D4NS

SpeedSPEC
D4NS
sti.com

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Safety-Door Switch

- Multi-contact, labor-saving, environment-friendly, next-generation safety-door switch
- Lineup includes three contact models with 2NC/1NO and 3NC contact forms and MBB models in addition to the previous contact forms 1NC/1NO, and 2NC
- M12-connector models are available, saving on labor and simplifying replacement.
- Standardized gold-clad contacts provide high contact reliability. Applicable to both standard loads and microloads.
- Variety of metallic heads available

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Specifications

Standards and EC Directives

Conforms to the following EC Directives:

- Machinery Directive
- Low Voltage Directive
- EN50047
- EN 1088
- EN 60204-1
- GS-ET-15

Certified Standards

Certification body	Standard	File No.
TÜV SÜD	EN 60947-5-1 (certified direct opening)	Consult your representative for details.
UL *1	UL 508, CSA C22.2 No.14	E76675
CQC (CCC)	GB14048.5	2003010305077330
KOSHA *2	EN60947-5-1	2005-197

*1. Certification for CSA C22.2 No. 14 is authorized by the UL mark.
*2. Only certain models have been certified.

Certified Standard Ratings

TÜV (EN 60947-5-1), CCC (GB14048.5)

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

Note: Use a 10 A fuse type gI or gG that conforms to IEC 60269 as a short-circuit protection device. This fuse is not built into the Switch.

UL/CSA (UL 508, CSA C22.2 No. 14)

A300

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

Q300

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

Specifications (continued)

Characteristics

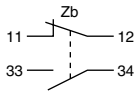
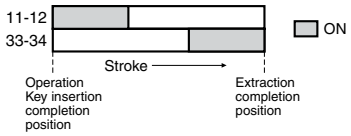
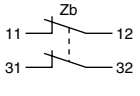
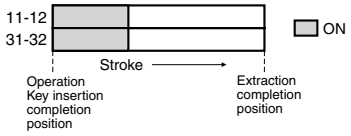
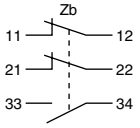
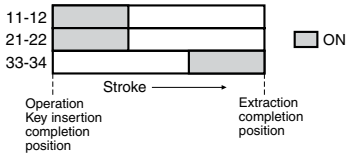
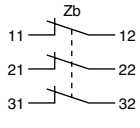
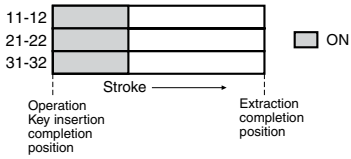
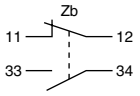
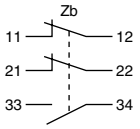
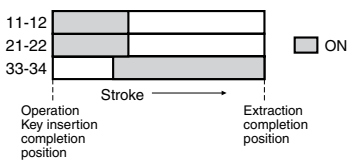
Degree of protection *1		IP67 (EN60947-5-1)
Durability *2	Mechanical	1,000,000 operations min.
	Electrical	500,000 operations min. (3 A resistive load at 250 VAC) *3 300,000 operations min. (10 A resistive load at 250 VAC)
Operating speed		0.05 to 0.5 m/s
Operating frequency		30 operations/minute max.
Direct opening force *4		60 N min.
Direct opening travel *4		10 mm min.
Contact resistance		25 mΩ max.
Minimum applicable load *5		1 mA resistive load at 5 VDC (N-level reference value)
Rated insulation voltage (Ui)		300 V
Rated frequency		50/60 Hz
Protection against electric shock		Class II (double insulation)
Pollution degree (operating environment)		3 (EN60947-5-1)
Impulse withstand voltage (EN60947-5-1)	Between terminals of same polarity	2.5 kV
	Between terminals of different polarity	4 kV
	Between each terminals and non-current carrying metallic parts.	6 kV
Insulation resistance		100 MΩ min.
Contact gap		2 x 2 mm min.
Vibration resistance		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)
Conventional free air thermal current (Ith)		10 A (EN60947-5-1)
Ambient operating temperature		-30 to +70°C (with no icing)
Ambient operating humidity		95% max.
Weight		Approx. 96 g (D4NS-1CF)

