

Safety Interlock Switches

D4NL



Guard Lock Safety-Door Switch

- Best-selling guard lock safety-door switch available in several compact, multi-contact models
- Selectable Operation Key insertion direction and adjustable mounting ensure installation flexibility
- Built-in switches with multiple-contact construction are available
- Key holding force of 1,300 N minimum
- Can be used for either standard loads or microloads
- Lineup includes models with a conduit size of M20
- IP67 degree of protection
- 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
- EN 1088
- EN 60204-1
- GS-ET-19

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	2003010305064267
KOSHA *2	EN60947-5-1	2005-196

*1. Certification for CSA C22.2 No. 14 is certified 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		

Solenoid Coil Characteristics

Item	Type	24 VDC	110 VAC	230 VAC
Rated operating voltage (100% ED)		24 VDC ^{+10%} / _{-15%}	110 VAC $\pm 10\%$	230 VAC $\pm 10\%$
Current consumption		Approx. 200 mA	Approx. 50 mA	Approx. 30 mA
Insulation Class		Class F (130°C max.)		

Indicator Characteristics

Item	Type	LED
Rated voltage		10 to 115 VAC/VDC
Current consumption		Approx. 1 mA
Color (LED)		Orange

Connections

Contact Form

Indicates conditions where the Key is inserted and the lock is applied. Terminals 12 and 41 are connected internally (as per GS-ET-19).

Model	Contact (door open/closed detection and lock monitor)	Contact form		Operating pattern	Remarks
		Door open/closed detection	Lock monitor		
D4NL-□AF□-□	1NC/1NO + 1NC/1NO				Only NC contacts 11-12 have a certified direct opening mechanism. (⊖) The terminals 11-42, 33-34, and 53-54 can be used as unlike poles.
D4NL-□BF□-□	1NC/1NO + 2NC				Only NC contacts 11-12 have a certified direct opening mechanism. (⊖) The terminals 11-42, 33-34, and 51-52 can be used as unlike poles.
D4NL-□CF□-□	2NC + 1NC/1NO				Only NC contacts 11-12 and 31-32 have a certified direct opening mechanism. (⊖) The terminals 11-42, 31-32, and 53-54 can be used as unlike poles.
D4NL-□DF□-□	2NC + 2NC				Only NC contacts 11-12 and 31-32 have a certified direct opening mechanism. (⊖) The terminals 11-42, 31-32, and 51-52 can be used as unlike poles.
D4NL-□EF□-□	2NC/1NO + 1NC/1NO				Only NC contacts 11-12 and 21-22 have a certified direct opening mechanism. (⊖) The terminals 11-42, 21-22, 33-34, and 53-54 can be used as unlike poles.
D4NL-□FF□-□	2NC/1NO + 2NC				Only NC contacts 11-12 and 21-22 have a certified direct opening mechanism. (⊖) The terminals 11-42, 21-22, 33-34, and 51-52 can be used as unlike poles.
D4NL-□GF□-□	3NC + 1NC/1NO				Only NC contacts 11-12, 21-22, and 31-32 have a certified direct opening mechanism. (⊖) The terminals 11-42, 21-22, 31-32, and 53-54 can be used as unlike poles.
D4NL-□HF□-□	3NC + 2NC				Only NC contacts 11-12, 21-22, and 31-32 have a certified direct opening mechanism. (⊖) The terminals 11-42, 21-22, 31-32, and 51-52 can be used as unlike poles.

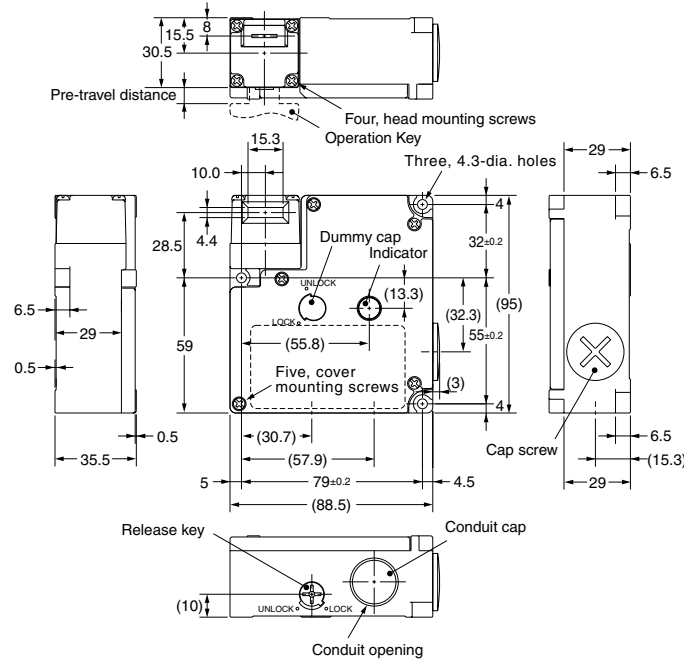
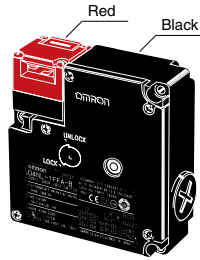


