


# Guard Lock Safety-door Switch D4BL

## Release Protective Cover Locks Using Controller Signals or Pushbutton Switches after the Cutting Tool Stops Moving Due to Inertia

- A mechanical lock is applied automatically when the Operation Key is inserted. A high level of safety is achieved using a mechanism where the lock is only released when voltage is applied to the solenoid.
- Conforms to EN (TÜV) standards corresponding to the CE marking.
- Approved by UL, CSA, BIA, SUVA and CCC standards.
- The Switch contact is opened by a direct opening mechanism (NC contacts only) when the protective cover is opened. Direct opening mechanism that is EN-approved is indicated by  on the Switch.
- Auxiliary release key ensures easy maintenance and unlocks the door in the case of a power failure.
- Tough aluminum die-cast body incorporating a switch box with degree of protection satisfying IP67, UL, and CSA TYPE6P, 13.
- Equipped with a horizontal and vertical conduit opening.
- Models incorporating easy-to-see indicators for monitoring and those using an adjustable Operation Key for a double door are available.
- The mounting direction of the head can be changed to allow the Operation Key to be inserted from four directions.



## Model Number Structure

### ■ Model Number Legend

#### Switch

D4BL -     -

1    2    3    4    5

#### 1. Conduit Size (2-conduit)

- 1: PG13.5
- 2: G1/2
- 3: 1/2-14NPT

#### 2. Built-in Switch (with Safety Switch and Lock Monitor Switch Contacts)

- C: 1NC/1NO (slow-action) + 1NC (slow-action)
- D: 2NC (slow-action) + 1NC (slow-action)

#### 3. Head Mounting Direction

- R: Four mounting directions possible (right-side mounting at shipping)

#### 4. Door Lock and Release

##### (Auxiliary Release Key is Incorporated by All Models)

- A: Mechanical lock/24-VDC solenoid release
- B: Mechanical lock/110-VAC solenoid release
- G: 24-VDC Solenoid lock/Mechanical release

#### 5. Indicator

- Blank: Without indicator
- A: 10 to 115 VAC or VDC driving (with orange and green LED indicator unit)

## Operation Key (Order Separately)

D4BL - K

1

#### 1. Operation Key Type

- 1: Horizontal mounting
- 2: Vertical mounting
- 3: Adjustable mounting (Horizontal)

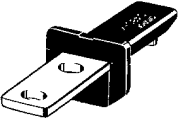

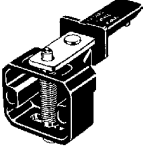
# Ordering Information

## ■ List of Models

### Switches

Lock method	Conduit size	Voltage for solenoid	Without indicator 1NC/1NO+ 1NC (Slow-action)	With LED indicator 1NC/1NO+ 1NC (Slow-action)	Without indicator 2NC+ 1NC (Slow-action)	With LED indicator 2NC+ 1NC (Slow-action)
Mechanical lock	PG13.5	24 VDC	D4BL-1CRA	D4BL-1CRA-A	D4BL-1DRA	D4BL-1DRA-A
		110 VAC	D4BL-1CRB	D4BL-1CRB-A	D4BL-1DRB	D4BL-1DRB-A
	G1/2	24 VDC	D4BL-2CRA	D4BL-2CRA-A	D4BL-2DRA	D4BL-2DRA-A
		110 VAC	D4BL-2CRB	D4BL-2CRB-A	D4BL-2DRB	D4BL-2DRB-A
	1/2-14NPT	24 VDC	D4BL-3CRA	D4BL-3CRA-A	D4BL-3DRA	D4BL-3DRA-A
		110 VAC	D4BL-3CRB	D4BL-3CRB-A	D4BL-3DRB	D4BL-3DRB-A
Solenoid lock	Pg 13.5	24 VDC	D4BL-1CRG	D4BL-1CRG-A	D4BL-1DRG	D4BL-1DRG-A
	G1/2	24 VDC	D4BL-2CRG	D4BL-2CRG-A	D4BL-2DRG	D4BL-2DRG-A
	1/2-14NPT	24 VDC	D4BL-3CRG	D4BL-3CRG-A	D4BL-3DRG	D4BL-3DRG-A

