

OMRON**ST****Type D40A****Compact Non-Contact Door Switch**

The D40A non-contact door switch provides a safety-related interruption at a specified proximity position of its actuator through a safety controller.

English INSTRUCTION MANUAL

Thank you for purchasing D40A Compact Non-contact Door Switch. Please read and understand this manual before using the products. Keep this manual ready to use whenever needed. Only qualified person trained in professional electrical technique should handle D40A. Please consult your OMRON representative if you have any questions or comments. Make sure that information written in this document are delivered to the final user of the product.

OMRON Corporation

© OMRON Corporation 2010-2026 All Rights Reserved.

2139497-6F

Instructions in the EU languages and a signed EU Declaration of Conformity are available on our website at <http://www.industrial.omron.eu/safety>.

Declaration of Conformity

OMRON declares that D40A is in conformity with the requirements of the following EU Directives and UK Legislation:

EU: Machinery Regulation (EU) 2023/1230,
EMC Directive 2014/30/EU, RoHS Directive 2011/65/EU
UK: 2008 No. 1597 Machinery (Safety), 2016 No. 1091 EMC,
2012 No. 3032 RoHS

Safety Standards

D40A is designed and manufactured in accordance with the following standards:

EN ISO13849-1:Cat. 3 PL d (with G9SX-NS□),
IEC/EN61508 SIL3 (with G9SX-NS□),
IEC/EN60947-5-3 PDDb (with G9SX-NS□),
IEC/EN61000-6-4, ISO14119 (Low level coded),
UL508, CAN/CSA C22.2 No.14

Safety Precautions**Meanings of Signal Words**

The following signal words are used in this manual.



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.

Alert Statements

Machine may start operating and may result serious injury or death.

Do not put the actuator close to the switch when the door is opened.

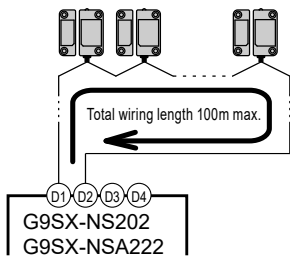
Also make sure to install D40A to minimize defeat possibilities. For required measures, refer to ISO14119 and other relevant standards and regulations.

Precautions for Safe Use

- Disconnect G9SX-NS□ from power supply when wiring D40A. Devices connected to G9SX-NS□ may operate unexpectedly.
- Do not operate the D40A with flammable or explosive gas.
- Incorrect wiring may lead to loss of safety function. Wire conductors correctly and verify the operation of D40A before using the system in which D40A is incorporated.
- Auxiliary monitoring output is NOT safety output. Do not use auxiliary monitoring output as any safety output. Such incorrect use causes loss of safety function of D40A and its relevant system.
- After installation of D40A, qualified personnel should confirm the installation, and should conduct test operations and maintenance. The qualified personnel should be qualified and authorized to secure the safety on each phases of design, installation, running, maintenance and disposal of system.
- A person in charge, who is familiar to the machine in which D40A is to be installed, should conduct and verify the installation.
- Be sure to inspect D40A daily and every 6 months. Otherwise, serious injury may possibly occur due to the system malfunction.
- Do not dismantle, repair, or modify D40A. Doing so may lead to loss of its safety functions.
- Use only appropriate components or devices complying with relevant safety standards corresponding to the required level of safety category. Conformity to requirements of safety category is determined as an entire system. It is recommended to consult a certification body regarding assessment of conformity to the required safety level.

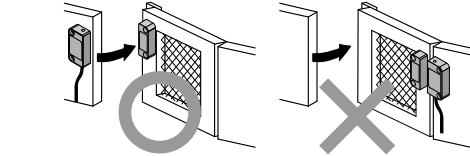
Precautions for Correct Use

- D40A must be used with designated actuator (D40A-1C or -A1) and designated controller type G9SX-NS□. Before using the D40A with any other OMRON Safety Controller, check applicability in the Instruction Manual for the other Controller.
- Handle with care
Do not drop D40A to the ground or expose to excessive vibration or mechanical shocks. D40A may be damaged and may not function properly.
- Conditions of storage and usage
Do not store or use the D40A under the following conditions. D40A may be damaged and may not function properly.
 - In direct sunlight
 - At ambient temperatures out of the range of -10 to 55°C
 - At relative humidity out of the range of 25% to 85% or under such temperature change that causes condensation.
 - In corrosive or combustible gases
 - With vibration or mechanical shocks out of the rated values.
 - Under splashing of oil or chemicals
 - In the atmosphere containing dust, saline or metal powder.
- Use cables with length less than 100m totally to connect multiple D40A switches. The supply voltage to D40A may decrease by the voltage drop depending on the cable or the wiring configuration. Check the power-supply voltage is in the rated range.

