Safety Interlock Switches
D4GL

Rev. 12.10

Guard Lock Safety-Door Switch

- Vertically mounting guard lock safety-door switch ideal for limited installation space
- Selectable operation key insertion direction
- Slim safety-door switch with an electromagnetic lock or unlock mechanism
- Built-in switches with multiple-contact construction are available
- A key holding force of 1,000 N minimum
- Can be used for either standard loads or microloads
- Lineup includes models with a conduit size of M20
- Variety of metallic heads available

G

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	2003010305064264
KOSHA *2	EN60947-5-1	2007-26

*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)	0.75 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.

UL/CSA (UL 508, CSA C22.2 No. 14)
C300

Rated voltage	Carry current	Current (A)		Volt-amperes (VA)	
		Make	Break	Make	Break
120 VAC	2.5 A	15	1.5	1,800	180
240 VAC		7.5	0.75		

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
Rated operating voltage (100% ED)	24 VDC ±10%
Current consumption	Approx. 200 mA
Insulation Class	Class F (130°C max.)

Indicator Characteristics

Item Type	LED
Rated voltage	24 VDC
Current consumption	Approx. 3 mA
Color (LED)	Orange/Green

Connections

Contact Form

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

| Model	Contact (door open/closed detection and lock monitor)	Contact form		Operating pattern	Remarks
		Door open/closed detection	Lock monitor		
D4GL-□AF□-□	1NC/1NO + 1NC/1NO	Door open/closed detection: Zb 11—12, 33—34	Lock monitor: Zb 41—42, 53—54	Lock position; 11-42, 33-34, 53-54; Stroke; Operation Key insertion completion position — Extraction completion position	Only NC contact 11-12 has a certified direct opening mechanism. The terminals 11-42, 33-34, and 53-54 can be used as unlike poles.
D4GL-□BF□-□	1NC/1NO + 2NC	Door open/closed detection: Zb 11—12, 33—34	Lock monitor: Zb 41—42, 51—52	Lock position; 11-42, 33-34, 51-52; Stroke; Operation Key insertion completion position — Extraction completion position	Only NC contact 11-12, has a certified direct opening mechanism. The terminals 11-42, 33-34, and 51-52 can be used as unlike poles.
D4GL-□CF□-□	2NC + 1NC/1NO	Door open/closed detection: Zb 11—12, 21—22	Lock monitor: Zb 41—42, 53—54	Lock position; 11-42, 21-22, 53-54; Stroke; Operation Key insertion completion position — Extraction completion position	Only NC contacts 11-12 and 21-22 have a certified direct opening mechanism. The terminals 11-42, 21-22, and 53-54 can be used as unlike poles.
D4GL-□DF□-□	2NC + 2NC	Door open/closed detection: Zb 11—12, 21—22	Lock monitor: Zb 41—42, 51—52	Lock position; 11-42, 21-22, 51-52; Stroke; Operation Key insertion completion position — Extraction completion position	Only NC contacts 11-12 and 21-22 have a certified direct opening mechanism. The terminals 11-42, 21-22, and 51-52 can be used as unlike poles.
D4GL-□EF□-□	2NC/1NO + 1NC/1NO	Door open/closed detection: Zb 11—12, 21—22, 33—34	Lock monitor: Zb 41—42, 53—54	Lock position; 11-42, 21-22, 33-34, 53-54; Stroke; Operation Key insertion completion position — Extraction completion position	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.
D4GL-□FF□-□	2NC/1NO + 2NC	Door open/closed detection: Zb 11—12, 21—22, 33—34	Lock monitor: Zb 41—42, 51—52	Lock position; 11-42, 21-22, 33-34, 51-52; Stroke; Operation Key insertion completion position — Extraction completion position	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.
D4GL-□GF□-□	3NC + 1NC/1NO	Door open/closed detection: Zb 11—12, 21—22, 31—32	Lock monitor: Zb 41—42, 53—54	Lock position; 11-42, 21-22, 31-32, 53-54; Stroke; Operation Key insertion completion position — Extraction completion position	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.
D4GL-□HF□-□	3NC + 2NC	Door open/closed detection: Zb 11—12, 21—22, 31—32	Lock monitor: Zb 41—42, 51—52	Lock position; 11-42, 21-22, 31-32, 51-52; Stroke; Operation Key insertion completion position — Extraction completion position	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

