

## 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



## 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 <sup>+10%</sup> / <sub>-15%</sub>	110 VAC ±10%	230 VAC ±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.

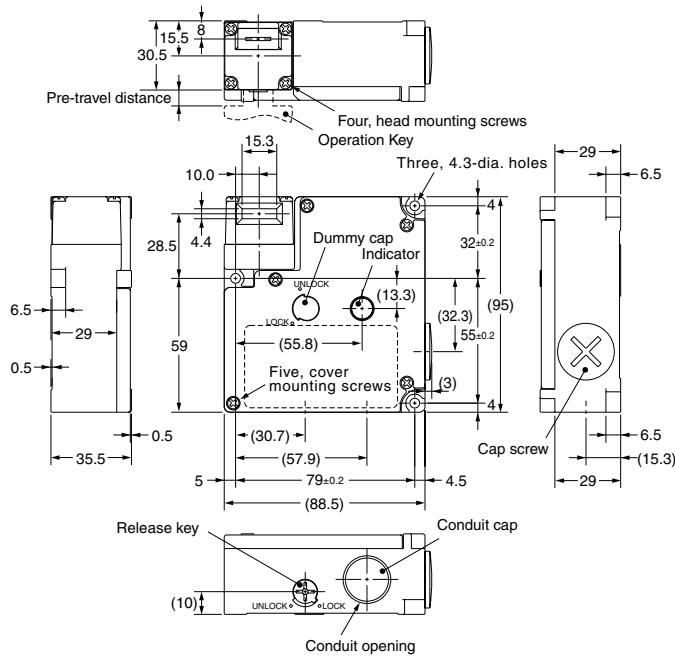
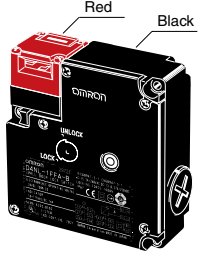
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# Dimensions and Operating Characteristics

(mm)

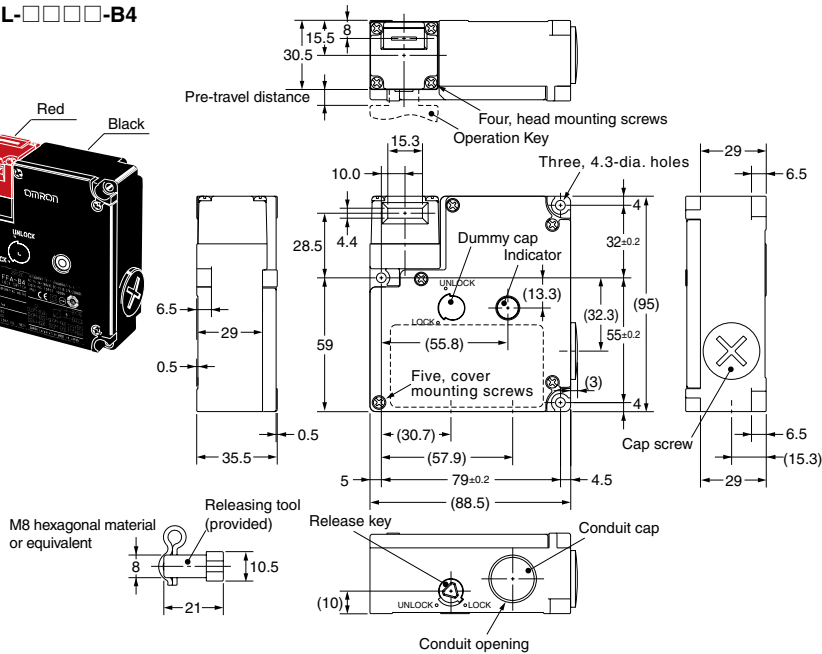
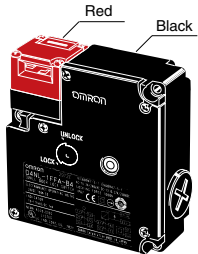
## Switches

