Safety Limit Switch
D4NA

Lowcost Safety Limit Switches

- Standardized gold-clad contacts provide high contact reliability. Can be used with both standard loads and microloads.
- Certified standards: UL, EN (TÜV), and CCC

Note: Contact your sales representative for details on models with safety standard certification.

Model Number Structure

■ Model Number Legend

D4NA-41□□
1

1. Head and Actuator
22: Roller lever (metal lever, resin roller)
2G: Adjustable roller lever, form lock (metal lever, resin roller)
31: Plunger
32: Roller plunger

Ordering Information

■ List of Models

Actuator	1NC/1NO (Snap-action)	
	Direct opening	Model
Roller lever (metal lever, resin roller)	⊖	D4NA-4122
Adjustable roller lever, form lock (metal lever, resin roller)	⊖	D4NA-412G
Plunger	⊖	D4NA-4131
Roller plunger	⊖	D4NA-4132

Specifications

■ Standards and EC Directives

- Conforms to the following EC Directives:
  Machinery Directive
  Low Voltage Directive
  EN50047
  EN60204-1
  EN1088
  GS-ET-15

■ Certified Standards

Certification body	Standard	File No.
TÜV Product Service	EN60947-5-1 (certified direct opening)	(See note 1.)
UL (See note 2.)	UL508, CSA C22.2 No.14	E76675
CCC (CQC)	GB14048.5	2005010305161224

Note: 1. Consult your OMRON representative for details.
2. Certification for CSA C22.2 No. 14 is authorized by the UL mark.
3. Ask your OMRON representative for information on certified models.

■ Certified Standard Ratings

TÜV (EN60947-5-1), CCC (GB14048.5)

Item / Utilization category	AC-15	DC-13
Rated operating current (I_e)	3 A	0.27 A
Rated operating voltage (U_e)	240 V	250 V

Note: Use a 10-A fuse type gI or gG that conforms to IEC60269 as a short-circuit protection device. This fuse is not built into the Switch.

UL/CSA (UL508, CSA C22.2 No. 14)

A300

Rated voltage	Carry current	Current		Volt-amperes	
		Make	Break	Make	Break
120 VAC	10 A	60 A	6 A	7,200 VA	720 VA
240 VAC		30 A	3 A		

Q300

Rated voltage	Carry current	Current		Volt-amperes	
		Make	Break	Make	Break
125 VDC	2.5 A	0.55 A	0.55 A	69 VA	69 VA
250 VDC		0.27 A	0.27 A		

■ Characteristics

Degree of protection (See note 3.)		IP65 (EN60947-5-1)
Durability (See note 4.)	**Mechanical**	10,000,000 operations min.
	Electrical	500,000 operations min. for a resistive load of 3 A at 250 VAC (See note 5.) 300,000 operations min. for a resistive load of 10 A at 250 VAC
Operating speed		1 to 500 mm/s (D4NA-1122)
Operating frequency		30 operations/minute max.
Contact resistance		25 mΩ max. (Initial value)
Minimum applicable load (See note 6.)		Resistive load of 1 mA at 5 VDC (N-level reference value)
Rated insulation voltage (U_i)		300 V
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		Level 3 (EN60947-5-1)
Impulse withstand voltage (EN60947-5-1)		Between terminals of the same polarity: 2.5 kV
		Between terminals of different polarities: 4 kV
		Between other terminals and uncharged metallic parts: 6 kV
Insulation resistance		100 MΩ min.
Contact gap		2 × 0.5 mm min
Vibration resistance	**Malfunction**	10 to 55 Hz, 0.75-mm single amplitude
Shock resistance	**Destruction**	1,000 m/s^2 min.
	Malfunction	300 m/s^2 min.
Conditional short-circuit current		100 A (EN60947-5-1)
Rated open thermal current (I_{th})		10 A (EN60947-5-1)
Ambient temperature		Operating: –30°C to 70°C with no icing
Ambient humidity		Operating: 95% max.

Note: 1. The above values are initial values.

2. Once a contact has been used to switch a standard load, it cannot be used for a load of a smaller capacity. Doing so may result in roughening of the contact surface and contact reliability may be lost.

3. The degree of protection is tested using the method specified by the standard (EN60947-5-1). Confirm that sealing properties are sufficient for the operating conditions and environment beforehand. Although the switch box is protected from dust or water penetration, do not use the D4NA in places where foreign material such as dust, dirt, oil, water, or chemicals may penetrate through the head. Otherwise, premature wear, Switch damage or malfunctioning may occur.

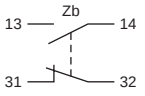
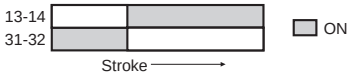
4. The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40% to 70%. For more details, consult your OMRON representative.