D4GL-□□□□-A

- Four, head mounting screws
- Head cap
- Operation Key
- Pre-travel distance
- 15.3
- 47
- 40
- 38
- 23.5
- 34.4
- 15.3
- 4.4
- Four, 5.2-dia. holes
- Four, 9.2-dia. spot facings (depth: 10)
- Four, LED indicators
- Release key
- Cover mounting screw
- Two, cap screws
- 31.5
- 84±0.2
- (127.5)
- 148
- (187)
- (21.5)
- 23.5
- (3)
- (3)
- 30±0.2
- 43

Conduit cap

(18.5)
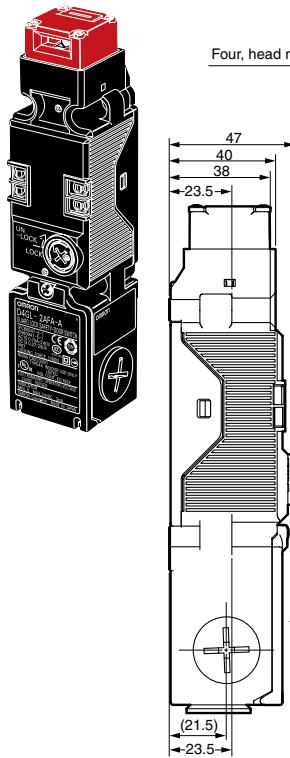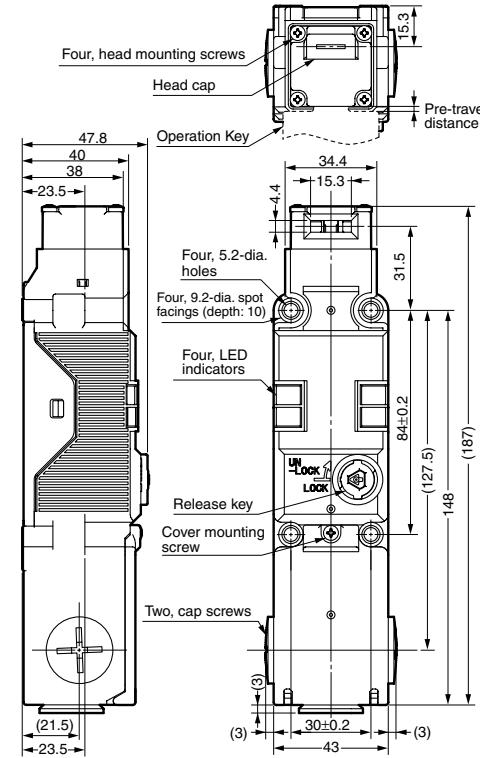
Operating characteristics	D4GL-□□□□-A
Key insertion force Key extraction force	15 N max. 40 N max.
Pre-travel distance	10 mm max.
Movement before being locked	4 mm min.

D4GL-□□□□-A4

- Four, head mounting screws
- Head cap
- Operation Key
- Pre-travel distance
- 15.3
- 47.8
- 40
- 38
- 23.5
- 34.4
- 15.3
- 4.4
- Four, 5.2-dia. holes
- Four, 9.2-dia. spot facings (depth: 10)
- Four, LED indicators
- Release key
- Cover mounting screw
- Two, cap screws
- 31.5
- 84±0.2
- (127.5)
- 148
- (187)
- (21.5)
- 23.5
- (3)
- (3)
- 30±0.2
- 43

Conduit cap

(18.5)

Operating characteristics	D4GL-□□□□-A4
Key insertion force Key extraction force	15 N max. 40 N max.
Pre-travel distance	10 mm max.
Movement before being locked	4 mm min.

Operation Keys

D4DS-K1

- 17.5
- 28
- 13
- 4.3
- 7
- 30
- 15
- 13
- 7
- Four, 2.15R
- 2

D4DS-K3

- Black
- 14
- 28
- 4
- 13
- 20°
- 6.3
- 9 dia.
- 8 dia.
- 4.5 dia.
- Angle adjustment bolt
- 30
- 40
- 56
- 2
- 15

D4DS-K2

- 10.5
- 9
- 28
- 6
- 7
- 30
- 13
- 15
- 7
- 2
- 4.3
- Four, 2.15R

D4DS-K5

- Black
- 20.9
- 28
- 4
- 15°
- 13
- 18°
- 24.6
- 22.5
- 43
- 41
- 30
- 55
- 6.5
- 8
- (7)

