

OMRON



SCC-1224A Safety Mat /Edge Controller

EN Quick Reference Guide

Thank you for purchasing the SCC-1224A Safety Mat/Edge Controller. Be sure to have this product handled by a "Responsible Person" who is well aware of and familiar with the machine to be installed. The term "Responsible Person" used in this document means the person qualified, authorized and responsible to secure "safety" in each process of the design, installation, operation, maintenance services and disposition of the machine. It is assumed that this product will be used properly according to the installation environment, performance and function of the machine. Responsible Person should conduct risk assessment on the machine and determine the suitability of this product before installation. Read this document and User Manual for the product thoroughly to understand and make good use of the descriptions before installing and operating the product. Keep this document at the place where the operator can refer to whenever necessary.

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Original instructions

Instructions in the official EU languages and a signed EC Declaration of Conformity in English are available on our website at www.industrial.omron.eu/safety.

EU Declaration of Conformity

OMRON declares that the SCC-1224A is in conformity with the requirements of the following EU Directives:
Machinery Directive 2006/42/EC, EMC Directive 2014/30/EU

Standards

The SCC-1224A is designed and manufactured according to the following standards.
EN ISO 13849-1:2015, EN ISO 13849-2:2012, EN 62061:2005/A2:2015,
EN 61000-6-2:2005, EN 61000-6-3:2007
cULus: Listed (ANSI/UL 508, CSA C22.2 No.14) file number: E195653

Safety Precautions

Meaning of Signal Words



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.

WARNING

Electric shock may occur. Make sure to shut down the power supply before performing wiring. DO NOT touch the terminals while power is being supplied.



Electric shock may occur. Make sure to shut down the power supply before setting the DIP Switch.



Serious injury may occur due to loss of required safety functions. DO NOT use the SCC-1224A Safety Mat/Edge Controller's auxiliary outputs as safety outputs.



Serious injury may occur due to breakdown of safety outputs. DO NOT connect loads beyond the rated values to the safety outputs.



DO NOT use the SCC-1224A Safety Mat/Edge Controllers for machines that cannot be stopped by electrical control. For example, DO NOT use it for a pressing machine that uses full-rotation clutch. Otherwise, the machine may not stop before a person reaches the hazardous part, resulting in serious injury.



Serious injury may occur due to loss of required safety functions. Wire the SCC-1224A Safety Mat/Edge Controller properly so that the 120 VAC or 24 VDC line does NOT touch the outputs.



Serious injury may 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 auxiliary output line is grounded.



Serious injury may occur due to loss of required safety functions. DO NOT connect multiple sensors in parallel and connect them to the SCC-1224A Safety Mat/Edge Controller. Read and understand the wiring examples and connect the controller with sensors in series.



Serious injury or property damage may occur. DO NOT use the SCC-1224A Safety Mat/Edge Controller where flammable gases or explosive gases may be present. Doing so may cause combustion or explosion due to relay heating or arcing during switching.



Serious injury may occur due to loss of required safety functions. When replacing an SCC-1224A Safety Mat/Edge Controller, configure the replacement controller suitably and confirm that it operates correctly.



DO NOT disassemble the SCC-1224A Safety Mat/Edge Controller. Doing so may damage the product or cause fire or electric shock, resulting in seriously injury.



Serious injury may occur due to loss of required safety functions. Operate this presence sensing safety pressure-sensitive protective device only when it is properly installed, tested and inspected in accordance with all applicable government, industry and company safety regulations.



Precautions for Safe Use

Obey the following warnings during system installation to ensure that safety-related components are configured to enable the system functions to operate properly.

(1) Risk Assessment

The proper use of the safety devices described in this document and User Manual as they relate to installation conditions and mechanical performance and functions is a prerequisite for their use.

When selecting or using the safety devices, a risk assessment must be performed during the development stage of the equipment or facilities to identify potential danger factors in equipment or facilities in which the safety devices are to be applied. Suitable safety devices must be selected under the guidance of a sufficient risk assessment system. An insufficient risk assessment system may result in the selection of unsuitable safety devices.