### Operation Keys (Order Separately)


Mounting type	Model
Horizontal mounting 	D4BL-K1
Vertical mounting 	D4BL-K2
Adjustable mounting (Horizontal) 	D4BL-K3

## Specifications

### ■ Standards and EC Directives

- Conforms to the following EC Directives:
  - Machinery Directive
  - Low Voltage Directive
  - EN1088

### ■ Approved Standards

Agency	Standard	File No.
TÜV Rheinland	EN60947-5-1	R9451050  (Direct opening: approved)
BIA	GS-ET-19	Mechanical lock: 9402293 Solenoid lock: 1998 20462-01
SUVA	SUVA	E6186/2.d
UL	UL508	E76675
CSA	CSA C22.2, No.14	LR45746
CQC (CCC)	GB14048.5	2003010305073836

**Note:** Ask your OMRON representative for information on approved models.

## ■ Approved Standard Ratings

### TÜV (EN60947-5-1), CCC (GB14048.5)

Item	Standard model	Indicator model
Utilization category	AC-15	AC-15
Rated operating current ( $I_n$ )	3 A	6 A
Rated operating voltage ( $U_n$ )	250 V	115 V

Use a 10-A fuse type gI or gG that conforms to IEC60269 as a short-circuit protection device.

### 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		

**Note:** The UL/CSA approved rating for products with indicators (-A) is 6 A/115 VAC.

## ■ Characteristics

Degree of protection (See note 2.)	IP67 (EN60947-5-1) (This applies for the Switch only. The degree of protection for the key hole is IP00.)
Durability (See note 3.)	Mechanical: 1,000,000 operations min. Electrical: 500,000 operations min. (10-A resistive load at 250 VAC)
Operating speed	0.05 to 0.5 m/s
Operating frequency	30 operations/min max.
Rated frequency	50/60 Hz
Contact gap	2 x 2 mm min.
Operating characteristics	Direct opening force: 19.61 N min. (EN60947-5-1) (See note 4.) Direct opening travel: 20 mm min. (EN60947-5-1) (See note 4.) All stroke: 23 mm min.
Lock holding strength	700 N min. (GS-ET-19)
Insulation resistance	100 M $\Omega$ min. (at 500 VDC)
Rated insulation voltage ( $U_i$ )	300 V (EN60947-5-1)
Conventional enclosed thermal current ( $I_{the}$ )	10 A (EN60947-5-1)
Dielectric strength ( $U_{imp}$ )	Impulse dielectric strength ( $U_{imp}$ ) 4 kV (EN60947-5-1) between terminals of different polarity, between each terminal and ground, and between each terminal and non-current-carrying metal part; 2.5 kV between solenoid and ground (EN60947-5-1)
Conditional short-circuit current	100 A (EN60947-5-1)
Pollution degree (operating environment)	3 (EN60947-5-1)
Protection against electric shock	Class I (with ground terminal)
Switching overvoltage	1,500 V max. (EN60947-5-1)
Contact resistance	50 m $\Omega$ max. (initial value)
Vibration resistance	Malfunction: 10 to 55 Hz, 0.35-mm single amplitude
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> min. (IEC68-2-27) Malfunction: 300 m/s <sup>2</sup> min. (IEC68-2-27)
Ambient temperature	Operating: -10°C to 55°C (with no icing)
Ambient humidity	Operating: 95% max.
Weight	Approx. 800 g

**Note:** 1. The above values are initial values.

- 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, oil or water penetration, do not use the D4BL in places where dust, oil, water, or chemicals may enter through the key hole on the head, otherwise Switch damage or malfunctioning may occur.
- The durability is for an ambient temperature of 5°C to 35°C and an ambient humidity of 40% to 70%.
- These figures are minimum requirements for safe operation.