### 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.

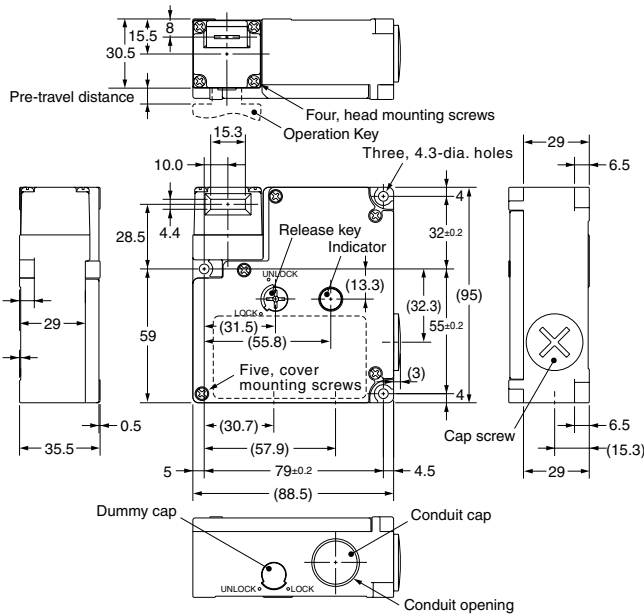
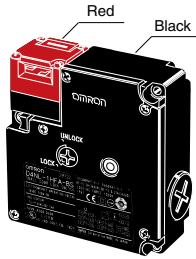
Notes:

1. Unless otherwise specified, a tolerance of  $\pm 0.4$  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)

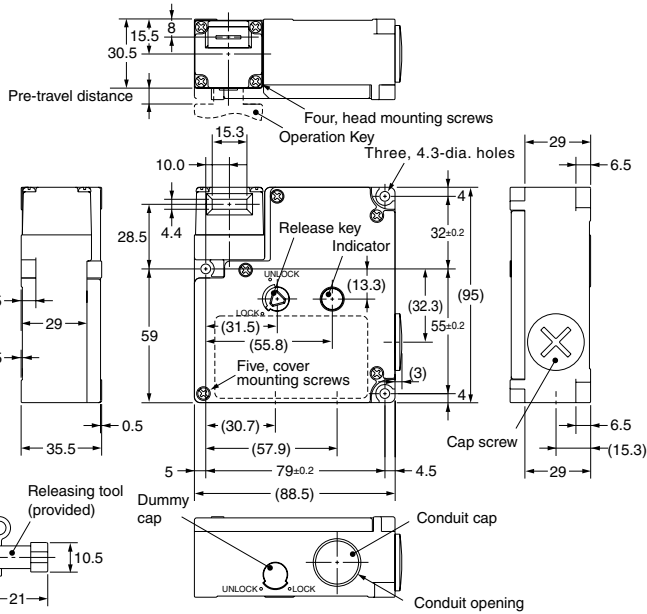
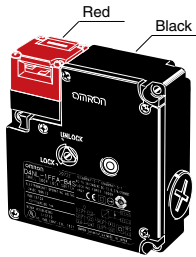
D4NL-□□□□-BS



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.

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D4NL-□□□□-B4S



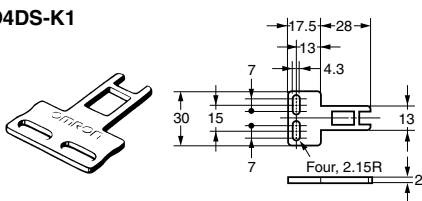
Operating characteristics	D4NL-□□□□-B4S
Key insertion force	15 N max.
Key extraction force	30 N max.
Pre-travel distance	9 mm max.
Movement before being locked	3 mm min.

Notes:

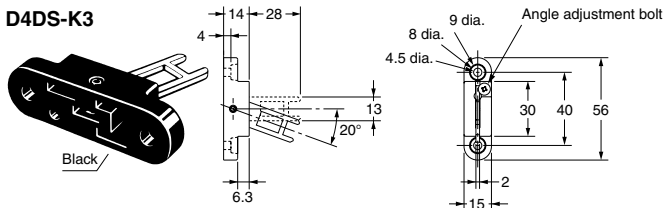
1. Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions.
2. There are fluctuations in the contact ON/OFF timing for Switches with multiple poles (2NC, 2NC/1NO, or 3NC). Confirm performance before application.