Mounting Holes (Enlargement)

- 17
- 15
- 4.5
- 8
- 41
- 43
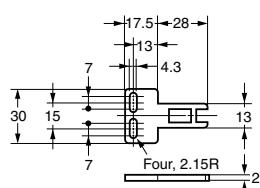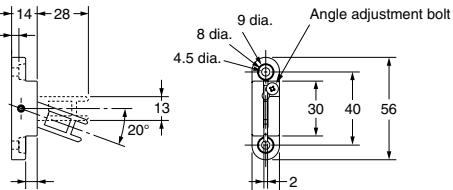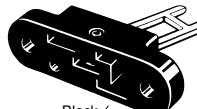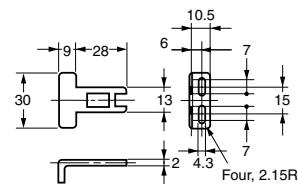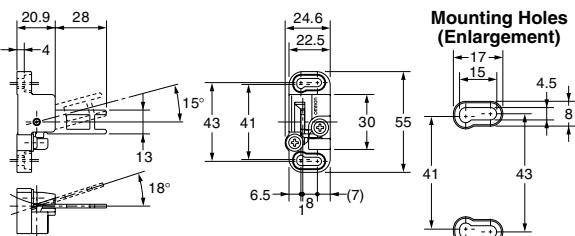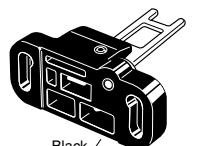
Note: Unless otherwise specified, a tolerance of ±0.4 mm applies to all dimensions.

Dimensions and Operating Characteristics (continued)

(mm)

With Operation Key Inserted

D4GL + D4DS-K1
**(with Front-inserted Operation Key)**

Horizontal insertion radius: R ≥ 200
(38)
51.5 min. 54 max.
Key insertion position
(15)
Center tolerance of key hole: ±1

Vertical insertion radius: R ≥ 200
(31.7)
Center tolerance of key hole: ±1
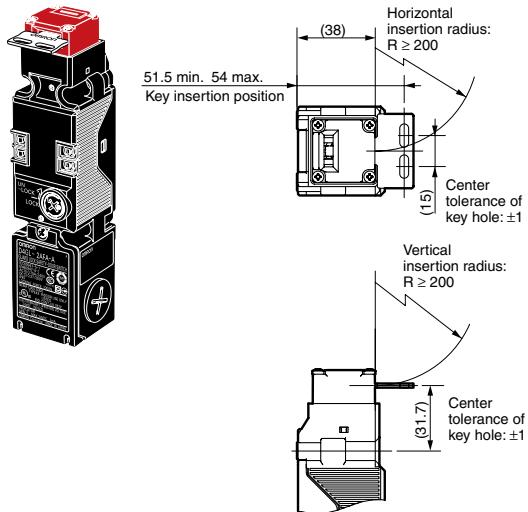
D4GL + D4DS-K1
(with Top-inserted Operation Key)

Horizontal insertion radius: R ≥ 200
(15)
Center tolerance of key hole: ±1
(39)
52.5 min. 55.0 max.
Key insertion position

Vertical insertion radius: R ≥ 200
(15.2)
Center tolerance of key hole: ±1
(39)
52.5 min. 55.0 max.
Key insertion position
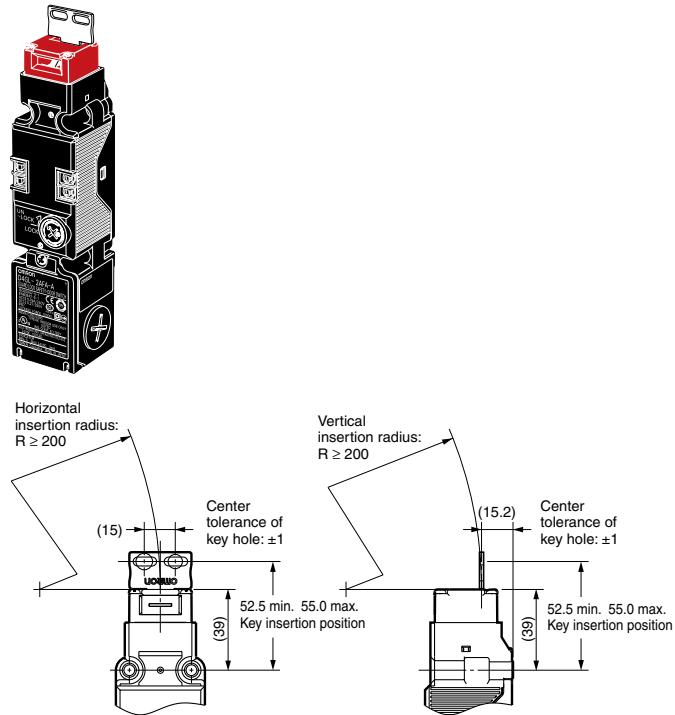
D4GL + D4DS-K2
(with Front-inserted Operation Key)

