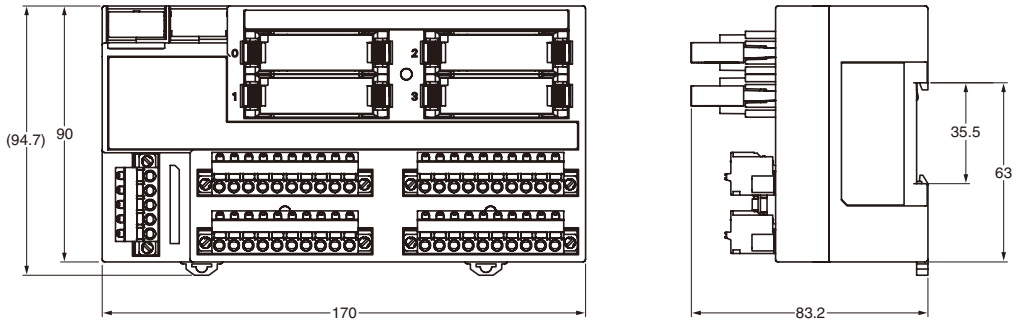
Dimensions

(Unit: mm)

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



DST1-MRD08SL-1

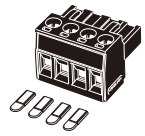
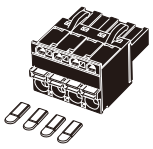


Safety Precautions

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)**

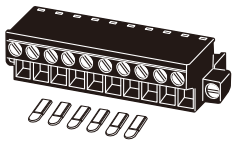
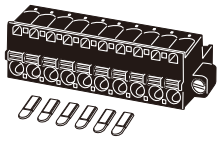
Accessories

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.

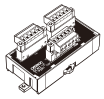
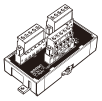
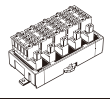
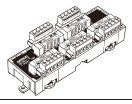
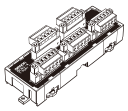
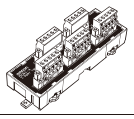
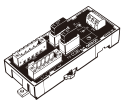
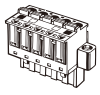
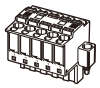
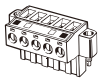
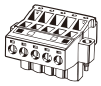
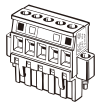
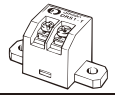
Terminal Blocks for the DST1

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

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.

* 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].

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	

⚠ WARNING

This catalog is a guide to help customers select the proper safety products. Observe the following items when choosing products, select the right products for your devices or equipment, and develop a safety-related system to fully utilize product functions.

Setting Up a Risk Assessment System

The items listed in this catalog must be used properly in terms of product location as well as product performance and functionality. Part of the process of selecting and using these products should include the introduction and development of a risk assessment system early in the design development stage to help identify potential dangers in your equipment that will optimize safety product selection. A badly designed risk assessment system often results in poor choices when it comes to safety products.

- Related International Standards:
  ISO 14121 Principles of Risk Assessment

Safety Policy

When developing a safety system for the devices and equipment that use safety products, make every effort to understand and conform to the entire series of international and industrial standards available, such as the examples given below.

- Related International Standards:
  ISO 12100 Basic Concepts, General Principles for Design
  IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems

Role of Safety Products

Safety products have functions and mechanisms that ensure safety as defined by standards. These functions and mechanisms are designed to attain their full potential within safety-related systems. Make sure you fully understand all functions and mechanisms, and use that understanding to develop systems that will ensure optimal usage.

- Related International Standards:
  ISO 14119 Interlocking Devices Associated with Guards-Principles for Design and Selection

Installing Safety Products

Make sure that properly educated and trained engineers are selected to develop your safety-related system and to install safety products in devices and equipment.

- Related International Standards:
  ISO 12100 Basic Concepts, General Principles for Design
  IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems

Observing Laws and Regulations

Safety products should conform to pertinent laws, regulations, and standards, but make sure that they are used in accordance with the laws, regulations, and standards of the country where the devices and equipment incorporating these products are distributed.

- Related International Standards:
  IEC 60204 Electrical Equipment of Machines

Observing Usage Precautions

Carefully read the specifications and precautions listed in this catalog for your product as well as all items in the Operating Manual packed with the product to learn usage procedures that will optimize your choice. Any deviation from precautions will lead to unexpected device or equipment failure not anticipated by safety-related systems or fire originating from equipment failure.

Transferring Devices and Equipment

When transferring devices and equipment, be sure to keep one copy of the Operating Manual and pack another copy with the device or equipment so the person receiving it will have no problem operating it.

- Related International Standards:
  ISO 12100 Basic Concepts, General Principles for Design
  IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems

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.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS, OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS 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 OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the product.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Disclaimers

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 model 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 model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased product.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

ERRORS AND OMISSIONS

The information in this catalog has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

PERFORMANCE DATA

Performance data given in this catalog 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 users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

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