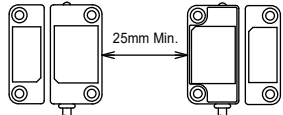


- Disconnect G9SX-NS□ from power supply when replacing D40A. Devices connected to G9SX-NS□ may operate unexpectedly.
- Adhesion of solvent such as alcohol, thinner, trichloroethane or gasoline on the product should be avoided. Such solvents make the marking on D40A illegible and cause deterioration of parts.
- Do not use D40A in the magnetic field of 1.5mT or more. D40A may not function properly.

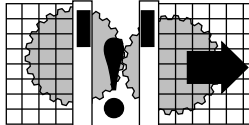
- Do not use D40A in the water or continuous water exposure environment, otherwise water may leak into D40A. (An enclosure of IP67 rating, which D40A is rated, protects against temporary immersion in water.)
- Do not use the switch or actuator as a stopper. Protect the switch and the actuator by setting up the stopper. Separate the switch and the actuator to a distance of 1mm or more.
- Install D40A actuator and switch in an appropriate distance so that it does not create a gap accessible to the hazard.



- Where two or more switches mounted adjacent, they should be no closer than 25mm.



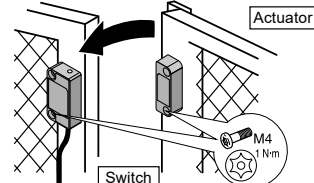
- Check that the machine is stopped whenever the interlocked guard door is open.



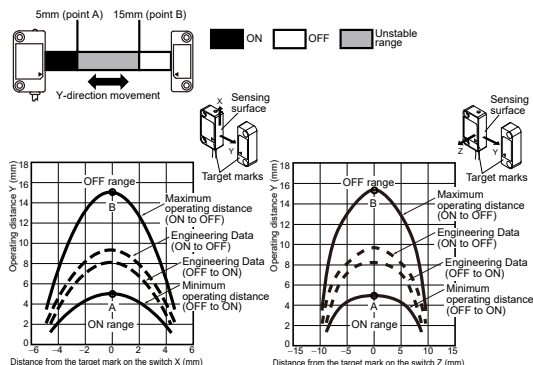
- Do not mount the switch and actuator on magnetic materials, otherwise it may affect the operating distance. Refer to the chart below for the estimated influence.

Distance from magnetic materials	Operating distance
0 to 5mm	Approximately 90% of the original value
5mm Min.	No influence

- Tighten each screw with specified torque by using M4 screw and washer for the installation of the switch and actuator. After installation and commissioning, the actuator and switch fixing screws should be coated with tamper proof varnish or similar compound. Using anaerobic locking compounds can have a detrimental effect on the plastic switch case if the compounds contact with the switch case.

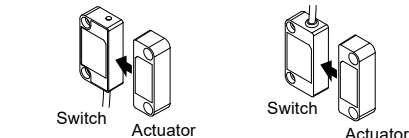
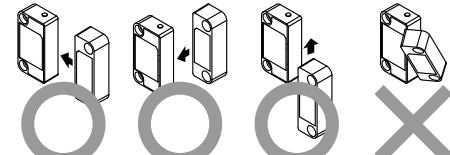


- Wiring
 - Use the following to wire to G9SX-NS
 - Solid wire: 0.2 to 2.5mm² AWG24 to AWG12
 - Stranded wire: 0.2 to 2.5mm² AWG22 to AWG12
 - When auxiliary output is not used, cut off the wiring and protect by taping so that it does not contact other terminals.
 - When you use an additional cable of 20m or longer, use a multiconductor cable to group the white, black, brown, and blue lines together.
- Handle cables with care:
 - For bending cables, it is recommended to bend them with a radius of bend no less than six times the cable outer diameter.
 - Do not apply a tensile strength of 50N or greater to the cables.
- In a residential environment, this product may cause radio interference, in which case the user may be required to take adequate measures.
- If there is any machine that has a large surge current (e.g., a motor) near D40A, connect a surge absorber to D40A between the blue and the other lines (white, black, brown, and yellow), respectively.
Suggested surge absorber's specification is as follows:
-Peak pulse power: 600W (10/1000μs) or more
(Per IEC61000-4-5(surge immunity))
-Breakdown voltage: 27-33V

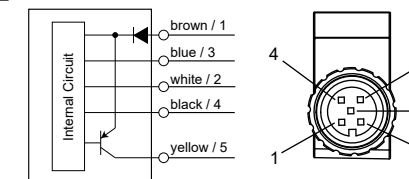
1 Detection Ranges (Engineering data)

Note1. The operating distance is the distance between the switch and actuator sensing surfaces.