Dimensions and Operating Characteristics

(mm)

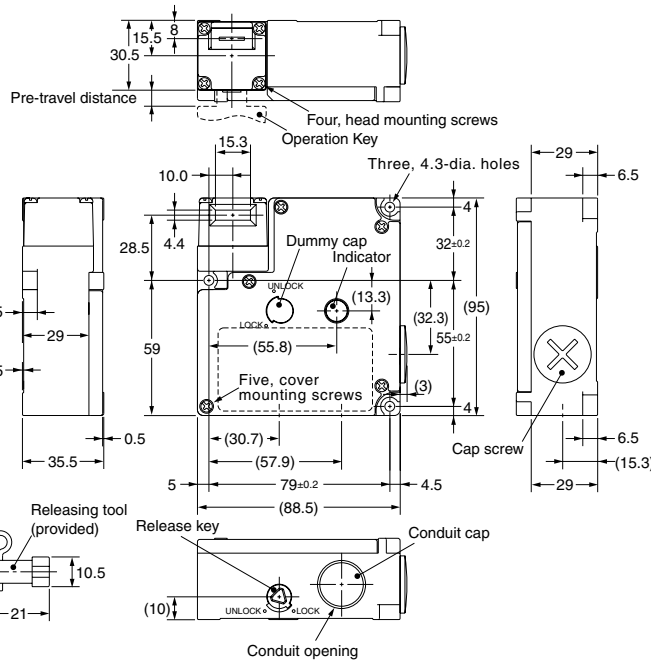
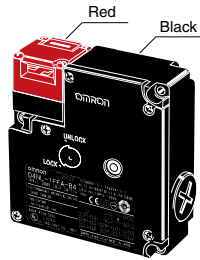
Switches

D4NL-□□□□-B



Operating characteristics	D4NL-□□□□-BS
Key insertion force	15 N max.
Key extraction force	30 N max.
Pre-travel distance	9 mm max.
Movement before being locked	3 mm min.

D4NL-□□□□-B4



Operating characteristics	D4NL-□□□□-B4
Key insertion force	15 N max.
Key extraction force	30 N max.
Pre-travel distance	9 mm max.
Movement before being locked	3 mm min.

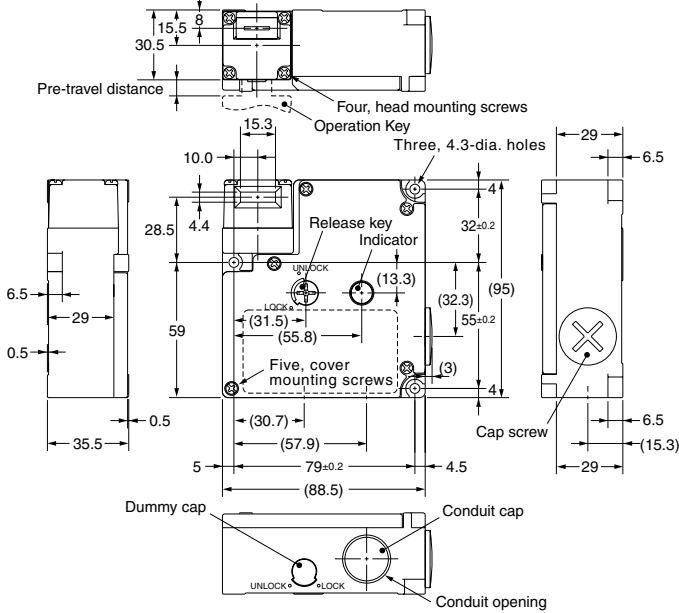
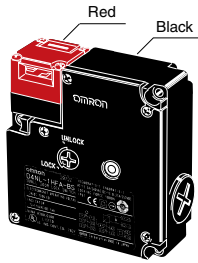
Notes:

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)

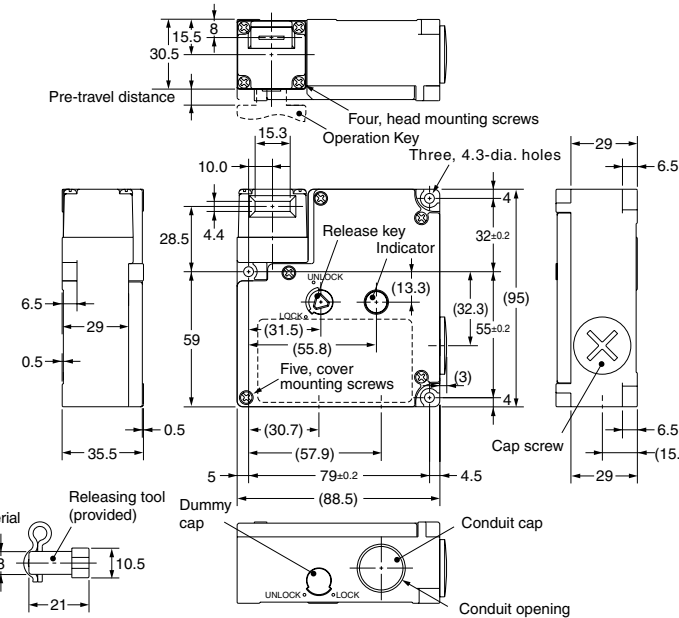
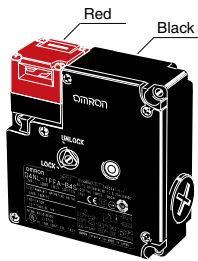
(mm)