- Typical related international standards: ISO 12100, Safety of machinery -- General principles for design -- Risk assessment and risk reduction

(2) Safety Measures

When using this safety device to build systems containing safety-related components for equipment or facilities, the system must be designed with the full understanding of and conformance to international standards, such as those listed below, and/or standards in related industries.

- Typical related international standards: ISO 12100, Safety of machinery -- General principles for design -- Risk assessment and risk reduction
IEC 61508, Safety Standard for Safety Instrumented Systems (Functional Safety of Electronic/ Programmable Electronic Safety-related Systems)

(3) Role of Safety Devices

The safety devices are provided with safety functions and mechanisms as stipulated in relevant standards, but suitable designs must be used to enable these functions and mechanisms to operate properly inside systems containing safety-related components. Build systems that enable these functions and mechanisms to perform properly, based on a full understanding of their operation.

- Typical related international standards: ISO 14119, Safety of machinery -- Interlocking devices associated with guards -- Principles for design and selection

(4) Installation of Safety Devices

The construction and installation of systems with safety-related components for equipment or facilities must be performed by technicians who have received suitable training.

- Typical related international standards: ISO 12100, Safety of machinery -- General principles for design -- Risk assessment and risk reduction
IEC 61508, Safety Standard for Safety Instrumented Systems (Functional Safety of Electrical/Programmable Electronic Safety-related Systems)

(5) Compliance with Laws and Regulations

This safety device conforms to the relevant regulations and standards. Ensure that it is used in compliance with local regulations and standards for the equipment or facilities in which it is applied.

- Typical related international standards: IEC 60204, Safety of Machinery -- Electrical Equipment of Machines

(6) Observing Precautions for Use

When putting this safety device to actual use, heed the specifications and precautions in this document and those in the User Manual. Using the product in a manner that deviates from

these specifications and precautions will lead to unexpected failures in equipment or devices, and to damage that results from such failures, due to insufficient operating functions in safety-related components.

(7) Mounting

The controller must be mounted correctly:

- For use in an environment with level 2 contamination.
- In an enclosure with a protection type of at least IP54 (IEC 60529).
- On a 35 mm DIN track (PFP-□N: sold separately).
- Use end plates (PFP-M: sold separately) on both ends of SCC-1224A Safety Mat/Edge Controller.
- The unit must not be operated in areas with major temperature changes.

(8) Moving or Transferring Devices or Equipment

When moving or transferring devices or equipment, be sure to include this document and User Manual to ensure that the person to whom the device or equipment is being moved or transferred will be able to operate it properly.

- Typical related international standards: ISO 12100, Safety of machinery -- General principles for design -- Risk assessment and risk reduction
IEC 61508, Safety Standard for Safety Instrumented Systems (Functional Safety of Electronic/Programmable Electronic Safety-related Systems)

(9) Wiring

Wire the connection terminals properly and check the operation before commissioning. Otherwise, the SCC-1224A Safety Mat/Edge Controller may not operate correctly or it can be burnt or destroyed by connection of electrical power to the incorrect terminals.

- Lines that are routed outside the switch cabinet must be protected properly.
- The limit values stated in the "Specifications" for the supply voltage must be observed. Do not use power supplies with large ripples or power supplies that intermittently generate incorrect voltages.
- When using a UMA Safety Mat, the terminals to connect to the UMA depend on the kind of the UMA. Connect the terminals X1, X2, X3 and X4 properly.
- To prevent short-circuit or ground failure of the load, connect protection elements such as fuses. Not doing so may damage or burn the controller.
- When connecting the SCC-1224A Safety Mat/Edge Controller to multiple sensors, ensure that the maximum number of sensors, the maximum sensor length, the maximum sensor surface area and the maximum total cable length for sensor connection are within the specified values.

(10) Disposal

Dispose of the product in accordance with the relevant rules and regulations of the country or area where the product is used.