Horizontal insertion radius: R ≥ 200
(38)
47.5 min. 50 max.
Key insertion position
(15)
Center tolerance of key hole: ±1

Vertical insertion radius: R ≥ 200
(31.7)
Center tolerance of key hole: ±1
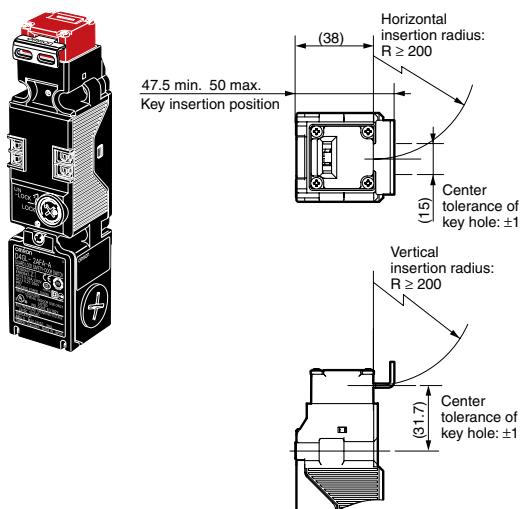
D4GL + D4DS-K2
(with Top-inserted Operation Key)
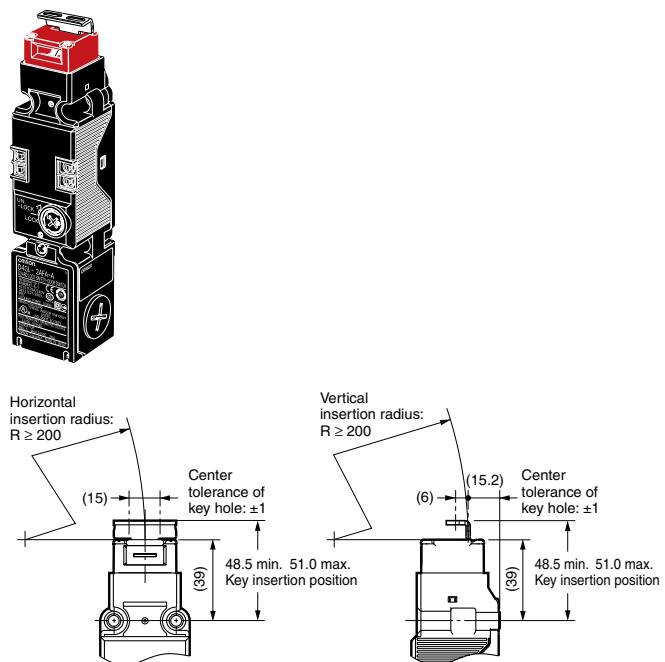
Horizontal insertion radius: R ≥ 200
(15)
Center tolerance of key hole: ±1
(39)
48.5 min. 51.0 max.
Key insertion position

Vertical insertion radius: R ≥ 200
(6)
(15.2)
Center tolerance of key hole: ±1
(39)
48.5 min. 51.0 max.
Key insertion position

Dimensions and Operating Characteristics (continued)   (mm)

With Operation Key Inserted

D4GL + D4DS-K3
(with Front-inserted Operation Key)

(38)

Horizontal
insertion radius:
R ≥ 50

52.5 min. 55 max.
Key insertion position

Center
tolerance of
key hole: ±1

(40)