D4NL-□□□□-BS



Operating characteristics	D4NL-□□□□-BS
Key insertion force	15 N max.
Key extraction force	30 N max.
Pre-travel distance	9 mm max.
Movement before being locked	3 mm min.

D4NL-□□□□-B4S



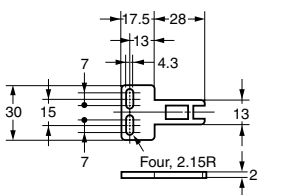
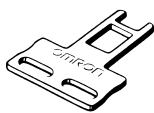
Operating characteristics	D4NL-□□□□-B4S
Key insertion force	15 N max.
Key extraction force	30 N max.
Pre-travel distance	9 mm max.
Movement before being locked	3 mm min.

Notes:

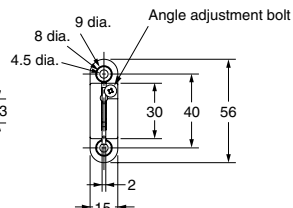
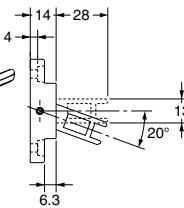
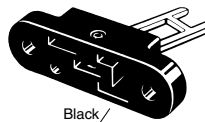
1. Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.
2. There are fluctuations in the contact ON/OFF timing for Switches with multiple poles (2NC, 2NC/1NO, or 3NC). Confirm performance before application.

Operation Keys

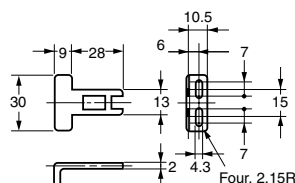
D4DS-K1



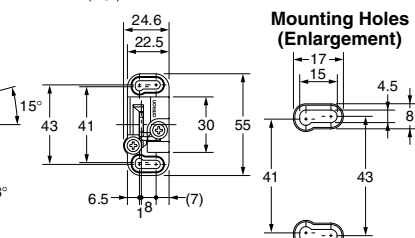
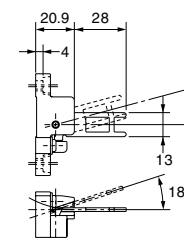
D4DS-K3



D4DS-K2



D4DS-K5

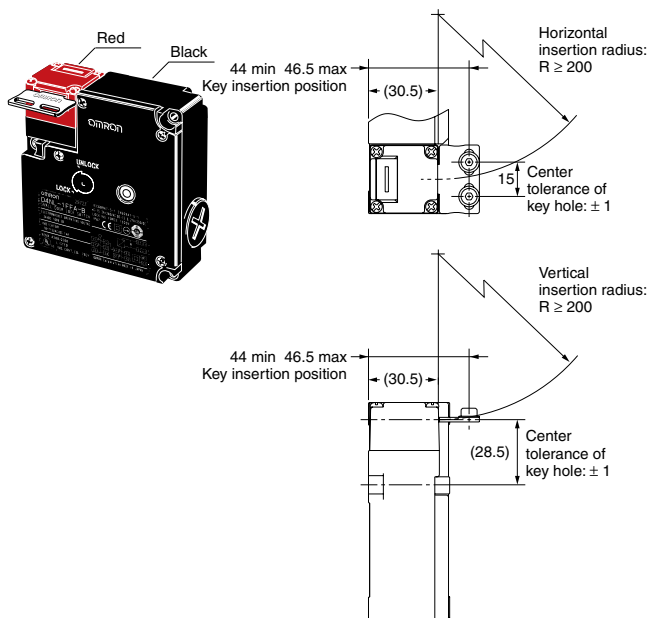


Dimensions and Operating Characteristics (continued)