5. Do not pass the 3-A, 250-VAC load through 2 circuits.

6. This value will vary with the switching frequency, environment, and reliability level. Confirm that correct operation is possible with the actual load beforehand.

Connections

■ Contact Form

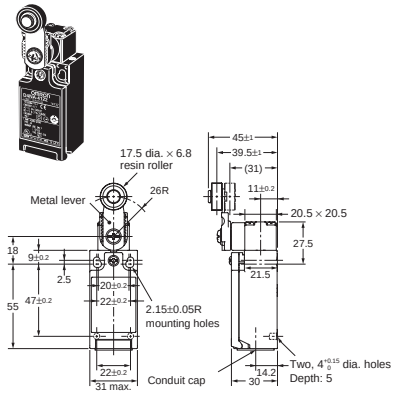
Model	Contact	Contact form	Operating pattern	Remarks
D4NA-41□□	1NC/1NO (Snap-action)			Only NC contacts 31-32 have a certified direct opening mechanism. ⊖ The terminals 13-14 and 31-32 can be used as unlike poles.

Dimensions

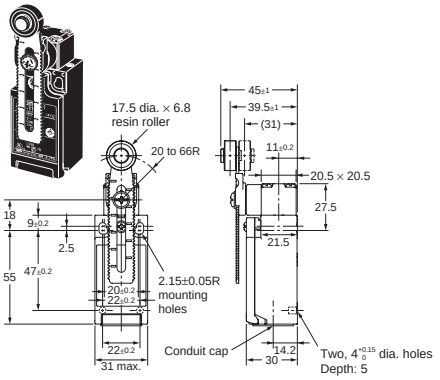
■ Switches

Note: All units are in millimeters unless otherwise indicated.

Roller Lever
(Metal Lever, Resin Roller)
D4NA-4122



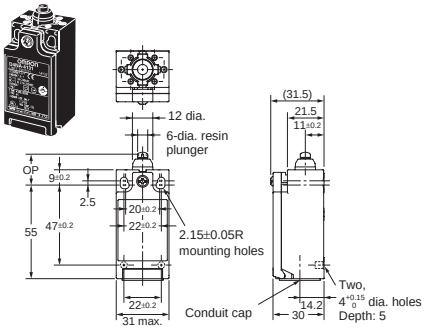
Adjustable Roller Lever,
Form Lock
(Metal Lever, Resin Roller)
D4NA-412G



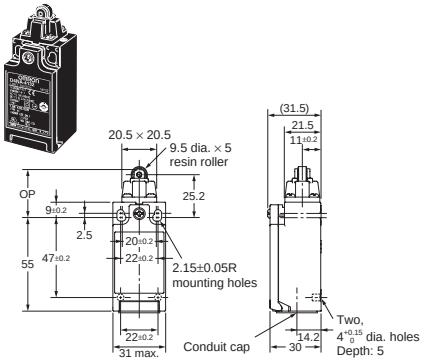
Model	D4NA-4122	D4NA-412G (See note 1.)
OF max.	5.0 N	4.5 N
RF min.	0.5 N	0.4 N
PT	18° to 27°	18° to 27°
OT min.	40°	40°
MD max.	14°	14°
OP	---	---
TT (See note 2.)	(80°)	(80°)
DOT min. (See note 3.)	50°	50°
DOF min. (See note 3.)	20 N	20 N

Note: **1.** The operating characteristics of these Switches were measured with the roller lever set at 32 mm.
2. Reference value.
3. For safe use, always make sure that the minimum values or greater are provided.

Plunger
D4NA-4131



Roller Plunger
D4NA-4132



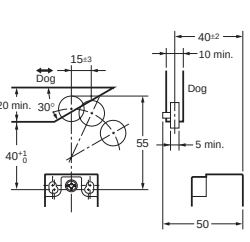
Model	D4NA-4131	D4NA-4132
OF max.	6.5 N	6.5 N
RF min.	1.5 N	1.5 N
PT max.	2 mm	2 mm
OT min.	4 mm	4 mm
MD max.	1 mm	1 mm
OP	18.2 ±0.5 mm	28.6 ±0.8 mm
TT (See note 1.)	(6 mm)	(6 mm)
DOT min. (See note 2.)	3.2 mm	3.2 mm
DOF min. (See note 2.)	20 N	20 N

Note: **1.** Reference value.
2. For safe use, always make sure that the minimum values or greater are provided.