Notes: The above values are initial values.
The Switch contacts can be used with either standard loads or microloads. Once the contacts have been used to switch a load, however, they cannot be used to switch smaller loads. The contact surfaces will become rough once they have been used and contact reliability for smaller loads may be reduced.
*1.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 D4NS in places where foreign material may enter through the key hole on the head, otherwise Switch damage or malfunctioning may occur.
*2.The durability is for an ambient temperature of 5 to 35°C and an ambient humidity of 40% to 70%. For further conditions, consult your sales representative.
*3.Do not pass a 3 A, 250 VAC load through more than two circuits.
*4.These figures are minimum requirements for safe operation.
*5.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

Diagrams show state with key inserted.

Model	Contact	Contact form	Operating pattern	Remarks
D4NS-☐A☐	1NC/1NO			Only NC contacts 11-12 have a certified direct opening mechanism. ⊖ The terminals 11-12 and 33-34 can be used as unlike poles.
D4NS-☐B☐	2NC			NC contacts 11-12 and 31-32 have a certified direct opening mechanism. ⊖ The terminals 11-12 and 31-32 can be used as unlike poles.
D4NS-☐C☐	2NC/1NO			NC contacts 11-12 and 21-22 have a certified direct opening mechanism. ⊖ The terminals 11-12, 21-22, and 33-34 can be used as unlike poles.
D4NS-☐D☐	3NC			NC contacts 11-12, 21-22, and 31-32 have a certified direct opening mechanism. ⊖ The terminals 11-12, 21-22, and 31-32 can be used as unlike poles.
D4NS-☐E☐	1NC/1NO MBB*			Only NC contacts 11-12 have a certified direct opening mechanism. ⊖ The terminals 11-12 and 33-34 can be used as unlike poles.
D4NS-☐F☐	2NC/1NO MBB*			NC contacts 11-12 and 21-22 have a certified direct opening mechanism. ⊖ The terminals 11-12, 21-22 and 33-34 can be used as unlike poles.

*MBB (Make Before Break) contacts have an overlapping structure, so that before the normally closed contact (NC) opens, the normally open contact (NO) closes.

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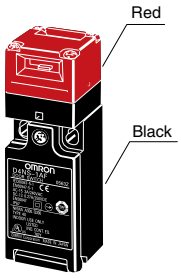
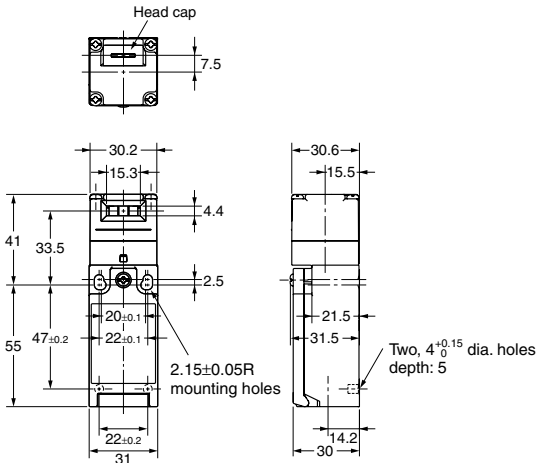
Dimensions and Operating Characteristics

(mm)