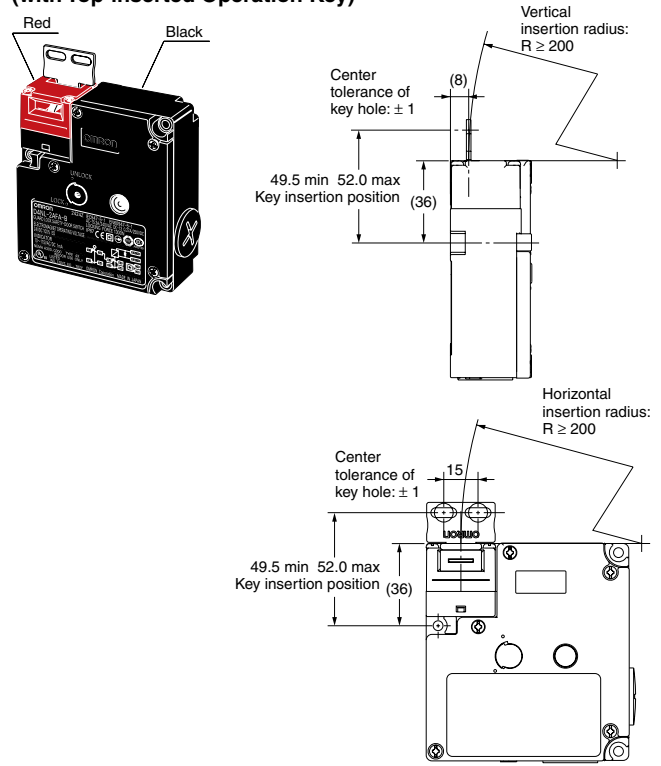
(mm)

With Operating Key Inserted

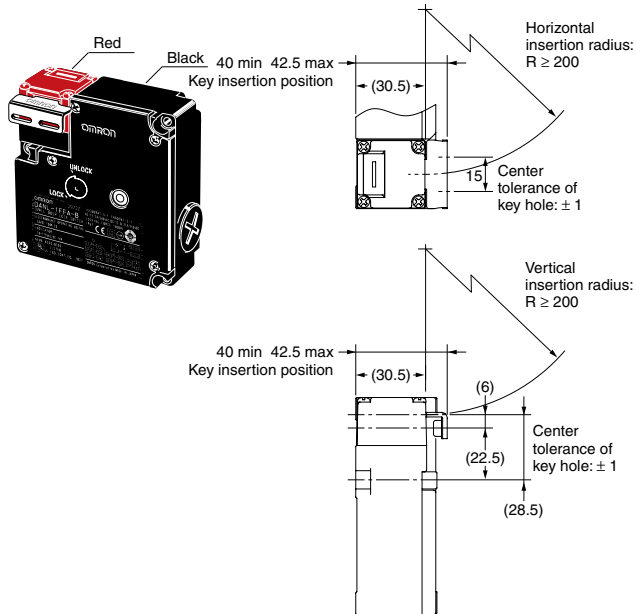
D4NL + D4DS-K1 (with Front-inserted Operation Key)



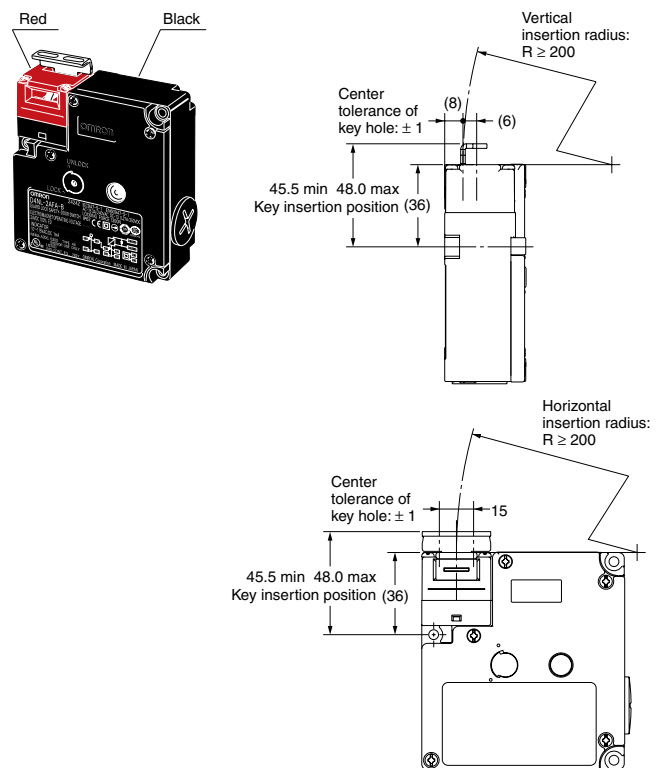
D4NL + D4DS-K1 (with Top-inserted Operation Key)



D4NL + D4DS-K2 (with Front-inserted Operation Key)



D4NL + D4DS-K2 (with Top-inserted Operation Key)