Note2. The graph indicates shifting to X or Z direction from following condition that the switch and actuator target marks are on the same axis and the sensing surfaces are exactly parallel condition. Dashed lines indicate reference value for maximum and minimum operating distance at ambient temperature +23°C. The solid line indicates reference values of the maximum and minimum operating distances.

2 Switch and actuator operation**• Switch and Actuator Mounting Directions****• Switch and Actuator Operating Directions****• LED Display**

LED color	Status
RED	Sensor does NOT detect actuator
YELLOW	Sensor detect actuator

3 Internal connection**4 Ratings and Specifications****• Ratings**

Item	D40A-1C□
Rated power consumption	0.6W Max. (See Note1)
Auxiliary output	Load: 24VDC 10mA (PNP open-collector output)

• Specifications and Performance

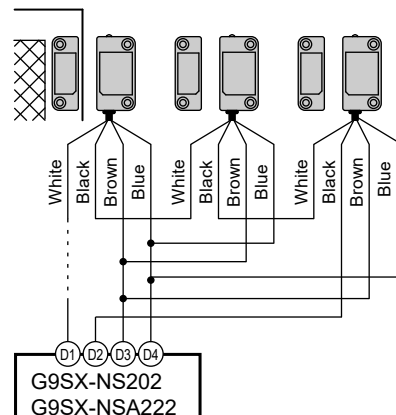
Item	D40A-1C□
Assured operating and release distance	OFF→ON 5mm min. (See Note2)
	ON→OFF 15mm max. (See Note2)
	Differential travel See "1 Detection ranges"
	Temperature influence See "1 Detection ranges"
	Repeat accuracy (max.) ±10% of operating distance at 23°C
Switching frequency	1Hz with G9SX-NS□
Ambient temperature	-10 to +55°C (No freezing or condensation)
Ambient humidity	25 to 85%RH
Insulation resistance (Between all conductive parts and switch case)	50Mohm Min. (by 500VDC megger)
Dielectric strength (Between all conductive parts and switch case)	1000VAC for 1min
Rated impulse withstand voltage	1kV
Vibration resistance	Frequency: 10 to 55 to 10Hz, Amplitude: 0.75mm half amplitude
Mechanical shock resistance	300m/s ² Min.
Pollution degree	3
Electromagnetic compatibility	As per IEC/EN 60947-5-3
Degree of protection	IP67
Material	Molded PBT
Mounting method	M4 screws
Terminal tightening torque	1N•m
Weight (D40A-1C5)	Switch: approx. 145 g Actuator: approx. 20 g
Reliability data (ISO 13849-1)	MTTFd = 100 year, DC = 60% *This data does not include the values of a safety controller.

Note1. Power consumption of loads is not included.

Note2. Operating distance means the distance of sensing surfaces between switch and actuator.

5 Connection Example**• Multiple switch connection**

Maximum 30 switches can be connected in series.

**• Wiring**

Signal Name	Cable color	Pin number	Description of operation
Non-contact door switch power input	+	brown	1 Power supply for D40A. Connect to D3 terminal and D4 terminal on G9SX-NS□.
	-	blue	
Non-contact door switch signal input	white	2	Input designated signal from G9SX-NS□. To set non-contact door switch output in ON state, non-contact door switch input must be in ON state.
Non-contact door switch output	black	4	Output status depends on actuator status and non-contact door switch input state.
Auxiliary monitoring output (PNP open corrector output)	yellow	5	Output when sensor detect actuator.

Troubleshooting

LED indicator Note1	Expected causes of the faults	Checking points and measures to take
D40A	G9SX-NS□	
●	●	Failures involving the wiring of power supply input
Light off	NS Light off	Failures of the parts of the circuits of D40A
○	●	Installation on magnetic substance
Red Light on	NS Light off	Installation in the vicinity of magnetic source
○	●	Failures of the parts of the circuits of D40A
Yellow Light on	NS Light off or NS Blink	Failures involving the wiring of D40A input
		Failures involving the wiring of D40A outputs
		Failures of the parts of the circuits of D40A

Note 1. When actuator is approximated to the switch.

Performance Level / Safety Category

The D40A together with G9SX-NS□ can construct the condition conforming to PL=d and Category 3 required by EN ISO 13849-1 European standard.