Precautions for Correct Use

(1) Handle with care

Do not drop the product or expose it to excessive vibration or mechanical shock. The product may be damaged and may not function properly. Do not place heavy goods on the product during transportation or storage. The product may be damaged and may not function properly.

(2) Solvents

Exposure of the product to organic solvents, such as alcohol, thinner, trichloroethane, or gasoline, should be avoided. Such solvents make the markings on the SCC-1224A Controller illegible and cause deterioration of parts.

(3) Storage and operating conditions

Do not store or use the products under the following conditions.

1. In direct sunlight
2. At ambient temperatures not between -20 and 55°C
3. At relative humidity not exceeding 90% or under temperature changes that could cause condensation
4. At air pressure out of the range of 86 to 106 kPa
5. In corrosive or combustible gases
6. Where subject to vibration or mechanical shock beyond the rated values
7. Where subject to contact with water, oil, or chemicals
8. In an atmosphere containing excessive dust, saline, or metal powder

(4) Wiring

1. Use the following to wire to the SCC-1224A Controller.
 - Stranded wire (Flexible wire): 0.75 to 1.5 mm²
 - Solid wire: 0.75 to 1.5 mm²
 - Strip the cover of wire no longer than 7 mm.
 - Terminal tightening torque: 0.5 to 0.6 N·m
2. Ground the negative side of the power supply. A controller with the positive side grounding will not work.
3. Do not connect a safety mat and a safety edge together with the SCC-1224A.

(5) Mounting of multiple SCC-1224A Controllers

Keep 25 mm or more from adjacent SCC-1224A Controllers when mounting in row. Temperature range when mounted in row is +40°C (104°F) max.

(6) Auxiliary output

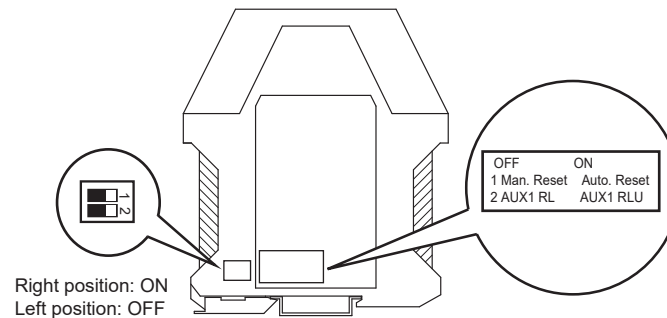
The following operations of the auxiliary output must be noted.

1. The auxiliary output is open when the SCC-1224A is powered off.
2. At power-on
 - In the auxiliary output without delay mode, the auxiliary output is closed once even when the safety output is closed immediately in the automatic reset mode.
 - In the auxiliary output delayed mode, the auxiliary output is closed for 3 s and then switched to open.
3. During operation
 - In the auxiliary output delayed mode, the closed state of the auxiliary output (for 3 s) is not extended even the sensor is activated again during this state.

Refer to User Manual for details of the settings and operations of the auxiliary output.

(7) This is a Class A product (Product in industrial setting). Use of the product in residential setting may cause radio disturbance. In such case, take appropriate measures