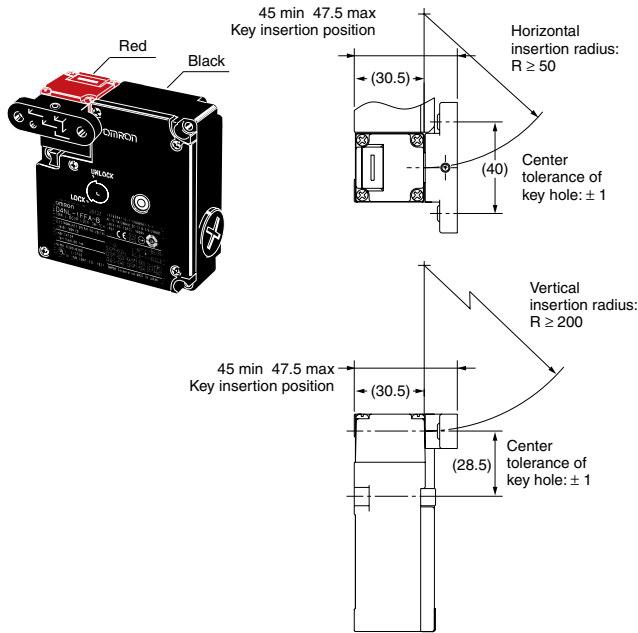


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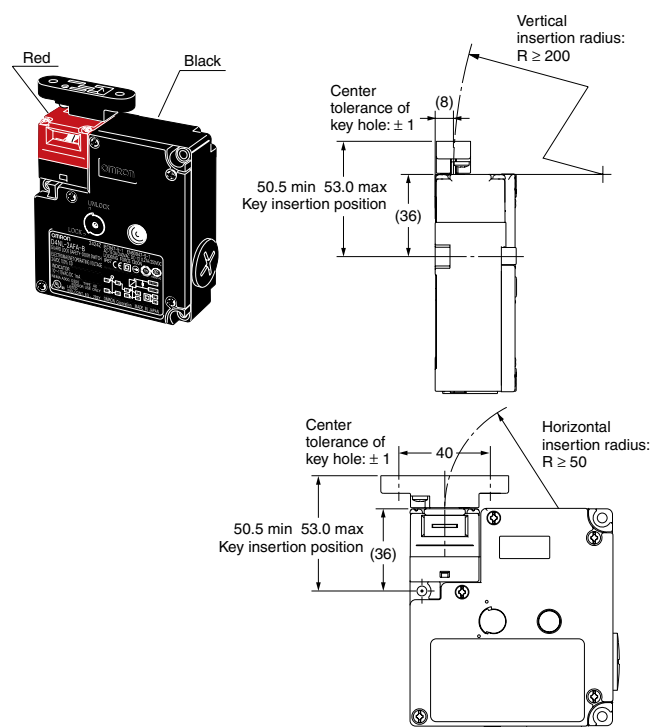
Dimensions and Operating Characteristics (continued)

(mm)

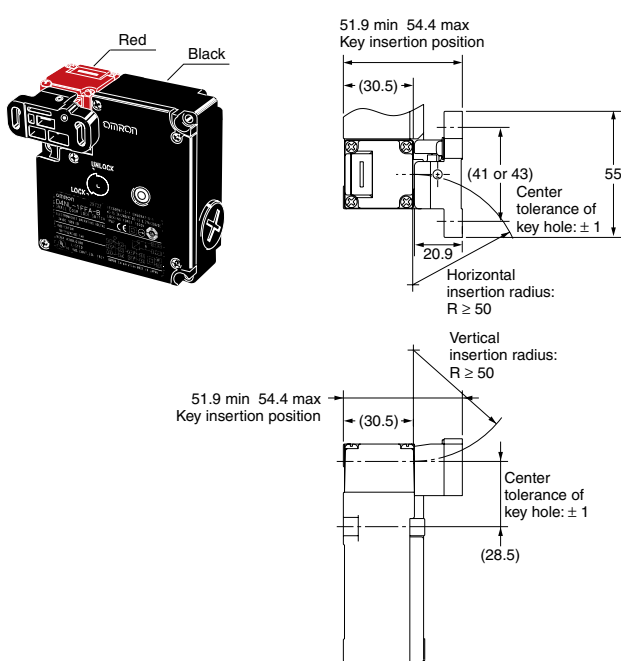
**D4NL + D4DS-K3
(with Front-inserted Operation Key)**



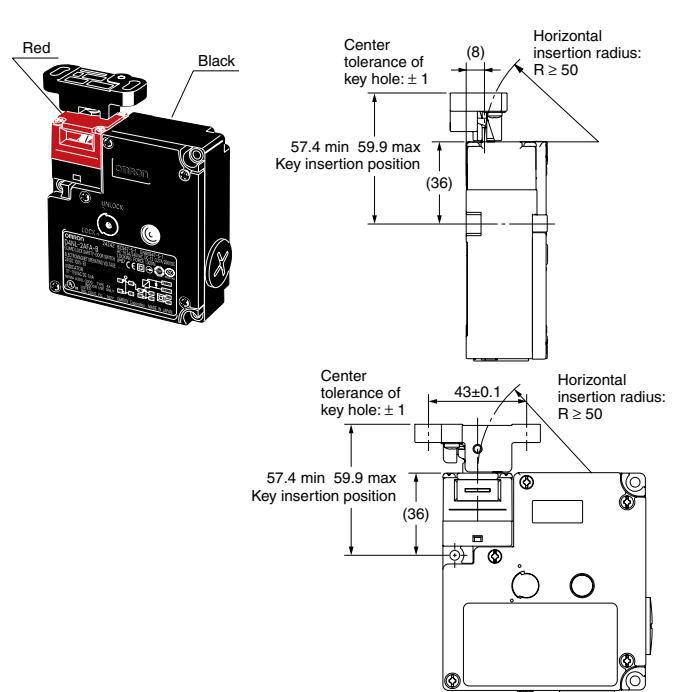
**D4NL + D4DS-K3
(with Top-inserted Operation Key)**