Operation Keys

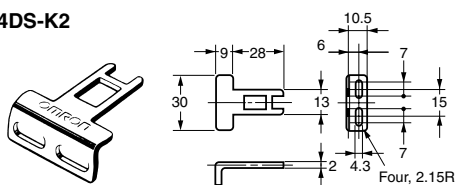
D4DS-K1



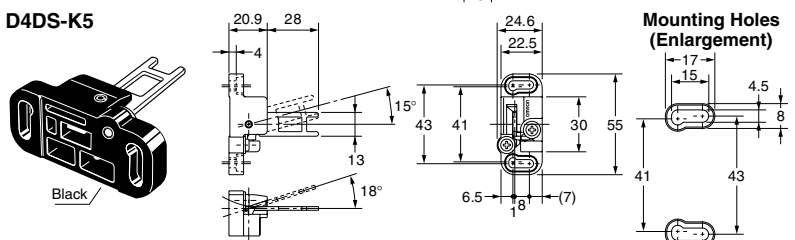
D4DS-K3



D4DS-K2



D4DS-K5

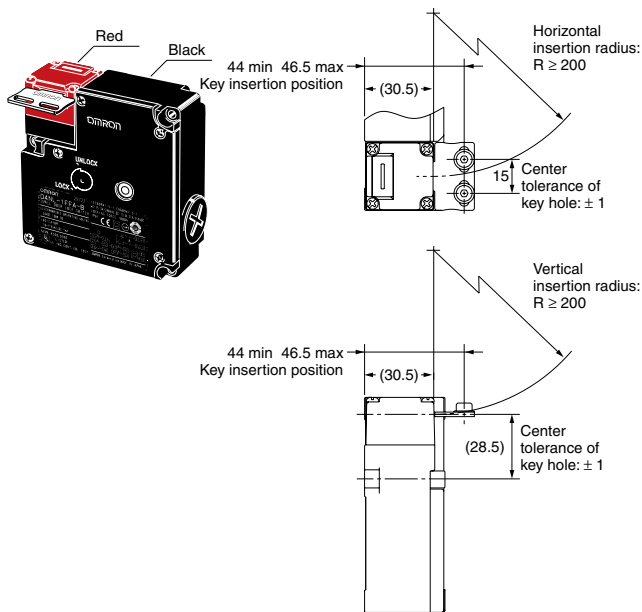


Dimensions and Operating Characteristics (continued)

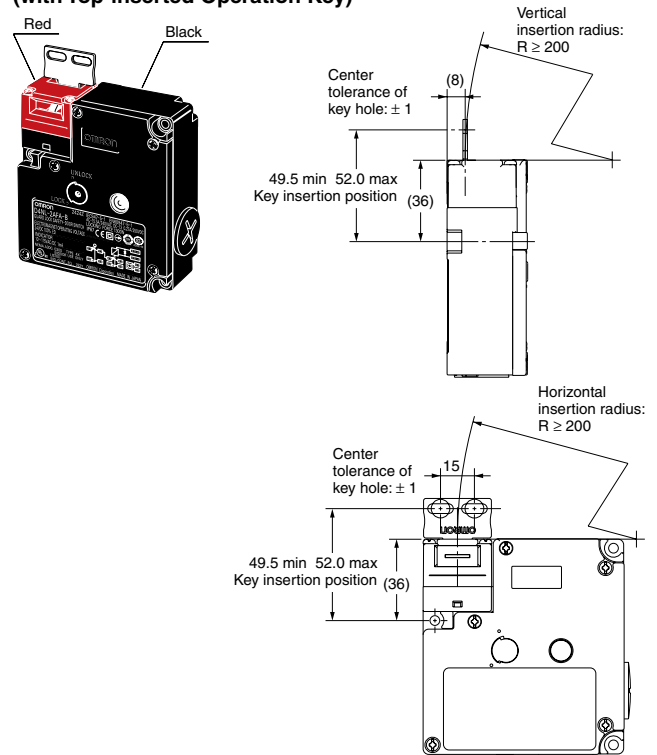
(mm)