DIP Switch

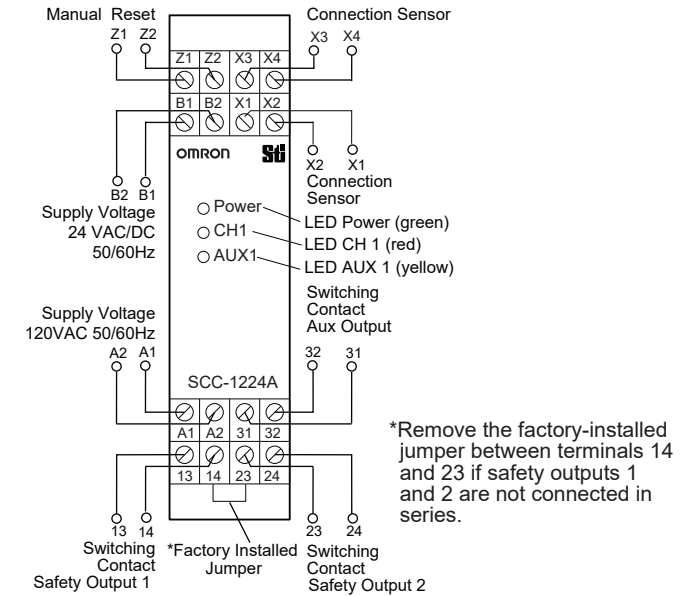


Right position: ON
Left position: OFF

■ DIP switch for configuring the operating mode

DIP Switch	Operating Modes
1	"ON" - Automatic reset (factory setting)
	"OFF" - Manual reset, EDM monitoring
2	"ON" - Auxiliary output without delay (factory setting)
	"OFF" - Auxiliary output delayed

Signal Indicators and Connection Terminals



*Remove the factory-installed jumper between terminals 14 and 23 if safety outputs 1 and 2 are not connected in series.

■ Signal Indicators

Label	Color	Name	Status	Description
Power	Green	Power LED	ON	Operating state
			Flashing	Fault alarm*
CH 1	Red	Sensor Input LED	ON	Sensor activated (Safety output OFF)
			Fast flashing* (approx. 4 Hz)	Sensor faulty*
			Slow flashing* (approx. 1 Hz)	Waiting for reset switch input* (Safety output OFF)
			OFF	Released from interlocked state (Safety output ON)
AUX 1	Yellow	Auxiliary output LED	ON	Auxiliary output contact closed
			OFF	Auxiliary output contact open

*Refer to User Manual for more information.

■ Connection Terminals

Terminal	Signal	Signal	Wiring
A1, A2	Supply Voltage 120VAC	Input terminals of 120 VAC supply voltage.	Do not connect a supply voltage of 24 VAC or 24 VDC.
B1, B2	Supply Voltage 24VAC/DC	Input terminals of 24 VAC or 24 VDC.	Do not connect a supply voltage of 120 VAC. When using 24 VDC, connect 24 VDC line to B1 and 0 VDC line to B2.
X1, X2	Connection Sensor	Input terminals of sensor signal.	Connect signal lines of UMA Safety Mat or SGE Safety Edge. For 1-cable type of UMA Safety Mat (UM□□A-□-□-1), connect brown line to X1 and blue line to X2.
X3, X4			Connect signal lines of 1-cable type of UMA Safety Mat (UM□□A-□-□-1), white line to X3 and black line to X4.
Z1, Z2	Manual Reset	Input terminals of a reset switch (NO contact). Also used as external device monitoring (EDM) terminals of contactors.	Do not connect any lines when in the automatic reset mode. Connect NC contacts of contactors when using the external device monitoring (EDM) function.
13-14	Safety Output 1	Closed or open according to sensor and manual reset inputs.	Do not connect any lines when not used.
23-24	Safety Output 2		Remove the factory-installed jumper between terminals 14 and 23 if safety outputs 1 and 2 are not connected in series.
31-32	Auxiliary Output	In the auxiliary output without any delay mode, the auxiliary output is closed without delay when the safety outputs are open. In the auxiliary output delayed mode, the auxiliary output is closed with a delay of 0.5 s after the safety outputs are open, and remains closed for 3 s.	Do not connect any lines when not used. Do not use this as safety output.

Ratings and Specifications

Power Input	
Power supply voltage*	120 VAC 50/60Hz (Terminals A1 and A2) 24 VAC 50/60Hz or 24 VDC (Terminals B1 and B2)
Operating voltage range	-10% to +10% of rated power supply voltage
Power consumption (with sensors connected)	120 VAC: 3.8VA max. 50 Hz, 3.5 VA max. 60 Hz 24 VAC: 1.2 VA max., 24 VDC: 1.5 W max.

* Select either Terminals A1 and A2 or Terminals B1 and B2 according to the power supply voltage applied. Never apply both voltages simultaneously.