**D4NL + D4DS-K5
(with Front-inserted Operation Key)**

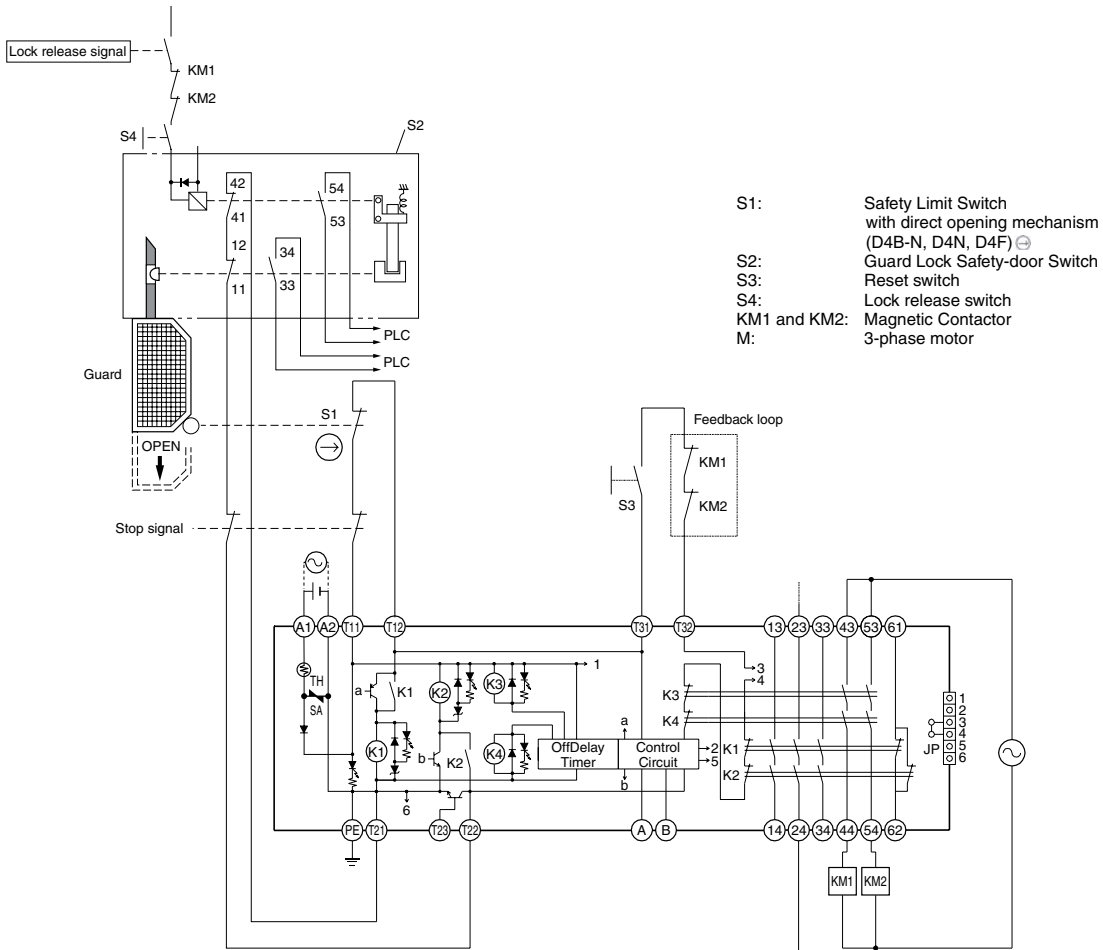


**D4NL + D4DS-K5
(with Top-inserted Operation Key)**

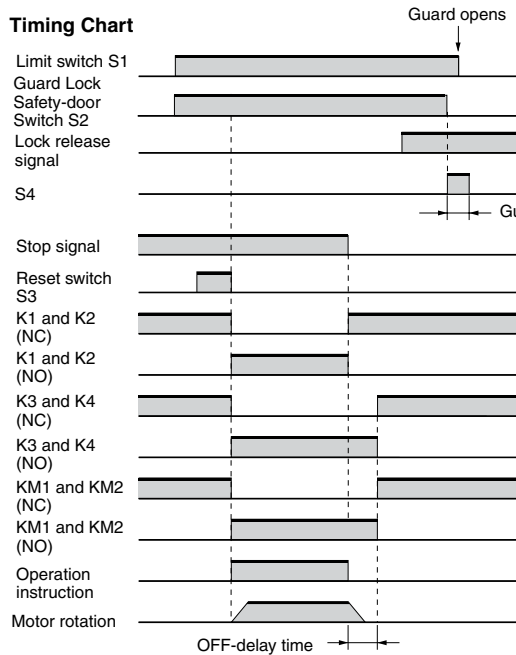


Application Examples

G9SA-321-T (24 VAC/VDC) + D4NL-A-A-, -A-B-, -A-C- (Mechanical Lock Type) Circuit Diagram (Manual Reset)



Timing Chart



Note: The above example circuit is for Category 3.