With Operating Key Inserted

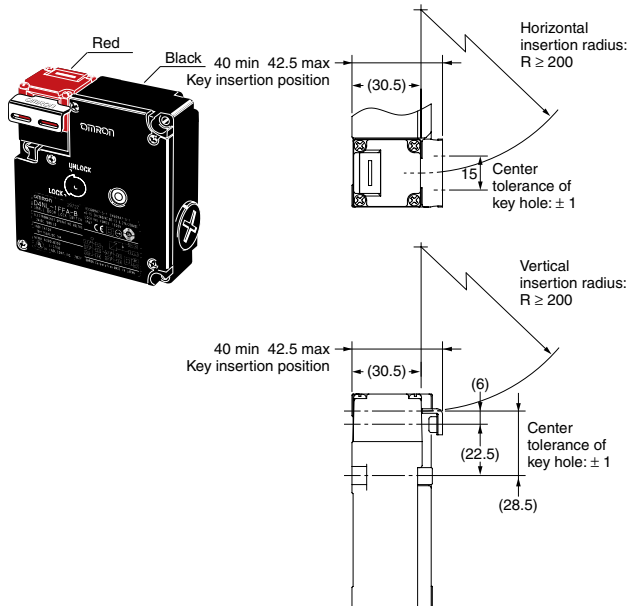
D4NL + D4DS-K1  
(with Front-inserted Operation Key)



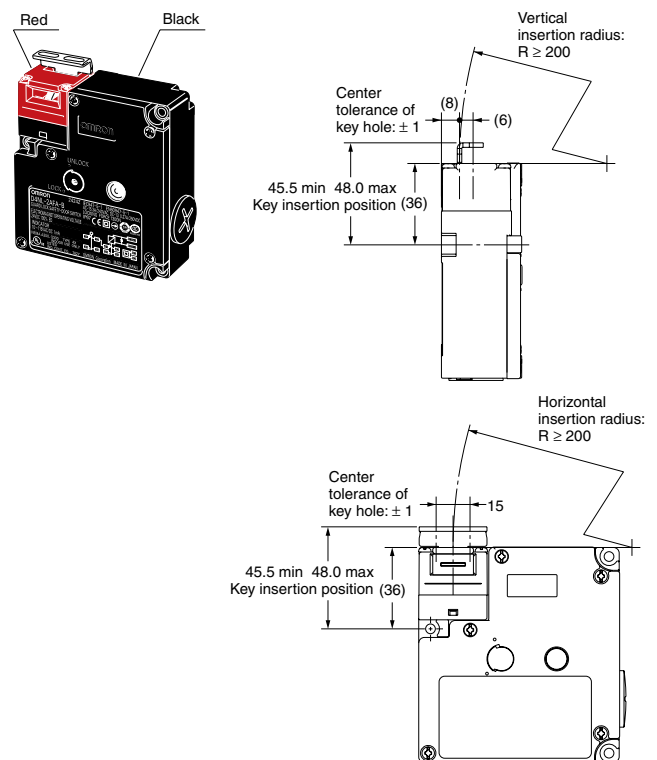
D4NL + D4DS-K1  
(with Top-inserted Operation Key)