Vertical
insertion radius:
R ≥ 200

Center
tolerance of
key hole: ±1

(31.7)
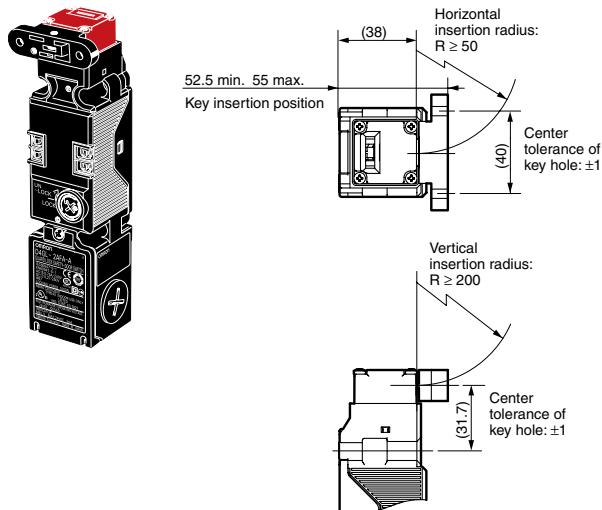
D4GL + D4DS-K3
(with Top-inserted Operation Key)

Horizontal
insertion radius:
R ≥ 50

Vertical
insertion radius:
R ≥ 200

Center
tolerance of
key hole: ±1

(40)

53.5 min. 56.0 max.
Key insertion position

(39)

(15.2)

Center
tolerance of
key hole: ±1

53.5 min. 56.0 max.
Key insertion position

(39)
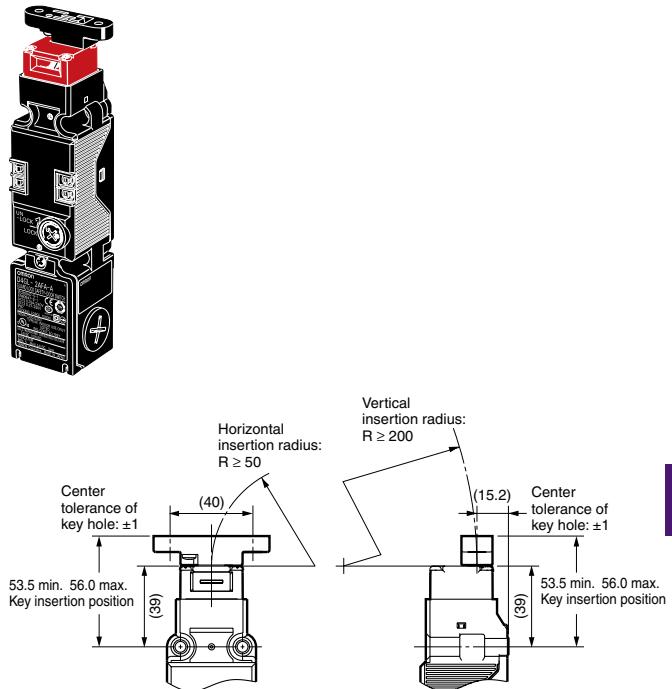
G

D4GL + D4DS-K5
(with Front-inserted Operation Key)

(38)

Horizontal
insertion radius:
R ≥ 50

59.5 min. 62 max.
Key insertion position

Center
tolerance of
key hole: ±1

(41 or 43)

Vertical
insertion radius:
R ≥ 50

Center
tolerance of
key hole: ±1

(31.7)
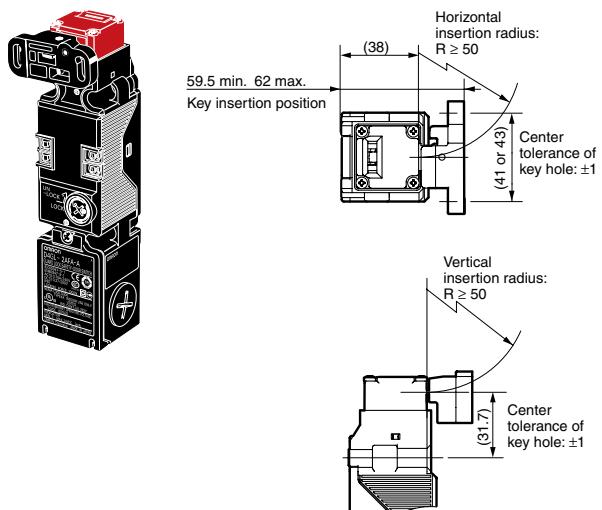
D4GL + D4DS-K5
(with Top-inserted Operation Key)