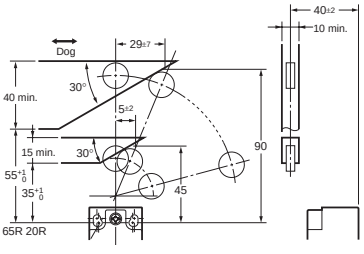
■ Levers

Refer to the following for the angles and positions of the watchdogs (source: EN50047.)

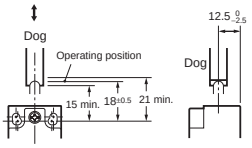
Roller Lever
D4NA-4122



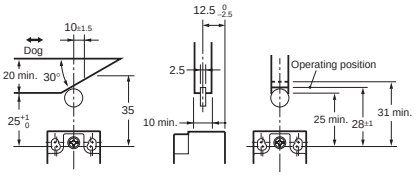
Adjustable Roller Lever,
Form Lock
(Metal Lever, Resin Roller)
D4NA-412G (Reference Values)



Plunger
D4NA-4131



Roller Plunger
D4NA-4132



Safety Precautions

⚠ CAUTION

Do not use metal connectors or conduits. If the Switch is made of resin, damage at the conduit section may cause electric shock.

■ Precautions for Safe Use

- Do not drop the Switch. Doing so may result in the Switch not performing to its full capacity.
- Do not attempt to disassemble or modify the Switch. Doing so may cause the Switch to malfunction.
- Do not use the Switch where explosive gas or flammable gas may be present.
- Do not use the Switch submerged in oil or water, or in locations continuously subject to splashes of oil or water. Doing so may result in oil or water entering the Switch interior.
- Protect the head from foreign material. Subjecting the head to foreign material may result in premature wear or damage to the Switch. Although the switch body is protected from penetration by dust or water, the head is not protected from penetration by minute particles or water.
- Turn the power OFF before wiring. Not doing so may result in electric shock.
- Install the cover after wiring. Not doing so may result in electric shock.
- Connect a fuse to the Switch in series to protect the Switch from short-circuit damage. Use a fuse with a breaking current 1.5 to 2 times larger than the rated current. To conform to EN ratings, use an IEC60269-compliant 10-A fuse type gI or gG.
- Do not switch circuits for two standard loads (250 VAC, 3 A) at the same time. Doing so may adversely affect insulation performance.
- The durability of the Switch is greatly affected by operating conditions. Evaluate the Switch under actual working conditions before permanent installation and use within a number of switching operations that will not adversely affect the Switch's performance.
- Be sure to indicate in the machine manufacturer's instruction manual that the user must not attempt to repair or maintain the Switch and must contact the machine manufacturer for any repairs or maintenance.
- Check the Switches before use and inspect regularly, replacing them when necessary. If a Switch is kept pressed for an extended period of time, the components may deteriorate quickly, and the Switch may not release.

■ Precautions for Correct Use

Environment

- The Switch is intended for indoor use only.
- Do not use the Switch outdoors. Doing so may cause the Switch to malfunction.
- Do not use the Switch where corrosive gases (e.g., H_2S, SO_2, NH_3, HNO_3, CI_2) are present or in locations subject to high temperature and humidity. Doing so may result in damage to the Switch caused by contact failure or corrosion.
- Do not use the Switches in the following locations.
  - Locations subject to severe temperature changes
  - Locations subject to high temperatures or condensation
  - Locations subject to severe vibration
  - Locations where the interior of the Protective Door may come into direct contact with cutting chips, metal filings, oil, or chemicals
  - Locations where the Switch may come into contact with thinner or detergents

Mounting Method

Mounting Screw Tightening Torque

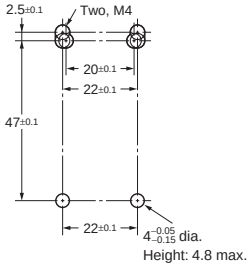
Tighten each of the screws to the specified torque. Loose screws may result in malfunction of the Switch within a short time.

1	**Terminal screw**	0.6 to 0.8 N·m
2	**Cover clamping screw**	0.5 to 0.7 N·m
3	**Head clamping screw**	0.5 to 0.6 N·m
4	**Lever clamping screw**	1.6 to 1.8 N·m
5	**Body clamping screw**	0.5 to 0.7 N·m
6	**Conduit mounting connection**	1.8 to 2.2 N·m

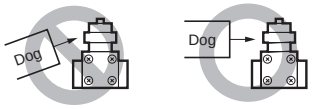
Switch Mounting

- Mount the Switch using M4 screws and washers and tighten the screws to the specified torque.
- For safety, use screws that cannot be easily removed, or use an equivalent measure to ensure that the Switch is secure.
- Secure the Switch with two M4 bolts and washers. Provide studs with a diameter of $4^{-0.05}_{-0.15}$ and a height of 4.8 mm max. at two places, inserting into the holes at the bottom of the Switch as shown below so that the Switch is firmly fixed at four points.