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



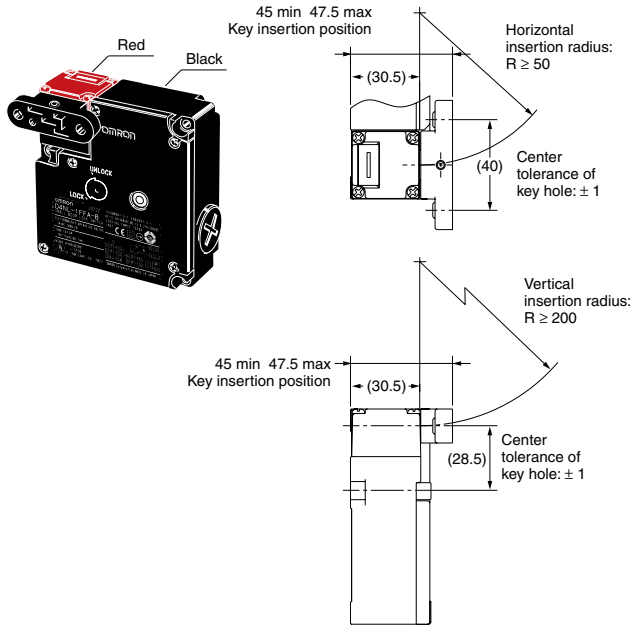
D4NL + D4DS-K2  
(with Top-inserted Operation Key)



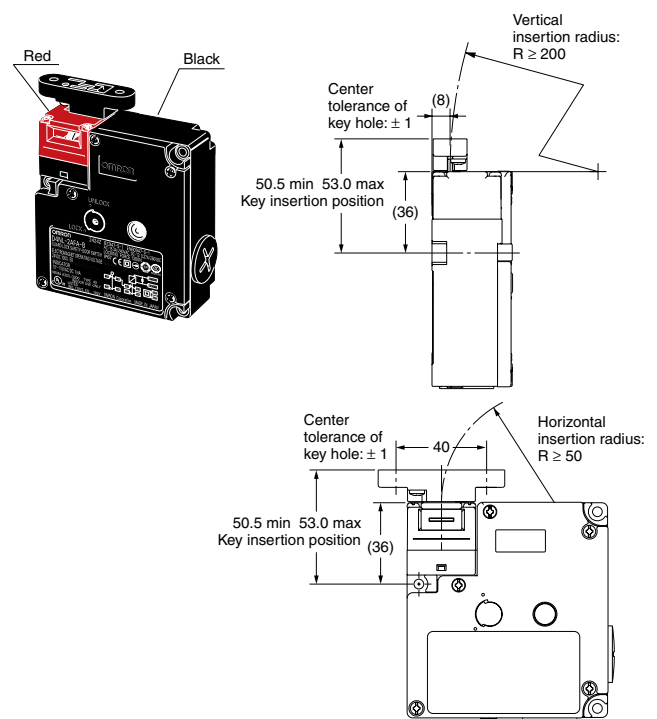
Dimensions and Operating Characteristics (continued)

(mm)

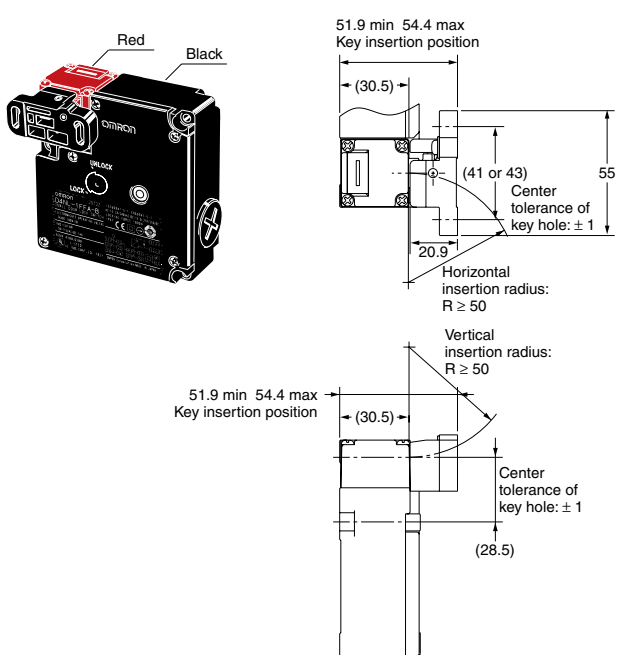
D4NL + D4DS-K3  
(with Front-inserted Operation Key)