Horizontal
insertion radius:
R ≥ 50

Horizontal
insertion radius:
R ≥ 50

Center
tolerance of
key hole: ±1

43±0.1
41±0.1

(15.2)

Center
tolerance of
key hole: ±1

60.4 min. 62.9 max.
Key insertion position

(39)

60.4 min. 62.9 max.
Key insertion position

(39)
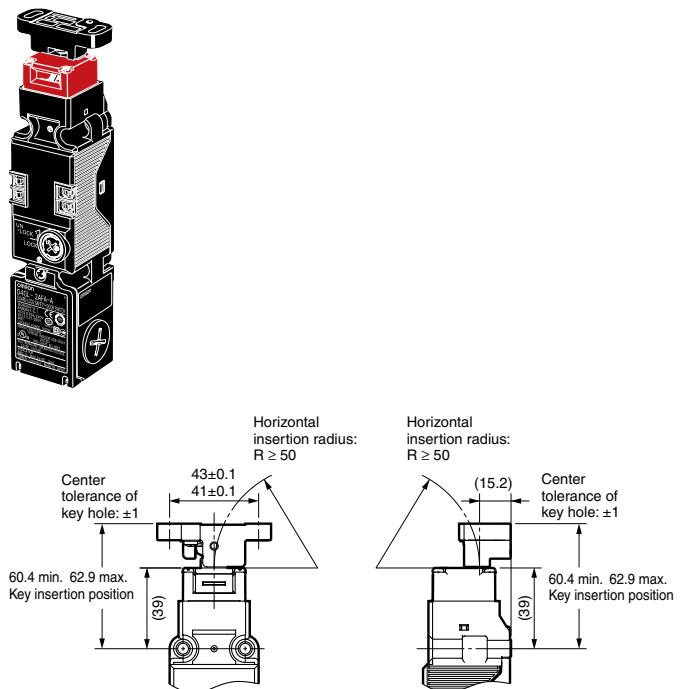
Application Examples

G9SA-321-T + D4GL-☐AFA-☐ (Mechanical Lock Type)
Circuit Diagram (Manual Reset)
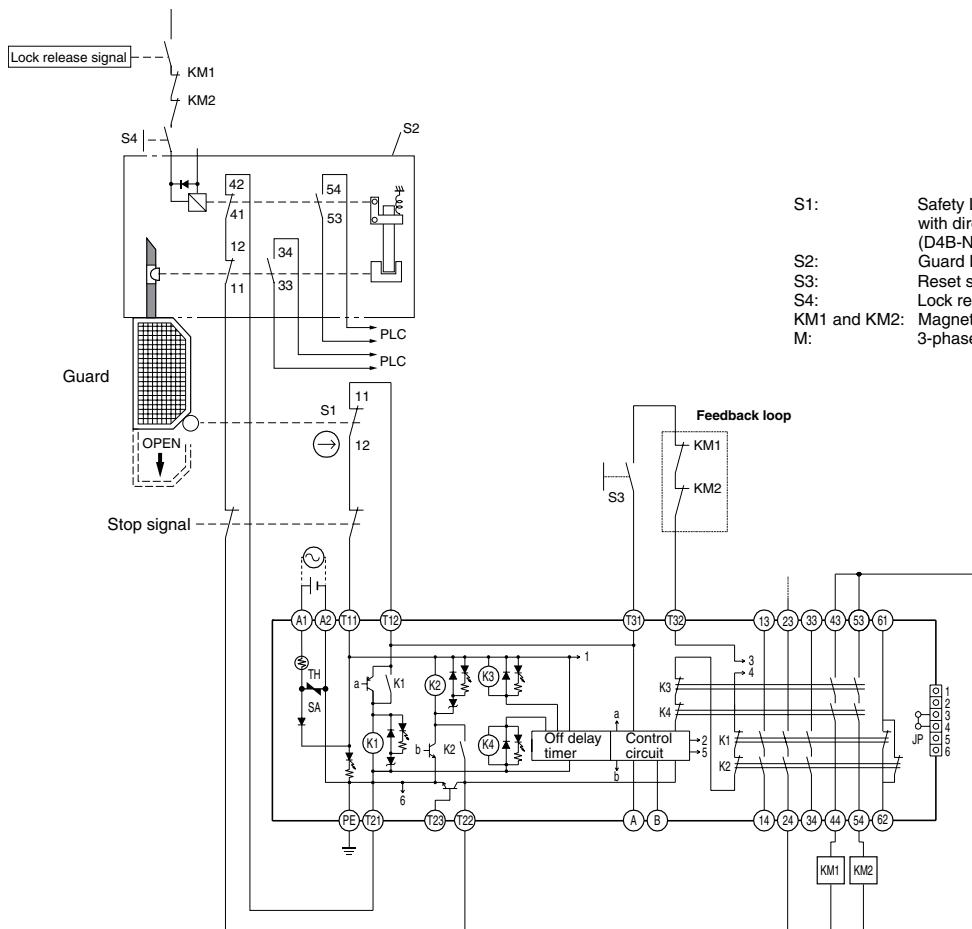
S1:	Safety Limit Switch with direct opening mechanism (D4B-N, D4N, D4F)
S2:	Guard Lock Safety-door Switch
S3:	Reset switch
S4:	Lock release switch
KM1 and KM2:	Magnetic Contactor
M:	3-phase motor
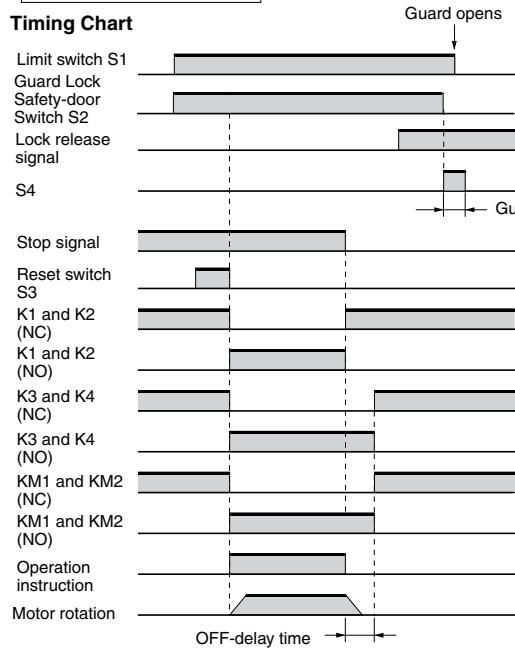
Note: The above example circuit is for Category 3.