1-Conduit Models

D4NS-1□F
D4NS-2□F
D4NS-4□F



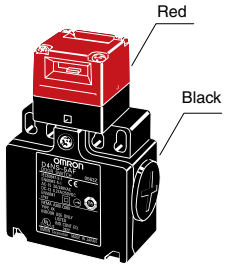


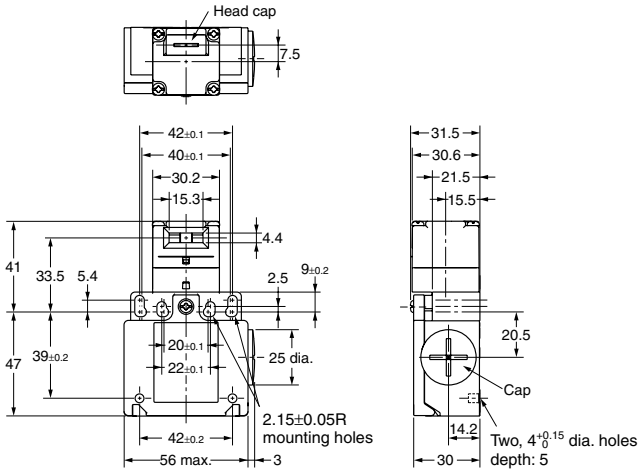
Model / Operating characteristics	D4NS-1@F D4NS-2@F D4NS-3@F D4NS-4@F
Key insertion force Key extraction force	15 N max. 30 N max.
Pretravel (PT)	6±3 mm
Total travel (TT)	(28 mm)
Direct opening force * Direct opening stroke *	60 N min. 10 mm min.

* Always maintain the above operating characteristics for safe use.

2-Conduit Models

D4NS-6□F
D4NS-8□F



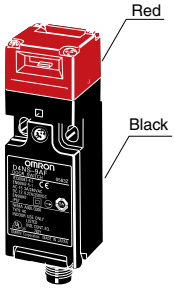


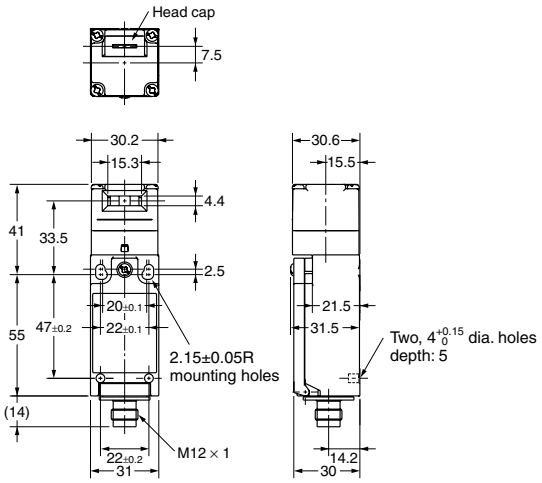
Model / Operating characteristics	D4NS-5@F D4NS-6@F D4NS-7@F D4NS-8@F
Key insertion force Key extraction force	15 N max. 30 N max.
Pretravel (PT)	6±3 mm
Total travel (TT)	(28 mm)
Direct opening force * Direct opening stroke *	60 N min. 10 mm min.

* Always maintain the above operating characteristics for safe use.

1-Conduit Connector Models

D4NS-9□F





Model / Operating characteristics	D4NS-9□F
Key insertion force Key extraction force	15 N max. 30 N max.
Pretravel (PT)	6±3 mm
Total travel (TT)	(28 mm)
Direct opening force ✻ Direct opening stroke ✻	60 N min. 10 mm min.

✻ Always maintain the above operating characteristics for safe use.

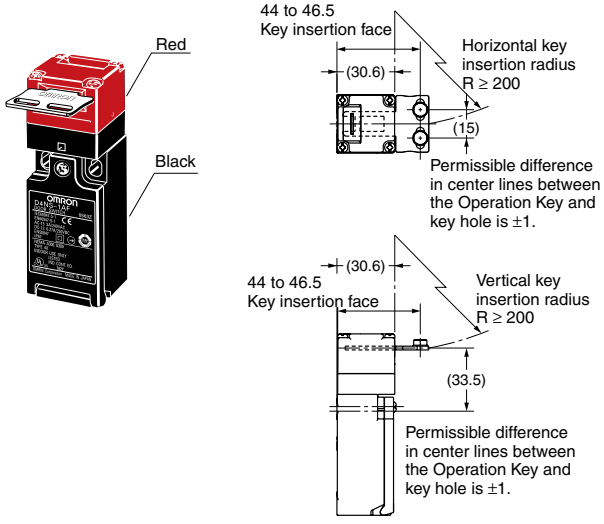
Notes:
1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
2. There are fluctuations in the contact ON/OFF timing for Switches with multiple poles (2NC, 2NC/1NO, or 3NC). Confirm performance before application.