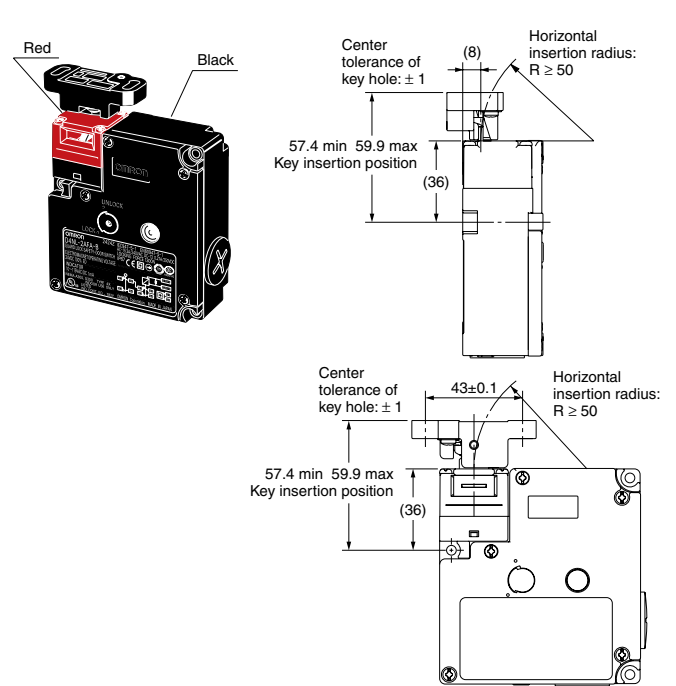
D4NL + D4DS-K3  
(with Top-inserted Operation Key)



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



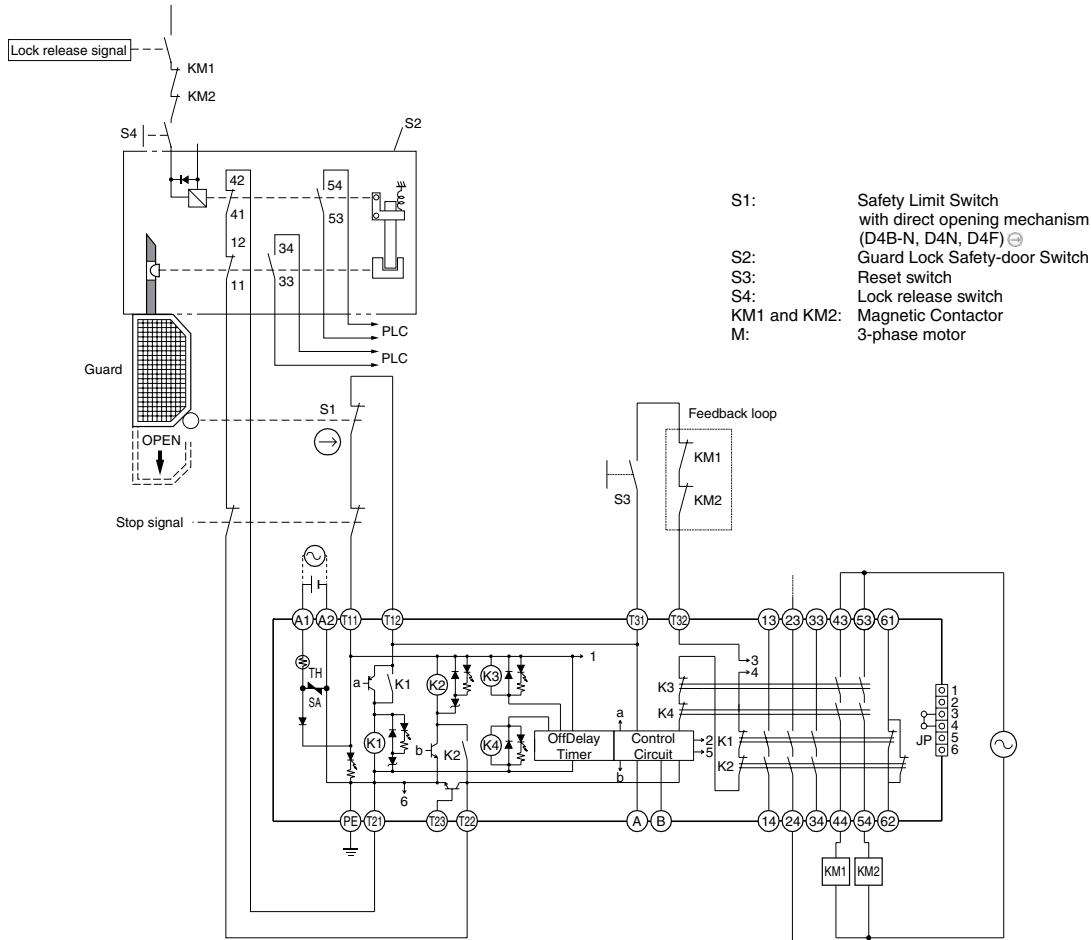
D4NL + D4DS-K5  
(with Top-inserted Operation Key)