Switch Mounting Holes

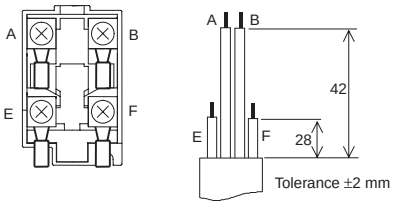


- Make sure that the dog contacts the actuator at a right angle. Applying a load to the switch actuator (roller) on a slant may result in deformation or damage of the actuator or rotary shaft.



Wiring

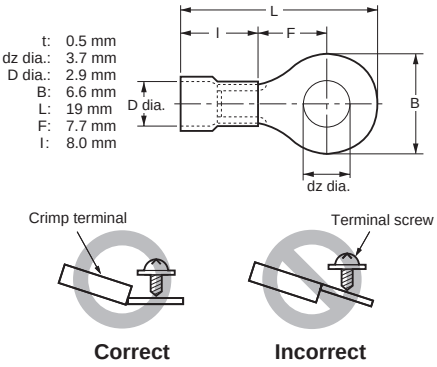
- When connecting to the terminals via insulating tube and M3.5 crimp terminals, arrange the crimp terminals as shown below so that they do not rise up onto the case or the cover. Applicable lead wire size: AWG20 to AWG18 (0.5 to 0.75 mm^2).
  Use lead wires of an appropriate length, as shown below. Not doing so may result in excess length causing the cover to rise and not fit properly.



- Do not push crimp terminals into gaps in the case interior. Doing so may cause damage or deformation of the case.
- Use crimp terminals not more than 0.5 mm in thickness. Otherwise, they will interfere with other components inside the case. The crimp terminals shown below are not more than 0.5 mm thick.

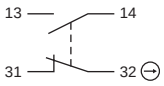
Manufacture	Type
J.S.T.	FV0.5-3.7 (F type) V0.5-3.7 (straight type)

J.S.T is a Japanese manufacturer.



Contact Arrangement

1NC/1NO (SNAP)



Conduit Opening

- Connect a recommended connector to the opening of the conduit and tighten the connector to the specified torque. The case may be damaged if an excessive tightening torque is applied.
- Use a cable with a suitable diameter for the connector.

Changing the Lever

The lever mounting screws can be used to set the lever position to any position in a 360° angle at 7.5° increments. Grooves are incised on the lever and rotary shaft that engage to prevent the lever from slipping against the rotary shaft. The screws on adjustable roller lever models can also loosened to change the length of the lever.

Remove the screws from the front of the lever before mounting the lever in reverse (front/back), and set the level so that operation will be completed before exceeding a range of 180° on the horizontal.

Recommended Connectors

Use connectors with screws not exceeding 9 mm, otherwise the screws will protrude into the case interior, interfering with other components in the case. The connectors listed in the following table have connectors with thread sections not exceeding 9 mm. Use the recommended connectors to ensure conformance to IP65.

Size	Manufacturer	Model	Applicable cable diameter
M20	LAPP	ST-M20 × 1.5 5311-1020	7.0 to 13.0 mm

Use LAPP connectors together with seal packing (GPM20), and tighten to the specified tightening torque. Seal packing is sold separately.

LAPP is a German manufacturer.

Storage

Do not store the Switch in locations where corrosive gases (e.g., H_2S, SO_2, NH_3, HNO_3, Cl_2) or dust is present, or in locations subject to high temperatures and humidity.

Others

- Do not allow the load current to exceed the rated value.
- Confirm that the seal rubber has no defects before use.
  If the seal rubber is displaced or raised, or has foreign particles adhered to it, the sealing capability of the seal rubber will be adversely affected.
- Use the correct cover mounting screws only, or the sealing capability of the seal rubber will deteriorate.
- Inspect the Switch regularly.
- Make sure that foreign particles do not enter the head when removing the screws from the four corners to change the head position in any of the four directions.
- Use the following recommended countermeasures to prevent telegraphing when using adjustable or long levers.

1. Make the rear edge of the dog smooth with an angle of 15° to 30° or make it in the shape of a quadratic curve.
2. Design the circuit so that no error signal will be generated.
3. Use or set a Switch that is operated in one direction only.

Warranty and Application Considerations

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 the 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 products.

Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used.

Know and observe all prohibitions of use applicable to this product.

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 PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

Disclaimers

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.*

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons. 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.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. C138-E1-01 **In the interest of product improvement, specifications are subject to change without notice.**

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