Dimensions and Operating Characteristics (continued)

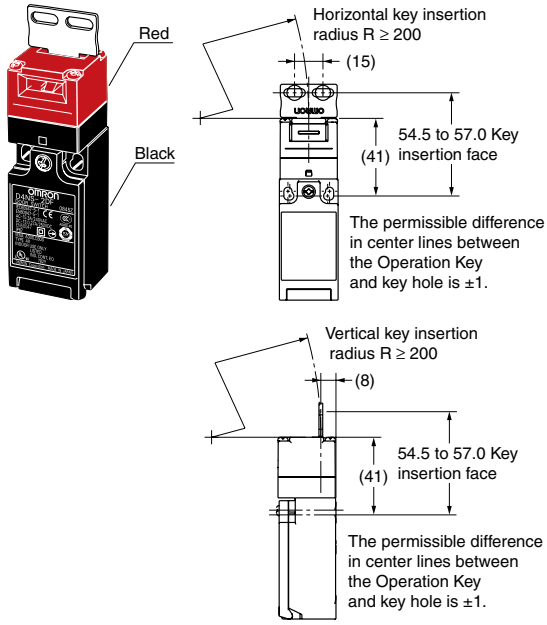
(mm)

With Operation Key Inserted (Relationship between Insertion Radius and Key Hole)

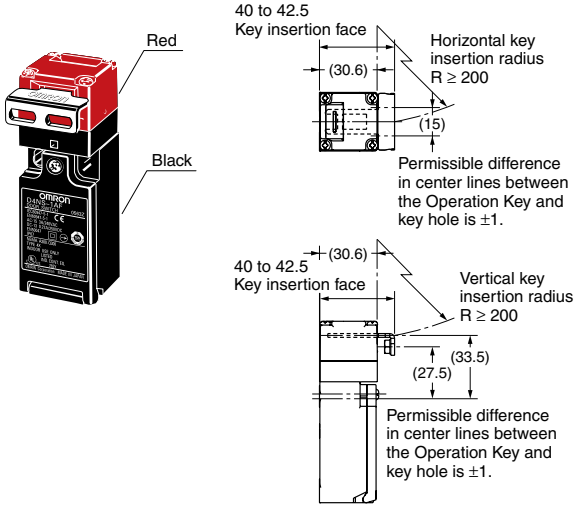
D4NS-1□F + D4DS-K1 (with Front-inserted Operation Key)



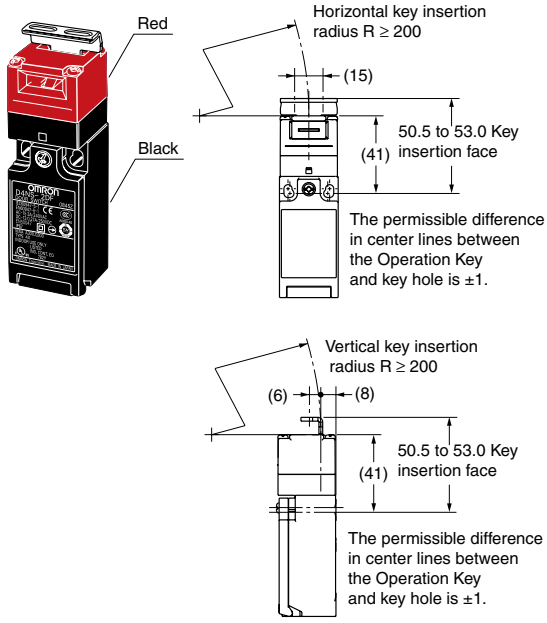
D4NS-1□F + D4DS-K1 (with Top-inserted Operation Key)



D4NS-1□F + D4DS-K2 (with Front-inserted Operation Key)



D4NS-1□F + D4DS-K2 (with Top-inserted Operation Key)