Timing Chart
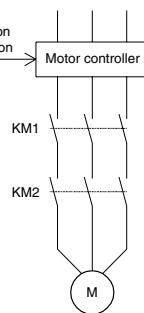
Ordering

Model Number Structure

Switch

D4GL – ☐ ☐ ☐ ☐ – ☐ ☐
      ❶ ❷ ❸ ❹ ❺ ❻

❶ Conduit Size
   1: Pg13.5
   2: G1/2
   4: M20

❷ 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)

❸ 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

❹ Door Lock and Release
   A: Mechanical lock/24 VDC solenoid release
   G: 24 VDC solenoid lock/mechanical release

❺ Indicator
   A: 24 VDC (orange/green LED indicator)

❻ Release Key Type
   Blank: Standard release key
   4: Special Release Key

❼ NPT, 1/2"-14 NPT Conduit
   Adapter included
   (Applicable to M20 Conduit models only)
   Note: To specify 1/2" NPT adapter, add "-NPT" to end of model code.

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
Horizonal mounting		D4DS-K1
Vertical mounting		D4DS-K2
Adustable 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

☐ = Highlighted **Rapid Delivery** products are available for shipment today or within **FIVE** days.

For information on the D4GL-SK10-LK Slide Key,
see www.sti.com

Ordering (continued)