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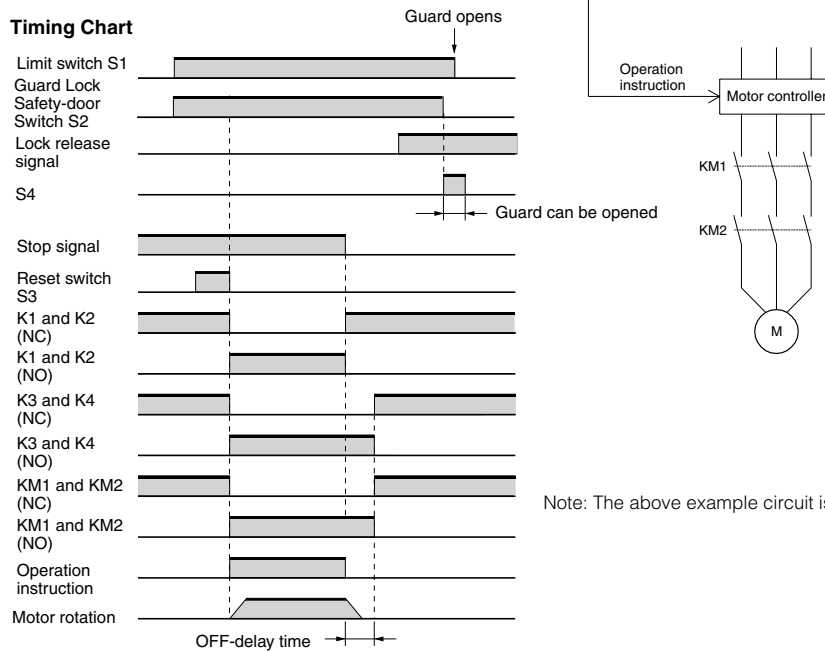
## Application Examples

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



- S1: Safety Limit Switch with direct opening mechanism (D4B-N, D4N, D4F)
- S2: Guard Lock Safety-door Switch
- S3: Reset switch
- S4: Lock release switch
- KM1 and KM2: Magnetic Contactor
- M: 3-phase motor

#### Timing Chart



Note: The above example circuit is for Category 3.

## Ordering

### Model Number Structure

#### Switch

D4NL - □ □ □ □ - □ □ □  
 ① ② ③ ④ ⑤ ⑥ ⑦



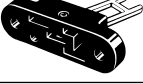

- ① Conduit Size
  - 1: Pg13.5
  - 2: G1/2
  - 4: M20\*
- ② Built-in Switch (with Door Open/Closed Detection Switch and Lock Monitor Switch Contacts)
  - A: 1NC/1NO (slow-action contacts) + 1NC/1NO (slow-action contacts)
  - B: 1NC/1NO (slow-action contacts) + 2NC (slow-action contacts)
  - C: 2NC (slow-action 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
  - G: 24 VDC solenoid lock/mechanical release
  - H: 110 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

#### Special Release Key

Type	Model
Special Release Key for D4GL, D4JL, D4NL, and D4SL Switches 	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/MDC	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					

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## 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					
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				
Metal							

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

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