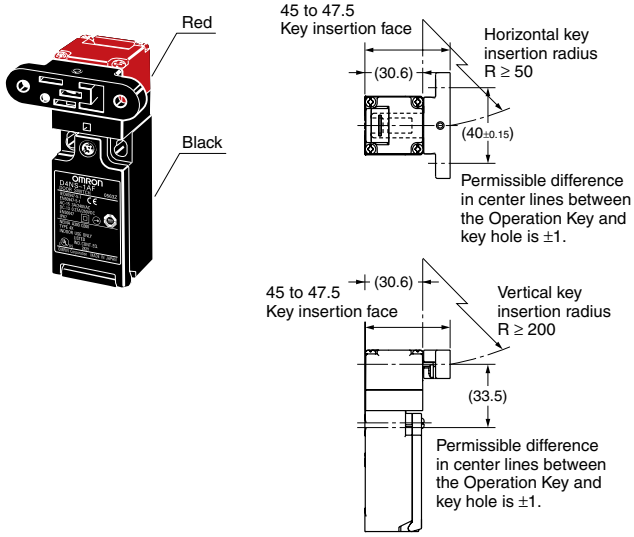


Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

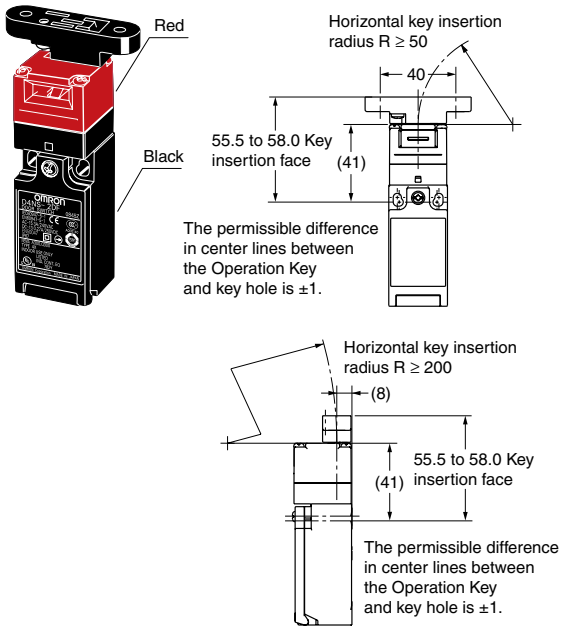
Dimensions and Operating Characteristics (continued)

(mm)

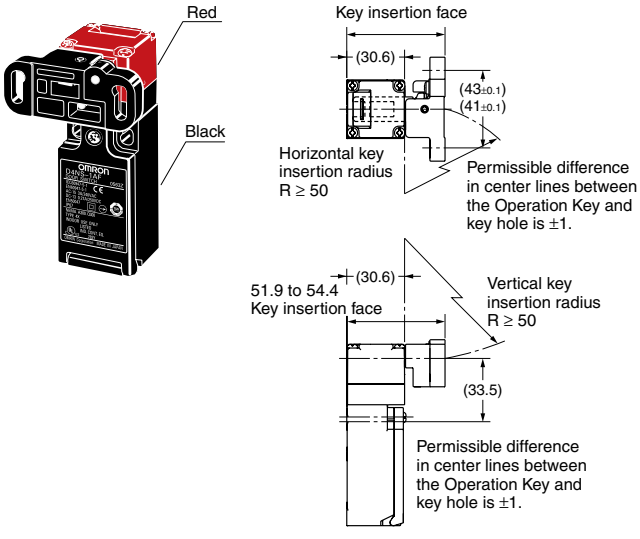
D4NS-1□F + D4DS-K3 (with Front-inserted Operation Key)