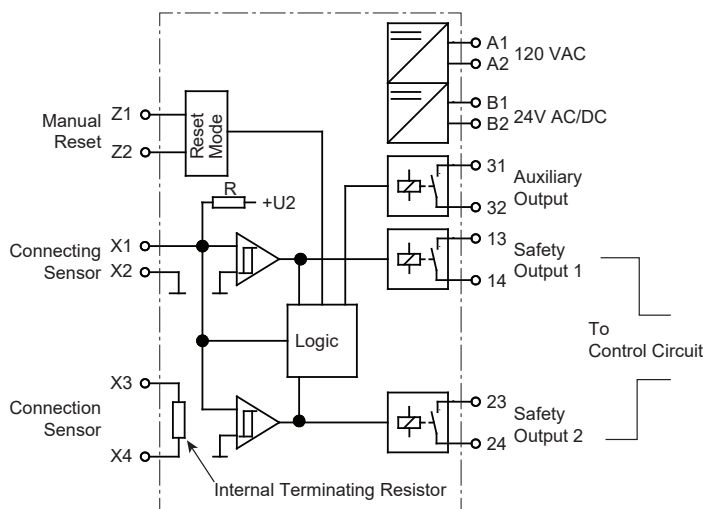
Inputs	
Sensor input	UMA Safety Mat: A maximum of 10 mats can be connected in series. SGE Safety Edge: A maximum of 5 edges can be connected in series. Maximum wiring length: 25 m max.

Contacts	
Safety output	230 VAC 3 A, 24 VDC 3 A (resistive load) 230 VAC 1 A (AC-15), 24 VDC 2 A (DC-13) (inductive load)
Auxiliary output	24 VAC/DC 2A (resistive load)

Characteristics	
Startup time *1	300 ms max.
Operating time (Open to closed) *2	550 ms max.
Response time (Closed to open) *3	13 ms max.
Maximum wiring length	25 m max.
Vibration resistance	10 to 55 Hz, Sinus, 0.15 mm amplitude, 10 cycles
Shock resistance	Malfunction: 147 m/s ²
Durability	Mechanical 1,000,000 cycles min. Electrical AC-15: 800,000 cycles min. (230 VAC, 1A) DC-13: 250,000 cycles min. (24 VDC, 2A)
Ambient operating temperature	-20 to 55°C (-4 to 131°F) (with no icing or condensation)
Ambient operating humidity	0% to 90%
Pollution degree	IP20
Material (Housing)	Polyamide PA6.6, self-extinguishing according to UL 94-V2
Protection type	Class II (protective insulation)
Pollution degree	2
Overvoltage category (IEC/EN 60664-1)	III
Rated insulation voltage	250 V
Rated impulse voltage resistance	4 kV
Dielectric strength	1.5 kVAC
Terminal tightening torque	0.5 to 0.6 N·m
Weight	approx. 210 g (7.4 oz)