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Ordering

Model Number Structure

Switch

D4NL - □ □ □ □ - □ □ □
 ① ② ③ ④ ⑤ ⑥ ⑦



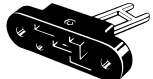

- ① Conduit Size
 - 1: Pg13.5
 - 2: G1/2
 - 4: M20*
- ② Built-in Switch (with Door Open/Closed Detection Switch and Lock Monitor Switch Contacts)
 - A: 1NC/1NO (slow-action contacts) + 1NC/1NO (slow-action contacts)
 - B: 1NC/1NO (slow-action contacts) + 2NC (slow-action contacts)
 - C: 2NC (slow-action contacts) + 1NC/1NO (slow-action contacts)
 - D: 2NC (slow-action contacts) + 2NC (slow-action contacts)
 - E: 2NC/1NO (slow-action contacts) + 1NC/1NO (slow-action contacts)
 - F: 2NC/1NO (slow-action contacts) + 2NC (slow-action contacts)
 - G: 3NC (slow-action contacts) + 1NC/1NO (slow-action contacts)
 - H: 3NC (slow-action contacts) + 2NC (slow-action contacts)
- ③ Head Mounting Direction and Material
 - F: Four mounting directions possible (Front-side mounting at shipping)/plastic
 - D: Four mounting directions possible (Front-side mounting at shipping)/metal
- ④ Door Lock and Release
 - A: Mechanical lock/24 VDC solenoid release
 - B: Mechanical lock/110 VAC solenoid release
 - C: Mechanical lock/230 VAC solenoid release
 - G: 24 VDC solenoid lock/mechanical release
 - H: 110 VAC solenoid lock/mechanical release
 - J: 230 VAC solenoid lock/mechanical release
- ⑤ Indicator
 - B: 10 to 115 VAC/VDC (orange LED indicator)
- ⑥ Release Key Type
 - Blank: Standard
 - 4: Special release key
- ⑦ Release Key Position
 - Blank: Bottom
 - S: Front

* Models with M20 conduits are also available with an M20 to 1/2-14NPT Adaptor.

Operation Key


D4DS-K □
 ①


- ① 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

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Special Release Key

Type	Model
Special release key 	D4NL-RK

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Ordering (continued)

List of Models

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

Head material	Release key position	Release key type	Solenoid voltage/indicator	Lock and release types	Contact configuration (door open/closed detection switch and lock monitor switch contacts) (slow-action) Certified direct opening NC contact	Conduit opening	Model
Plastic	Bottom	Standard	Solenoid: 24 VDC Orange LED: 10 to 115 VAC/VDC	Mechanical lock Solenoid release	1NC/1NO+1NC/1NO	M20	D4NL-4AFA-B
						M20 with 1/2" NPT adaptor	D4NL-4AFA-B-NPT
					1NC/1NO+2NC	M20	D4NL-4BFA-B
						M20 with 1/2" NPT adaptor	D4NL-4BFA-B-NPT
					2NC+1NC/1NO	M20	D4NL-4CFA-B
						M20 with 1/2" NPT adaptor	D4NL-4CFA-B-NPT
					2NC+2NC	M20	D4NL-4DFA-B
				M20 with 1/2" NPT adaptor		D4NL-4DFA-B-NPT	
				2NC/1NO+1NC/1NO	M20	D4NL-4EFA-B	
					M20 with 1/2" NPT adaptor	D4NL-4EFA-B-NPT	
				2NC/1NO+2NC	M20	D4NL-4FFA-B	
					M20 with 1/2" NPT adaptor	D4NL-4FFA-B-NPT	
				3NC+1NC/1NO	M20	D4NL-4GFA-B	
					M20 with 1/2" NPT adaptor	D4NL-4GFA-B-NPT	
			3NC+2NC	M20	D4NL-4HFA-B		
				M20 with 1/2" NPT adaptor	D4NL-4HFA-B-NPT		
			Solenoid lock Mechanical release	1NC/1NO+1NC/1NO	M20	D4NL-4AFG-B	
					M20 with 1/2" NPT adaptor	D4NL-4AFG-B-NPT	
				1NC/1NO+2NC	M20	D4NL-4BFG-B	
					M20 with 1/2" NPT adaptor	D4NL-4BFG-B-NPT	
				2NC+1NC/1NO	M20	D4NL-4CFG-B	
					M20 with 1/2" NPT adaptor	D4NL-4CFG-B-NPT	
				2NC+2NC	M20	D4NL-4DFG-B	
					M20 with 1/2" NPT adaptor	D4NL-4DFG-B-NPT	
				2NC/1NO+1NC/1NO	M20	D4NL-4EFG-B	
					M20 with 1/2" NPT adaptor	D4NL-4EFG-B-NPT	
				2NC/1NO+2NC	M20	D4NL-4FFG-B	
					M20 with 1/2" NPT adaptor	D4NL-4FFG-B-NPT	
3NC+1NC/1NO	M20	D4NL-4GFG-B					
	M20 with 1/2" NPT adaptor	D4NL-4GFG-B-NPT					
3NC+2NC	M20	D4NL-4HFG-B					
	M20 with 1/2" NPT adaptor	D4NL-4HFG-B-NPT					
Solenoid: 110 VAC Orange LED: 10 to 115 VAC/DC	Mechanical lock Solenoid release	2NC/1NO+1NC/1NO	M20 with 1/2" NPT adaptor	D4NL-4EFB-B-NPT			
		2NC/1NO+2NC	M20 with 1/2" NPT adaptor	D4NL-4FFB-B-NPT			
	Solenoid lock Mechanical release	2NC/1NO+1NC/1NO	M20 with 1/2" NPT adaptor	D4NL-4EFH-B-NPT			
		2NC/1NO+2NC	M20 with 1/2" NPT adaptor	D4NL-4FFH-B-NPT			