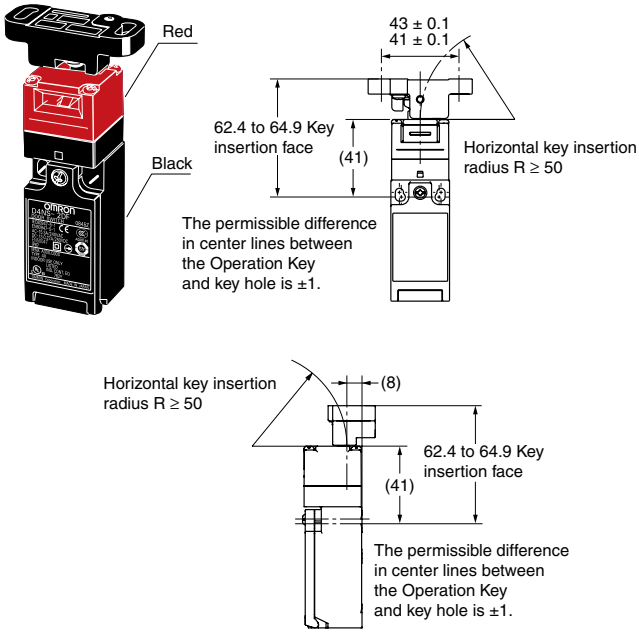
D4NS-1□F + D4DS-K3 (with Top-inserted Operation Key)



D4NS-1□F + D4DS-K5 (with Front-inserted Operation Key)



D4NS-1□F + D4DS-K5 (with Top-inserted Operation Key)



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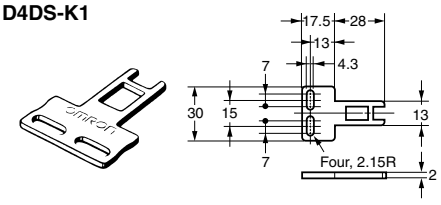
Dimensions and Operating Characteristics (continued)

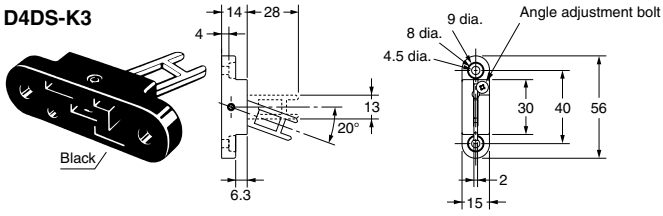
(mm)

Operation Keys

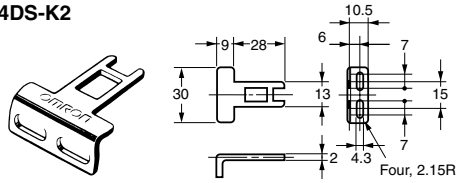
D4DS-K1



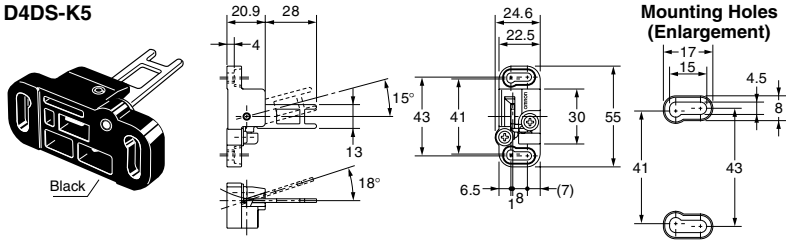
D4DS-K3



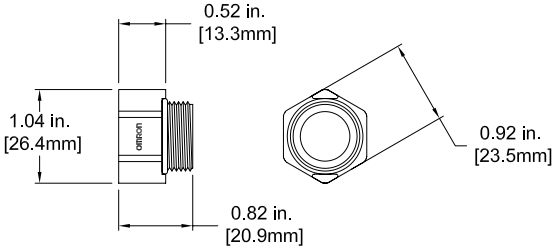
D4DS-K2



D4DS-K5



M20-NPT Adapter



Ordering

Model Number Structure

Switch

D4NS – ☐ ☐ ☐ – ☐

❶ ❷ ❸ ❹

❶ Conduit Size
- 1: Pg13.5 (1-conduit)
- 2: G1/2 (1-conduit)
- 4: M20 (1-conduit)
- 6: G1/2 (2-conduit)
- 8: M20 (2-conduit)
- 9: M12 connector (1-conduit) (only 4-pin is available)