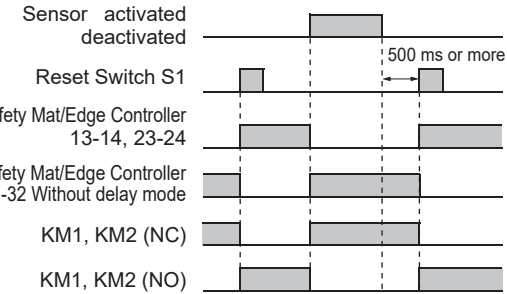
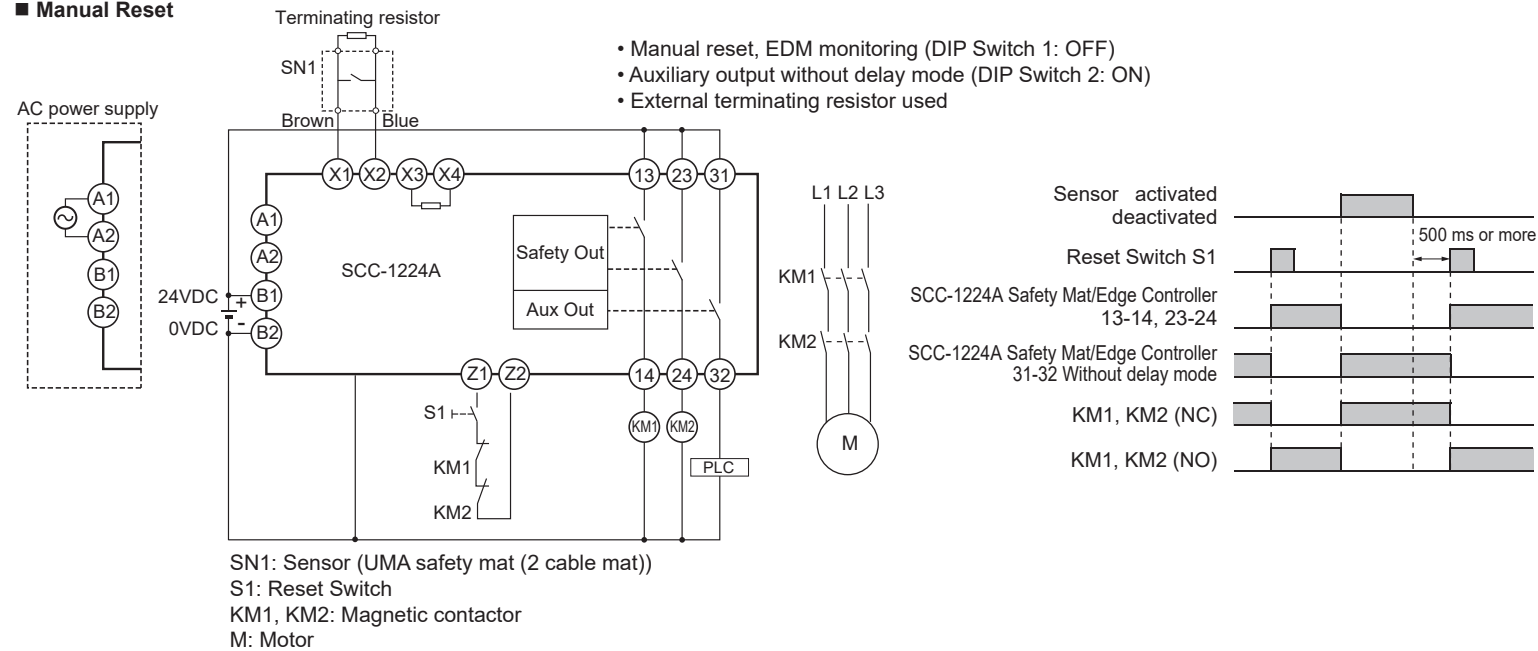
*1. The startup time is the delay time from power-on to when the SCC-1224A Safety Mat/Edge Controller is ready to operate.
*2. The operating time is the time it takes for the safety output contacts to be closed after the sensor is deactivated and the manual reset input contacts are closed. The contact bounce time is not included.
*3. The response time is the time it takes for the safety output contacts to open after the sensor is activated. Contact bounce time is included.