## Solenoid Coil Characteristics

Item	24-VDC mechanical lock models	110-VAC mechanical lock models	24-VDC solenoid lock models
Rated operating voltage	24 VDC $+10\%$ $-15\%$ (100% ED)	110 VAC $\pm 10\%$ (50/60 Hz)	24 VDC $+10\%$ $-15\%$ (100% ED)
Current consumption	Approx. 300 mA	Approx. 98 mA	Approx. 300 mA
Insulation	Class F (130°C or less)		

## Indicator Characteristics

Item	LED
Rated voltage	10 to 115 VAC/VDC
Current leakage	Approx. 1 mA
Color (LED)	Orange, green

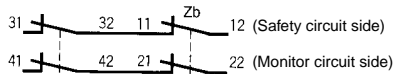
## Connections

### ■ Contact Form (Diagrams Show State with Key Inserted and Lock Engaged)

Model	Contact	Operating pattern	Remarks
D4BL-□C□□-□	1NC/1NO+1NC 		Only NC contacts 11-12 and 31-32 have an approved direct opening mechanism. The terminals 11-12 and 23-24 can be used as unlike poles.
D4BL-□D□□-□	2NC+1NC 		NC contacts 11-12, 21-22, and 31-32 have an approved direct opening mechanism. The terminals 11-12 and 21-22 can be used as unlike poles.

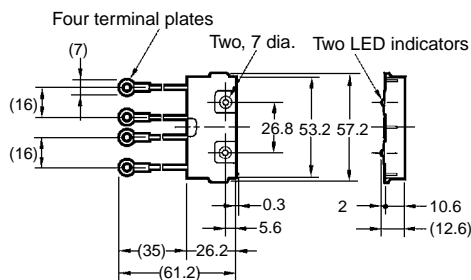
**Note:** The EN-approved direct opening mechanism is indicated by on the Switch.

### ■ Contact Form 2NC + 2NC

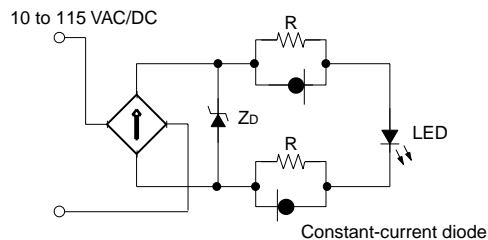


### ■ Indicator Unit

#### Dimensions



#### Internal Circuit

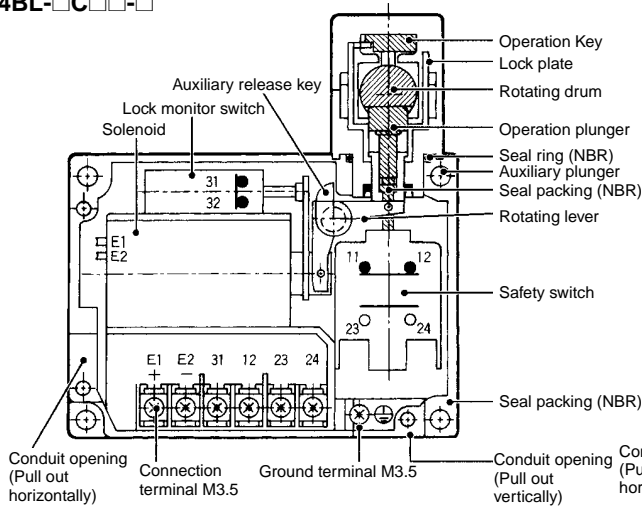


# Nomenclature

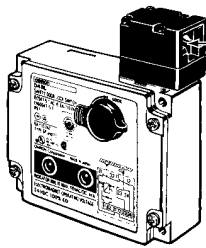
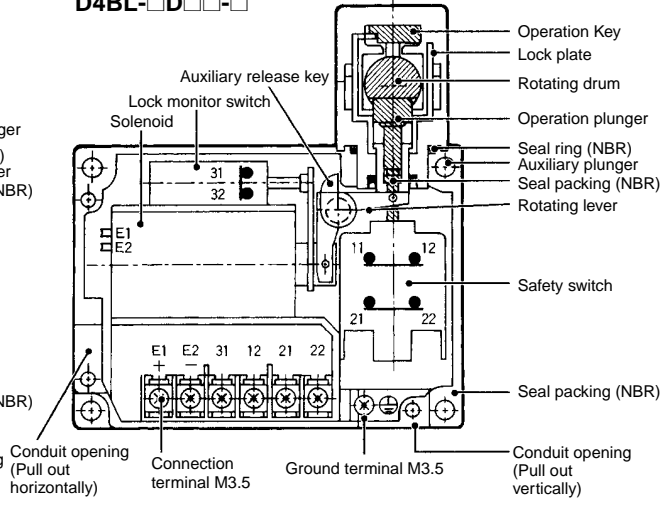
Safety Interlock Switches