❷ Built-in Switch (with Door Open/Closed Detection Switch and Lock Monitor Switch Contacts)
- A: 1NC/1NO (slow-action)
- B: 2NC (slow-action)
- C: 2NC/1NO (slow-action)
- D: 3NC (slow-action)
- E: 1NC/1NO (MBB contact)
- F: 2NC/1NO (MBB contact)

❸ Head Mounting Direction
- F: Four mounting directions possible (Front-side mounting at shipping)/ plastic
- D: Four mounting directions possible (Front-side mounting at shipping)/ metal

❹ M20-to-NPT Adapter
Blank: Adapter is not included
NPT: Adapter is included*

Note: An order for the head part or the switch part alone cannot be accepted. (The operation key is sold separately.)

*Not available with 2-conduit models.

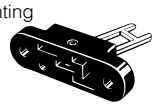
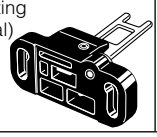
For information on the D4NS-SK Slide Key, see page G-202.

Operation Key

D4DS-K ☐

❶

❶ Operation Key Type
- 1: Horizontal mounting
- 2: Vertical mounting
- 3: Adjustable mounting (horizontal)
- 5: Adjustable mounting (horizontal/ vertical)

Type	Model
Horizontal mounting 	D4DS-K1
Vertical mounting 	D4DS-K2
Adjustable mounting (horizontal) 	D4DS-K3
Adjustable mounting (horizontal/vertical) 	D4DS-K5

Ordering (continued)

List of Models

Switches with certified direct opening mechanisms (Operation Keys are sold separately)

Type	Contact configuration		Conduit opening/Connector	Model
1-Conduit	Slow-action	1NC/1NO	Pg13.5	D4NS-1AF *
			G1/2	D4NS-2AF *
			NPT	D4NS-4AF-NPT
			M20	D4NS-4AF
		2NC	Pg13.5	D4NS-1BF *
			G1/2	D4NS-2BF *
			NPT	D4NS-4BF-NPT
			M20	D4NS-4BF
		2NC/1NO	Pg13.5	D4NS-1CF *
			G1/2	D4NS-2CF *
			NPT	D4NS-4CF-NPT
			M20	D4NS-4CF
		3NC	Pg13.5	D4NS-1DF *
			G1/2	D4NS-2DF *
			NPT	D4NS-4DF-NPT
			M20	D4NS-4DF
	Slow-action MBB contact	1NC/1NO	Pg13.5	D4NS-1EF
			G1/2	D4NS-2EF
			NPT	D4NS-4EF-NPT
			M20	D4NS-4EF
		2NC/1NO	Pg13.5	D4NS-1FF
			G1/2	D4NS-2FF
			NPT	D4NS-4FF-NPT
			M20	D4NS-4FF
2-Conduit	Slow-action	1NC/1NO	G1/2	D4NS-6AF
			M20	D4NS-8AF
		2NC	G1/2	D4NS-6BF
			M20	D4NS-8BF
		2NC/1NO	G1/2	D4NS-6CF
			M20	D4NS-8CF
		3NC	G1/2	D4NS-6DF
			M20	D4NS-8DF
	Slow-action MBB contact	1NC/1NO	G1/2	D4NS-6EF
			M20	D4NS-8EF
		2NC/1NO	G1/2	D4NS-6FF
			M20	D4NS-8FF
1-Conduit, with connector	Slow-action	1NC/1NO	M12 connector	D4NS-9AF
		2NC		D4NS-9BF
	Slow-action MBB contact	1NC/1NO		D4NS-9EF

1. The recommended models for equipment and machinery being exported to Europe are those with an M20 or Pg13.5 conduit sizes, and for North America, the recommended models are those with a NPT conduit sizes.
2. Resin is used as the material for the D4NS housing and head. Use the metal D4BS Safety-door Switch for applications requiring greater mechanical strength.

*Models with Korean S-mark certification.

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