Functional Circuit

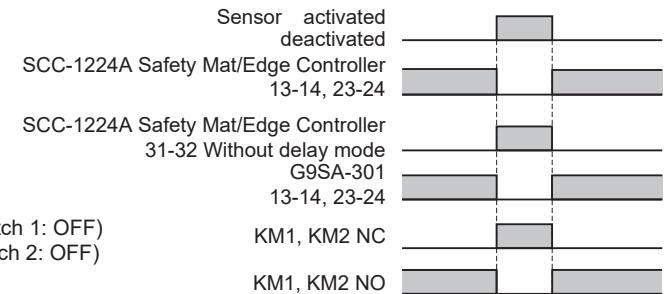
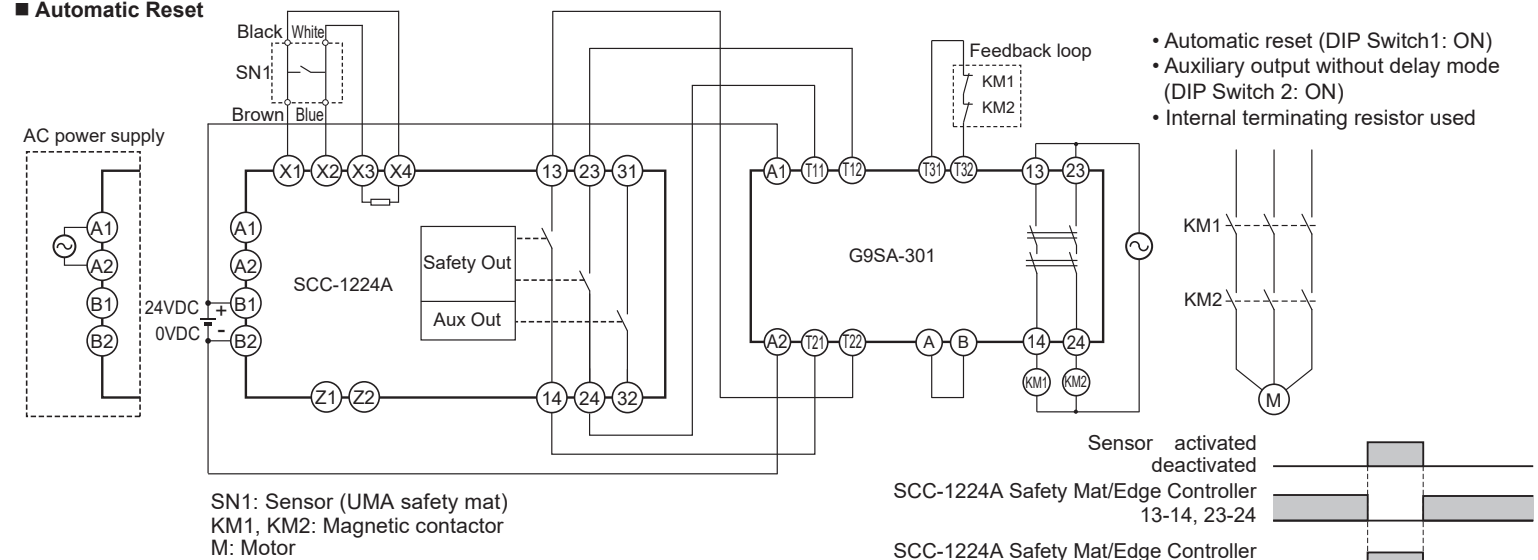