D4BL

D4BL-□C□□-□



D4BL-□D□□-□



The head can be changed to any of four directions.

# Dimensions

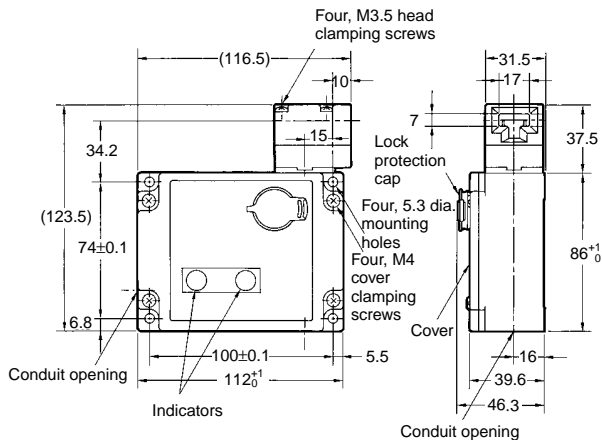
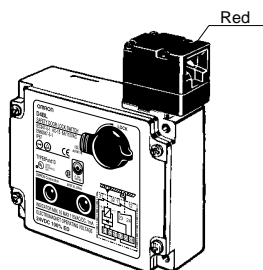
**Note:** 1. All units are in millimeters unless otherwise indicated.

2. Unless otherwise specified, a tolerance of  $\pm 0.4$  mm applies to all dimensions.

3. There are fluctuations in the contact ON/OFF timing for 2NC contacts. Confirm performance before application.

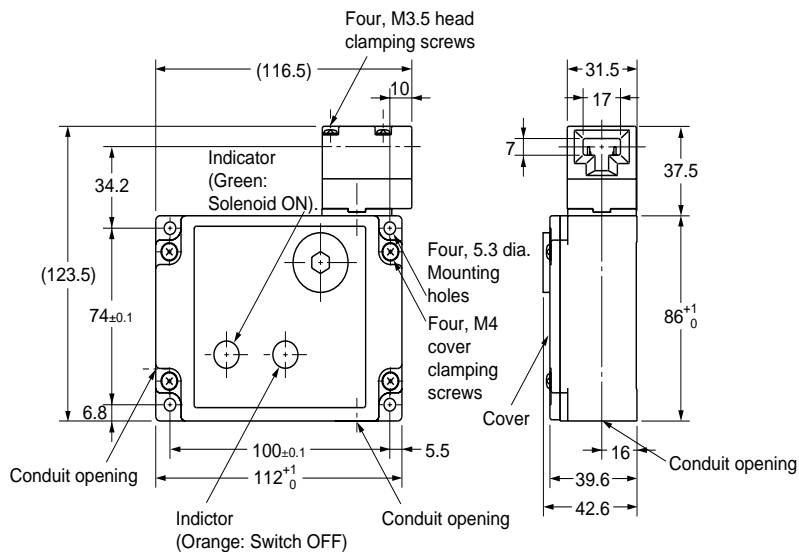
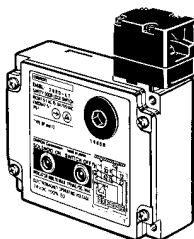
## Switches

D4BL-□□□□-□



Operating Characteristics	D4BL-□□□□
Key insertion force	19.61 N max.
Key extraction force	19.61 N max.
Movement before being locked	15 mm max.

D4BL-2GRD-AT



Operating Characteristics	D4BL-2GRD-AT
Key insertion force	19.61 N max.
Key extraction force	19.61 N max.
Movement before being locked	15 mm max.