List of Models

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

Head Material	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 size	Model
Plastic	Standard	Solenoid: 24 VDC Orange/Green LED: 24 VDC	Mechanical lock Solenoid Release	1NC/1NO+1NC/1NO	M20	D4GL-4AFA-A
					M20 with 1/2" NPT adaptor	D4GL-4AFA-A-NPT
				1NC/1NO+2NC	M20	D4GL-4BFA-A
					M20 with 1/2" NPT adaptor	D4GL-4BFA-A-NPT
				2NC+1NC/1NO	M20	D4GL-4CFA-A
					M20 with 1/2" NPT adaptor	D4GL-4CFA-A-NPT
				2NC+2NO	M20	D4GL-4DFA-A
					M20 with 1/2" NPT adaptor	D4GL-4DFA-A-NPT
				2NC/1NO+1NC/1NO	M20	D4GL-4EFA-A
					M20 with 1/2" NPT adaptor	D4GL-4EFA-A-NPT
				2NC/1NO+2NC	M20	D4GL-4FFA-A
					M20 with 1/2" NPT adaptor	D4GL-4FFA-A-NPT
				3NC+1NC/1NO	M20	D4GL-4GFA-A
					M20 with 1/2" NPT adaptor	D4GL-4GFA-A-NPT
				3NC+2NC	M20	D4GL-4HFA-A
					M20 with 1/2" NPT adaptor	D4GL-4HFA-A-NPT
			Solenoid lock Mechanical Release	1NC/1NO+1NC/1NO	M20	D4GL-4AFG-A
					M20 with 1/2" NPT adaptor	D4GL-4AFG-A-NPT
				1NC/1NO+2NC	M20	D4GL-4BFG-A
					M20 with 1/2" NPT adaptor	D4GL-4BFG-A-NPT
				2NC+1NC/1NO	M20	D4GL-4CFG-A
					M20 with 1/2" NPT adaptor	D4GL-4CFG-A-NPT
				2NC+2NO	M20	D4GL-4DFG-A
					M20 with 1/2" NPT adaptor	D4GL-4DFG-A-NPT
				2NC/1NO+1NC/1NO	M20	D4GL-4EFG-A
					M20 with 1/2" NPT adaptor	D4GL-4EFG-A-NPT
				2NC/1NO+2NC	M20	D4GL-4FFG-A
					M20 with 1/2" NPT adaptor	D4GL-4FFG-A-NPT
				3NC+1NC/1NO	M20	D4GL-4GFG-A
					M20 with 1/2" NPT adaptor	D4GL-4GFG-A-NPT
				3NC+2NC	M20	D4GL-4HFG-A
					M20 with 1/2" NPT adaptor	D4GL-4HFG-A-NPT

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OMRON SCIENTIFIC TECHNOLOGIES, INC. USA Tel. 1/888/510-4357 **Canada** Tel. 1/866/986-6766 For the Latest Information On the Internet: **www.sti.com** **OMRON**

Ordering (continued)

List of Models (continued)

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

Head Material	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 size	Model
Plastic	Special Release Key	Solenoid: 24 VDC Orange/Green LED: 24 VDC	Mechanical lock Solenoid Release	1NC/1NO+1NC/1NO	M20	D4GL-4AFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4AFA-A4-NPT
				1NC/1NO+2NC	M20	D4GL-4BFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4BFA-A4-NPT
				2NC+1NC/1NO	M20	D4GL-4CFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4CFA-A4-NPT
				2NC+2NO	M20	D4GL-4DFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4DFA-A4-NPT
				2NC/1NO+1NC/1NO	M20	D4GL-4EFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4EFA-A4-NPT
				2NC/1NO+2NC	M20	D4GL-4FFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4FFA-A4-NPT
				3NC+1NC/1NO	M20	D4GL-4GFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4GFA-A4-NPT
				3NC+2NC	M20	D4GL-4HFA-A4
					M20 with 1/2" NPT adaptor	D4GL-4HFA-A4-NPT
			Solenoid lock Mechanical Release	1NC/1NO+1NC/1NO	M20	D4GL-4AFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4AFG-A4-NPT
				1NC/1NO+2NC	M20	D4GL-4BFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4BFG-A4-NPT
				2NC+1NC/1NO	M20	D4GL-4CFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4CFG-A4-NPT
				2NC+2NO	M20	D4GL-4DFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4DFG-A4-NPT
				2NC/1NO+1NC/1NO	M20	D4GL-4EFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4EFG-A4-NPT
				2NC/1NO+2NC	M20	D4GL-4FFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4FFG-A4-NPT
				3NC+1NC/1NO	M20	D4GL-4GFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4GFG-A4-NPT
				3NC+2NC	M20	D4GL-4HFG-A4
					M20 with 1/2" NPT adaptor	D4GL-4HFG-A4-NPT
Metal	Special Release Key	24 VDC	Mechanical lock Solenoid Release	2NC/1NO + 1NC/NO	M20 with 1/2" NPT adaptor	D4GL-4EDA-A4-NPT
			Solenoid lock Mechanical Release	3NC+1NC/1NO		D4GL-4GDG-A4-NPT
				2NC/1NO + 1NC/NO		D4GL-4EDG-A4-NPT

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