Refer to the following link for the Safety-related characteristic data: http://www.fa.omron.co.jp/safety_6en/

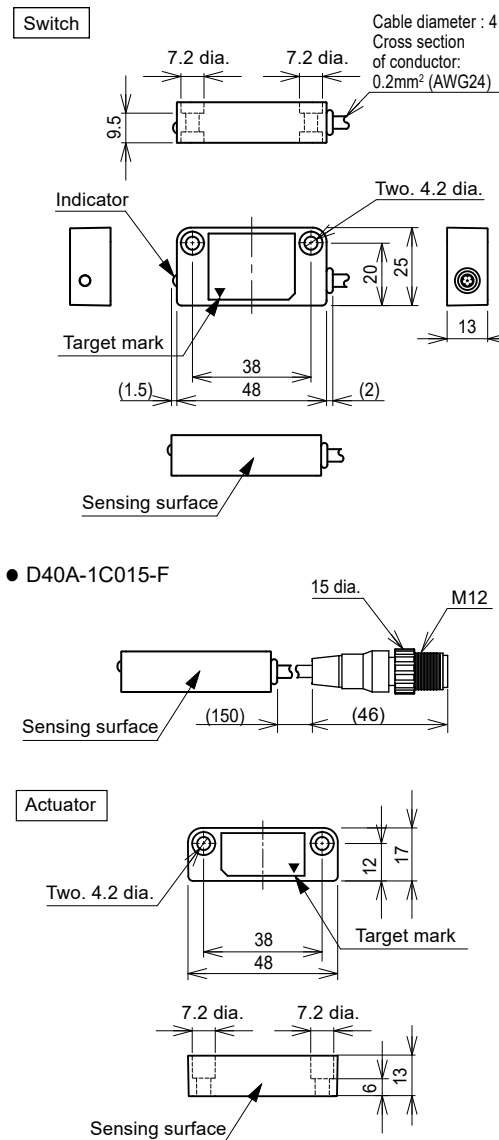
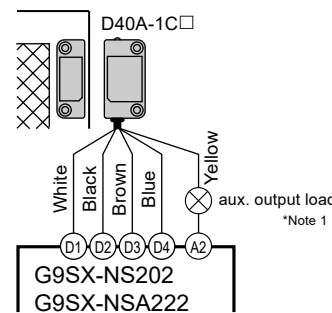
This does NOT mean that D40A and G9SX-NS□ can always be used for required category under all the similar conditions and situations. UL does not provide UL certification for any functional safety rating or aspects of the D40A device.

Conformity to the categories must be assessed as a whole system. When using D40A and G9SX-NS□ for safety categories, make sure the conformity of the whole system.

Suitability for Use

Omron Companies shall not be responsible for conformity with any standards, codes or regulations which apply to the combination of the Product in the Buyer's application or use of the Product. At Buyer's request, Omron will provide applicable third party certification documents identifying ratings and limitations of use which apply to the Product. This information by itself is not sufficient for a complete determination of the suitability of the Product in combination with the end product, machine, system, or other application or use. Buyer shall be solely responsible for determining appropriateness of the particular Product with respect to Buyer's application, product or system. Buyer shall take application responsibility in all cases.

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

6 Dimensions**• Single switch connection**

Note 1. Maximum auxiliary output current is 10mA.

Inspection & Maintenance

- Daily inspection:
 - Check every guard door to see that machine stops when guard door is opened.
- 6-month inspection:
 - Isolate all power.
 - Check the switch and actuator for proper alignment.
 - Check terminals for proper connections.
 - Check wiring for signs of damage.
 - Before resuming normal machine operation, check every guard door to see that machine stops when the guard door is opened.

OMRON Corporation (Manufacturer) Shioikoji Horikawa, Shimogyo-ku, Kyoto, 600-8530 JAPAN Contact: www.ia.omron.com	
Regional Headquarters	
■ OMRON EUROPE B.V. (Importer in EU) Wegalaan 67-69, 2132 JD Hoofddorp The Netherlands Tel: (31)2356-81-300/Fax: (31)2356-81-388	■ OMRON ELECTRONICS LLC 2895 Greenspoint Parkway, Suite 200 Hoffman Estates, IL 60169 U.S.A. Tel: (1) 847-843-7900/Fax: (1) 847-843-7787
■ OMRON ASIA PACIFIC PTE. LTD. 438B Alexandra Road, #08-01/02 Alexandra Technopark, Singapore 119968 Tel: (65) 6835-3011/Fax: (65) 6835-3011	■ OMRON (CHINA) CO., LTD. Room 2211, Bank of China Tower, 200 Yin Cheng Zhong Road, PuDong New Area, Shanghai, 200120, China Tel: (86) 21-6023-0333/Fax: (86) 21-5037-2388