Application Examples

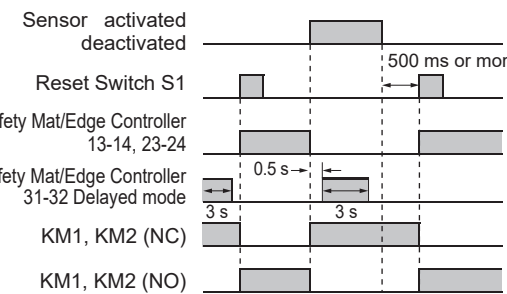
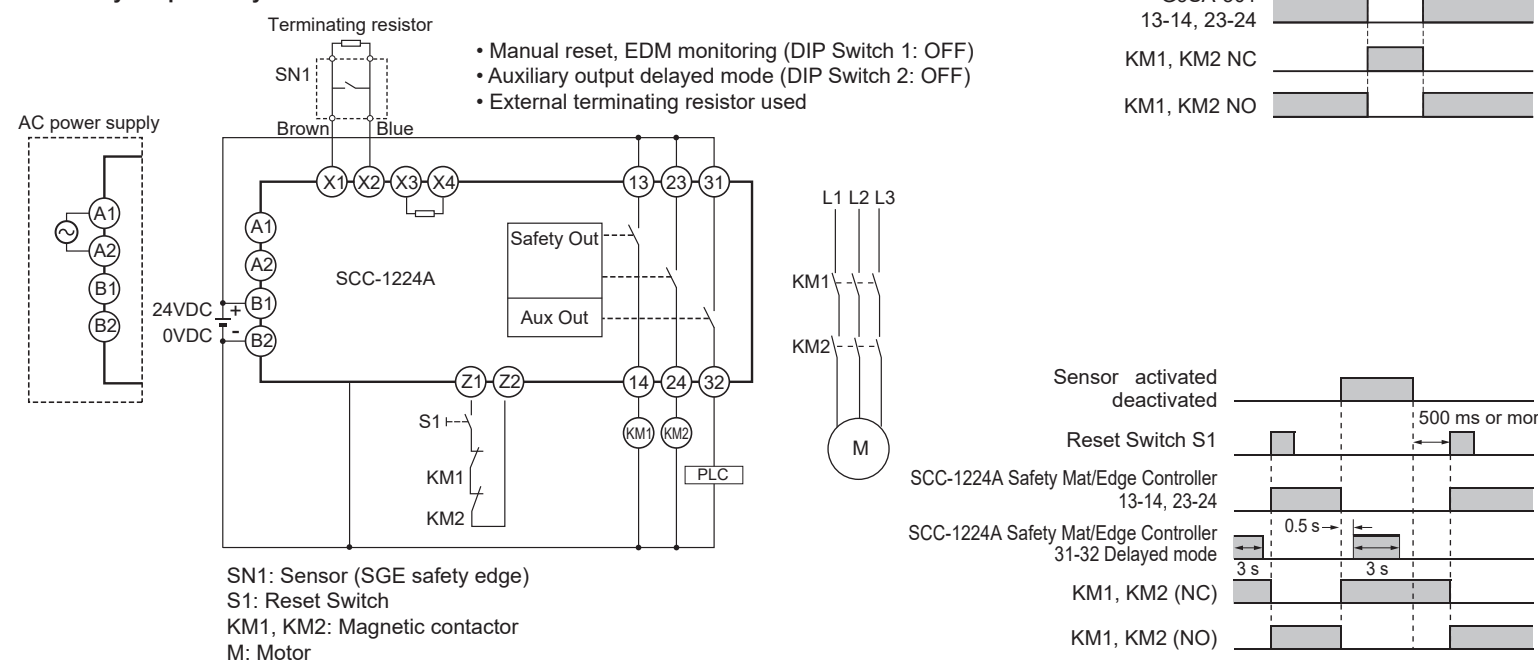
Manual Reset



Automatic Reset



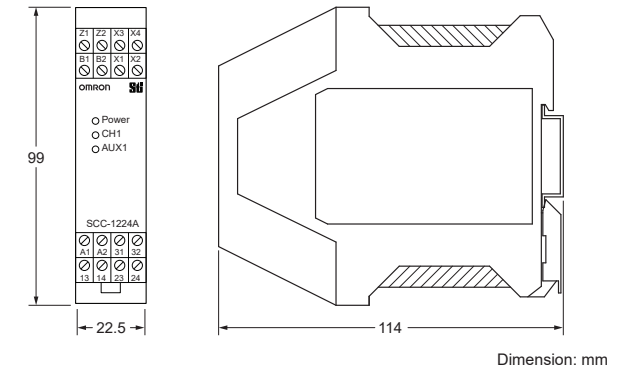
Auxiliary Output Delayed Mode



Limitations for Using Sensors

Sensor	Maximum number of sensors connected in series	Maximum sensor surface area/total length of sensors connected in series	Maximum total cable length
UMA Safety Mat	10	Sensor surface area: 10 m ²	25 m
SGE Safety Edge	5	Total length of sensors: 30.5 m	25 m

Dimensions



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. NEVER USE THE PRODUCT 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(S) IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also Product catalog for Warranty and Limitation of Liability.

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