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(Continued on next page)

Ordering (continued)

List of Models (continued)

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

Head material	Release key position	Release key type	Solenoid voltage/indicator	Lock and release types	Contact configuration (door open/closed detection switch and lock monitor switch contacts) (slow-action) Certified direct opening NC contact	Conduit opening	Model
Plastic	Bottom	Special release key	Solenoid: 24 VDC Orange LED: 10 to 115 VAC/VDC	Mechanical lock Solenoid release	1NC/1NO+1NC/1NO	M20	D4NL-4AFA-B4
						M20 with 1/2" NPT adaptor	D4NL-4AFA-B4-NPT
					1NC/1NO+2NC	M20	D4NL-4BFA-B4
						M20 with 1/2" NPT adaptor	D4NL-4BFA-B4-NPT
					2NC+1NC/1NO	M20	D4NL-4CFA-B4
						M20 with 1/2" NPT adaptor	D4NL-4CFA-B4-NPT
					2NC+2NC	M20	D4NL-4DFA-B4
						M20 with 1/2" NPT adaptor	D4NL-4DFA-B4-NPT
					2NC/1NO+1NC/1NO	M20	D4NL-4EFA-B4
						M20 with 1/2" NPT adaptor	D4NL-4EFA-B4-NPT
					2NC/1NO+2NC	M20	D4NL-4FFA-B4
						M20 with 1/2" NPT adaptor	D4NL-4FFA-B4-NPT
					3NC+1NC/1NO	M20	D4NL-4GFA-B4
						M20 with 1/2" NPT adaptor	D4NL-4GFA-B4-NPT
				3NC+2NC	M20	D4NL-4HFA-B4	
					M20 with 1/2" NPT adaptor	D4NL-4HFA-B4-NPT	
				Solenoid lock Mechanical release	1NC/1NO+1NC/1NO	M20	D4NL-4AFG-B4
						M20 with 1/2" NPT adaptor	D4NL-4AFG-B4-NPT
					1NC/1NO+2NC	M20	D4NL-4BFG-B4
						M20 with 1/2" NPT adaptor	D4NL-4BFG-B4-NPT
					2NC+1NC/1NO	M20	D4NL-4CFG-B4
						M20 with 1/2" NPT adaptor	D4NL-4CFG-B4-NPT
					2NC+2NC	M20	D4NL-4DFG-B4
						M20 with 1/2" NPT adaptor	D4NL-4DFG-B4-NPT
					2NC/1NO+1NC/1NO	M20	D4NL-4EFG-B4
						M20 with 1/2" NPT adaptor	D4NL-4EFG-B4-NPT
					2NC/1NO+2NC	M20	D4NL-4FFG-B4
						M20 with 1/2" NPT adaptor	D4NL-4FFG-B4-NPT
3NC+1NC/1NO	M20	D4NL-4GFG-B4					
	M20 with 1/2" NPT adaptor	D4NL-4GFG-B4-NPT					
3NC+2NC	M20	D4NL-4HFG-B4					
	M20 with 1/2" NPT adaptor	D4NL-4HFG-B4-NPT					
Metal				Mechanical lock Solenoid release	2NC/1NO+1NC/1NO	M20 with 1/2" NPT adaptor	D4NL-4EDA-B4-NPT
					3NC+1NC/1NO	M20 with 1/2" NPT adaptor	D4NL-4EDG-B4-NPT
				Solenoid lock Mechanical release	2NC/1NO+1NC/1NO	M20 with 1/2" NPT adaptor	D4NL-4GDA-B4-NPT
					3NC+1NC/1NO	M20 with 1/2" NPT adaptor	D4NL-4GDG-B4-NPT

Note: Consult factor for models with Korean S-mark certification.

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